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SURVEYING REQUIREMENTS MEETING MANAGEMENT SESSIONS 1-5  
FEBRUARY 1982(U) OFFICE OF THE CHIEF OF ENGINEERS  
(ARMY) WASHINGTON DC E J EAST ET AL. FEB 83

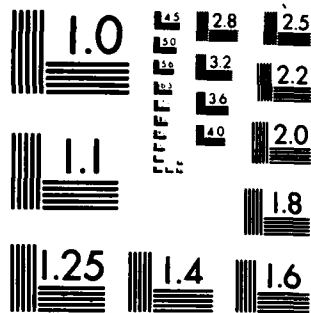
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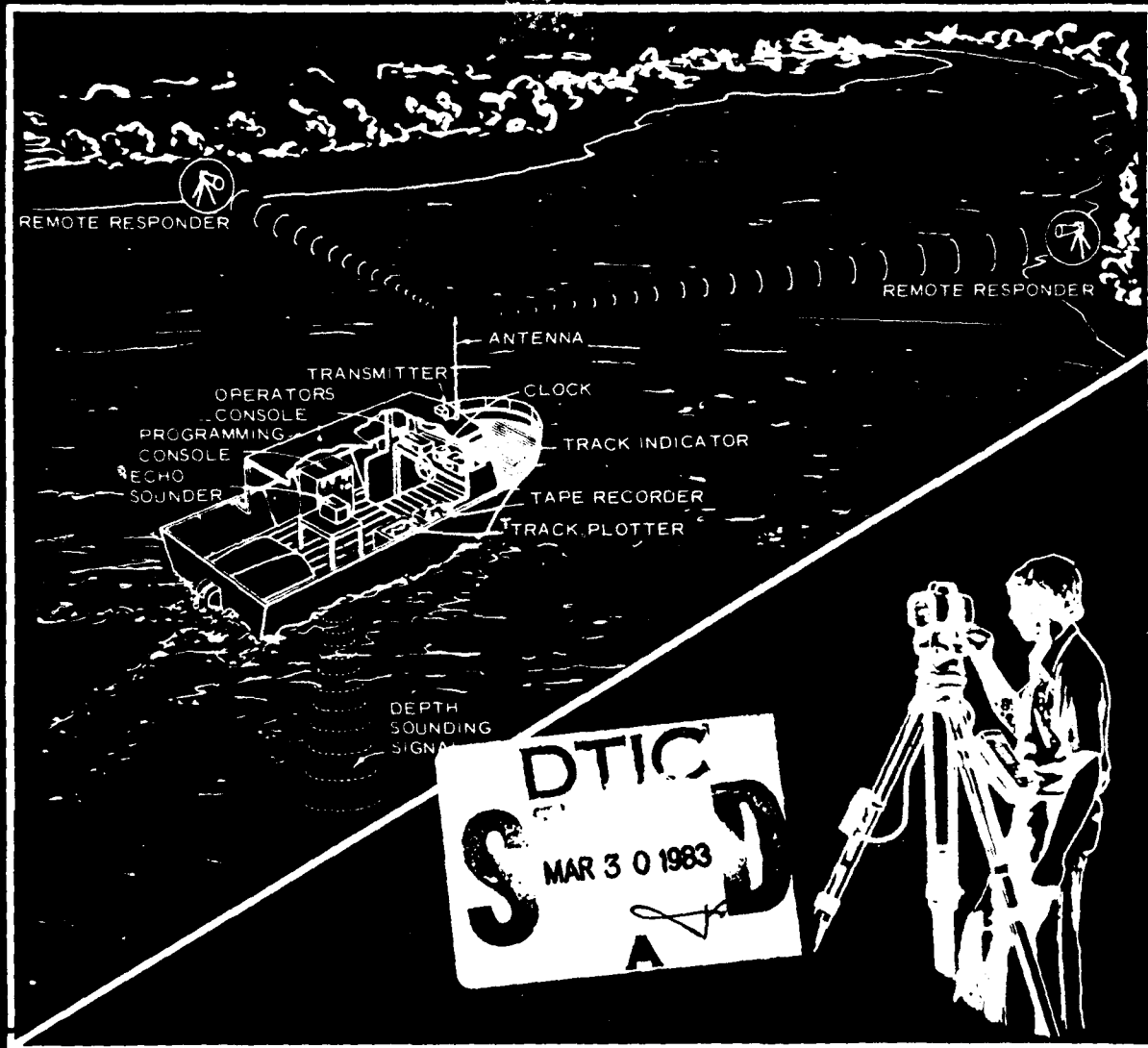
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U. S. Army Corps of Engineers

# SURVEYING REQUIREMENTS MEETING MANAGEMENT SESSIONS

1-5 February 1982



February 1983

U. S. Army Corps of Engineers  
Office of the Chief of Engineers

Washington, D. C.



**US Army Corps  
of Engineers**  
Office of the Chief  
of Engineers

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U. S. Army Corps of Engineers

**SURVEYING REQUIREMENTS MEETING  
MANAGEMENT SESSIONS**

1-5 February 1982

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February 1983

FOREWORD

This publication summarizes the management sessions of the Corps Surveying Requirements Meeting held at the Sheraton Hotel, Jacksonville, Florida, on 1-5 February 1982. The purpose of the meeting, which included management and technical sessions, was to exchange ideas, methods, and experiences of District, Division, Laboratory and Office of the Chief of Engineers surveying and mapping personnel. The experience and knowledge gained through this meeting will foster accomplishment of the Corps newly developed surveying and mapping objectives.

The meeting was sponsored by the Office of the Chief of Engineers. The management sessions were planned, organized and conducted by the Engineering Division, Directorate of Civil Works, Office of the Chief of Engineers, to improve management and administration of Corps surveying and mapping activities.

These proceedings were compiled by Mr. E.J. East and M.K. Miles of the Office of the Chief of Engineers under the general supervision of Mr. Lloyd A. Duscha, Chief, Engineering Division, Directorate of Civil Works, Office of the Chief of Engineers.

Lieutenant General Joseph K. Bratton, CE, was the Chief of Engineers during the period of the meeting and preparation of the proceedings.



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U.S. Army Corps of Engineers  
Surveying Requirements Meeting

MANAGEMENT SESSIONS  
ITEMIZED AGENDA

1-5 FEBRUARY 1982

MONDAY-1 FEBRUARY

- 8:00am-9:30am    **MANAGEMENT SESSION 1**  
(Management Study/Coordination)
1. Welcome and Opening Remarks -  
Ed East, OCE
  2. Management Study on Surveying and Mapping -  
M. K. Miles, OCE
  3. Federal Surveying and Mapping Coordination Overview -  
M. K. Miles, OCE
  4. Control Surveying Coordination within the Federal  
Government:  
Federal Geodetic Control Committee (FGCC) and the NGS  
Blue Book - Jim Stem, National Geodetic Survey (NGS)
  5. Transfer of Corps Aerial Mapping Film to the EROS  
Data Center (EDC) - Tom Lauterborn, U.S. Geological  
Survey (USGS)
- 9:30am-10:00am    **BREAK**
- 10:00am-11:30am    **MANAGEMENT SESSION 2**  
(Technical/Research and Development)
1. Technical User Groups Overview -  
M. K. Miles, OCE
  2. Organizing a Successful Computer Aided Applications  
Program - Dr. N. Radhakrishnan, WES
  3. Research and Development (R&D) in Surveying and  
Mapping - Ed East, OCE
  4. Civil Works R&D - Bill Roper, OCE
  5. Surveying and Mapping R&D at ETL -  
Ken Robertson/Ed Roof, ETL
  6. Surveying and Mapping R&D at WES -  
Dale Hart/George Downing/Jack Stoll, WES
  7. Cartographic Services for Government Agencies -  
Chuck Sullivan, Federal Prison Industries .
- 11:30am-1:00pm    **LUNCH**
- 1:00pm-3:00pm    **MANAGEMENT SESSION 3**  
(Contracting)
1. General Corps Contracting Strategy -  
Ed East/M. K. Miles, OCE
  2. Public Law 92-582 (Brooks Bill) -  
Ken Powers, OCE
  3. Procurement of Surveying and Mapping Services,  
Proposed EC 1180-1-173 - M. K. Miles, OCE

4. Competitive Negotiations -  
Jerry Yager, OCE
5. Implimentation of Contracting Policy -  
OCE, Division and District Personnel
6. Contractor Performance and Capabilities -  
OCE, Division and District Personnel
7. Computerized Contract Labor Monitoring -  
Jimmy Reaves, Mobile District

3:00pm-3:30pm  
3:30pm-5:00pm

**BREAK**

**MANAGEMENT SESSION 4**

(Training/Personnel)

1. Corps Training Courses Overview -  
M. K. Miles, OCE
2. Annual Training Needs Survey -  
John Andreoli, Huntsville Training Division
3. Non-Corps Sponsored Training -  
M. K. Miles, OCE
4. Classification Standards -
5. Other Personnel Problems -

5:00pm-7:30pm  
7:30pm-9:30pm

**DINNER**

**MANAGEMENT SESSION 5**

(Resource Management)

1. Planning and Scheduling Resources
2. Organization Structure
3. In-House Capabilities
4. Expertise Requirements
5. Professionalism

**TUESDAY-2 FEBRUARY**

No Management Activities

**WEDNESDAY-3 FEBRUARY**

7:30pm-9:30pm

**TECHNICAL USER GROUPS SESSION 1**

(Joint Session of all User Groups)

1. Establishment and Organization of User Groups:  
Land-Based Technical  
Hydro-Based Technical  
Training  
Personnel  
Contracting  
Resource Management
2. Computer Assisted Methods and Technology -  
Rich Malm, OCE  
(Joint Session of Land-Based and Hydro-Based  
Technical User Groups)
3. Separate Sessions of Each User Group to Identify  
Goals, Objectives, and Tasks



**THURSDAY-4 FEBRUARY**

**7:30pm-9:00pm**

**TECHNICAL USER GROUPS SESSION 2**

**(Separate Sessions of Each User Group)**

- 1. Finalize Goals, Objectives, and Tasks**
- 2. Prepare User Group Statements for Management Wrap-up Session**

**FRIDAY-5 FEBRUARY**

**1:30pm-2:30pm**

**MANAGEMENT WRAP-UP SESSION**

**(All Management Sessions/All Corps Employees)**

- 1. Session Overview -**  
**Chairman: Ed East, OCE**
- 2. Statements of Goals, Objectives and Tasks by User Group Chairmen:**  
**Land-Based Technical User Group**  
**Hydro-Based Technical User Group**  
**Training User Groups**  
**Personnel User Group**  
**Contracting User Group**  
**Resources Management**
- 3. Closing Remarks**

**2:30pm**

**MANAGEMENT SESSIONS ADJOURN**

U.S. ARMY CORPS OF ENGINEERS

SURVEYING REQUIREMENTS MEETING

MANAGEMENT SESSIONS

1-5 February 1982

INTRODUCTION

The U. S. Army Corps of Engineers conducted the Surveying Requirements Meeting on 1-5 February 1982. The Jacksonville District acted as host to the meeting which was held in the Jacksonville Sheraton at St. John's Place Hotel.

Corps attendees included representatives of 35 Districts, 7 Divisions, U. S. Army Engineer Topographic Laboratory, U. S. Army Engineer Waterways Experiment Station (WES), and the Office, Chief of Engineers (OCE).

The 5-day meeting included Corps-only management sessions all day on Monday, 1 February, the evenings of Wednesday and Thursday, and Friday afternoon. The proceedings of these management sessions are covered in this document.

The open conference consisted of the presentation of 49 technical papers by government and private individuals on 2-5 February 1982. Surveying equipment was displayed and demonstrated by private vendors at 50 exhibit booths and aboard 8 survey boats. The results of these technical sessions and equipment exhibits are covered in a separate document prepared by the Waterways Experiment Station titled SURVEYING REQUIREMENTS MEETING, 2-5 February 1982, prepared April 1982.

Mr. E. J. East, representative of OCE, acted as Meeting Chairman. He was assisted by Mr. M. K. Miles, also of OCE. Mr. Bill Bergen and other employees of the Jacksonville District acted as coordinators and hosts. Messers. G. C. Downing and E. D. Hart of WES acted as coordinators of the exhibits and demonstrations.

U.S. ARMY CORPS OF ENGINEERS

SURVEYING REQUIREMENTS MEETING

MANAGEMENT SESSIONS

JACKSONVILLE, FLORIDA

FEBRUARY 1, 1982

TRANSCRIPT OF MANAGEMENT SESSIONS PROCEEDING

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## P R O C E E D I N G S

MANAGEMENT SESSION 1 (8:00 a.m.)

### Welcome and Opening Remarks

Mr. East: Gentlemen, and lady, I believe, of the Army Corps of Engineers, and other special guests, it is with great pleasure and pride that I welcome you to this first ever surveying requirements meeting.

My name is Ed East, and I am the chairman of this week's meeting. I bring special greetings and best wishes to you from Mr. Lloyd Duscha, the Chief of the Engineering Division, Directorate of Civil Works, Office of the Chief of Engineers. The Engineering Division is the Office at Headquarters which sponsors this meeting.

As I mentioned, I am the chairman of this week's meeting. But more importantly, I and my associate, M.K. Miles, to my left, the OCE Coordinator for this meeting, are really your surrogates, your representatives, at OCE. As such, we want to meet with you personally this week to discuss your problems and see how we might help.

When I wrote that line for my speech it reminded me of the joke about the two biggest lies in the Corps.

The guy from OCE is visiting a field office and says, "I am here to help!" And the district fellow says, "I'm glad your're here!" Well, I can guarantee you, that M. K. and I are here to help. And I hope that you are, or will be glad that we came.

Two years ago this month I was given the responsibility of evaluating surveying and mapping activities being performed in support of the Civil Works Program. I approached this task with considerable apprehension, because I didn't have a technical background or practical experience in these areas. In fact, I don't even own a pair of cowboy boots, which I understand, is a prerequisite to being a surveyor.

I did, however, have an intuitive sense that the surveying and mapping program and the people who carried out the program had been suffering from benign neglect for a long period of time. Corps management at all levels, as best as I could see, had shared equally in this neglect.

Well, I enthusiastically jumped in with both feet. Unfortunately, my timing wasn't too good. And it still isn't. During the past two years, Civil Works funds have shrunk, new project starts have not materialized, and the civil works work force has been reduced, in fact, I suspect some of you have even been involved in some form of reduction-in-force activities.

A recent cartoon in the Washington Post seemed to me to put the budget situation in perspective. The president was shown taking the Oath of office over a year ago at the U.S. Capitol Building: "I, Ronald Reagan, swear that I will faithfully execute the duties of the president of" -- ET CETERA, ET CETERA. Now he is faithfully executing the budgets of many federal agencies, including the Corps Civil Works Program.

Of course, I have probably overstated the problem with respect to the Corps, and there is much to be said in support of the administration's efforts to get control of the economy. However, our Civil Works funding situation will most likely get worse before it gets better. Nevertheless, I remain optimistic.

I believe that the changes which we have initiated during the last two years at OCE, and the changes which we will be initiating, will lead to tangible benefits for you. M. K. Miles and I will be discussing many of these changes with you this week in both formal and informal discussions. But M. K. and I can only do so much at OCE to plan, to organize and to gather information to support improvements. We need your help too.

In fact, two years of efforts have convinced me that your fortunes will be directly related to the efforts you will be willing to make in your offices day by day, month by month, year by year. It will not be easy. It will take a special effort on your part to seek out and study new methods and technology, and even more effort to implement their use.

It will take a special effort on your part to organize and manage your work, and even more effort to motivate and encourage those employees under your supervision to produce a quality, cost-effective product.

In summary, then, I would challenge you to assume your responsibilities as professionals. Working together, we can improve your collective professional standing and your individual personal rewards.

I urge you to begin now, this week, to ask questions, to seek out answers, to establish communication with your peers, and to support your OCE surrogates.

Finally, let each of us resolve to embrace the philosophy of our Chief of Engineers, Lieutenant General Bratton, which is so well captured on this slide. (Presentation of slide with caption, "professionalism and integrity, we're proud to sign our work.")

I do want to explain this scrub brush. We have a very lengthy program and we are going to have to keep on time. I would like this to be a reminder that if you run over in your presentations, we will have to scrub the presentors after you. So I am going to leave this scrub brush right up here, and hope it does the job. M. K., will you go on with the next part of the program.

## Management Study on Surveying and Mapping

Mr. M. K. Miles: As Ed said, we have a lengthy program. We have spent a lot of time preparing for this meeting, as indicated by the size of the handout material. It was so large we had trouble getting it to the meeting. One document came over the phone through word processing equipment, another came through the mail, and the third came by private van. You can't say we don't have enough hand-out material.

I would like to begin to go through the hand-out material at this time. Could I have Vu-graph No. 1.

One of the first things I did when I came to OCE about a year and a half ago was to try to get a better handle on the size and the organizational structure of the surveying and mapping activities within the Corps of Engineers.

After working for 7 years in a district office, I knew the surveying and mapping organization was somewhat dispersed, both within the districts and within the divisions and branches in the districts.

The division offices did not have coordinators, or points-of-contact, for surveying and mapping activities. There was no counterpart to the surveying personnel at the district. The office of the Chief of Engineers had no counterpart or contact. About two year ago, Ed was appointed the point-of-contact at OCE, and then he brought me on board a few months later.

Vu-graph No. 2 exemplifies the organization structure with which you are all aware: OCE, Office of the Chief of Engineers, the divisions, and the districts.

This map, Vu-graph No. 3, depicts the boundaries for the Civil Works directorate, districts and divisions. This is a little outdated. It was revised recently. Now the New England Division is part of N.A.D., and there has been some realignment of district boundaries.

Some of this information was put together before we did our so-called surveying and mapping management study in June of 1981. Most of you provided input for this study.

Vu-graph No. 4 is a result of the organization charts that were in effect in February of 1980. This shows basically the organizational placement of surveying and mapping functions of the Corps.

The big circle shows the surveying and mapping functions located only in the engineering divisions which is approximately 25 districts or 64 percent of the total surveying and mapping functions.

The smaller circle represents the surveying and mapping functions in the constructions or operations division or, where they are combined, CON-OPS Division.



There are 5 districts in the Corps that have all their surveying functions located only in the CON-OPS Divisions, which represents 13 percent of the organizational placement.

The overlap area composes nine districts that have survey functions split, some in the Engineering Divisions and some in the CON-OPS Divisions.

Vu-graph No. 5 was also made from the 1980 organization charts, which have changed since then. But I think it gives a trend. The numbers themselves are not precise, but the trend is there. These are approximate numbers.

It shows civil engineers being in the minority, with 4 in CON-OPS, 24 in engineering, and a total of 28. As you look down the list, you will see a maximum of surveying technicians and land surveyors, at about 700. That number may now be a little closer to 600 or 650, composed primarily of surveying technicians.

At this time, we only have about six or seven people in the Corps of Engineers in the land surveying series. Again, about 73 percent of the surveyors and mappers are located in the engineering divisions and 27 percent in the CON-OPS Divisions.

These numbers are part of the reason why the surveying and mapping coordination function at OCE is in the Engineering Division.

Vu-graph No. 6 this is a pie chart representing those numbers you just saw on the previous chart. The big circle on the left showing engineering divisions, again showing about half of those people as surveying technicians and the other half composed of the various other functions.

The two pie charts are drawn to scale, so you can see the size of the work force in the engineering divisions versus the work force in the CON-OPS Divisions.

Starting with Vu-graph No. 7 is summarized information from the management study of June 1981.

The total number of surveying and mapping personnel, 1,652, differs by about 400 spaces from previous charts. That is due to people working less than full time in the surveying and mapping functions.

This is a summary chart showing the number of positions per division or office. Engineering, CON-OPS, planning, real estate, the area offices are listed across the top.

Coming down the left side, we have the percent of the duties of these people which relate to surveying and mapping activities, starting with 100 percent and going down to less than 30 percent.

For instance, in the Engineering Divisions, we have approximately 250 people involved with surveying and mapping functions less than 30 percent of the time. These are primarily the people whose function is not surveying but whose function requires surveying support, i.e., project managers, civil engineers, design branch personnel; people who need surveys to perform their function and thus have to coordinate and get involved with the surveying function to accomplish their work.

In looking at the total Corps of Engineers surveying and mapping workload, we had earlier estimated a \$60 to \$80 million annual effort. But the study of June 1981 indicated that estimate was low. A rough approximation would be \$100 to \$115 million annually.

Vu-graph No. 8 shows the total workload, the in-house workload, the contract workload, and the percent of the activity that is contracted. On the left we have broken it into management, hydrographic, topographic, boundary, control, precise, and other miscellaneous surveys.

Out of \$114 million total workload, \$41 million is in the hydrographic area, which is, by far, the predominant workload.

At first I thought the hydrographic workload would comprise half or two thirds of the surveying effort. This indicates it is less than half of the surveying effort.

The next column shows the in-house workload, and how it is broken out into these areas. Again, you see the hydrographic surveying dominating and some of the other areas with a lot less. Surprisingly, the percentages are not too different from the total workload.

In the land-based surveys, i.e., topographic, boundary, control, precise, the percent of work contracted is fairly consistent, as you can see from the column "percent of activity contracted."

For instance, in topographic, we contracted 62 percent; in boundary, 69 percent.

Those numbers range between 50 and 70 percent of those efforts being contracted. Whereas, the hydrographic workload is predominately done in-house, with only 32 percent contracted.

A good rule-of-thumb would be: We do two-thirds of our hydrographic surveying in-house, with one-third by contract; and on the land side, it is just the reverse, one-third in-house and two-thirds by contract.

As you can see at the bottom of the vu-graph, we are doing 55 percent of our total surveying workload in-house and 45 percent by contract.

The next seven or eight pages of the hand-out break those numbers out by divisions and districts by first showing the in-house effort in man-years and the contract effort in dollars, on pages 9 through 12.

Then on page 13, we converted the estimated annual man-years of in-house effort to annual expenditures, using some rough ball-park figures to convert people to dollars. In this we used the cost of the equipment on pages 9 through 12. This equipment value in the Corps totaled about \$45 million.

The charts starting on page 13, used that equipment value in the in-house effort, i.e., the depreciation of the systems. The annual leave, the cost of the vehicles, and all the associated overhead costs involved in the surveying and mapping activity were also included.

Individual districts can reconstruct a percentage chart like I did on a Corpswide basis and see how they compare as far as workload, in-house staff, and percent of contracts in the different surveying and mapping areas.

There is a hand-out in your registration package titled "Narratives on Specific Needs and Problems." It is about a 60-page document stapled separately, not in the red registration package.

This is a result of the narrative comments that most of you submitted last summer on the specific needs and problems of your particular organization. This report is organized into general comments, comments on the work force, personnel problems, training problems, contracting, technical problems, comments on research and development, and consultation and coordination efforts within the Corps.

You will see that I rearranged the submittals from the field and reorganized them. At the end of each paragraph is the name of the district or division office which submitted that particular comment. I didn't indicate whether that comment came from the engineering side of the house or the construction side of the house, or from the area offices, just simply which district.

We don't have the time this morning to go through this in any detail. We are going to use this as a basis for some of our working groups that we are going to set up later in the week. So hang onto it.

If you have any spare time, you might want to look through some of the areas that you are particularly interested in. We want to base some of our work here, and after we leave the conference, on the material in this package.

We're right on time, Ed, I made up for your over-run.

Mr. East: Okay.

#### Federal Surveying and Mapping Coordination Overview

Mr. M. K. Miles: That will conclude the activities on the management study. I would like to go into the next agenda item, federal surveying and mapping coordination activities.

Vu-graph No. 18 depicts the summation of surveying and mapping efforts that OCE must coordinate with other federal agencies.

First, the OMB Circular number A-16. Several years ago, when I was in the Norfolk District, I wasn't familiar with this document. Then one year, in February, I got a package through channels that said, "submit your A-16 requirements." This package was about one-half inch thick. And everybody said, "What's this?"

Some of the districts probably throw it in the trash can, and others submit something, unaware of the results or what it is for.

The OMB Circular A-16 outlines an effort at the federal level to coordinate surveying and mapping activities within the federal government. These include mapping requirements, which originally were the quadrangle maps of the U.S. Geological Survey; secondly, the control surveying requirements, coordinated by the U.S. Coast and Geodetic Survey, now known as NGS, National Geodetic Survey. NGS does this through a committee called the Federal Geodetic Control Committee, FGCC.

Other efforts in the federal government include the High Altitude Photography Program. Sponsored by the Geological Survey, and the Digital Cartography Program, also sponsored by the geological survey.

We are going to have somebody from NGS talk about the Federal Geodetic Control Committee and their control requirements.

Also, we are going to have someone from the Geological Survey talk about some of their coordination programs.

I also have two hand-outs that I would like you to pick up after the session. I only have about 50 sets, so I would like to try to get one set to each district. Only districts having a split survey function should pick up two sets.

These relate to the mapping requirements of the USGS. These are two status maps, the status of orthophoto mapping and the status of topographic mapping.

These are the latest status maps published by USGS in these two areas. I will have them up here so that during the break you all can come by and pick up one of each.

Again, I only have 50 sets, and we have quite a few more people than that. So if you would, just get one set per district, unless your district has a split function.

To recap the mapping program briefly, OMB Circular A-16 says that the federal government will coordinate all their requirements for mapping through USGS. USGS has an annual canvass, or survey, that they conduct through all the agencies, to identify requirements for new quadrangle maps or updates of quadrangle maps.

On the control side, the Federal Geodetic Control Committee does the same. All people with requirements for control or geodetic surveys are requested to input their requirements through channels to headquarters. OCE, in turn, submits them to the Federal Geodetic Control Committee, who plans and coordinates these activities.

The other efforts, the High Altitude Photography Program, recently started by USGS, is an effort to coordinate acquisition of high altitude photography, normally at 40,000 feet altitude or above. This is the type of photography that USGS uses to make and update the quadrangle maps. They have to obtain this photography to carry out their mission. In doing so, they are trying to coordinate and meet the needs of other government agencies.

Therefore, we can get photography of certain areas of the country through this program at a reduced price. There are 10 to 15 other federal agencies putting money into the program, therefore this photography can be obtained at reduced costs.

The Digital Cartography Program is just getting started on a federal wide basis. USGS has been doing this in-house for quite some time as an aid in their map and map revision work.

A bill has been introduced in Congress that would set up a revolving fund federal wide for people to buy digital cartographic data from USGS in a computer-readable format. The user would reimburse USGS for the cost of that product. That cost would be greatly reduced from the actual cost of producing the product because of the federal coordination activities.

This program is also aimed at standardizing digital cartography from a software and hardware standpoint. The federal agencies involved in this digital mapmaking work and their computers could then relate to each other and the programs and data are in some standardized format, so all users can understand and use it.

OCE has recently been asked by the general accounting office, for Senator Warner, who is on one of the committees looking at the Bill, for data relating to the Corps activity in this digital cartography area. Some of you have been contacted by Ed and have talked to me about some of these activities in the Corps. We were given so short a deadline by G.A.O. that we didn't have time to get out letters, so we just contacted a few of our division surveying and mapping coordinators, and some of the districts, who we knew, as a result of our study of June 1981, had some activity involvement in this area.

I would like for you to keep in mind if you are doing any digital mapmaking, which almost all of you are in some form or another, that there is a federal effort to coordinate and standardize the formats and the data so that the maps that you produce could eventually be transferred to USGS or NOS in a computer-readable form. They could then use that data to update their maps and charts in a more efficient manner.

With the coming technology, this is going to be one of the areas that is going to expand and be more of a requirement. I see a need for coordination between the agencies in developing these standards and formats.

#### Control Surveying Coordination within the Federal Government

Mr. Miles: I would like to introduce Mr. Jim Stem, from the National Geodetic Survey (NGS). He is a geodesist in the Office of the Director of NGS. Prior to the assignment he now has, he was a supervisory geodesist in the control networks division of NGS, where he analyzed projects for the 1980 through 1983 North American Datum. He has a BS degree in mathematics, an MS degree with a major in Geodesy from Purdue University. He is a member of the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

Jim is going to talk to you in detail about the Federal Geodetic Control Committee and NGS' efforts to coordinate surveying and mapping activities in this area from the federal standpoint.

Mr. Stem: Good morning. I am grateful to Mr. East and Mr. Miles for giving me this opportunity this morning. I am not a contractor, but I am selling something this morning. In my allotted time I will attempt to obtain your cooperation in two activities of the Federal Geodetic Control Committee (FGCC).

Your exposure to the FGCC in the past has probably been through either of two activities. You have probably adopted or are aware of the FGCC publication, "Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys." We have had that for many years, and it is updated as needed. Today I am seeking your cooperation in adopting another FGCC publication, "Input Formats and Specifications for the National Geodetic Survey Data Base." NGS calls it their Blue Book. There are other Blue Books in the Federal Government. You have probably used BLM's Blue Book, their manual for the survey of the public land survey system.

You have also been exposed to FGCC activities through, as Mr. Miles mentioned, the annual canvass for plans and requirements. This canvass has really been two canvasses, one for plans and requirements and another for accomplishments for any particular Fiscal Year.

There has always been a Federal surveying and mapping coordination effort. The FGCC was the Department of Commerce response to A-16 in 1967. These are the responsibilities that have been assigned to the National Oceanic and Atmospheric Administration (NOAA) by way of A-16. NOAA assigned its responsibilities for coordination activities to the FGCC.

The main responsibility of the FGCC is coordination of all Federal Geodetic control surveys and "related" surveys. Therein lies one problem: What are related surveys?

I would define any survey that can be upgraded, for a fraction of NGS's establishment cost, to a control survey of the type classified by the FGCC, to be a "related" survey. For example, the accuracy of the observations may exist, but not the monumentation, and for small additional expenditure for the monumentation, it becomes a geodetic quality monument and control point or, you may have the geodetic monumentation and observations, but not the connection to the National Geodetic Reference System. With the additional expenditure of the connection, you have a product that the NGS and other Federal agencies are spending significantly more than this additional cost to produce the same control points. As taxpayers, we should be concerned why should NGS or another agency spend \$4,000 or \$6,000 per control point when another agency is also capable, with the expenditure of an additional \$600 or \$800, to establish the same point. That is my interpretation of a related survey.

The FGCC consists of one representative from each of the following Federal agencies:

Department of Agriculture

Department of Commerce

Department of Defense

Department of Energy

Department of Housing and Urban Development

Department of Interior

Department of Transportation

National Aeronautics and Space Administration

Tennessee Valley Authority

It is a committee, and that has maybe been one of the problem of the FGCC. It performs, or doesn't perform, like many committees that all of us serve on during our professional career. Most of them require time

above and beyond our normal assignments and the committee activities are normally last on the priority list. This has been a problem with the FGCC.

There were two circumstances that combined led to review of the FGCC activities at NOAA. We obtained a new Administrator a couple of years ago--the Administrator serves as the Federal Coordinator for the FGCC--and at the National Geodetic Survey we obtained a new Director, Capt. John D. Bossler. These changes plus discussions at OMB, led to the review of FGCC activities. Under consideration was dropping the whole FGCC effort or developing some means of making it work.

OMB and NOAA decided that there was substance to this activity, that there was a coordination work as defined in A-16 to be accomplished, and a new FGCC organization was established. I serve in the Secretariat to the FGCC, one of three full-time slots that are dedicated to this effort. I am a geodesist, the gentleman I work with is a Public Administrator, and we have a secretary. The three of us are full-time in this effort performing the function of a catalyst, and secretary, everything from planning and producing minutes of meetings, to being here today, to working with the subcommittees, and all that needs to be done to keep this planning function producing.

Created in this new FGCC are the subcommittees. The Instrument Test and Evaluation Subcommittee existed before, and it is presently completing a report on the "total station" equipment that it evaluated. It is also compiling a list of Instrument Test Sites. The New Technology Subcommittee is writing a review of the proposed GRAVSAT project and evaluating other proposals of that nature in the Federal Government such as "TOPEX" and the Global Positioning System (GPS), and coming up with a document on how it interrelates with different Federal Government research and development programs. The Requirements and Plans Subcommittee is one of the areas in which I am soliciting your cooperation for today. It is performing a function mandated by OMB Circular A-16, that of producing the Annual Federal Plan for Surveys and Requirements. The Data Base Subcommittee is inventorying all the various data bases or files, either automated or manual, that exist in the Federal Government. They are defining "compatibility", levels of compatibility, and trying to tie together some of the sources of control information that exist. The Methodology Subcommittee is in charge of the update and rewriting of the Standards of Accuracy and Specifications for Control Surveys. They are starting a complete rewrite. These subcommittees, since this new FGCC organization has been formed, have met two or three times, and each has its task well defined and under way. The subcommittees are composed of very qualified subject matter specialists. They are tops in each of their agencies in the subject of the particular subcommittee.

I am soliciting from each of you input to this Annual Federal Survey Plan. The required form is labeled as vu-graph number 19 in the handouts by Mr. Miles. This is a revision of the form that you have seen before



in the packet that you received from the district office, the problem in the past has been that is too often has been ignored. We need meaningful information, and some good numbers to do do any worthwhile planning. We are not asking you to spend lots of time completing these, but we just want to know more of what are your survey requirements. The form entries are numbered because these are going into an automated data file, so that we can correlate the requirements geographically.

We hope to disseminate this not only within the Federal Government but within all the districts and regions of the Federal agencies, and to some of the surveying and mapping agencies within the states and local governments. We would like to produce a document that can flow between agencies and provide a little more communication on the planned and required surveys.

Under the form is submitted, any submission is either a requirement, or it is a scheduled operation. I request that you check one or the other. If it is definitely something that you have on your operations plan, then it is a scheduled operation. If it is for a project that must be done in the next year or two it is a requirement. And item (5.0) says: in which Fiscal Year is the requirement? We are keeping a file on this, and it should be living file on the status of this project. You will either be making a first submission or an update. You will check one of those. A form would be submitted when the requirement is deleted or it is completed. Other than these just write a description of the project, horizontal, vertical, gravity; its location, who is funding it, and who is going to perform the work. There is a place for the source of the funds and who is desired to perform the survey--in-house, another Federal agency, or by contract, and who is the contractor. The next section of the form is a description of the survey. I think it is pretty much self-explanatory. Everything doesn't get completed, just the core of the requirement. The mechanism for submitting requirements is through Mr. Miles.

The other item that I am soliciting or trying to sell to you today is the use of that blue publication that we saw in the first vu-graph, "Input Formats and Specifications for the National Geodetic Survey Data Base." That publication describes the Federal standards for keying geodetic control data. It has been accepted by the Data Base Development Subcommittee as a standard for a geodetic-type data file.

It is used by NGS in a program that goes beyond Federal applications. Essentially, the program is an exchange of services between NGS and anyone. The NGS will analyze data that it receives in this standard format, they will adjust it and they will publish it. In exchange for these items, the submitted control must extend the national network, be properly mounumented, and be performed to FGCC accuracy standards. That is the trade-off of the program, and it seems to be working well.

There are many ways that these formats can be used internally in the Corps. I know there have been discussions with survey districts that are requesting our TRAV10 least-square adjustments program. These formats also serve as the input for TRAV10. The NGS will be willing to assist you in putting data in this format and get NGS software running on your own in-house computers on a cooperative basis for some type. It will not be a free effort. I discussed this with Capt. John D. Bossler, Director, NGS, before coming down here, and he will consider entering into some type of cooperative arrangement to integrate FGCC standards, and NGS software, with your software, in such a way that it will make the flow of projects smoother both within your organization and to the National Data Base.

I will quickly run through a little of this publication--how it is organized.

There are two volumes. There is a horizontal volume and a vertical volume. These are the chapters in each of those: A general chapter, an observations chapter, a descriptions chapter, and a positions chapter for each of horizontal and vertical control surveys. That organization exactly parallels the organization the geodetic data base. There are independent data bases for: the descriptions of the control points, the published adjusted positions or elevations and related information from the adjustment, and the observations themselves.

Incidentally, we are ready to open the horizontal data base, both the descriptions and the positions, to users like yourselves who want to interrogate the data base via terminal. Notice will be coming on the procedures. It is essentially a matter of opening an account with the commercial firm where the data base resides. The vertical information will be placed in the data base in the very near future.

These nex couple of vu-graphs just kind of depict the organization that is necessary when putting geodetic control surveys in computer-readable form. We have a universal set of all the data elements that were collected in the field. Within that universal set, there is a subset. In this case, this depicts the horizontal observations portion. This forms one of the files that is keyed and submitted in Blue Book format as a unit. Within the horizontal observation file portion there are records, e.g., a distance record. This is completely analogous to an 80-column card, which you are familiar with. I am illustrating the organization that exists in the Blue Book. All the different horizontal observation records can be broken into these nine different categories of data. Then, within each of those categories, there are numerous records from which you can choose, depending upon which apply to the job being submitted. Not every type of record is needed for every project, and the whole procedure involves just going through this publication and deciding which records you need for the project at hand.

One problem I think exists with the publication. It is so overwhelming when you first pick it up, because it is so voluminous. But when you look at your type of survey, second order-class two-traverse, and pick out which records you need, it finally sifts down to a very small amount of work involved, and you don't need to use 50 percent of the publication.

In the publication all points are either control points or peripheral points. Control points are monumented stations in the ground for which observations exist, and a description exists, and they will be positioned and published. Peripheral points are all the points surrounding and supplemental to the control point. They are all part of the horizontal control station. They include the azimuth marks, the reference marks, and eccentric instrument setups, points for which you have observation information, but not descriptive information, points which are essential for the integrity of the network to make ties between the network, but points that would not be published as part of the data base. So, you see applying the Blue Book becomes a coding exercise. These kinds of points get a suffix added to their numbers to connect them to but distinguish them from observations being submitted at the control point.

The whole project follows the traditional classification of the project by order-class. But in addition to having "order-class" for an entire project, we go one step beyond that and define an "order-type" for each individual point within the project. All of this builds in more information about the points. So you have an accuracy indication, the method of survey, and monumentation indicator of the points as well as the overall order-class of the project.

There are numerous other codes that must be assigned as a short-hand in coding the information. For example, there are equipment numbers and elevation codes.

Thank you for this block of time. I will be here for the entire week and welcome the opportunity to meet you and talk more about any of the NGS or FGCC programs. I have never been to one of your annual meetings before, so I am looking forward to my visit with the Corps.

Mr. Miles: Thank you, Jim. I would like to encourage the Corps Personnel to talk to Jim during the breaks or during lunch or any time during the conference about what he has talked to us about this morning.

Now we come to our first assignment for the working types here. We have in the hand-out, as Jim mentioned the requirements form. As usual, we have been asked by the FGCC to submit our annual requirements. This year, instead of using the traditional letters-through-channels format, I have decided to have you take the form home with you, xerox as many copies as you need, fill out the information, as Jim explained, and mail it directly to me at OCE. You have my office symbol in the registration package.

I am going to try to put this together quickly and get it to FGCC. We have a short deadline this year. So I would appreciate it if you would get it to me within a week or so of when you get back home.

The other thing that I would like to mention, as Jim discussed, is the Blue Book. OCE would like to stress the importance of putting all of our control survey data in an organized format and an organized standard. Other agencies can share our control through this system. More on this will be included in the field survey techniques course that is going to be taught in Arlington, Texas the first week in March. We have a little over 80 students signed up for the course from just about all the District Offices.

We are going to have those two Blue Books, one on horizontal and one on vertical control at that training course. Jim is going to be there with some other NGS people to teach how to use the book and how it should be applied.

So for those of you, either yourself or your people, who come to this training course, you will be introduced to the book in much more detail, and hopefully we can start using the NGS-prescribed data formats for our control surveys.

#### Transfer of Corps Aerial Mapping Film to the EROS Data Center

Mr. Miles: We have with us this morning Tom Lauterborn from USGS and the National Cartographic Information Center, commonly referred to as the NCIC.

I will try to cover some of the acronyms that you may not be familiar with. EROS is the Earth Resources Observations System; EDC is the EROS Data Center. These things will be discussed in just a minute.

Tom is a Cartographer/Geographer, with the Geological Survey. He is a graduate of the University of Maryland. He is the program manager for the Aerial Photography Information Data Base. He would like to talk to you this morning about transfer of Corps of Engineers aerial film to the EROS Data Center. Tom.

Mr. Lauterborn: Good morning. I would like to thank M. K. and Ed for inviting the survey to these meetings. And, believe me, we have been working on them for a long time to get on this schedule, to try to address all the Corps people at one time.

As many of you know, I have been to your offices throughout the U.S. over a period of probably the last couple of years, so I have met quite a few of you.

However, we felt that this was a good opportunity to talk to all of you at one time. So we tried to get ourselves on this program, and I appreciate the invitation.

The subject, as stated in the program, transfer of Corps film to the EROS Data Center, is something that we, the survey, have been trying to, you might say, pull off for quite some time.

Essentially what we are trying to do is make old aerial photo projects more available to users. What I mean by that is, if you check your records and go through your offices, you will find that there are a lot of Aerial Photo Projects that have been flown way back as late as the thirties and forties that are no longer being used within the offices.

In most cases, they are stored in cans of film that are set off to the side and no longer touched by the human hands.

What we are trying to do here is more or less what Jim was mentioning earlier, within NGS. We are soliciting help from the Corps, in that we would like to try at the survey to obtain this photography and transfer it to the EROS Data Center.

That is coming across kind of hard, but the reason why we want to try to do this is because, in the Aerial Photo Information Data Base, that contains information on photo projects, and this data base that I manage shows the information associated with the various projects.

But the key to putting this information into the data base is that you have to be able to duplicate the film to the user. And this, in a lot of cases, presents considerable problems to a lot of the Corps offices, because they might not have the photography in the office, it might be with a contractor, they may not have the lab facilities, and so forth. And there are a lot of reasons.

So what we are trying to do here is make this taxpayer-supported imagery, as originally acquired for one purpose, useful for other purposes.

I am trying to do a sales job here. I am trying to get your offices, your people, to turn over this imagery that is no longer useful, and transfer it to the EROS Data Center.

The survey, for the most part, bears the cost. The only cost on the part of the people in the Corps offices essentially would be just that of transferring the film up to the EROS Data Center.

Now, it is going to be hard to kind of cover this in a half an hour, and I want to be able to get another gentleman on the end of the program here, about the last ten minutes, from the EROS Data Center, just to kind of explain a little bit about how that works there.

So let me just touch base a little bit about what our particular office is trying to do in terms of getting this imagery up there. Again,

as I mentioned, I have been to a lot of the Corps offices throughout the country in the last few years, and I have just found that it is worthwhile but it takes a lot of time.

And this way, we hope to be able to generally sell the program to you all, and then we will be available for the rest of the week here. The survey is going to have a booth up outside. And both Kent and I will be glad to answer any questions for anybody that we won't be able to answer in this short a period of time.

Let me just briefly describe first -- I am going to leave this up here for a little while. I know it is an awful lot to read, but I think it is very critical, because one of the principal reasons that we are trying to get some of the old photo projects out of the offices is that you will find that a lot of the old imagery, going back especially before -- prior to 1940 -- is this Nitrocellulose-Base imagery, commonly referred to as nitrate film.

You notice down here on the bottom, we had to retype this because a lot of the documentation that we were able to get from the National Archives and Records Service in Washington was kind of mutilated and old, so we retyped it.

And you will notice up here that it goes on to state the very unstableness of that Nitrocellulose Film, and it kind of documents a little bit about flash-point conditions, where it has been known to self-ignite at certain temperatures.

And, believe me, I have been to some of the Corps offices and I have seen how some of the film is stored. And it is not in a very good environment, to say the least.

I am not saying this is true for every Corps office, because I have found that it is pretty flexible wherever you go. Some of the Corps offices do not have their photography, it is at the contractor's. Some of it is a mixed bag, with some of it there and some of it no.

And then there are other cases where all of the film is at the offices. I think this is very critical in terms of safety. And this again is just one part of the reasons why we are trying to get this imagery.

Part one, the Silver Nitrate Base, which is the old imagery, we would like to get first. And what we do with that, there are two alternatives. The first would be to try to get it to the National Archives in Washington.

If we can't do that, we can always try to get it ourselves and try to get it to the EROS Data Center and let them try to take care of it. But

basically what happens to that imagery is, it will be duplicated on safety film and then destroyed, because of the hazardous conditions of the imagery.

So this is the first part of the phase of obtaining the film. Okay. Now, the second part would be just acquiring those old projects.

And again, I emphasize old projects. What we are trying to get here are nonhigh-use projects that you probably have very little use for, those that you may have, oh, some minor use, can maybe get to a little later, whereby if you decide to send several projects up there, and let's say maybe there are two to three frames you need reproductions of, that is no problem. We can get that back to you, if that is the case.

Right now I would just like to run through a little bit of what the main image file at the EROS Data Center looks like in terms of imagery from other agencies, starting down here at the bottom.

Of course, we start off with the Interior Department, and all the GS imagery is out at the EROS Data Center which, by the way, is in Sioux Falls, in case any of you don't know where it is at.

And you can see that there is close to three million frames of imagery from the GS. Okay. Then we have other Interior Imagery from the Bureau of Reclamation, Bureau of Land Management, Bureau of Indian Affairs.

We have a lot of the Army, Navy and Air Force Imagery, National Park Service, NASA Imagery from Johnson Spacecraft Center, Ames Research Center in California and Wallops Island.

And we also have -- I will go to this one next -- EPA. And you can see that we have started to get some Corps film in there. Now, this doesn't break down where this Corps film came from. There is about 23,000 roles. But I know where it came from, because I got quite a bit of it myself.

Most of this comes from the St. Louis District, Chicago District, and there's some imagery there that is classified as coming from the New England Division. I'm not sure exactly where. It is a lot of coverage of Vermont.

The St. Louis District's Photography, I believe, is the entire state of Missouri. And the Chicago Imagery covers most of the Great Lakes area.

That is the status of the imagery from the Corps and the other agencies. I would like to say that what is the beauty of this transfer and where the imagery is stored is that this film now becomes useful for more than one purpose.

It is now available to anyone who is looking for photo coverage over an area where previously there may not have been any coverage at, say, a particular scale or date range, that sort of thing.

And in most cases you will find that this imagery was probably never going to be used anyway, and now it is available for other purposes. And you would be surprised the number of users of this imagery for various reasons, why they would go back and be concerned, you might ask, about whole coverage over areas.

And there's a lot of users. Right off the top of my head I can think of the Environmental Protection Agency, for one, in many instances looks for coverages of, say, streams and rivers back in the forties and compared to present-day, maybe for litigation or court cases.

A lot of times you have a lot of the states doing environmental studies and local jurisdictions. And this imagery is very worthwhile to these people. And previously they, of course, in many instances they didn't know that this imagery was available.

Well, now it is, because once it gets into the EROS Data Center, it is useful and becomes extremely well advertised through the use of their facilities there, where they have interactive terminals throughout the U.S., and maybe Kent will address that in a little bit, and I don't want to cut into his time too much, because I just want him to, hopefully, address the status of how the imagery is set up out there and how the information is distributed.

In my particular office, NCIC, we are -- our headquarters is in Reston, Virginia. We have four regional centers throughout the United States. And we also have 22 State affiliates.

And that is principally how we get the information out and how it becomes available. We put out catalogues and microfiche, letting people know where this information is.

And we would like the Corps' data to become part of this data base. Kent. I would like to introduce Kent Swanjord and let him take the last ten minutes or so of this discussion on the film.

Kent is from the EROS Data Center in Sioux Falls.

Mr. Swanjord: My name is Kent Swanjord. I am NCIC Coordinator for EROS Data Center. I would like to thank the Corps for the opportunity to be here and address you and show you -- give you some information about the data center.

I guess I would also like to thank an Ozark guy in Minneapolis that got me around Chicago, over St. Louis, and through Atlanta last night. That just wasn't in me.



As Tom mentioned, the EROS Data Center is in Sioux Falls, South Dakota. EROS stands for Earth Resources Observations Systems. We are a National Center for archiving, reproducing and disseminating different types of Aircraft and Satellite Imagery.

This is a view of our electronic receiving station, where we receive Lansat Satellite or Satellite Data from the Goddard Space Flight Center. It is processed and made into master reproducibles.

These are just a few -- this view is the aerial view that shows the facilities in back. We have the water system, where water is -- we recycle our own water and reuse it.

You see the solar panels in the back, where we utilize the solar energy to heat the water. This is a picture, one of the views of our archives. We store different types of film, primarily one of the types of film right now is a national mapping division's aerial mapping topography.

As Tom mentioned, the NASA high altitude reconnaissance photography primarily from ames, and other types of data, other sources, are increasingly coming into the archives, such as EPA, BLM, National Park Service and the Corps.

Another large data base we are now developing is the National High Altitude Photography Program, which we retain all the black and white masters and first-generation dups of the color infrared.

You will notice that it is a very controlled and clean atmosphere. Basically what the slide tells you is some of the numbers on the film storage.

We have over five million frames of aircraft photography and one and a half million frames of satellite photos. And it is organized very similar to a library, to support the reproduction in the photo lab.

The Data Base, of course, is a computerized main image file that has geographically retrievable coordinates. There are some 60 different locations around the country and in Alaska which have teletyping capability to do research on this data base.

We acquired photography through the auspices of NCIC primarily and input this data into the data base either using photo indexes, map line coordinates, or making out our own photo indexes.

We are probably going to end up with most of them backwards, most likely. (Indicating Slide) This is a status map. In about 1978 some of the state agencies and federal agencies started to get together to put together their requirements for high altitude photography, and this is the current status as of December of this year.

One other way we are acquiring data for our archives is, of course, the M.O.U.'s that are assigned with EPA, and now the Corps, BLM, and other agencies and organizations.

This is sort of a nerve center of the data center, in the photo lab. This is where the scheduling is done, the schedule area. The computer in effect tracks and controls scheduling in the photo lab.

Through this computer, they can tell which lines in printing and processing are open or have backed-up orders. They can also tell at a quick glance just what the demand is as far as orders are concerned.

If there are a lot of black and white prints, for example, that are backed up, then they can schedule those black and white prints.

They schedule the prints according to what darkrooms are available, or camera systems. This is another -- in addition to the regular production there, we also have a custom lab which does special handling, enlargements, enhancements, and so forth. This is the processing end and the inspection end of the photo lab.

Again, another look at some of the inspection stations at the data center. And after the inspection, after the processing and inspection, the prints are matched with the orders, and billing and shipping statements, and sent through this dissemination station to the customers.

This is part of the Chemical Management System, where we recycle all the chemicals and so forth, including our silver recovery units.

This is a synopsis of FY-81 production. It shows basically that we did \$4.3 million in sales at the data center last year.

This is the user services activity up at the data center. This is a reflection of the other NCIC offices which are set up much the same way. This is the actual customer interface, the user interface.

These people have the capability to use CRT Terminals to do research. They have the other necessary research tools. They can also do the ordering, the mapping centers, NSTL, NCIC, offices like that.

Some of the growth that we have seen in sales or production, aircraft has -- Lansat has increased. In the last year we have gone up about four percent, whereas the aircraft data demand increased something like 55 percent.

And we owe this to a couple of things. We believe that one is the increasing use of inhab, which is now two years old, and becoming a more complete coverage of the U.S.

Secondly is the addition of data to the data base which has hithertofore been inaccessible and not publicized. And thirdly, increasing knowledge of resource people on the use of Aerial Photography and Satellite Imagery.

Here is an example of where applications branch is showing productive class. I believe this one is for foreign scientists. But there are other classes put on for BLM and other agencies.

This is another example of a class. As was mentioned before, we are doing an increasing amount of work in Spacial Data Systems, which is merging and using different types of data, principally digital data, using Lansat Data, merging it with vegetational or hydrology or whatever.

And we get some scientists that are amateur scientists that also give us some ideas on how to use data. This is backwards, so you can't read it.

One day, early on in Lansat, a student sent in his design for a spaceship, for gathering more data of the earth.

I appreciate this opportunity. I will be around with Tom during the rest of the week, and I will be happy to answer any questions that you may have. Thank you.

Mr. Miles: Thank you, Kent.

As you heard during the session this morning, we first went over some of the results of our management study. One of the areas of that study dealt with coordination and consultation. This has been an effort to encourage more coordination between the Corps and the other federal agencies, which we think is badly needed. OCE would like to encourage more intergovernment coordination of the type that will improve our surveying and mapping activities as well as those of the other agencies and of the private citizens who use these products and services.

We also did a fantastic job of staying on schedule. According to the official clock, we are one minute ahead of the schedule. I guess I will give this minute to Ed.

Mr. East: We have scheduled a half hour for a coffee break. Hopefully you will have time to get your coffee and talk with some of the speakers who have made their presentations here this morning, or maybe meet some of your colleagues in other districts.

We planned half an hour just for that purpose, because it doesn't take a half an hour to drink coffee. But we would like those people to come back who are on the program in the next session about ten minutes early, we will gather here and just run through the next session. With that, we will adjourn.

## MANAGEMENT SESSION 2 (10:00 a.m.)

### Technical Working Groups Overview

Mr. Miles: We would like to get started with our second management session, scheduled between 10:00 and 11:30, when we hope to break for lunch.

As I mentioned earlier, you can see the management agenda today is broken out into five sessions. The titles of these sessions are the areas of interest highlighted in the management study. These are areas in which we are organizing the discussions today.

We would like to now go into the Technical/R&D Session. I would like to start the technical portion, and then, about halfway through, Ed East will start the R&D portion.

One of the things that we would like to accomplish is to set up and organize what we are going to term "technical working groups". There was some discussion about this two years ago at our meeting in Wilmington, N.C. It was suggested that there be a committee to guide the hydrographic surveying efforts of the Corps towards improving some of our activities in that area.

We expanded that concept to include all types of surveying the Corps does, as well as some of the related management activities of the Corps.

Vu-graph No. 21 depicts what we envision as some of the areas we would like to organize: land-based surveying from a technical standpoint, hydro-based surveying from a technical standpoint, training, personnel, contracting, and resource management.

We hope to get together again in a joint session on Wednesday and Thursday evenings, and divide you gentlemen up into these groups according to your areas of interest. We will develop some committees to work in these areas, during Wednesday and Thursday evenings, and then later, after the conference, and during the future so we can make some improvements in these areas.

We will, during these evening sessions, provide a detailed explanation in general, we want these committees, or working groups, to develop some goals, objectives and tasks that can be accomplished in the future, and prepare a summary statement to be given on Friday during our management wrap-up session.

This will allow other people, not in the working group, to hear what your group has identified as important. Critical areas and your game plan or scenario for future improvements should be presented.

## Organizing a Successful Computer-aided Applications Program

Mr. Miles: I feel that one of the areas which we need to organize and standardize is our software packages for processing survey data for both land and hydrographic surveying data.

Later on in the program, I think it is on Wednesday, on the hydrographic side, we are going to have a fellow from the National Ocean Survey talk about standardizing data tapes so that the Hydrographic Survey Data that we generate can be sent to N.O.S. in a computer-readable format instead of on paper maps, as is done now.

We are trying to push this standardization and coordination effort in the Corps so that we can contribute to the total federal effort in surveying and mapping.

I would like to introduce Dr. Radhakrishnan. We call him Radha. He is a special Technical Assistant in the ADP Center at WES. He has a PH. D. in Civil Engineering from the University of Texas at Austin and 13 years in the engineering and computer applications area. He is a project manager for the Corps program known as Case, Computer-Aided Structural Engineering. We would like to set-up a similar effort in the surveying field. We might call it Casm, and acronym for computer-aided surveying and mapping with that, I would like to introduce Dr. Radha.

Dr. Radhakrishnan: Thank you, M. K. What I am going to be talking about may at first appear to be foreign to you, because it is delivered by a foreigner, one could say.

The presentation will stress the importance of developing good software (programs) to make efficient use of computers. Every District office developing its own programs can result in duplication and wasted resources. Centralized development of software can result in both cost and resource savings but should be pursued cautiously due to the decentralized operation of the Corps. But if properly organized, such a development can utilize the professional talents available in the Corps in an optimum manner and produce products that are useful to all offices. The concept of organizing such an effort is illustrated by an example in the structural engineering field.

In 1977, the Corps started a project called Computer-Aided Structural Engineering (CASE) at WES. In the past 4 years, this project has produced 20 computer programs and an equal number of reports in a variety of structural engineering design/analysis areas. The programs have been widely accepted in the field and have been used more than 13,500 times by 36 districts in FY 81. Also, a survey indicates that the CASE programs were used by 23 Corps offices in at least 67 projects in FY 80-81.

The CASE Project was predicated on the concept that:

1. Corps engineers can better solve the Corps' special problems.

2. Each Corps office can contribute a little in the area of its expertise.

3. Ultimate users of the computer programs accepted by CASE should play a role in designing them.

The steps involved in implementing a CASE program are:

1. Field offices recommend priorities of programs to be developed.
2. OCE considers recommendations and provides funding guidance.
3. WES submits a plan of action.
4. OCE approves the plan and provides funding.

5. CASE programs are developed by task groups, WES, and program development teams.

A detailed process of review and development is followed to ensure that the programs meet the Corps' needs. This process involves:

1. Task Group - prepare computer program criteria document
2. OCE - receives document and sends for field offices review.
3. Field Offices - comment on document and send back to OCE.
4. OCE - sends comments back to the task group.
5. Task Group - resolves comments and updates document.
6. OCE - receives updated documents and sends to WES.
7. WES - writes computer program to meet the criteria document (uses Corps and other resources)

One of the strong points of the CASE concept is the involvement of the structural engineers from the field offices as task group members. The task group members prepare a program criteria document, review existing programs against this criteria, and recommend modification to these programs or new ones. The task groups active in FY 82 are:

3-D Stability (CW)

Pile Structures & Substructures (CW)

Finite Elements (CW)

Miter Gates (CW)

U-Frame Structures (CW)

Geotechnical Aspects of CASE (CW)

Building Systems (MP)

Structures Subject to Explosions (MP)

Task groups on T-Walls (retaining and flood) and Culverts and Conduits released their final programs in FY 81 and are operating in a secondary role. One of the original task groups on Bridge Relocation completed their work in FY 78. Presently, the eight task groups are composed of 57 members who represent 30 field offices plus 14 other members from OCE and the laboratories. It is noteworthy that all 14 Corps division offices, the Navy, and the Federal Energy Regulatory Commission are represented in the CASE project.

A major advantage of CASE is that OCE plays a key role in the identification of priorities which is helpful for long range planning. Other advantages include:

1. The CASE Project addresses both Civil Works and Military Programs Directorates needs; therefore, the programs developed will reasonably satisfy all field offices.

2. CASE work will provide continuous dissemination of information between field offices and will ensure transfer of technology between the R&D laboratory and field offices.

3. CASE work identifies problem areas for future R&D work. It is also a vehicle to cross-train engineers in R&D laboratories in accepted Corps design procedures.

One of the important aspects of this project is the Technology Transfer Plan. It is achieved by a combination of:

1. Publication of Reports

2. Presentations at Corps Meetings and Professional Societies

3. Teaching of a number of specially design short courses.

4. Ascertaining constant involvement of OCE, field offices and Labs in criteria and product development through Task Groups.

The final product of the CASE efforts are well documented computer programs with practical Corps examples. The programs run in both conversational and data file modes with interactive graphics options. Technical support is provided for the programs.

The CASE project addresses two main points. The programs developed in each application area are ensured to meet Corps needs because of the review and development process. This is an important strength because other organizations do not develop program for design/analysis of the Corps' unique hydraulic structures. Point two is that the engineers are not required to use the programs. Professionals do not like to be told to use a standard but rather evaluate for themselves the capabilities of a product. A report is published on the program, a training course is conducted, information is disseminated by various forms, OCE sends a letter saying the program is available and encourages use as a preferred program, but it is still left up to the individual's discretion. The project recognizes that Corps personnel are the best available to solve the Corps special problems. CASE can essentially be viewed a cooperative effort where everyone owns a piece of the rock. It is believed that efforts similar to the CASE project will be successful in the surveying and mapping field. It is obvious that tapping the professional resources available in the Corps can result in significant accomplishments and promote professionalism.

Mr. Miles: Thank you, Radha. I enjoyed that. However, we have got to scrub the next session. (Laughter) not really. I would like to point out that he kept using the words "geotechnical" and "structural." We would like to substitute the words "surveying and mapping," and change "CASE" to "CASM" and get started here at the conference, at least in the conception stage, on such a program.

We have all the elements here: OCE, the districts, the divisions, and WES. Hopefully, at some of these night sessions, we can get into the meat of this subject as it relates to the surveying and mapping area.

#### Research and Development in Surveying and Mapping

Mr. East: Radha, those remarks about OCE, one thing we can do is read clocks. (Laughter) you got into our time, but I second M. K.'s comments. I think that was a tremendous presentation and right on target, those things that you were saying about professionalism particularly.

I can't emphasize enough, if you want to improve your lot, you are going to have to think in terms of this word "professionalism" and all the things that go with it. Okay.

Now we are going to be talking about R&D. I would like to put up some vu-graphs. All the vu-graphs that I am going to put up are in your hand-out, starting at page 23.

If I could have the next vu-graph. I did have a chance to read the management study results, and there was a section on R&D. And it seems to fit. It seemed to me that most of the input related to answering four questions: Why do we do it? What are we doing? Who's doing it? How are we doing it? Next slide.



As Radha pointed out in the structural "CASE" work, their prime effort was directed towards solving Corps structural engineering problems. Our prime effort in R&D is directed toward field and office improvements in the surveying and mapping areas.

Why do we do it. The bottom line is, to assure the Corps produces high-quality surveying and mapping products in the most effective and efficient manner possible.

What are we doing? Our R&D laboratory people are reviewing, evaluating, modifying, developing and/or demonstrating procedures, techniques and equipment to aid you in producing these surveying and mapping products.

Who is doing it? Well, some of you are! And you are inventing a whole lot of wheels, I am afraid. But you have to get the job done, and you have just been taking it on yourselves, and gotten it done, and that is to be applauded.

But now that we have a little more central input, as opposed to decentralized input, I think we can improve the individual wheel-building situation and give you some help.

One of Radha's slides I think, characterized it as: Every office thinks they have these unique problems. Well, we don't feel you have that many unique problems necessarily for, let's say, the work required to dredge a channel.

Some of you have done R&D, some are continuing to do it, and some of you will do it in the future. But our R&D laboratories, basically ETL, the Engineering Topographic Laboratory, and the Waterways Experiment Station, WES, are carrying out the Corps formal R&D program.

They carry out this program with funding that is provided under the R&D General Investigations Appropriation. The R&D office at OCE supports this budget line item before the OMB and the Congress.

I don't know if you can really grasp the significance of it, but we now have a research program. The title is Surveying and Mapping. It falls under the broader title of Surveying and Satellite Applications. The first formal year where surveying and mapping showed up as an official line item was in FY 82. In FY 81 we broke it out-internally-as a line item. Prior to that, surveying R&D was in the concrete program, and virtually non-existent.

I think you can see that we have come a long way in the R&D area. But it has taken a lot of hard work. Radha, we are doing something up in OCE. Next slide, please.

I thought I would provide this as a little bit of a background, the chronological development of the R&D effort. We certainly hope

that in FY 83 we could get as much as \$400,000. There is, however, little hope for that. But we have identified projects and areas where we think we could use that money very effectively. Next slide.

I also provided, in hand-out pages 31 and 32, the FY 82 and FY 81 R&D program by work unit. The work unit is how we identify specific R&D efforts. There is a title, there is funding associated with it, and, on the left, the priority that we gave each work unit.

I guess I confused you because I didn't have page 31 and 32 on the vu-graph, but that is provided in your handout. The lab doing the work is also indicated next to the work. So, if you want to follow up with questions on that particular work, we will let you do that in just a few minutes.

R&D, how are we using it? That is what the gentlemen from the labs are going to be talking to you about in just a few minutes. They are going to make some general comments along these lines today, and then you are going to see, in specifics, how that role is being applied, later in the technical sessions this week.

Just a final word: R&D, as it relates to the technical working groups. M. K. has shown you a chart, a strawman, of working groups that we developed at OCE, in looking towards how we might get you all organized to look at certain key areas of concern. One of the working groups we have proposed is a land-based and a water-based working group. I suspect that we would have R&D task groups basically coming out of those larger groups.

I think that is enough of an overview on the R&D.

#### Civil Works Research and Development

Mr. East: I would now like to introduce to you Dr. Bill Roper, who is currently the assistant director of the R&D office for Civil Works at the Chief's office. Before joining the Corps, which he joined last September and, by the way, took Mr. Mel Martin's place, Bill was the Director for Plans and Programs at EPA Headquarters. Bill is a Registered Professional Engineer in Wisconsin. He received his BS and MS degrees from the University of Wisconsin. He holds a PH. D. from Michigan State University. So, Bill, thank you for coming. We will be glad to hear your remarks on R&D.

Dr. Roper: It is a pleasure for me to be here today. I have not been with the Corps that long in the Civil Works Program. I was with the Corps, and still am, as an Army Reserve Officer on the Military Side.

There are really two reasons why I am here today. One is, I want to get firsthand feedback from the field in this particular area so that I

have a better understanding of field problems, priorities, and programs that you would like to see in an R&D program. Further I would like to stimulate you to think in terms, of really communicating these needs to the people at OCE and the labs.

Secondly I would like to convey to you that the area of surveying and mapping has been identified over and over as an area where R&D has a big potential payoff. It is an area where R&D could provide a very sizable impact in helping the Corps work more efficiently. I am saying, that you have got our attention at OCE in the R&D area.

I would like to follow up on something that Ed East said at the beginning of the program about the Civil Works Budget. We are under a lot of pressure to constrain, constrict, and reduce that budget. And as he said, I think it is going to get worse before it gets better.

Particularly in the R&D area, we are feeling the squeeze. What that really means is that when we begin developing the program for FY-83, and we start doing the planning for FY-84, we have to be very sure that we put together a program that is going to stand on its own. It should be a program that clearly shows the benefits that would be attained in order to be competitive with other areas in the budget.

Along that line, I would like to commend Ed East and M. K. Miles for the surveys that were conducted last year, which started identifying in writing the problems and needs for the surveying and mapping area. That is an important part of putting together a good program. And I think that more follow-up, study, and analyze in this area is probably needed.

Right now in the R&D Directorate we are in the process of developing the program for FY-83. The last three days of this week, the Research and Development Review Board is meeting in Washington to review the accomplishments of '81, look at the program plan of '82, and to assess the '83-84 projected plan.

There will be briefings presented to General Wray and other members of the Corps top management on both the Military and Civil Works R&D program. Surveying and mapping will be one of the line items that will be addressed in detail by ETL and WES at that meeting.

Another important action that is coming up is the annual program review. On 9 March the satellite and surveying program for FY 83 will be reviewed in detail at OCE.

I would challenge you, as the users and field representatives, to make sure that your ideas, and your thoughts are communicated to Ed East and others at OCE Headquarters, as well as to the representatives from WES and ETL.

Anyone can submit needs into the R&D needs system, and they will be reviewed and prioritized during the program review process. Simplistically that is how the FY-83 program is developed.

If projects are not submitted for the program review, it is not very likely that they will be inserted later. I think the process that has been set up to develop an R&D program is a good one, but it is only as good as the people who participate in it.

In closing, I would leave you with the challenge, to input into the needs system. Let your representatives know. Identify your real needs, and show why they are important, including their potential applicability at the division or Corpswide level. If you do that, I think you will find a good reception at OCE, because, as I mentioned earlier, the satellite and surveying program has been identified as an area where there is high potential payoff for the Corps.

If a well-justified program is presented, I think the funding possibility is pretty good. This area, as Ed has mentioned, is relatively new as a line item. But it is one of the few R&D areas that has steadily gone up in funding level over the last several years and it is projected to continue that increase through '84.

Most of the other R&D programs are actually going down or level through '84. So you do have our attention. Let us hear from you.

Mr. East: You hear that, Radha? The pie is only so big and it is shrinking. We are trying our best to keep a piece of it, a piece of that rock.

The next thing I would like to do is introduce the people who are involved in the R&D program in surveying and mapping, and to get them up here. There are certain ones, I think, who are going to have a few words to say to you.

And then, if we have just a few minutes, we might take some questions from the floor directed towards these folks. So you might be looking at those specific work units that I identified in the hand-out. That may spur a question or two, or you may have some other questions that aren't related to the specific work items.

So if I could have all the R&D people up here, and I will introduce them when they get up here, ETL and WES.

Mr. Marvin Taylor: Why does civil works only support the surveying and mapping program?

Mr. East: That is a good question. We don't intend to have it continue that way. We do have one gentleman from Military Programs Engineering Division with us who might be able to answer. We felt we didn't want to add another element in developing, the surveying and

mapping R&D effort. But that is certainly in our thinking. In fact, we had really wanted somebody from the master planning group in Military Programs at OCE to come. We are certainly going to pursue this. It has been thought about, and we just haven't reached the point where we want to make our pitch.

Mr. Roof: I will answer your question directly. The military side of the house is putting a lot more R&D money in surveying and mapping for military requirements than Civil Works is putting in for the civil works side.

A lot of work that ETL does in Civil Works is an offspring of what they originally approved for the military side. Because one of our jobs is to look at it and see if there is technology transfer from the military side of the house to the civil works side.

Mr. East: You are right. However we haven't gotten much out of the military bucks that have been put into ETL. And one of the reasons for that is a lot of those bucks come from the defense mapping agency. I doubt whether Military Programs OCE has identified our particular area for support.

Ed, "how much funding from military programs, from the chief's office, goes to ETL for surveying and mapping?"

Mr. Roof: About \$6 million or \$7 million.

Mr. East: \$6 million or \$7 million from engineering or --

Mr. Roof: From the Military, OCE 52-C and 855, which are OCE Tech-base funds.

Mr. East: Okay then, Ed, I am going to have to ask you this question: Why don't we know something more about what they are doing in that area so that we could evaluate its application to the civil works area?

Mr. Roof: Well, let me be perfectly frank with you. We are not doing much because Civil Works has not identified any needs. That is the name of the game.

Mr. East: I see. We are into this circular thing here. (Laughter)

Mr. Roof: The thing is, they have longterm needs, where we have a 15-year program for the military side of it. We have the tech-base and the R&D money figured all out until about 1995.

Mr. East: Well, I am glad you asked that question. We are going to start pursuing that particular aspect of the R&D Civil-Military interface.

## Surveying and Mapping R&D at ETL and WES

Mr. East: Now, I would like to introduce the three gentlemen up here. Dale Hart is a Supervisory Research Hydraulic Engineer and Chief of the Prototype Evaluation Branch, Hydraulic Analysis Division, Hydraulics Lab. All of these guys have long titles, Radha. I think they are all in competition with you. George Downing, who has been scurrying around here, will also, I hope will get up here before the session is over. He is a Supervisory Electronics Engineer, and the Chief of the Design and Development Branch of the Instrumentation Services Division at WES.

Next, I would introduce Mr. Ken Robertson. Many of you know Ken because of the precise measurements work that he has been involved with. He really has done some outstanding work in that area, and worked very well with the Districts. In fact, he stands out as a shining example of ETL's efforts to support Civil Works.

I would also like to introduce Ed Roof. While Ed's work is probably not familiar to many of you, I am sure he has worked with some of you with the Inertail Surveying Technology. I can assure you, he will be working with you in the future in that area.

I would like, right now, to entertain some questions. How many minutes do we have for Mr. Sullivan? Twenty. That means I have one minute or so for questions. Does anybody have a question they want to direct to somebody up here on the panel?

Oh, I beg your pardon, some of you wanted to say a word or two. Dale, how about, would you start for us?

Mr. Hart: I will summarize this in just a few minutes, because I have a technical presentation tomorrow and I don't want to steal too much of my own thunder. The gentlemen who just joined us at the table is George Downing, who most of you know.

George and I have been involved in the hydrographic survey portion of the program for the last 11 or 12 years. Our primary function is to assist the districts in improving the methods and equipment the districts use in conducting hydrographic surveys.

We have assisted the districts by developing certain types of equipment. Probably the most important efforts we've made are for the small boat data logging systems that have been developed over the past several years. We conducted a survey and determined that many districts use small boats for surveys and they couldn't handle existing equipment on these boats. So we came up with a smaller unit for those people.

We are also involved in dealing on a first person basis with the districts when they have a problem. Right now George is dealing with the Detroit District, helping them in one of their problems.

In addition to this, we are the ones who coordinate these conferences each time they are held. They used to be each year but are now every third year.

And we also handle the training program that we hasten to tell Mr. Roper that the funding for the training program does not come out of our R&D program.

And that is just basically what we do. I just wanted to take a couple of minutes, but I did want to say one thing, and that is my appreciation for the Chief's office now taking an active role in our program.

This is the first time in almost 12 years that we have had any real leadership from the Chief's office. And it has made a considerable difference, as far as I am concerned.

Mr. East: Thank you Dale. Ken, were you going to speak?

Mr. Robertson: I am Ken Robertson. Our organizational structure changes so fast, I don't know what branch I am in. So I won't go into that in detail. But I would like to talk to you in general about R&D as it affects you.

First of all, you are working presently on the assumption and with the philosophy that what we provide has to be based on what you can use. And what you can use is limited by the fact that you don't have anybody to use it.

A lot is being done on contract at present, and so we are having to look at two areas: Those things which will provide you a means of checking on the contractor and, second, a means of doing some jobs that the contractor is not equipped to do.

So we are addressing these two areas. And we are also trying to come to you with products which have been developed under military funding at ETL and have some possibility of use in the districts.

Let me mention just a couple of these in passing. One is a system which you will hear more about later on this week. It is called APPS, A-P-P-S, Analytical Photometric Positioning System.

This is a rather simple thing. Someone can be trained in only a few days to use it. And it will serve you in a Photogrammetric capacity, those of you who don't have one, to check map products, to look for things like encroachment, to use aerial photography that a contractor provides you, to do many jobs, cut and fill, a whole lot of things, and in a very simple fashion, with personnel that you can train yourself in a short period of time.

This is an outgrowth of a military program. And we are trying to get it into the civil works area.

Another area that I would like to mention is the use of inerial. This is something that is also a military development. It has been used successfully in one or two districts but needs much more widespread use.

Another thing that we want to mention, through the talk of one of our contractors later on, is the use of north-seeking gyros. The purpose of this again is to check on contractors, not for you to go out and do surveys, because we realize that you can't put parties in the field anymore. But how do you check on a contractor? This is one way.

So it is a piece of equipment that is at least partially a military development, and yet it is commercially available. How many of you use northseeking gyros? (No hands raised) Nobody. Yet it is a commercial development, you see. It is something that is on the market. We want to introduce these things.

One other thing that I want to mention, and then I will turn it over to Ed, and that is this, that we do want to look into certain areas where there is no capability among architect-engineers and surveying contractors, and that is in areas such as dam monitoring.

We are going to discuss something that was developed to measure tilt, and specifically for dams. It uses a Zeiss Ni2 level together with a couple accessories. And it enables you to measure tilt very accurately and very simply, whether you are measuring lock walls, tilt of lock walls, or whether you are measuring long-term tilts in dams.

These are the kinds of programs that we are trying to introduce. But let's turn back to what Ed said a minute ago. If you have needs, we are frequently unaware of them totally. Perhaps sometimes you are unaware of your needs because you can get the job done but not quickly and not inexpensively.

And so I hope that you will go back home and put some thought into what your R&D needs are, needs to check on contractors, needs to do jobs that you are currently unable to do or find very difficult to do, and come back to ETL and tell us about them.

Now I would just like to introduce Ed Roof, who is also from ETL, and have him mention a little about inertial survey, which is also one of our work units this year.

Mr. Roof: Through Ed East's efforts, we have obtained about \$22,000 or \$25,000 for this current fiscal year to give demonstrations of inertial technology at some selected sites to solve some of the Corps problems.



At the present time, our plans are basically sometime in May, we hope, if the system is back working again, when we bring it back to ETL, we will come through New Orleans and hit at least four of the districts in the Lower Mississippi River Division.

And with luck, I understand Rock Island also has a requirement probably to use the inertial, so we might try to hit them, too, later on in the end of this current fiscal year.

The beginning of the next fiscal year, we hope to put a full-fledged demo on. At the present time, we are looking at the Mobile District. They have some very interesting survey problems.

When we do these, we will coordinate them with the division survey coordinator and with the districts involved, and hope that they will notify the neighboring districts of the exact date.

The inertial technology, you just won't believe it when you see it. New Orleans just finished a contract with Span, and I think the Corps representative there, Don Eames had a chance to see how fast it works.

We put him in a vehicle, and he was gone and didn't get back until 10:00 o'clock that night. And he started from just North of New Orleans, went up to Baton Rouge and back, surveying all the way.

And if you tried to do that conventionally, you would be out there quite a few weeks.

Mr. East: That (inertial technology) is amazing. You get in a vehicle, drive it on top of those levees and obtain x, y, and z readings so quickly. George, did you want to say anything?

Mr. Downing: When the Waterways Experiment Station -- He said I could say two words, and I said two words, but since I have the floor I will take just a few more.

I did want to say thanks to the districts in assisting the Waterways Experiment Station in the R&D efforts. When something is being developed, it always goes through several stages.

First we have to find basic information, and for that we go to the districts. When we get something we want to try, again we have to go to the districts.

And so we have called on the districts in the past and will be in the future. And right now we are working on two, and I would like to thank the two most recent gift-givers, the Portland District, where we just finished working, and they supplied a boat and people, for a heave system development.

And we were trying with the Philadelphia District, on another type of heave system. So those are the two most recent, but I thought I would take this chance to thank you.

Mr. East: Thank you George. We will be talking about R&D all through the technical sessions and getting into a lot more of the details of these new equipment developments in those sessions. I urge you to attend these sessions, and to get the documentation for them if you have work that is applicable. I really challenge you to be "professionals" in this areas.

Now, I will let you folks sit down on the floor level.

#### Cartographic Services for Government Agencies

Mr. East: And now, for the record, I must mention that we are not allowed, as government employees, to accept any gratuities from the A-E contractors or equipment manufacturers attending this meeting. We do have a gentlemen, who is next on the program, who is from Lewisburg Penitentiary and I'm sure he would be very happy to have you accompany him back to Lewisburg.

That's sort of a bad introduction, so let me put that behind us, and introduce Mr. Chuck Sullivan, Superintendent of Industries at the U.S. Penitentiary, Lewisburg, Pennsylvania.

Some Corps districts have been advised of the services these folks provide, and have taken advantage of these services. But I am not sure how widespread their activities are. We were quite surprised at OCE that his agency even existed. I thought it would be very appropriate, since Mr. Sullivan did express an interest in getting the word out to all the Corps districts, that this meeting would make a perfect forum for that. So, Chuck, if you would come forward, please.

Mr. Sullivan: Good morning. I would like to take the opportunity to thank Mr. East and Mr. Miles for letting me come today and take a few minutes of your time.

I notice they have put me right close to the luch period, and rather than ask for animosity, I am going to keep it real short, simple and sweet and let you get out of here as soon as possible.

I am a representative of the Unicor, Federal Prison Industries. Our prime objective is employing inmates, giving them something to do besides sit on their tails and build some hard time.

We are a totally owned government corporation. We were formed in 1934. The government gave us \$4 million to start with. About three or

four years later, we paid that \$4 million back, and since that time we have been a self-sustaining, profit-making organization, I think the only one within the government.

We do not get an allocation or funding similar to what you people get. We sell a variety of products throughout the Federal System. We have got some 64 factories at 37 different institutions scattered around over the country.

We have six different divisions. One of them is the metal products. I happened to be here a while ago and saw on one of the slides, there was a lot of shelving shown, where you store various items. That is one of the primary products that one of my factories makes in Lewisburg.

I have some information over here that depicts these things. And I would like the opportunity to talk to all of you about it later. We have a data graphics division. And I am sure most of you have somewhere along the line purchased signs and related items.

We manufacture for the Forest Service, Park Service -- I used to be the manger of a sign factory in Atlanta, and we did a lot of work for the Mobile Corps of Engineers.

We have a wood-plastics division that manufactures solid-core and plastic-laminated furniture, office-type furniture. I am just going to touch on these things and go on so we can get out of here.

If most of you were in the military, I am sure you had a pair of black shoes somewhere along the line, and odds are that those were made at our factory in Leavenworth, Kansas. They also make the brooms and so forth you sweep everything up with, that you buy from GSA.

Textile Division, we manufacture Army blankets, towels, sheets, pillow cases, pajamas, and a lot of related items like that for the Veterans Administration. And I think we have sent some to the Corps at different times, what they call soil-sample bags.

So we are related and have been for a number of years. We have got a 50th Anniversary coming up here before very long, and we are looking forward to it.

The factory I have at Lewisburg, that is of prime interest. And the reason I am here is to tell you about the cartographic drafting. It is kind of in its infancy stages. The job has been there for some time, but it never really got off the ground. People didn't work at it and, like everything else, it takes a group effort to make anything work.

I have some samples of some of the work that we have done over here. We have accomplished quite a bit of work, doing various mapping for GSA, and we are in it right now for defense mapping agency, GMA.

And I have contacted one of your regions. We really didn't know about you people until, oh, some four or five months ago, when we got in touch with the Washington office, and we found out that you were widespread and that we could supply you with what we felt like were a whole lot of services.

Well, I contacted the Pittsburgh office, and Mr. Taylor was kind enough to give us some work. And I think we accomplished it to their satisfaction. He gave us some more, so it must have been pretty good.

And just like I say, we do all of the processing, compilation, cultures, swamps, the orchards, the whole bit. And, like I say, I want to cut this short and get out of here. I am kind of rattling off, but I am going to be here for the next couple of days, and I would like for you to look over what we have to offer. I have some booklets over here for the Unicorn, kind of advertising a little bit. And I will be here for a couple days and would be happy to answer any of your questions.

And you are welcome in our penitentiary (laughter) at any time. We try not to keep anybody overnight. We might offer you a free meal and show you some of the quarters where people live.

We do employ inmates as our source of labor. I would like to touch on one subject quickly. Contrary to popular belief, they are not slave labor. We do pay our people anywhere from 40 cents to a dollar an hour.

Now, that doesn't sound like a whole lot of money. But a guy making a dollar an hour in a penitentiary will clear about \$170 a month. And I doubt seriously that there are many of you in this room who can say flat out that they save flat our \$170 a month -- no room, no board, no responsibilities, no bills to pay. They haven't got it as bad as it sounds.

So, like I say, I will be here for a couple of days. I will be more than happy to talk to you about what we do. And if you have got any questions about a penitentiary, I have got a picture of one over here. I will be glad to put it up and let you look at what it looks like from the outside. Thank you.

Mr. East: Thank you, Chuck. From the gripes I hear about salaries and so forth, you may get some new customers.

We will take a break now for lunch until 1:00 o'clock, sharp. Thank you.

(Whereupon, at 11:30 o'clock am., the meeting was recessed, to reconvene at 1:00 o'clock p.m., the same day in the same place) - - -

## AFTERNOON SESSION

### MANAGEMENT SESSION 3 (1:05 p.m.)

#### General Corps Contracting Strategy

Mr. East: I guess we are a little bit late getting started, so we will get right into it. This third management session is a two-hour session. You will notice, the great majority of it has to do with contracting.

To start, I just wanted to say a few words about the Corps contracting strategy.

May I have the first vu-graph. We have an A-E contracting policy at headquarters, and I think some of you are probably familiar with it, so I will just let you read that.

Of course, we are heavy in OCE in the design area, and we haven't been paying much attention to the surveying and mapping aspect of contracting. But I think, if you take the A-E and substitute surveying and mapping, as would show on the next vu-graph, that it wouldn't be too hard to substitute surveying and mapping, and have the same policy as our goal. Next vu-graph.

I did want to reinforce the vu-graph that M. K. had prepared for background. I call your attention particularly to that last column, the hydrographic and the land-based surveying and mapping. Note that for hydro two-thirds of our work is done in-house and one-third contracted. It is just reversed for the land-based work. In introducing this particular subject, I wanted to scope it for you.

To clarify, there are some offices that are doing a lot more contracting than others, and there are some that are doing a lot less. But this is a composite of the contracting activities from all the districts that reported. Okay, next vu-graph.

I think what I wanted to do with this vu-graph is basically ask a number of rhetorical questions. When we look at contracting strategy it seems like there is no one typical district. Everyone seems to have their own unique problems, as far as the workload and the resources to accomplish the workload.

And so I think you have to ask, when you are developing your contracting strategy, "What is your situation?". What work can you contract? How much can you contract? How can you maintain an adequate in-house capability? How can you properly supervise the contractors' work? I believe, if you look at all of these questions, it probably gives you a good lead in to answering this final question: How

can you get management's attention? I really think that you need to answer these questions and document them. Then, with that information, go to your management. Next.

In the past, as most of you know, we have been using the A-E procedures to obtain the services of contractors for surveying and mapping. That has been the procedure in most cases. Currently, we are using procedures that range anywhere from A-E procedures through low-bid procedures. And there is admittedly tremendous confusion in the field. Unfortunately, we at OCE are a big part of that confusion.

In the future, though, I think it is all going to wash out. You are going to be seeing our surveying being contracted on the basis of the specific work to be accomplished, and the requirements of the state, as far as the registration law pertaining to requirements for that work. For example, will you need a licensed A-E? Will you need a licensed surveyor? And so forth. And we will be talking about that in just a bit.

Let's see. I want to go to Vu-graph 41. When I prepared this, I thought it might be helpful to have you run down this list and recall how we go through our A-E procurement process. Okay. And Vu-graph 42, I think we want to look at formally advertised procurements.

We know in the Corps we have construction contracts, supplies-materials contracts etc., and these are generally low-bid. We have service contracts that can be broken down into nonprofessional and professional contracts. I think we all agreed that when we are talking about surveying and mapping in the main, these service contracts are of a professional nature. I would like to go to Vu-graph number 44. I believe this vu-graph really wraps up what we are looking for at OCE, in the Engineering Division. But, I am sure that we are going to have some discussion about what other folks at OCE are looking for.

Under the A-E procedures, the considerations use in selecting firms for the A-E work is expertise, experience, capability, location and spreading the work. Those are the five basic considerations spelled out in the D.A.R., Defense Acquisition Regulation. And that has not changed. That continues to be the criteria that we use in selecting the best A-E for the work. There is no bidding in the A-E selection process. There is no low bid.

Now, I would like to discuss our professional surveying services contracts where we do not need a licensed engineer. I would like to stress that we in the Engineering Division at OCE feel that expertise, experience and capability are still, and should be thought of by you, as the prime selection factors. However, price now must be considered in these types of contracts. But that should be tempered by the complexity of the work. Notice that "location of the contractor" and "spreading-the-work" are not going to have to be addressed under competitive negotiation procedures in the same way they were under the A-E procedure.

Now, just to set the tone for the speakers who are going to talk to you about procurement of A-E services and professional surveying and mapping services, I thought I would try to demonstrate what we are talking about, and try to get some key parameters fixed in your minds. Maybe all these discussions will then be relevant to you.

I am very pleased to have present Mr. Bill McCormick, who is the Chief of the Engineering Division in the South Atlantic Division, and I will ask him to come up here and help me out with this little demo. I might also ask him to remain to provide input, or answer any questions that you might ask.

Bill, will you represent the A-E side, and just hold this sign up for a minute.

Jerry Yeager, if you would, just hold this sign up. And Jimmy Reaves, would you just come up here a minute? Okay. Now, Jimmy, if you just push this "price" sign along the connecting rope.

Now, on the A-E side, we are looking for the "best A-E" to do the work. We want the best job. And, Bill, if you would, turn that sign over. For A-E contracts we have a "No Bid" procurement. We select the A-E based on his qualifications. We want the best A-E to do the best job.

Now, in the Corps, something that characterizes the other end of the spectrum, the other end of the rope, is construction contracts. And we want those construction contractors to "meet job requirements". And we want the contractors to be responsive to the bid documents. We also want them to give us the "lowest bid". Okay. This rope represents the full range of procurement procedures we have available for our use.

Now Jimmy is going to represent you in the surveying and mapping procurement area. And he is going to make that determination of how close he will come to the "best A-E" end, or how close to the "meet job requirements" end. And you can see, there is a quite distance between each end of the rope. It is going to have to take a lot of good, hard thinking to determine how price is weighted into the procurement process.

I think Jerry wasn't too happy about holding up his "low-bid" sign. The procurement people that Jerry heads up have been really forcing us to take a harder look at price competition. And in some cases they have even said we must go to the lowest bid.

At OCE, we feel that the great majority of the surveying and mapping procurements are going to fit somewhere in between. But we can't decide, at OCE where they will fit. You are going to have to decide where the price factor comes in.

Public Law 92-582 (Brooks Bill)

Mr. East: This demo is my way of introducing our next speakers. I would like to introduce Ken Powers, who is the gentleman in the office of the Chief of Engineers who has the title Assistant Counsel for Procurement Policy and Regulations. He has had that assignment since 1978. Three years before that, he was in the litigation section.

Ken served in the Judge Advocate's Office of the Air Force between 1970 and 1975. So, Ken, if you would, come and explain something about the legal basis for all these things that we are doing to these folks, it would be really appreciated.

Mr. Powers: Thank you, Ed. We are not doing it to them, we are doing it for them. As you well know, in September of 1980, the infamous Circular EC 1180-1-171 was issued, which seems to have caused a ripple of discontent among some of the folks.

And what I would like to do first of all is to explain to you why that circular was issued and what it really means. What I would like to do is explain to you how this Circular EC 1180-1-171 came into being and what it really means.

Three events that occurred simultaneously caused us to look at our A-E selection procedures and the scope to which, or the types of work that these procedures were supposed to be used for.

The first thing that happened was, about January of 1980, the Air Force, for the first time, discovered that the Corps had an animal called an open-end A-E contract. And when they found out how it worked, they liked it. And they wanted one, too.

But instead of just asking us what authority we had for using this type of procedure and adopting it themselves, they went to the D.A.R. Council and they asked that the D.A.R. be changed to take the coverage that the Corps had in its Reg and put it in there so that all three services could use it.

Well, this required us to look at the scope of our A-E selection procedures, particularly as they apply to the open-end contract type.

The next thing that happened was the F.A.R. The F.A.R. is a Federal Acquisition Regulation. It is being written right now, and it is supposed to cover all Federal agencies, both D.O.D. and civilian agencies.

And what they are doing is basically taking the Federal Procurement Regs, which are the civilian agencies' Regs now, and marrying that to the D.A.R., and coming up with a brand-new Reg that will apply across the board.



Well, the problem is that the FPR has a definition of Architect-Engineer Services. It is the same definition that is found on the Standard Form 254 and 255.

But the D.A.R. did not have any such definition, so that meant that we had to take a look at that definition and make sure that it is broad enough but not too broad to cover the requirements of the law.

And the third thing was, and the most crippling thing to us, was DARCOM had a contract which was appealed to G.A.O. And G.A.O., in their infinite wisdom, came down and they ruled in favor of DARCOM. But in doing so said, "the army's only authority to use the A-E selection procedures was when they related to military construction contracts only."

So we went back to G.A.O. and told them that they were all wet and asked them to reconsider the case completely. But in doing so, we had to give them a huge legal brief to fully explain just exactly what the scope of the A-E selection procedures was and what their proper use as far as the Corps of Engineers was concerned, or as far as the army was concerned.

So in doing that, in taking a look at this thing, we found out that the A-E selection procedures were being used for procurement of services that in no way related to Architecture-Engineering Services.

For example, they were being used when we needed an EIS prepared. They were being used when we needed an Archaeologist to do a field survey. And basically they were being used for any type of professional services we needed when we didn't know where to get them from.

Well, that is not what the purpose of this, of the Brooks bill, which is the basic authority for the use of the A-E selection procedures, talks about.

So what we did, we went back and we took a look at the Brooks Bill, and we took a look at our earlier -- the earlier statutes authorizing the Secretary of the Army to procure Architect and Engineer services in the manner in which we do now; that is, without regard to price in the selection of the firm that we are going to deal with.

We thought that it would be -- it was apparently necessary to specifically set forth the circumstances under which the selection procedures were to be used.

Now, we took a look at the Brooks Bill, and the Brooks Bill talks about what A-E services are and who an A-E firm is.

Okay, now, all through this process nobody sat down and specifically thought about how this whole thing related to surveying and mapping. We were more concerned with the pure A-E versus those items that in no way related to A-E services.

What the Brooks Bill basically says is that A-E services, Architect-Engineer Services, are those professional services of an architecture or an engineering nature as well as incidental services, that members of these professions -- that is, the architectural and the engineering professions -- and those in their employ logically and justifiably perform. Okay?

And who is an A-E firm? An A-E firm is any individual firm, partnership or corporation, or other legal entity, which is permitted by law to practice the professions of architecture and engineering -- permitted by law.

We went back and looked at that, and basically what that meant was licensed by the states. So as a result of the issuance of 171 and the problems that occurred as far as surveying and mapping were concerned, we had to sit back and decide, "hey, are surveying services architectural or engineering services?" Particularly engineering.

"And are surveyors engineers for the purposes of this act?" Well, what we did was, we said, "How are we going to determine this?"

We went out, the first thing we did was, we talked to the professional firms. And they didn't know. Some of them said, yes, they were engineers and others said no, surveying has grown to be a separate profession. It is no longer part of the engineering profession.

Well, what we finally decided to do was to say, "hey, let's look at the state laws and see what the state law says a surveyor is." So we looked at them. We found out that all 50 states license surveyors, that 40 of them are licensed by the same board that licenses architects and engineers. And that board is composed of land surveyors as well as architects and engineers.

We found that some states -- four of them, to be specific -- define surveying as that part of the profession of engineering which -- and it goes on and describes what surveyors do.

So that didn't really do much for us except lend more confusion to the whole issue. So what we finally decided to do was to take a stand, and that is that since the profession itself could not determine whether or not surveying was part of engineering, we said it was not, it was a separate -- a separate profession, unless the state law said otherwise.

And therefore, surveying firms are not architectural or engineering firms, except in those states where surveying services are engineering services.

Now, that is the underlying doctrine we have taken right now. We have developed a proposed circular, which you have, and which M. K. Miles is going to talk about right now.

But that is how the earlier circular came to be, and that is how we have told you, when you questioned us, how we thought that the earlier circular should be applied.

Okay, do you have any questions so far? I know I left you hanging. But M. K. is going to pick it up. Okay.

#### Procurement of Surveying and Mapping Services, Proposed EC 1180-1-173

Mr. Miles: This doesn't seem like the highlight of the meeting, does it? Everybody is falling asleep and appears totally bored. We will give you a chance in a minute.

As Ken was saying, in your hand-out material you have got a copy of the Brooks Bill, for those of you who haven't seen it. It is on page 46. You also have a copy of Engineer Circular No. 1180-1-171 that Ken was talking about that came out in September of 1980.

You also have a copy of an earlier Engineer Regulation, ER 1110-1-1000, dealing with procurement of surveying and mapping services, dated October 1965, which was before the Brooks Bill, and which is, from a legal standpoint, still in effect, because it has not been rescinded. You also have a copy of the new proposed draft circular, with "draft" stamped on it, EC 1180-1-173.

Let me give you a little bit more background on what we, at OCE, have been doing in this area since September of 1980, when 171 came out and said to use only the A-E procedures for work requiring performance by an architect-engineer. Right after that came out, we started getting phone calls and letters. The Chief of the Engineering Division on the Civil Works side, and the Chief of the Engineering Division on the Military Programs side, sent out a joint letter asking for comments from the field.

We received about a hundred pages of written comments from all the Districts and Divisions. I attended an American Congress on Surveying and Mapping meeting in San Francisco and discussed this issue with them.

At that meeting I raised the question, "are surveyors engineers?" Of course, I got a mixed opinion from the audience. Some said that surveyors, particularly the boundary surveying types in that society, said that surveyors are not engineers; surveying is a unique, distinct profession.

Some of the engineers in that society, that do a lot of surveying work along with their engineering work, said that surveying is part of engineering and always will be.

So it was at that point that we realized that the societies that usually take the lead in such type policies were somewhat split, and we couldn't look to them for any type of standardization. Then as Ken said, we looked at the state registration laws.

We have also met with the societies again recently, just before Christmas. We invited the American Congress on Surveying and Mapping, the American Society of Civil Engineers, the National Society of Professional Engineers, the American Consulting Engineers Council, and a new organization you may not be aware of called COFPAES, which is the Committee on Federal Procurement of Architect and Engineer Services.

These five organizations, with their Chief Counsels and Executive Directors came in for a meeting. They met with all these speakers, except Mr. McCormick; also the Chief Counsel, the Chief of the Engineering Division, and people from our Military Programs Directorate.

We discussed this in quite a bit of detail. They asked us to delay issuing this Circular 173 until they had time to prepare written comments, a combined set of comments, from all five of those societies.

They recently got back to us with about an 80-page document of their comments that we got just before we came down to this meeting. We were supposed to get it the first part of January, but because of their coordination problems with five different societies, we just got it last week. We have not been able to fathom through that document to determine how it will affect this draft circular.

So just keep in mind that this draft circular is just a proposed draft. We still have to meet again with those societies which, hopefully, are representing the entire surveying-mapping-architect-engineer industry, before this goes into effect.

Therefore, we have it dated 1 March 1982. If they present no arguments of any substantial nature which cause us to change our train of thought, the circular that you have will probably be issued on 1 March 1982. It is on page 53 of the hand-out material, if you want to look through it.

Basically, it relies on the state registration laws, as Ken said. In the background statement, it defines what an architect-engineer is, as Ken recently discussed.

It leads up to why we are using the state registration laws to define the difference between engineering and surveying. It specifies that all states register surveyors and all states register engineers.

In this area, one of the districts had correspondence from one of the state surveying societies. In the past we have procured surveying services through the A-E process, where we state in our CBD announcements that we require a registered engineer to perform a particular type of surveying service for us. When the state registration law says that these are clearly the duties of a registered land surveyor, and the state registration law defining engineering only mentions the work "surveying," whereas the definition of land surveying in the state is two pages long and covers everything imaginable.

The Mobile District got one such letter from the State of Florida Surveyors Association.

So we have mixed opinions coming to us. Surveyors saying, "don't require an engineer, because you eliminate me as a surveyor, and I can do the work, and the state says I can do the work." So you have to understand all the implications that this policy has from all directions.

On the second page of the document, we actually go into the policy. As Ken said, as of this time, a review of the 50 registration laws clearly finds four states defining the surveying profession as being a part of the engineering profession. In those four states, we have no choice but to consider surveyors as engineers. They are defined that way. So in those four states, surveying services would be procured through the normal, traditional A-E process.

But in all the other states, when you have a work requirement to be performed in a certain state, you would first look at the definition of surveying in that state and the definition of engineering in that state. You, the person with the requirements, being a professional, and hopefully a licensed surveyor and a licensed engineer in that state, and understanding the implications of the law and your work requirements, should identify which of the two professions should perform the work for you.

If those laws are not clear, and in many states where they haven't recently revised the definition of surveying, the law is very unclear. It may only be one or two sentences long, and you can either draw from it that it covers everything in the realm of surveying or it only covers the part of surveying dealing with property line surveys and making plats and legal deed descriptions.

Then you would have to turn to the engineering definition and see if the engineering definition covers the type of surveying that you need to contract for.

This decision is made at the district level by the professional people with the requirements, usually the survey function in the engineering or con-ops divisions. The procurement people at OCE have agreed that these are the people at the district who should be making that decision.

The engineering division at OCE has worked very closely with procurement and the legal office at OCE in developing this document. It is well coordinated at OCE, and I think we all agree on the content.

I don't think that is necessarily the situation at the district level between procurement, legal and engineering. But that is the situation at OCE.

The problems comes when you have to make a judgment based on those two registration laws. If it is not clear to you and you have to make a judgment, then you should have a good reason for the decision that you make.

We have decided to support that decision. You don't have to forward that decision up through channels to see if we agree. Simply make that decision.

The only time anybody in the chain of command will look at that decision is if the contract is protested and an investigation is made. Then we will look at your decision, and hopefully you would have made it based on this policy and state registration laws.

Secondly, down in Paragraph C, we attempted to define the background and nature of surveying and mapping, so that if the architect-engineer procedures are not used, the competitive negotiation process outlined in the D.A.R. in Section 3 would probably apply.

These competitive negotiations must include price as one of the evaluation factors in the selection process.

As you can see from the last couple of sentences of the EC, "Technical Evaluation factors should be developed by requirements personnel. Relative importance and weight of all evaluation factors, including price, should be developed jointly by requirements and procurement personnel."

I don't think this is the way it is being done now, but this is the way we perceive it being done.

#### Competitive Negotiations

Mr. Miles: If you would hold your questions until after Jerry talks, all of us will answer your questions. We want to recognize people from the floor to talk about the experiences they have had in the divisions and the district offices.

Basically we have the feeling that you are not as familiar with the competitive negotiation procedures as you should be, and that is why we have asked Jerry Yager, the Chief of the Office of Contracting Policy at OCE, to fill you in on competitive negotiation procedures.

Just a little background on Jerry. He has been with the Corps since 1977. Before that, he was with the Naval Air Systems Command, NASA, Assistant Secretary of the Army for Installations and Logistics and the Army Research Institute. He has been the Chief of the Office of Contracting Policy since it was organized in 1977. In addition to serving as a focal point for procurement matters in OCE, his overall mission is to upgrade the competence and performance of the procurement process of the Corps. He is very interested in making the Corps

procurement profession more of a profession, just as I am concerned with making the surveying profession more of a profession.

So, with that, I would like to have Jerry talk to you about competitive negotiations.

Mr. Yager: Thank you, M. K. actually, I would like to talk more to you about competition, because it is here, in services and surveying, and you are going to be seeing more and more of it.

One of the papers in your hand-out is a letter from Donald Soble, Office of Federal Procurement Policy, in which he emphasizes competition. He addresses architect-engineer procurements, but he is really speaking about all service procurements and he says he is going to look for considerably more competition in the procurement of all services. Page 45.

There has recently been an acquisition letter (A1 82-2) issued by the Department of the Army, as a result of pressure from the Office of the Secretary of Defense, which addresses increasing competition also.

And it has every one of the defense agencies appointing a competition monitor. They are looking for someone who will develop a plan for each organization within the Department of Defense and send it forward for approval.

We don't know what we are going to do with that. It is mainly addressed to weapons systems. It talks in terms of weapons-systems-type procurements and refers to various Department of Defense instructions which deal with weapons systems acquisition. It also talks about spare parts break-out and those sorts of things. As you probably know, in the Corps, especially in construction, competition has been a way of life; formal advertising has been a way of life.

More than 50 percent of the dollars of everything we buy is through formal advertising; it is a higher percentage which is competitive including other than only formal advertising).

In the acquisition process including procuring of services, flexibility is the keynote. I felt kind of funny when Ed had me hold up that sign before, because I have not been saying we ought to buy these services, S&M through formal advertising.

What I have been saying is that if applicable, if the situation warrants and the ingredients are there for formal advertising, then of course it should be used. That is the policy of the Department of Defense; that is the policy of the United States Government.

If the ingredients are not there; if there are reasons why you can't use formal advertising, why you need to negotiate, then by all means, use negotiation as the procedure.

Within both kinds there are various alternatives and methods available to you. Within formal advertising, there is two-step formal advertising. This may be a strange term to most of you, and I won't attempt to give you any detailed discourse now, but it does permit you to examine how contractors propose to perform your requirement before you ever look at price.

And once you have determined that they can do it, that they have the capability and the competence to do the job, and you get rid of those firms that are not capable and not competent, then you have them bidding.

In effect you are saying that any of these firms that we select can do the job; we will take any of these. And then price comes in. And that is formal advertising, a form of it.

There are basic ordering agreements that are obtained through formal advertising procedures. There are a number of alternatives available. It is not all low bid as we do in construction.

In the negotiation area, we have an even greater range. Again, flexibility is the keynote. Unfortunately, there are too many people in the Corps, procurement and technical, who don't have a range of experience in these alternate types.

So we have a training problem and experience problem on our hands. We are not sure how we are going to deal with it in OCE.

We know what the problem is. Dealing with it specifically becomes even more of a problem. We will be addressing it shortly. If there are any ideas that any of you have, or might have later, please let us know. We are open to any and all suggestions as to how we can accomplish that.

I received something just before coming down here that may be of interest to you. We issued a TWX that M. K. put out a while ago, last spring, that talked about size standards.

With these kinds of services, we said you should use the \$7.5 million level set forth in the D.A.R. that was later challenged. It was challenged with a procurement that was on the street when that notice went out, which was changed from the two-million standard to the 7.5 million standard.

The SBA, size appeals board, found for the complainant and said that the two-million standard should apply; that is, any company that had done more than \$2 million worth of business as an annual average for the past three years was considered large business and could not bid on the small business set-aside.

We did not do anything with that ruling because we didn't have the SBA's reasoning. It took from then, which was August, when they put out



their decision, until yesterday, for them to complete writing it up, have it staffed and release it.

It looks like we are going to have to issue something changing the standard to the \$2 million level for surveying that the size appeals board put out. We do not know yet whether we are going to appeal that decision.

But, as I said, this just came in before I came down here, and we haven't really had an opportunity to discuss it. I have talked informally with a few people in OCE, and the consensus I have from those few is to leave it alone, let the \$2 million level apply, and then perhaps some larger firm might protest, and that will give G.A.O. or the size appeals board perhaps, another opportunity.

Well, that is about what I had to say. There are a lot of questions that will be coming up.

#### Implementation of Contracting Policy

Mr. East: We are going to open it up for questions. But first, I would like to get some input from some people that I know have some specific things that I think will be of value to us all.

Jimmy Reaves would you tell us some of your experiences in contracting for surveying and mapping services at Mobile?

Mr. Reaves: Are you talking about going by the competitively negotiated?

Mr. East: Yes. Would you come up here? Maybe that would be better. I should have had you stay up here when you were pushing that "price" sign across the rope.

Mr. Reaves: I am Jimmy Reaves, from the Mobile District, Chief of the Survey Section. Actually, we don't have a survey section, we have changed our name to the Cartography, Geodesy and Photogrammetry Section.

We put together a package to try to comply with the EC, and to come up with required surveying services for the district in a competitively negotiated contract form.

We had four categories that we recommended for evaluation in the technical area and one for price. Weights that we suggested be used, were 80% technical 20 percent for price.

This went up to procurement and supply, and there was some discussion on it. After several months, it was finally advertised in the CDD. It was still a competitively negotiated contract at this point.

Approximately two weeks after appearing in the CBD procurement and supply put out an amendment that made it a low-bid contract. Price was a hundred percent, technical zero, we were allowed to say if the ones referred to us were technically qualified or not.

It was just awarded last Friday to a contractor. I have no doubt that the contractor will try his best to comply with the contract. But when you have an extremely unbalanced bid, I don't see how the contractor can meet all his obligations in some areas, because the prices that were quoted on some parts of like \$25 a day for a registered land surveyor seem to be just a little bit unrealistic.

I think their procedure could work if we could get them to establish agreeable weights and stick to them thru award of the contract. In the beginning we tried to get them to set up how we would weight things, how they would be evaluated, what part price would pay, what part technical would play and agree on the weights and everything else on the front end.

This is the only way that I think it can work. I think that some divisions or some districts have awarded some of these contracts, and I am not sure how they have come out on them.

I know, on the A-E contracting that we have had before, we have had some bad contractors. If you have done contracting work, you are going to have some bad contracts, or bad contractors, or inefficient contractors -- I don't want to say "bad" -- nonproductive contractors.

Just because a contractor can perform under A-E procedures contract doesn't mean he is going to be able to perform under the competitive or a fully competitive contract, because he goes into a different posture. You are talking about a different game altogether.

The name of the game is: Make money. I will guarantee you that if you start losing money, you are going to find some way to cut corners to get your money.

The contractor is in the same position. They can't stay in business without making a profit. They have to make a profit to exist. Anytime you get an unrealistically low price for a contract from a contractor, you are in a no-win situation. This is my opinion, that you have to have a reasonable price to get a reasonable product.

It may be debatable, as to what the reasonable price is. I am not arguing that point. But it can't be so low that the contractor can't make a profit and can't furnish you the services you need.

The Corps, I think, realizes that just about everything that they do starts with surveys. You can relate that to the foundation of a building. If the foundation is bad, eventually the building is going to fall.

Unless we have some means of providing adequate surveys, it is going to be downhill all the way from here.

Mr. East: Jimmy, I think you have expressed the basic concern a lot of people share with price coming in - and even prices from the top five A-E's - and what the impact might be on the quality of that product.

Is there somebody from Charleston here? Can you address this issue, where surveying was low bid?

Mr. McCormick: Although I am not prepared to get into any detail, I could talk about some of the problems. I will just relate to you a little bit about what they told me their experience was, to fill out the program here.

Charleston did invite proposals, or invite bids, on some surveying work, received quite a number of bids. I don't remember the number, but there were a lot of firms that bid.

The low bidder was a firm from New York that really isn't in the survey business, as I understand. It is what we call a broker, who planned to do the work by sending people down to South Carolina. That was his plan.

But he made one little slip between the cup and the lip. His employees were expecting to be paid per diem from, New York I guess (and I don't know the details) but he was unable to, because that was not covered in his contract.

So for one reason or another, had been unable, when I last talked to the district, to field any significant number of people. I think they were just in the process of giving him some pretty firm directions as to how many parties he had to field for the coming week and see whether he could produce or not. But the feeling was that he might not be able to pull it off at all.

That may not be very accurate statement, but I think that is about it. They wound up with a contractor who -- I think probably was very sorry he got the job.

That is probably enough said there. It was probably a misunderstanding of what was required somewhere.

Mr. East: It was low bid?

Mr. McCormick: It was strictly low bid, no prequalification.

Mr. East: You can see the confusion we are having in the field. I talked to somebody just before the lunch break, from Jacksonville. Is

that gentlemen -- would you come and tell us your experience in Jacksonville. And when you do, would you introduce yourself and your office.

Mr. Lockhart: I am George Lockhart from the Jacksonville District. I am Chief of Specifications Section there. We do, along with Procurement and Supply Division, the A-E Contracting, and more recently the competitively negotiated contracts.

We have been through the process on one contract so far as surveying and mapping goes. And in the beginning, we were fortunate, I guess, in having the experience of some of the other districts, like Mobile.

I talked to quite a few people that have been through this, as far as the weight factors go, and we established weight factor where pricing was not a hundred percent of the selection.

We have yet to make an award on it because of a protest, which is still being resolved, which is another problem in these types of procurements.

But I think that in the process we went through, we did get firms that were capable of doing the work. Now it remains to be seen if they can do it for the price that they have given to us, because in one instance, we were able to compare the price that the contractor proposed, with what they had previously done for us under the A-E procedures, and there was a significant amount of difference.

And so we really don't have the experience of how they will perform. Certainly you do have to give price consideration, but it should not be a hundred percent. We had it around 20, 25 percent, somewhere like that. On the initial selection, we used that criteria. From the people within the competitive range that submitted best and finals, low price was the governing thing. We felt that this was appropriate, because within the competitive range we felt that technically the firms were pretty well equally qualified. There really wasn't that much of a distinction between them.

And so that is where we are in that process. We have used it on a couple of other contracts, one for some vegetative mapping. Here again, we are in the process of making an award on that one, so we don't have the experience of contractor performance. And there was, once again, a significant price difference in the low contractor and, for example, the government estimate of what might be a bid range.

The contractor's qualifications look very well to do the job. But that question mark is still there, as far as I am concerned, about: are they going to be able to perform for what they offered to us? And we will learn that soon enough.

Mr. East: Thank you. Are there any districts here that have used the competitive negotiation procedure successfully and had that experience? Yes, sir. Could you come forward and talk to us.

One thing I think, Jerry, we want to do is show you what the impact is, on having price as a factor. We would like this to come through to you, so that when you are talking to your people in the field you will have a better understanding of the problems that our engineering construction and operations people are having.

Mr. Blackwell: I am Mickie Blackwell. Am I coming on too strong? (Laughter) I work in A-E contracts in Tulsa. And I know there's other guys who are doing the same thing. Why didn't you hold your hand up? (Laughter)

But we used the competitive negotiations for about, I think, five surveying contracts, and we are using them for archaeology work and studies. And we have been real successful with them.

Well, one thing, we have got good procurement people. And I think this has a lot to do with it. They did not make us take the low bid.

And we did the same thing, I think, that Mobile did, set up a guideline on a factor. We used boundary surveys, but we gave them a higher technical expertise percentage, with price not coming in quite so heavy.

And on, well, a plain old tilt range, we call them, survey, we let price come in a little heavier. And in doing so, we got a low bid, and we got a good contractor. But he really got burned. And we have had to have inspectors out there, because he was trying to get a modification.

And after it was over with, he admitted he came in too low. And he says, "I really lost money. I got burned on this job."

So if you have got adequate people inspecting it, you have got a good contractor, he says he will do what he says he is going to do -- if you get somebody who is not going to follow the specifications or in some way they can get around it -- but in our boundary work, we have been real happy. I think we had good contractors.

Mr. Vanhaverbeke: How did the prices you got -- how did the prices compare from what you got previously by negotiating?

Mr. Blackwell: The prices were pretty much in line. You mean with --

Mr. Vanhaverbeke: Negotiated versus low-bid type.

Mr. Blackwell: This is on the boundary work? We had some that were so low that we -- they were not in competitive range. Some were extreme. Some were real high.

Mr. Vanhaverbeke: It disturbs me that apparently somebody somewhere seems to think that the previous method of A-E selection, negotiating, that price was not a factor. And I don't understand that, because 'most everybody I know who was dealing in this who is competent in surveying, they know about what it is going to cost.

Once you select an A-E firm, if he doesn't have the price, he doesn't get the job. And most people I know who I deal with, the whole idea was to get the product you wanted at a reasonable price. And you know what a reasonable price is.

And in my experience, we have had maybe two contractors over a period of years who bid low on something, and it was their own fault. I never heard anyone say any different, so I don't really understand why they want to go this other way, when I am perfectly willing to bet that on the average you are going to come out about the same.

Mr. Blackwell: I see what you are saying.

Mr. Vanhaverbeke: And the second thing that disturbs me is the connotation I am getting, it is coming from somewhere, on professionalism. For one thing, for instance, when we are required in A-E procedures to consider them professionals, and we can do it in-house, and nine cases out of ten you can perform it, but when you don't have the professional position, you can't.

Plus, who has determined that an engineer is a surveyor? In most states an engineer is not allowed to practice survey. Who wants a professional engineer in there? He wants a professional survey person.

Mr. East: Ken, can you address that? You pretty well addressed it in your opening, but maybe we need to cover it a little bit more.

Mr. Powers: Okay. To answer your first question first, about why do we have this change, you know, why it is necessary to go through this process, when we are not getting any better prices, okay, for one thing, when you use a competitive negotiation procedure, price, even though it is a very small element, becomes a factor in selecting the firm you are going to negotiate with.

Mr. Vanhaverbeke: Does that seem smart to you?

Mr. Powers: Now, wait a minute. The engineers at OCE have been unanimous in telling the lawyers, "look, if there is any way on God's earth we can continue to use the A-E selection procedure for surveying, we want to do it."

So it is the lawyers who have been telling them no, they can't do it, that the Brooks Bill, which allows the A-E selection procedure's use at

all says: Engineers only. And that does not include surveyors, unless surveyors are engineers. Okay.

So now, your second question about why do we get the engineers into it, that is why, because the Brooks Bill applies to architects and to engineers.

And unless you can call surveyors or surveying engineering, you can't use the procedure on it. Okay.

Mr. Long: I am J. T. Long, Little Rock District. Sometimes I wonder if we are not "swallowing a camel and straining at a gnat" on many of these items. I have a couple of ideas and comments I would like to make. We have had the same experience as Messrs. Blackwell and Van Haverbeke on the wide range of fee proposals on our competitive negotiation contracts. We have negotiated several of these type contracts and we always prepare a Government Estimates so we can evaluate the reasonableness of the fees proposed by the contractors. Even though the contractors prepared their estimates using the same specifications and scopes of work, the wide variations in price are unreal. On one contract we had a Government estimate of \$70,000. We have had these type contracts for the last 15 years so we feel that we know what the cost should be. On this particular contract, we had proposals ranging from \$30,000 to \$290,000, which makes it extremely difficult to evaluate proposals with that wide of a range.

The second item I had which is more closely tied with the "swallowing a camel and straining at a gnat" is in the area of the Corps' application of the registration laws in each state. As an example, back in 1845, Mr. Jones, the surveyor for the Bureau of Land Management (BLM) was surveying the public lands in the western part of Arkansas. Because the lands were described and should be surveyed under the same laws he could also survey in Oklahoma. But now, the Corps, in our infinite wisdom, says that if in one state they consider surveying a part of engineering you can use the A-E Selection Procedure, but if the adjacent state does not consider surveying a part of engineering you cannot use the A-E Selection Procedure, but must use the Competitive Negotiation Procedure. This could mean that we would have to have two type contracts for surveys in adjacent states if we used that type of logic.

Mr. Powers: Okay. I can respond to that, too. If you have a situation where you have got conflicting state laws, what you should do is, you follow the highest state laws.

In other words, if one state requires performance by an engineer on the surveying work, and the other state does not, then you use the A-E Selection Procedures in that instance, because part of the contract required an A-E.

Mr. Anderson: My name is Dennis Anderson, Fort Worth District. What state would they be licensed in?

Mr. Powers: He would have to be licensed in both states, but that has got nothing to do with us. That state law says: Professionally licensed to practice, you know --

Mr. Anderson: That is certainly going to limit your competition, though, that that's

Mr. Powers: No.

Mr. Anderson: You are going to severely limit the competition, if you deal in five states, like we do, because it is not a simple matter of one state or another. It is five states.

Unidentified Speaker: Right.

Mr. Anderson: And that is going to severely limit the competition. And I thought that's what we were headed for with the new procedure -- more competition.

Mr. Powers: Okay. We, of course, faced that. That has got nothing to do with these procedures at all. You know, each one of those five states has laws that require surveying that is done in their state be done by a licensed surveyor in their state.

Mr. Anderson: Unless it is official pursuit of official business for the federal government.

Mr. Powers: No. The way that usually reads is that government employees are exempt from the licensing requirements.

We could do none of two things very easily. You could get a surveyor who is licensed in the state that he needs to be licensed in, or he can come in, as a guest, and most state licensing laws allow out-of-state surveyors to perform specific projects, you know, by just notifying the registrar that they are going to do it.

And there are certain limitations on it, without having to become specifically licensed in that state. But see, that has nothing to do with us. You are going to have that problem whether you use the A-E Selection Procedure or not.

Because, if you practice without a license, it is malpractice, and you are subject to the state laws precluding that.

Mr. Taylor: I am Tom Taylor, Pittsburgh District. I think we are mixing this licensing and surveying up. We are mixing apples and oranges. I think there are a few licensed Pennsylvania surveyors here.

In Pennsylvania, you only have to be licensed to do land surveying, if you are going to earn a buck. All other surveying can be done by



engineering firms, A-E Firms, which is what I think is addressed in the Brooks Act when they say incidental services.

And I think that would put all other surveying but land and boundary surveying into the negotiation series.

Mr. Powers: Okay. Pennsylvania is one of those four states that defines land surveying as part of the profession of engineering, so in Pennsylvania all surveying is engineering by definition.

The other states are Ohio, New York and Connecticut.

Mr. Marvin Taylor: I am Marvin Taylor, from Omaha. Have you taken into consideration the Bill presently before Congress, dictating the A-E Procedures for the Interior, and so forth, when they are setting up the Federal boundary?

They are dictating by law the A-E Procedure. So, to me, it is kind of irrelevant that, through the boundary surveying, you can follow that which, to my knowledge, will soon be passed, or you are doing surveying which is already covered. We are whipping a dead horse.

Mr. Powers: Okay. I am aware of that Bill. A similar situation occurred in 1979, when Congress was considering passing the Federal Acquisition Act, which was a procurement statute which applied to everybody.

And Senator Church, from Idaho, sponsored an amendment to the Brooks Bill as part of that act, which would have stated that surveyors are covered. In other words, it would be architects, engineers and land surveyors.

The fact that both Bills were introduced is an indication that their sponsors believed that the Brooks Bill does not now cover surveyors.

Secondly, even if it is passed, it does not apply to D.O.D., it applies to Interior, in the specific situation.

Now, we have talked to the professional associations who are the ones who pushed this thing, and told them, "look, just get that language, you know, just get Interior's name dropped out and put in 'Federal Government' instead, or include D.O.U., and everything is going to be fine. We go back to our way of doing things and everybody will love it."

They said that they would see what they could do. But in the meantime, we are stuck.

Mr. Vanhaverbeke: It seems to me that the intent is what you are really usually involved with in the law, and obviously the intent of the law is to have the proper professional doing the related type of work.

At the time that surveying was not separated out as a separate field, it would be like saying, you know, we've got a lot of laws about horses and buggies, and we have got airplanes now.

Mr. Powers: Okay. That is exactly the thrust of the surveying associations' response to use on that circular. They have pointed out that if you look at the legislative history of the Brooks Bill, it said the whole reason for the creation of a law making that type of procedure applicable to non-D.O.D. is the fact that so much hangs on design. You can't skimp on design work or you are going to pay for it later on in construction.

Well, the same thing, of course, would apply to surveying. You don't skimp on surveying or you are going to pay for it later in design and construction.

So that is one problem we are wrestling with, and I don't have an answer to that, except that is absolutely right. But the law doesn't say "surveyors."

Mr. Tom Taylor: The Brooks Act does say that you may go the A-E Procedure if the services are incidental to A-E work. I am sure you have all reviewed this. And that is a problem in our district.

It seems that it is incidental survey work, when we include it in the contract work for a bridge or a highway or whatever it might be, or a dam site. But it isn't incidental if it is a branch or a section, put out under contract ourselves.

Now, who makes that decision? How can you split up professional work and one time call it incidental and another time call it not incidental?

Mr. Powers: Okay. The Brooks Bill does talk about work being incidental and allowing A-E's to do it. But it talks about it being incidental to A-E services, and if so, then it is to be performed by an engineer or an architect or somebody in his employ.

So, in other words, if you have got surveying, just as you said, to be done, and you put it out on the street with an A-E Contract as part of that contract, then, of course, you go the A-E route. You get an A-E to do it. No licensed land surveyor can do that work.

Now, as to your question as to why is it incidental on one hand and not the other, you could argue that surveying is always incidental to the professions, to the profession of engineering or the profession of architecture.

But it is not talking about incidental in that framework. It is talking about incidental to the work to be performed under a certain contract.

If you put out a survey contract, where you want surveying to be done, then, if there is some other type of work that is going to be done with the surveying, that work is incidental to the surveying. The main thrust of the contract is surveying.

In an A-E contract, the main thrust of the work to be done is either architectural or engineering work. And the incidental, the small, separate, you know, other work, is surveying.

Now, there can be other incidental-type work than an A-E does as well. We could require that he get an archaeologist to do an archaeological survey as an incidental to the work that he is going to do.

If we are going to build something right around an historic site, we have got to cite it, so, as you know, to miss destroying anything of significance. And if that is lumped into a single contract, then the archaeological services are just like the surveying services, and incidental.

Mr. Miles: We are going to have some more time for questions in a minute, but first Jerry Yager would like to make another remark.

Mr. Yager: This is in response to some of the comments that were made earlier. They were saying that you don't see how some of these companies are going to be able to do it for the price, they will lose money, do a bad job for us.

I have known enough architects and engineers to know that generally, once that price is set, no matter how you set it, the name of the game is to make money.

And whether you negotiate the price on an A-E selection, or if you do it through formal advertising, or any method in between, once the price is set, the name of the game is to make the money. They will cut the corners, they will do anything they can to make the buck.

So just because you negotiate it as you would an A-E contract doesn't guarantee that you are going to get the job you think you are going to get. And lord knows, we get enough bad jobs to prove that out.

What is this procedure, increased negotiation, going to have on you? It is going to make you develop more definitive specifications; certainly not as definitive as a gnat's eyebrow or anything like that, but a lot more than has generally been the practice around the Corps.

When you are dealing with an A-E firm, many times the first thing you talk about is: What is the firm going to do and how do you spell it out?

Well, you are going to have to do that. It will not be easy. No one is saying it will be easy. But it is something that is going to have to

be done. It is done in other engineering professions and has been for many, many years.

As you heard from my Bio, I spend a lot of time with a materiel command with the Navy, working with aircraft and missiles and avionics. And I guarantee you, working on the edges of the state of the art, engineering people who were working up specifications for development trend to be specific as possible, recognizing that many time they couldn't be because they just didn't know what to expect.

But you have to get it as best you can. And what we are saying in surveying is, there is a whole lot better you can do. Now, maybe you can't point out every location in advance where the firm is going to work, but you can identify the teams he is going to need, what they are going to cost; and maybe you can't identify time until you get to it, but these are things you are going to have to look to.

Government estimates -- if you were at OCE and had the advantage of being able to see a lot of the responses or the results that come in between government estimates and the prices at which the contracts were awarded and some of the ones which were finally finished after changes, you would see that there is often, often a great disparity between the government estimate and what the price is.

When you go at it competitively, there is an even greater difference. We always take a reasonable price. That is our mission, a reasonable price. No matter how we obtain it, through negotiation or through formal ad, the contracting officer must certify that the price is reasonable.

It can be a very low price and still be reasonable. The firm could even lose money. One of the things you look at is his responsibility, that is, his ability to lose money, his ability to do the job.

But, you know, that is his game, That is the contractor's game. Certainly we can question him if his price is way too low, if he is out of the competitive range, because he is too low or too high. Yes, that is a proper thing to question.

But once it is set, that is his job to do. And our job, or your job, is to make sure he does it. It is not easy. It is not going to be easy. But, as we have shown you, that is the way it looks like it is going to be, and it is going to get worse.

Mr. Miles: During the development of this guidance, we have had a lot of conversation and contact with the Lower Mississippi Valley Division (LMVD). Is anybody here from LMVD, or from New Orleans, St. Louis, Vicksburg or Memphis? We have had a lot of trouble in Memphis. Who would like to summarize what experiences they have had with recent contracts?

Mr. Selvo: My name is Billy Selvo. I am with the Memphis District Geotechnical Engineering and Survey Branch. Last summer, in '81, we awarded two surveying contracts. One was awarded in July and the other in August.

The problems we have had have stemmed primarily from the way our contract read. In the past, when we had A-E-Type negotiations, we generally used the same wording of the contract, and we really didn't have any problems. The prices were generally fair and reasonable, such that things worked out pretty well on both ends.

When we went to the competitive bid-type procurement, we ran into problems from the onset. One of the first problems involved the paying of per diem. We had quite a few jobs that in duration would only require three or four days' work.

In the contractor's proposal, the intention was to pay, per diem to only several men on the party, such as the party chief and maybe an instrumentman. This in turn resulted in a very large turnover of the contractor's employees and created quite a problem with absenteeism.

As we moved from location to location, with the contractor not paying his lower-rated employees any type of per diem, there were not willing to travel. So in essence we had quite a turnover, which resulted on our end, as just a big training program. We found ourselves having to suffer through the training of three or four new men daily or weekly.

Generally, that is one of the bigger problems we have had -- the wording of the contract. Before, where the execution of the contract was a little smoother, now it seems to be strained.

Because of the low bids, we found the contractor, trying to cut corners on different issues. Our contract was ambiguous in certain terms and now it seems even more so. The contractors were challenging some of our wording, and it got to be a day-to-day battle on the interpretation of the contract.

Right now we have had a little better success, since we have been working about six months. But our workload now has really gone down, so we really aren't operating more than one or two parties, and that really simplified a lot of the matters.

I think in essence what we are going to have to do this next year, is concentrate on and rewrite a lot of the wordings and provisions in our contract, to compensate for some of the problems we have had in the past.

Mr. Miles: Let me get back to one point we mentioned a little earlier, about negotiating the specifications or negotiating the scope of the work. Some of you talked to me on the phone during the development of this guidance and said, "we don't have any in-house capability in the area of photogrammetry and we need some photogrammetric mapping done. We

have to get an A-E Firm on board and sit down at the negotiating table and let them tell us what we need in terms of photogrammetry. We can't write the specs, so we have to get an A-E that we can trust to tell us what we need."

When it gets to that point, it is pretty bad. We have got to maintain in-house expertise. I want to make this clear, because I think this happens. We depend on the A-E firm to develop the actual scope of work instead of relying on our own expertise.

Since the New Orleans Districts contracts roughly \$10 million of surveying annually, perhaps somebody from New Orleans who could give us some idea of the successes or failures they are having during this transition period.

Mr. Eames: I am Don Eames, Chief of the so-called Precise Survey Section. It is kind of a misnomer. But anyway, I represent what is left of the in-house surveyors.

And we have had some of the same experiences that Memphis District brought out, a very similar pattern there. We recently had one contract to do all of our revetment work. And they came in with something like about one third of the price that the revetment contract was the year before.

And it was something -- the figures were something like -- I think it went from, I think, \$1,200,000 down to \$400-and-something-thousand on one contract, this latest contract.

When we got into it, we ran into all kinds of problems with them not being able to perform satisfactorily and give us the things that we wanted.

But here again, like Mr. Yager said, and like Memphis District's representative reiterated, I think a lot of those problems we brought upon ourselves, by not being specific enough in our specifications.

And I think we really have to take a lot of that blame for ourselves. And that is something that I, too, here, would like to really reiterate, is the way the procedure is going to be -- it looks like it is going to be going.

We are going to have to be very, very definitive, I believe, and spell it out. If you want something, make sure it is in the contract, and don't go blame the contractor if he doesn't give you what you want if you didn't get it in there, because I think that is very important, to spell it out, just what we want.

We have got nobody to blame but ourselves if we don't get it and it is not in the contract. Being in the section that I am in, I am not too

well briefed on contract procedures or anything. What little I know I have sort of gotten through osmosis, I guess you would say.

But one interesting comment, I think some gentlemen here, I heard him talking about how -- asking the question about how did the prices compare going the A-E versus competitive negotiations or low bid, I think it was.

Well, we have one classic example of that, where we have one contractor that we got through the A-E, the old A-E Selection Procedure. And it ran, I think, for a five-man crew, it was about \$1,200 a day.

And, well, when they went to this, what we call -- we have set up recently what they call formula criteria evaluation board. And we have used this system of putting different percentages on the different evaluation factors.

And when we used that method, the same contractor got on board and he is now charging something like \$900-and-something a day and is providing, supposedly, essentially the same services. So that gives you a pretty good comparison of the effect this has had in reducing costs.

Now, it remains to be seen, like some people have brought out, whether, like we said, making money is the name of the game, but I guess it remains to be seen if they are going to be cutting any corners that are going to affect the quality of the end product or not.

But that is just some of the experiences. Most of the other experiences that we have had are very parallel to those that other people have already brought up here.

One other little thing, I don't know if it is really too relevant at this point, but talking about -- I think it is really -- of course, I am prejudiced -- but I think it is very essential to maintain a certain amount of in-house capability and expertise, because, from what I have seen, I don't want to low-rate the contracting or contractors, you know, but it has been my experience, I have been in the survey branch now for 20 years in New Orleans District, and I have seen it go from our heyday of the government crews, when we had ten crews performing all of the workload, I have seen it get to the point where it took up to 27 contract crews to provide the same out-put that we were getting with ten in-house crews.

And, of course, a lot of this is because of the fact that, like you said, in a way we are running sort of a training program for contractors, because it takes -- we train them for a year, you know, and then another one will come in, you know, and then we have to retain some of their boys.

Well, many of them, of course, we transfer over to the new contractor when he comes over. But -- and we have got seven or eight contract monitors that are some of the cream of the Crop of our old in-house

surveyors that go around keeping sort of a quality control check on the contractors.

And I would say that probably within the next five years, most of those men are going to be lost through attrition, and we are going to -- we have nobody coming up through the ranks to replace those men. And I think that we are going to be totally at the mercy of the contractors, which, depending on the integrity of the contractors, it may not be too enviable a position.

So these are just some of the comments, some of the things that are going through my head. I guess that's about all I have for right now.

Mr. LaFountain: My name is Jack LaFountain, from Buffalo. You quoted a price of \$900 to \$1,200 per day. What does your own crew cost?

Mr. Eames: Well, our own crews are supposedly around the \$1,200 range. I find these kind of variable figures, you know. There are different ways that you can evaluate and come up with district overhead and --

Mr. LaFountain: Well, with district overhead and everything, my crews run about \$800 a day, as a maximum. And at that price, I don't see how you can award a contract.

Mr. Miles: Well, Don led into our next agenda item performance and capability, which I want to get to in just a minute. But right now Mr. McCormick, S.A.D., wants to make a few more comments.

Mr. McCormick: This is where I get to ask the question I wanted to ask a while ago. The Tulsa District and a couple of others that have used the competitive system successfully, did you announce the weighting factors beforehand?

Did you publish the percentages that you were going to assign? No, you didn't. I think this is a key point. And, Jerry, you might want to comment on this.

Mr. Yager: You can't

Mr. McCormick: Okay. That settles that. So that is why we didn't do it!

Mr. Yager: You can tell them what the factors are and you can put them in the order of relative importance, but you can't put the percentages as such beside them. That is government business. And you don't give them out afterwards, either.

Mr. McCormick: Can you and should you document those within the office before you invite proposals?



Mr. Yager: Oh, yes, you very much should. You can't change horses in midstream.

Mr. McCormick: That's what we did, I think, in Mobile. That is the reason I asked the question. I thought you could publish them, but if you can't publish them, you should decide those ahead of time and document them in your procurement file.

Mr. Yager: Some of the civilian agencies do so, but the Department of Defense is very strong against doing it. And we are part of the Department of Defense.

Mr. McCormick: That's good.

Mr. East: This applies to your people. They all have instructions to not change, right?

Mr. Yager: Well, it's in the DAR. They have to follow the DAR requirements.

Mr. McCormick: I think that is a point that some of us have missed along the way, what has changed here is the source selection method basically and not the way to go about buying it. We still can negotiate, if we have the requirements that demand a negotiated procurement.

But you are negotiating in a little different arena than you were before, because you are in a competitive mode. You don't have to deal with one firm. You can seek proposals from several.

So I think it is important to remember that what has changed, is the source selection. I think what has concerned the districts, Jerry, is that in the past we have had architect-engineer firms who do surveying as an incidental in this part of the country.

There were people who we knew could perform. We knew that if we selected one of those, three or four or five or seven firms, and if we could reach a price agreement with them, which we were able to do pretty regularly, we knew we would get a good job.

That is why we feel insecure now, because we are going to have to deal with people we haven't really dealt with before. I guess only our track record will show, and that is the only way we are going to find out whether is really works.

But the key to it, as has already been said, is the contract requirements. And I think that is probably where we have been "snookered. We have used contract requirements which we had understandings with, with all the firms we have been working with. Now we are dealing with a bunch of strangers, and I think the contract requirements are going to have to be tightened up. And we will have a much heavier reliance on the written word in the administration of those contracts.

Let me ask counsel here: As I understand it, we are still at liberty to procure A-E through A-E Selection route any survey services that are incidental to the design itself, in other words, part of that same contract? Is that still a viable route?

It doesn't seem to be mentioned in this EC, but perhaps there is a reason for that. I didn't see it in the draft EC. But that is still true?

Mr. Powers: That is still true.

Mr. McCormick: I think that is very important because, in our Military Construction Program down in this part of the Country we are doing more and more surveying as part of the design.

Mr. Marvin Taylor: The deal about incidental and primary, if it is going to be used for construction, to us that is incidental. How we package it and who we give it to is well within the rules, if we want to make it a separate job we do it without any guilt.

If it is going to be used for design and construction, it doesn't have to be done by that same contractor. That would be prohibiting competition.

Mr. Marvin Taylor: I really didn't want to open that up, but I was indicating how you package it. And that would be anti-competition.

Mr. Powers: No. You can package it any way you want to.

Mr. Marvin Taylor: All right.

Mr. Powers: But you can't use the A-E Selection Procedure to get your surveying done unless you package it with the A-E work.

Mr. Marvin Taylor: The OCE school says different.

Mr. Powers: I know.

Mr. Marvin Taylor: That was last fall.

Mr. Powers: We will straighten them out, too. But that is not our view. That is the -- the General Accounting Office has said that to be incidental it must be incidental within the same contract, not project. Because that is the way we kind of like to look at it.

If you are having surveying done related to a specific project, and you are going to do the design work a little later on, it is still incidental. But G.A.O. says no.

Mr. Miles: I would like to point out, maybe the underlying reason for the incidental thing in the Brooks Bill, is that the incident work

may be so closely related to their design work that they need to do both, to ensure an adequate design.

If the design is not that closely related to the survey work, or if the district chooses to be responsible for the surveying work, and to negotiate a contract for the surveying work separately, and then turn it over to a design firm, the district's saying that they are going to be responsible, for the surveying work.

If there are any faults in the design because the survey was inadequate, the designer cannot be responsible. The district is responsible. The district must in turn, hold the surveying contractor responsible for his errors and the consequences.

The incidental statement was not intended to be a broad statement that includes everything. The things that need to be in the A-E Contract to ensure adequate performance of the classic A-E duties, such as design and specifications, are the incidentals referred to in the Brooks Act.

Mr. Carlson: I am Dick Carlson, from the New England Division. I would like to address a tangential issue, if I can. Maybe Jerry or Ken could answer it.

And it concerns the concerns of others who have said that we have nothing left in our own survey capability and we are contracting out, and apparently this is being done to meet the space reductions.

Surveyors seem to be the first ones to get lopped off. However, I am confused, and I have got to have this question answered before I leave.

In the New England Division, we have attempted to cut out two survey parties, from three to go to one. And they invoked something called OMB Circular A-76, which deals with the contracting out of Government Services to meet space reduction requirements basically.

And as I understand it, it says that you can't do it unless you can show that the surveying firm can do it for ten percent less than you can.

And this EC, or the new draft EC, confuses me, because A-76 deals with industrial-type services, and I am pretty sure that our division was told that, yes, you go ahead and do the study of this industrial-type service, yet the EC defines surveying as a professional service.

So I am surprised to hear so many people say that they have been cut, and nobody mentioned A-76. And I would like to know how that relates to this professional contract.

Mr. Yager: A-76 is addressed in an Army regulation, AR 235-1, I think is the number of it. And there is an OCE Regulation. I don't know if it is out. They have had an awfully hard time trying to tailor it to Civil Works from the Army Reg.

But that requires an evaluation be made. Your question is whether or not you would make an evaluation, even start it, with this type of service. That is something I don't think you are going to find any guidance for anywhere, and that is something that is going to be handled on a local basis.

Mr. Miles: When the commercial activities that the districts have submitted such as surveying and mapping, come to OCE, they are reviewed by the technical functional element.

Being in the surveying functional element, I have seen three or four from several districts. I don't believe I have seen one from N.E.D.

Before any action can be taken in those areas to reduce in-house spaces to meet A-76 requirements, they have to come through OCE and be announced to Congress before these reductions can be made.

The technical elements, myself in particular, have recommended to the Resource Management Office that the surveying and mapping capability in the districts needs to be maintained at certain levels of capability and expertise. We relate it to the engineering and design capabilities. In general, I don't believe surveying and mapping is a commercial and industrial type of activity, in accordance with OMB Circular A-76.

Mr. Powers: You think the surveying EC is causing trouble. A-76 is a mess, as far as the Corps is concerned. There is a couple factors that play on surveying in particular.

What the circular says is that all commercial and industrial activities of the whole federal government are supposed to be reviewed and a cost comparison is supposed to be done of any activity costing more than \$100,000 a year to perform, with certain exceptions that I will talk about in a minute.

And once you have done this cost comparison, and you are supposed to develop a statement of the work and go out with a solicitation and get bids or proposals for private contractors to do the same kind of work, and if the low bid, or the lowest acceptable proposal, is less than the cost to the government to do it, then you award the contract; if the government's cost of doing it is cheaper, then you don't award the contract at all, and you continue pertaining it in-house.

Conversely, you are supposed to do the same thing for all the functions that you are now performing by contract, and you are supposed to do a cost analysis of conducting those in-house. And if that cost analysis shows that you can do it in-house, then you are supposed to come and bring it back in-house and go and ask for more spaces for it.

The exceptions to this rule are (Laughter) -- fat chance, Hug? Okay. There are a couple of exceptions to the requirements to go through this cost study stuff.

The first is that \$100,000 threshold. Okay. If the cost of doing the function does not exceed \$100,000, then you don't do the cost study, you are free to go ahead and contract it out, period, immediately.

Secondly, these are commercial and industrial functions. They are not -- they are recurring-type activities. They are not individual projects.

Now, someone told me -- and I have forgotten who it was -- in civil works, that they determined, or asked RMO to determine, that things that I think surveying would be analogous to, where you go out and you survey for a particular project. You are doing one job at a time rather than a continuing thing. That is not covered by A-76, and it is not supposed to be, either.

For example, if we were doing construction activities with in-house people, they would not be covered by A-76. Let's see, there was one other point that I was going to make. Oh, yes, A-76 is not meant to get around personnel ceilings. It is not supposed to be used for that purpose at all.

A-76 has been alive since 1976, and we were supposed to have done all these wonderful reviews a long time ago. But civil works tried to fight it for years and now find themselves caught up trying to make these studies so that through the A-76 method they can meet their personnel ceiling. Well, they are going to have a lot of difficulty doing it.

So, going back to the answer to your question, you can get around it, you can fight it by saying, "hey, A-76 doesn't apply. These are not a commercial function, that is, it is not a continuing thing. These are individual jobs."

Secondly, they are not supposed to use A-76 to meet the personnel ceilings. And thirdly, you can't contract out through, unless you go through A-76. So what I would suggest you do is -- I don't know how much you can fight this, you know, internally, because your division engineer has been given certain cuts. It is up to him to make them basically and decide where they go.

So if -- it depends on how you package the function. You could say that the surveying that you do is in less than \$100,000 increments, and therefore say, "we are contracting it out anyway."

Mr. Carlson: Just as a sidelight to that, I would like to tell you where we are with that. There were 15 cuts involved in this thing. And I think the circular requires the study take two years, or the evaluation be made over two years.

So in essence those 15 cuts now are delayed for two years, as this study goes on. And I think what they are doing making the cuts elsewhere. I really don't know what they are doing.

Mr. Powers: I don't know of any time limit on the circular at all. Maybe there is a time limit, where the Corps is given two years in which to review all their functions.

But the time it takes you to perform this analysis is just as quick as you can do it. You identify the function, you figure out the cost in accordance with a manual that they provide. It is very detailed. And then you write your statement of work and go right ahead and contract. It is supposed to take you, like, 60 days, or something like that, to do it.

#### Contractor Performance and Capabilities

Mr. Miles: I would like to get back to what Don Eames and Jimmy Reaves mentioned, contractor performance and capabilities.

I hear these statements, "we have to train the contractors." And "we have to have on-the-job inspectors to be sure they are doing what they are supposed to be doing." Then some one says surveying is a professional activity. To me, these things just don't fit together.

You are hiring a professional firm to perform a professional service, but you have to train these people and inspect them to be sure they give you a professional job.

I am asking you a question. How many of you, with a show of hands, think that the contractors that you are getting to do your surveying work are not really qualified to do the work? (Show of hands)

You should never hire a contractor and sign a contract with him, but feel he is not really qualified to do the work.

Mr. Anderson: Surveying boils down to the party chief in the field. We hear a lot about the contractors. If you get a very large contractor with a very good reputation, he puts out a party chief who can't cut it, you are not getting anything from him.

So, you know, this is a little bit different than buying nails or something. We can all describe exactly what nail we want, how much it is going to weigh.

Mr. East: I would like to respond. Dennis, you know, you have the same problem in the design field.

Mr. Anderson: Yes, sir, I know.

Mr. East: I am a structural engineer. That building design that you are having an A-E do, the structural design, it is the same thing. That individual, in the A-E's office, is going to make, or break, that design.

Mr. Anderson: But you have to admit, in the other A-E-Type Contracts, the Corps gets good jobs and gets bad jobs. The Corps holds some contractors' hands, and the Corps throws away and Redoes some of the work.

Surveying isn't exceptional. We get good jobs and we get bad jobs, just like they do under then A-E Procedures.

Mr. Miles: But my point is, I don't think we hire A-E Firms to do our design work knowing we are going to have to require them to attend a training course put on by the Corps during their contract period.

I have got a lot of hands here. Let me get somebody who hasn't spoken. Bob Spies from Philadelphia.

Mr. Spies: I am Bob Spies, from the Philadelphia District. M. K., I think that question you asked is kind of like, "when did you stop beating your wife? Or have you stopped beating her?"

I think it depends on the type of survey work that you are going out to have done. If you are going out and getting a boundary survey, fine, you hire a land surveyor. If you are going out and you are going to get a topographic map made photogrammetrically, you hire a photogrammetric mapping firm.

One of the problems that we run into today, especially in hydrographic work, there are very few contractors in the country who are competent enough to do the type of hydrography as effectively and as accurately as we can do it.

If we go out, let's say, on an open-bid type of situation, it is extremely difficult to disqualify someone. Anyone who sits here, just handles contracts, perhaps never had the experience -- I cite specifically dredging contracts, where you let one, and you know the plan that the man has is not sufficient to do the job. Try to disqualify him.

You get people coming in today who replied to our advertisements in the commerce business daily that they consider hydrographic surveying running two cross lines across a creek for Housing and Urban Development for Flood Insurance, A Flood Insurance Study.

There is no way in the world, how do you eliminate these people? Okay. The negotiated bid. I agree with you, that negotiation is not going to guarantee you a good job.

But I think that your question depends on the type of contract work that you are asking about, M. K. as I said before, it has to be qualified. The survey people that I have hired for A-E, surveying contracts, I select, on the A-E Contracts, on the A-E Selection process. And I have been satisfied with most of the work.

I have had a bummer on a couple of them there on that. But again, I don't think we can show our hands without qualifying what type of survey we are talking about.

Mr. Miles: Well, I have to disagree with you a little, Bob. I understand the concept of hydrographic surveying. It may be that the industry does not have the capabilities that we have in-house. That is why we do two thirds of our hydrographic surveying in-house.

In general, I think we have talked about specifications and stating your requirements. If the contract package is worded properly and all the requirements are stated, I don't think you would have that much trouble turning down a firm that obviously was not qualified.

It is a matter of how you put the package together. I think we must make improvements in that area.

My question was, why do you hire a firm that must be trained to meet your requirements?

Mr. Anderson: I can answer that, for Fort Worth. We were instructed to low-bid. The man that came in with the low bid got the job. That's how. It certainly was not by choice on my part.

Mr. Miles: The fellows on the panel are going to be here for the rest of the day, and some of them are going to be here tomorrow. They would like to answer your questions. So, hold your questions and contact these people later.

But we do have to stick to the schedule. This afternoon we are going to have somebody from the Office of Personnel Management and I want to allow him the allotted time. Personnel Job Classifications is another very important issue.

#### Computerized Contract Labor Monitoring

Mr. Miles: I would like to introduce Jimmy Reaves from the Mobile District. Jimmy contracts somewhere between \$6 million and \$10 million worth of surveying a year and has a lot of contract parties working for him.

Because of a shortage of in-house personnel he has developed a computer system to help monitor these contractors. So, Jimmy, if you would come up and give us an overview of what you are doing, and explain the system.

Mr. Reaves: Generally, in the past, say, eight to ten years, we have been running an average of anywhere from 30 to 45 and, at times 50 survey parties of any one time.

Back when I first came with the district, the method of doing business was kind of haphazard. We sent the contractor out and he did



the work. The bill came in and was verified, then we called up finance and told them how much money we needed. The contractor was paid with very little paper work.

Things have gotten a little more sophisticated because the Corps of Engineers look after their money a little bit better now. When you have 40 contract parties working over the district, trying to keep up with them, how much money they have spent, how much you have left to spend, is a bit of a problem.

We don't have many people in the field, or in the office. There are 11 full time and two co-op students in the office so we are not in too good a shape right there.

To try to determine where our projects were, what money was being spent for and how to budget it we got with our computer center to help develop a program which would allow us to input data on the terminal in our office to monitor our contracts.

We have what we call a "Schedule A" that lists all the different items under which the contractor can work with its associated price.

You can keep up with projects where you have multiple contractors and multiple personnel working on them. You can also keep up with hired labor. We hope to further develop the system so that you can make projections of the work for time, determine how much more money will they earn by a specified date. At the end of the year, it will go through and tell you how many man-days of civil engineering you used, how many of four-man parties, or how many of five-man parties.

It will tell you costs per contractor, or it will tell you every project and cost that a party worked on.

The program will tell you almost anything you want to know about the financial aspect of your work. If you have a problem, or if you want to know what your contractors are doing, or what your hired labor is doing, we have two ladies outside who helped develop the program for us in the ADPC Center.

They are here with a terminal. We have a lot of the printouts that came from the program. We will be glad to get with you and show you what the program will do, if it will help you. The program is available to you.

Susan can explain to you a lot better about how the program works than I can. I have to say this about our computer center: We have had fantastic cooperation not only on this program but on everything that we have done with that computer center. They have been really outstanding.

Susan has worked with us to accomplish our goal. We have changed our mind in midstream, she pulls her hair out, but we have got a program that at least it helps us.

Now, whether it will help you or not, I don't know. But if you want to see it, we are set up kind of right around the corner, and we will be glad to show it to you.

Dr. Radha, we do have good program documentation, and I would be glad to furnish anybody who wants a copy.

Mr. Miles: With that, we will take our afternoon break. Try to be back at 3:30.

## MANAGEMENT SESSION 4 (3:40 p.m.)

### Corps Training Courses Overview

Mr. Miles: We are ten minutes behind already, but I guess we were talking about contracting during the break and couldn't get back.

I am going to be able to make up that ten minutes, because we had a cancellation. John Andreoli, of the Huntsville Training Division, who was going to talk to you about the Annual Training Needs Survey and explain the Corps' PROSPECT and nontraditional training program and some other training programs is not here.

He mailed me some material that arrived during the break. Some of the material did not arrive so I have to apologize.

This is one of the areas that we identified as one of the critical areas that we should discuss here today. It is one of the areas in which we would like to set up a technical user group in the evening sessions.

This view graph depicts, why have it? Who needs it? And who can provide it? I think it is obvious why we need it, especially after the last session.

We are not talking about training contractors. As I mentioned earlier some districts have told me that they don't have the capability to write the scope of work for certain types of contracts.

The present atmosphere is one of reducing spaces and cut-backs. It is really going to be impossible to turn this trend around. I think we really need to put the emphasis on highly qualified people, well-trained experts doing the work.

If we can't have the quantity, we must have the quality. So in that light, I would like to go over the existing training program as it now exists for surveying and mapping personnel in the Corps.

There are three OCE-sponsored training courses. I am the OCE proponent for the three of them.

You may be familiar with the first one, Hydrographic Surveying Techniques Course, which is conducted by the Waterways Experiment Station. It was actually set up as part of the original research and development work unit to train Corps people in the use of the modern electronic survey equipment and automated systems used in hydrographic surveying.

I think the course has been in existence for 10 or 12 years. Dale Hart, of the Waterways Experiment Station, is the course coordinator.

Until just recently, I think the course tuition was about \$1,700 per student. It is very expensive in terms of Corps courses. The reason for that expense is because of the equipment associated with the course.

We felt that hands-on training on these electronic survey systems and boats is a required part of the training course. The cost of having those boats available for a week during the training period has run the cost of the course up drastically.

The course is scheduled for next month, or the first week in March, at the Waterways Experiment Station. It is basically the same course that has been taught every year. It is limited to about 20 or 25 students.

The nominations are in and the people should be ready to attend.

Unidentified Speaker: Is it one or two weeks?

Mr. Miles: The Hydrographic Survey Course this year is one week. It has been two weeks in the past, one week of classroom and one week on the boat. As a result of monitoring the course, it appeared there was too much free time in the course. So we consolidated it and brought in some night and evening sessions, and now it is compressed into one week.

I hear some sighs. There is a good reason for that. We are trying to keep the cost of the course down. We have had to make some changes in the course that I would like to go over with you.

Because of the excessive cost of bringing the equipment to the course, the course is going to go up to about \$2,500 per student for one week of training.

When the cost gets this high, the district people who approve the training and set up the training program and budgets are not going to be sending students who require the training. These are people in the GS-5, GS-6, GS-7 range in the surveying technician series.

It is real hard to justify such expensive training so, the course has been compressed to one week, 56 hours, to keep the cost down. We are going to propose a change to the course in 1983. The students would attend the classroom part of the course, theoretical instruction on electronics, radio waves and the computer system on board. Then we hope to set up a list of districts that have expertise in the various systems and can teach the hands-on training.

This has a twofold benefit. First it reduces the cost of the course and second it will give students training on the type of equipment needed. Many of the students stated in their course evaluations that the course was great. However, they learned to operate a Motorola System, but in their home district, they had brand X, not Motorola. The theory was good but the hands-on section was not pertinent. They still didn't know how to run the equipment in their home district.

We have a lot of different systems in the Corps, probably as many systems as we have districts. However, I think there is enough duplication of the equipment that we could identify one particular district as being the lead district for motorola systems, another for the typical N.O.S. Hydroplot System, and so forth. We could narrow it down to four or five districts that would provide the hands-on training.

The student would attend the classroom session, which would be either at WES or at some hotel facility or some district office, which would vary. (It will be in Memphis in 1983). At the end of the week of classroom training, we would give them a list of the districts and the contacts who could provide the hands-on portion. When they went back to their home district, they could have their supervisor or training officer, contact the proper training district and arrange to have that student go TDY to that district for the hands-on training.

The only cost that would be incurred for the hands-on portion would be the TDY costs.

This gives them the hands-on experience with the specific type of equipment they need and it will keep the cost of the tuition for the classroom portion at a reasonable level.

The other course, on the land surveying side of the house, is called field survey techniques. As most of you are probably aware this course was more of a symposium than it was a course. It was like this conference.

This conference used to deal with hydrographic surveying requirements only, and the field survey techniques course was somewhat of a conference on the land side of the surveying picture.

This year we are combining the two conferences and turning that field survey techniques course into just that, a training course to teach field surveying.

I have a course outline and lesson plans for this field surveying techniques course, which is next scheduled in Arlington, Texas, for 1 through 5 March, 1982. You can pick them up during the next break.

This course is full. I think we have got over 80 students enrolled. You can look at the lesson plans and see the types of things we are going to be teaching at this course.

Some of the instructors at the course are here today. I recognize two or three of them. Bobby Applegate, from Huntington. I don't see the rest of them. You might check with Bobby during the break. He can explain to you in detail what we are trying to do with this course.

The course is going to be scheduled again in 1983 and 1984, hopefully on an annual basis, depending on the results of the annual training survey.

The third course, which has never been held, is photogrammetry for managers. We organized the course and were preparing to have a university teach the course. It was going to be a two-week course for managers. By "managers," we mean those who have surveying done by contract and need to understand photogrammetry, so they can use it to improve their activities.

When we surveyed, through the Annual Training Needs Survey, last year there were only 12 responses. The course was set up, for a minimum of 25 or 30 students. So we couldn't conduct the course last year.

#### Annual Training Needs Survey

Mr. Miles: This brings me to the Annual Training Needs Survey. I don't know if you all are familiar with the Annual Training Needs Survey. Maybe I can get a show of hands for those of you who are familiar with the annual survey. (Show of hands)

It is good to see that most of you have seen it, and you probably know it as the Purple Book that Huntsville puts out, with all the courses listed in it.

Every year they update that book with new courses and new descriptions, and they send out an annual letter asking you to put in your requirements for the training your people need during the coming year.

This year's letter comes out today, 1 February, 1982. It will probably be in the districts, in the personnel offices, with the training officer when you get back. I had hoped to have copies of it here, but they either got lost in the mail or Huntsville didn't send them.

You have until the 15th of April, I believe, to input your needs through the training officer for the courses you want your people to take next year. That will be FY-83.

So keep in mind those three courses, look for them in the training book, and submit the candidates that you think you have in your organization that need to attend.

Mr. Vanhaverbeke: How do you find out if they got accepted or not?

Mr. Miles: So far, on the Field Survey Techniques Course, I don't think we have been turning down anyone. We turned down people on the Hydro Course because of the limited class size.

Mr. Vanhaverbeke: We put some names in on that first thing you talked about, but when the first list came out, there wasn't anybody from the district on it.

Then you all -- somebody sent a letter out from Huntsville, asking for more applicants. So we turned them in again. But we still have never heard anything.

Mr. Miles: On Huntsville's annual training needs survey?

Mr. Vanhaverbeke: Yes.

Mr. Miles: Are you telling me that you are trying to get people into the Field Survey Techniques Course next month?

Mr. Vanhaverbeke: Right.

Mr. Miles: Did you do that through your training officer?

Mr. Vanhaverbeke: Yes.

Mr. Miles: There must be a break in communications in your personnel office.

Mr. Vanhaverbeke: He told me that I'd be lucky if I found out two weeks before.

Mr. Miles: The annual survey that was conducted last year for this course only showed 62 candidates that had been nominated by the districts. The course size was 80. They were actually short of people. We at OCE, put out a circular and asked for more nominees. Then it went from 62 to 85.

Mr. Vanhaverbeke: Is there anyone here who can tell if particular names have been accepted or not?

Mr. Miles: The Huntsville Division training person didn't make it. I don't have the final list with me. But next week, when we get back to normal business, you can either call me or call the fellow whose name is on the list here, John Andreoli. He is on the proposed attendance list; name, Office Symbol, and Phone Number.

The simplest thing would be to just call him and see if any of your nominated people made the list. If they didn't make the list and you feel like they need to come, call me, and I will see if I can get the ceiling cap changed and get them in.

This is normally handled routinely through the training officer in the personnel chain of command. You may have a problem in your local personnel training office.

Mr. Vanhaverbeke: I won't argue about that. (Laughter)

## Non Corps - Sponsored Training

Mr. Miles: On the other training sources, I would like to highlight that there is a lot of good local training provided by the American Congress on surveying and mapping. They have workshops throughout the country, many of them every year, in hydrographic surveying, topographic surveying, instrumentation and state coordinate computation on the state plain grid systems.

If you are not members of ACSM, you will get a pitch from them Wednesday afternoon to join their society. One of the good things that you do get from the society is the newsletter and magazines that announce these local training courses.

Frankly, some of the costs of their courses are less than the costs of our courses. You can attend some of their 3 or 4 day workshops for \$150 or \$200. You don't get the Corps view, but you do get good training through ACSM.

Another source is local universities. A lot of the local community colleges offer surveying courses, night courses for the technician-type people you probably have working for you.

I would like to encourage you to be more active in this area and look for alternative training sources for your people. We need more training in the surveying area in the Corps. Especially in light of the upcoming and past space reductions and professional requirements that we are trying to meet.

Does anybody have any questions on training?

Mr. Robertson: I am Ken Robertson from ETL. I would like to mention also that we do have a course in precise measurements, which is not an OCE-sponsored course in the sense that it appears in the Purple Book, but is in an ETL which has been sent to each of the districts.

The cost of this course is about \$3,000. That is for the entire course, not per student. So if you have 15 students, that is only \$200 apiece. It is done in your district and done with your equipment.

So if you are interested in a course like that, it is precise monitoring of dams and locks and that sort of thing, why, you can contact me. And there is an ETL out on it.

The number is in the book, the Red Book.

Mr. Miles: OCE issued an engineering technical letter, which we call an ETL, which happens to be the same initials as the Engineer Topographic Laboratories, on that course about a year ago, February or March of 1981.



I can't remember the number of the ETL, but it specified what Ken said: What is available, the list of contacts, and the arrangements that need to be made.

Are there any other questions on the training program?

Mr. Clyde: Jack Clyde, New England. My people are in TDY so much that they can't really attend any university or survey courses. They possibly travel in six states, so it is pretty hard to really get qualified as a land surveyor in any one state except where they have residence. And sometimes they never are home except on weekends.

So how do you -- how could you really get any training for them?

Mr. Miles: Your question is: How do you obtain training for people who are continuously on TDY?

Mr. Clyde: Right.

Mr. Miles: Well, I guess it depends on your work requirements. If you can't spare those people, there is little you can do.

I would think you could make arrangements for them not to be on TDY at least one or two weeks a year so they could attend these Corps-sponsored courses or these ACSM workshops.

Being constantly in a travel mode, really does eliminate the local university courses. However, the Army, through TRADOC, which used to be a function of the Engineer School at Fort Belvoir, offers correspondence courses.

I think there are four surveying courses in the series, numbers 1 through 4, from basic surveying to advanced surveying. They are good courses. They are especially good for people who are on the road like that, who could work through those correspondence courses.

As far as qualifying for a state licensing exam, being on the road and traveling from state to state, is something that would have to be worked out with the state registration board. Your concern is qualified training, to qualify you with experience that the state registration board would accept to allow you to take a state exam? Is that your question?

Mr. Clyde: Yes.

Mr. Miles: Well, I would assume that if you did enough qualifying surveying work in those various states over a period of years that all the work in the various states would qualify in each and that, after the required number of years, you could meet those standards. You should contact the state registration boards and understand their requirements.

Mr. Taylor: For the last year and a half, we have done everything possible to find a photogrammetry course, and have not been able to find one. And I wasn't even worried about money, who to send or where to send them. All I want to do is find a course, and I will do the rest of it.

Mr. Miles: Well, like I say, the annual training needs survey that we put out --

Mr. Taylor: I put in two of those.

Mr. Miles: You put in for two of those 12. But we couldn't justify the \$40,000 cost of the course just for 12 students. I am hoping that by telling you that course is available and that the training needs survey is in the field now, you all will put in your requirements. If each district had one person coming, we would be able to justify the course for 1983.

The field survey techniques course has one-half day devoted to photogrammetric work. In the advanced part of that course it is devoted to estimating, handling contractors, and planning the missions for photogrammetric work.

In the basic part of that course, it deals with the principles of photogrammetry, the stereo compilation concepts and things of that nature.

Mr. Long: J. T. Long, from Little Rock. I have one of my employees going to Huntsville for a two-weeks course on 25 February 1982.

Mr. Miles: J. T., that is photo interpretation. It does not go into the details of photogrammetric mapping. It may meet your needs. I don't know. It may not.

Mr. Reaves: We sent a man for three months to Fort Belvoir in photogrammetry. You can do that. They have some other classes up there, also.

Mr. Miles: Jimmy is referring to the Defense Mapping School. In the training needs survey, this year, there is an enclosure in the back of the survey that lists other than OCE-sponsored training.

The Defense Mapping School courses that would apply are listed. The problem with those courses is they are quite lengthy. They require several months of dedicated effort to attend them. But they are excellent courses. We may hear a little more about that tomorrow morning from Colonel Stockhausen, the Director of the Defense Mapping School who is our keynote speaker. Any other questions? (No response)

Okay, at this time, we will wrap up our training session and move into the personnel session. Ed East will take this one.

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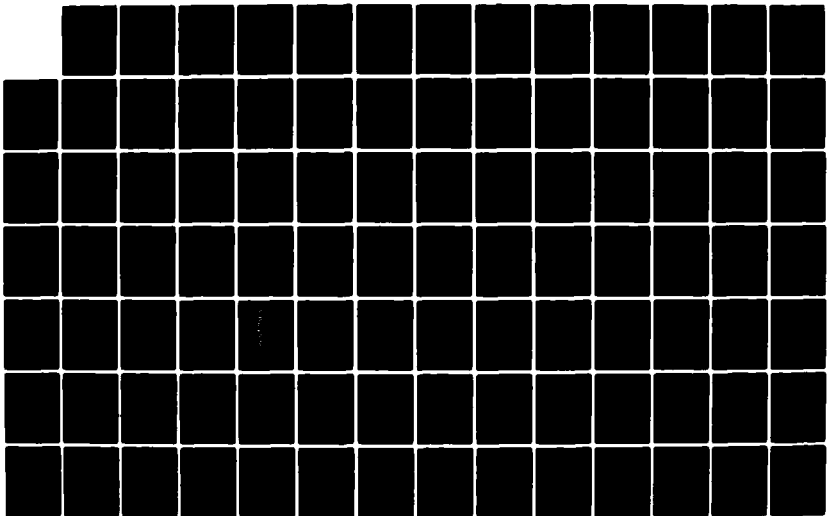
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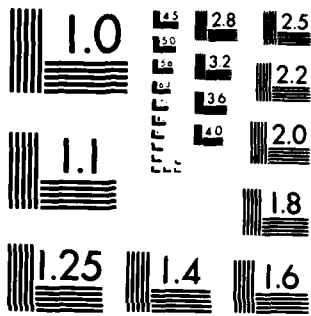
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## Classification Standards and other Personnel Problems

Mr. East: As M. K. said, we would now go into the personnel area. Personnel is the third item in this management study. It is lengthy. It runs from page 15 through 27, and covers quite a few of the problems. I had reviewed them quickly, prior to M. K. putting this management study together, and got a flavor of these problems. What my vu-graphs do is summarize this wide-ranging problem into just some very short statements. So if we could have our first vu-graph.

I think what I would like to tell you is that M. K. and I feel that people are the Corps' most important resource. We have talked a lot about technology and getting a quality product in a more efficient way through using technology. We had a session on R&D where we emphasized that. But it all goes back, and it has been brought up before this morning, and this afternoon, that people really make this thing work. And people problems are OCE's major concern in the surveying and mapping area. Next.

I think these three statements summarize everything that is in pages 15 through 27, insofar as what you have told us about personnel problems. Next.

Zeroing in a little bit; low-grade structure, outdated job descriptions, we saw a lot of that. Classifiers don't understand the job. And then I added one, a cautionary note. Sometimes rewriting job descriptions can mean something like this (thumps down) instead of something like this (thumps up).

So there is a caution here, and I would just raise that for you to be thinking about, particularly as we have our next speaker up here.

The idea of low self-esteem, I think is something that a person experiences internally. And it is obviously impacted by external influences. Unfortunately, the survey function, as we all know it, is looked on as the doormat and the stepchild. Next.

This vu-graph is going to introduce our next speaker. But I did want to mention a couple things that are important here.

On a numerical basis the overwhelming classification standard, is the surveying technician series. The Corps, it appears, has between six and seven hundred people under this classification standard. That represents about one fourth of the total federally-employed surveying technicians.

It appears we only have only about ten people in the Corps falling under the land surveying series. And under this series, the type of work includes primarily boundary line or property surveys. I believe a gentleman is here from the Bureau of Land Management who possibly can add some thoughts on this. It is a professional series, and I think we certainly need to work at having more than ten people in this series. We need to professionalize our survey and mapping work forces.

Now, I am going to introduce a gentleman from the Office of Personnel Management. He is going to describe the process that he has to go through, and the Office of Personnel Management goes through, in rewriting classification standards. He is also here to observe the technology that we have displayed here, to see how the people and the technology interface.

We can help him in that in one or two ways. We can be supportive of him and help him with his job, or we can sit here and complain and moan and groan about past injustices and problems and so forth. I really don't believe that we want to rehash those things. I understand at one of the previous hydro conferences that a gentleman from the Personnel Office at OCE was so deluged with complaints that he looked at his clock and said, "I've got to catch a plane," and left. (laughter)

Gentlemen, that won't do a thing for you. So I want to show you this slide, and I mean it sincerely. Wrong slide. (laughter). Still the wrong slide. (laughter). Jerry Yager said I couldn't pull a joke off, and that was perfect. It wasn't planned.

Now, I would like to introduce Mr. Carl Jackson, Personnel Management Specialist with OPM. Mr. Jackson has a B.A. in history and is currently working on his master's in business administration. He has put in four years in the private sector at Union Carbide, two years in the Office of the Mayor-Personnel District of Columbia Government, and six years at OPM in the Office of Standards Development.

He has begun to study these two job series, and he is going to tell you about the process, and he is going to be here the next few days to meet you and to see the equipment you work with. I hope you will support him. And I can assure you, we are working at OCE. M. K., particularly has been working to gather up job descriptions that reflect the new situation in the surveying and mapping field.

And M. K. is going to be working very closely with Mr. Jackson on that. So be supportive, be positive, please don't be negative, because it certainly doesn't help your cause.

So, with that, I will introduce Mr. Jackson.

Mr. Jackson: Thank you. I hesitate to tell you, after learning that you may be hostile, but my plane is not leaving until Wednesday afternoon. (Laughter)

I prepared a few notes, and I was going to handle this a little bit humorously, but then, sensing the mood of the place, maybe I had better be a little more straight forward.

First of all, it might be helpful if I just ran through how we develop a standard. There are five basic steps: We fact-find; then we develop the draft; we send this out to all Federal agencies, unions, special interest groups such as handicapped interest groups, and American Congress on surveying and mapping which probably would be very much involved in this study; we would then review the comments made; make revisions based on those comments; and then we would publish the final.

This may seem a little bit straightforward, but it is not nearly as straightforward as it sounds.

Fact-finding requires a lot of reading including dirty historical files. You start reading about such things as why surveying has changed from a blue-collar occupation to a white-collar occupation. Usually when we do a study, we go all the way back to the beginning rather than starting with the current standard as the person who developed the current standard might have missed something.

You get into statistics, you get into a lot of verbal contact. I think this occupation will be a little bit more of a challenge than most, in part because the equipment used is not readily understood by those outside the field. However, it should not be any worse than writing, say, the computer specialist series. In addition, in this fact-finding process things can get really bogged down due to a need for listening to the concerns of particularly special interest groups, ranging from, for example, the American Congress on surveying and mapping to perhaps women's groups. For example, this study has only just been initiated-about a month ago. Consumate with that we sent out a flier. One of the first groups we heard from was WISE, Women in Science and Engineering, which is a subgroup OP Federal Women's Task Force. This group is concerned about the low representation of women; which is approximately one woman for every 900 males in the 817 occupation. So, in the fact-finding phase first of all you identify the problem, e.g., low numbers of women in the occupation, then you decide if the issue is a problem, and finally you see what you can do with it.

First of all in this instance we would check to see if the reasons are systemic, such as due to criteria we established and incorporated in the classification or the qualification standards, e.g., do we have education requirements that are unrealistic? If study shows it is not a systemic problem but rather a recruiting problem we might note that the solution is out of our bailiwick, and advise the group to work with recruiting personnel in operating personnel offices. So -- facting isn't done in a vacuum, nor is the next, or drafting stage. Among other guides, we even have a manual on how to do a study. However, the controlling element is Title V of the United States Code which defines each grade level, 1 through 18. Our job is then to interpret Title 5 in occupationally specific terms. However, the definition of a grade level in Title V might be only four sentences or a short paragraph. We have to flesh out the kinds of duties performed in an occupation and assess the knowledges, skills, abilities, supervisory controls, this sort of thing

and determine their grade level worth as defined in Title 5. We then translate all this into a documents called classification standards and qualification standards. We perform this translation within the format constraints of the Fact Evaluation System (FES). It is a system we went to about seven years ago for writing classification standards, and these two standards, the 1373 and the 817, will be written in fact or evaluation system format. Under FES all occupations and all jobs are broken down into nine parts, such as knowledge, supervision, guidelines used and how used, scope and effect, physical hazards, and so forth. FES includes what we call a primary standard which defines the levels within each of these nine factors. For example, knowledge has eight levels, and each of these levels is defined in this primary standard. Thus, the theory is that when one combines the proper level from each of the nine factors one replicats the intent of Title 5.

You are also, when you write a classification standard, controlled somewhat by closely related occupations. For Corps surveying work, civil engineering, which was just rewritten in the FES format, would have an impact on how factor levels are determined, the work is described, etc.. In fact, it is my understanding that the program that led to the development of the 1373 and 817 was purposely held up until after the Civil Engineering Standard was rewritten, and that one of the reasons for this is that Civil Engineering and the 817 must be in harmony in terms of evaluating the appropriate grade level of the work.

Currently, the knowledges, skills and abilities used in surveying are recognized as a part of, a subset -- I don't know what kind of word you want to use without creating any kind of problems -- of civil engineering.

I understand that in most college or university surveying is part of the civil engineering curriculum.

The other thing about not working in a vacuum would be functions covered by other standards are grade controlling. For example, I understand you all are getting more and more into computer application, you are getting involved in contracting. I have heard comments about the need for legal knowledge in terms of land law. When this standard is written, one of the things we will very carefully have to do is to make sure that any evaluation of legal knowledge would not exceed what would be a comparable level in, say, the paralegal series.

Another thing I wanted to go into is that classification and pay are two very, very different things. We establish grades on work within occupations. The classifier in the field then puts a grade on a job using that criteria to evaluate that specific job. But in neither case do they get involved with pay, per se. Now, if you are general schedule at A 12, A 5, A 4, or whatever, grade level your pay is going to be whatever A 5 or 4 gets. But determining what a 5 or 4 gets in the way of salary is with a completely different organization. That is the President, his pay counsel and OPM's the compensation group. However, that OPM group does not work in a vacuum either; I am sure you all are



familiar with how the pay comparability surveys are run every year. However, there is also in the compensation area a mechanism for adjusting pay rates. For example, one of the things that we heard from interior was that they were losing an awful lot of their land surveyors, 1373, because the oil companies are currently looking and bidding on Federal lands that had not formerly been commercially developed. The contention is that these oil companies are hiring land surveyors away from the government at a lot higher salary.

Now, if that is true, it would probably be a market-type thing that would go on for maybe two years, six months, who knows? But the mechanism for handling a pay problem like that is a special rate authority given by OPM, e.g., a matter for the compensation group, not our group.

In addition, you probably are aware that from time to time engineers get special rates because they are one of these occupations that go in cycles, you either have too many at one time and then you don't have enough at another time. In those periods when there are not enough of them, the government has to complete economically and will sometimes establish a special pay rate.

Another good example of occupations which get special rates are accountant and nurses. What I am talking about here is different from blanket special pay rates. The same office does it, but this latter situation is different from the separate pay rates for engineers in that it might be for an area like Alaska, because no one wants to go to Alaska, the cost of living is higher and all that sort of thing. Therefore, the government might offer a special inducement pay. But all that is a separate issue from classification which is concerned with grade levels, not pay rates. Classification is not a vehicle for resolving pay issues.

As an aside, but possibly worth noting here is that the government's pay philosophy has always been that we are not to lead in pay, that we need -- we, the government, not me necessarily -- a wage that makes us as competitive as possible to insure getting people who can do the work, as opposed to paying top dollar to get the best and the brightest while setting pay standards for industry.

And I would not say that I agree or disagree with that philosophy, but I suspect it is gaining even more currency. So now that I have quickly outlined what I do and discussed how it relates to what appears to be your greatest concern, e.g. pay, let me tell you a little bit about the kinds of things, even after a month, I already know that I need to look into.

1. I am hearing a lot about equipment advances and the effects on the knowledge and skills and abilities of survey practitioners. First let me illustrate that equipment advances can be a two edged sword. For example, the computer operator series was just finalized and what

happened due to technological advances was sort of negative for the grade levels of operators because the computers are getting so sophisticated with the net effect that the machines self drive and the people don't have to know as much in terms of methods, procedures and techniques.

I am not saying that that is going to be a problem here or anything like that. All I am trying to do is make you aware that this sort of thing can be a two-edged sword. Frankly, I am not that familiar with the equipment yet to make any kind of generalities. However, we usually find that technological advances have little grade level impact on technical work.

2. The other thing as I noted earlier is the serious underrepresentation of women and minorities.

3. Another problem that we have identified is in the area of hydrographics. The standards are much more geared to land surveying than it is to hydrographics. I don't know all the reasons, but two appear to be that there are more boundary surveyors in the government service than there are of you who perform hydrographic surveys; and, number two, is agency level interest. For example, we have already had a proposed standard sent to use through personnel channels by the employees in one organization and it reflects almost exclusively criteria for land surveying because that organization has only land surveyors.

4. Another thing is the effects of contracting out. But here again, my initial reaction is that it won't have a grade-controlling effect, because you would -- if it has grade-controlling effect -- be classified to contracting and procurement rather than surveying, if it were grade controlling. If it is not grade controlling, there would probably not be any effect.

5. Another thing that has come up is the effect of the work leader grade evaluation guide and supervisory grade evaluation guide; particularly the work leader grade evaluation guide. That guide was written after the last issue of the 817 came out and the 817 is full of references to chief of party. I don't know yet, but my initial reaction is the chief of party stuff should probably come out of the 817 standard; and, after using the 817 standard to establish the base level of work, the work leader grade evaluation guide would be used to establish the final grade on the position.

That could have a positive -- though I shouldn't use words like "positive and "negative." What I mean is that such a procedure could possibly have the effect of upgrading crew chief jobs, but I don't know.

6. Another thing that I want to do is to decide whether or not, as appears to be the case, there is general contentment with the qualification standards. The qualification standard for the 1373 was rewritten just, I think, two or three years ago; the cause being to include criteria related to state certification. Most of the states now

have their acts together on certification; at least to such a degree that we could accept state certification as one of the criteria for meeting entry level requirements for land surveying. But other than that, I can't find where there is any particular source of discontentment with the qual standards.

7. Another point of concern is the unusual situation wherein the surveyor and surveyor technician standards are in, what we call, different families, on the 800 and the 1300 families. Usually, when you have a technical and professional occupation, they are in the same series. For example, personnel clerk and technician are both in the 200 family as are the 2 grade internal personnel occupations; and the accounting clerk and technician as well as accountants are in the 500 family.

I have looking at that some; thinking of how to reorganize it, and I really don't know the answer. I think we may -- unless we hear just a great hue and cry to the contrary, just leave it along since, from organization to organizations the survey technicians are working with or supporting very different disciplines. For example, with -- in N.O.A. they do quite a different job than you all do. In one instance the surveying supports geodasy in the 1300 family, and another it supports engineers in the 800 family.

Since surveying is a discipline that is used in several different areas, maybe we should leave it with the area that it appears to the most, e.g., engineering.

If this is all sounding a little vague and run on, it is. I have had this study only a month. Typically a study like this takes at least a year before we get a draft, and usually longer.

In addition, it isn't the only project I have one of the reasons I have received this assignment is that I have another project that is out in a review stage and I have about three months on my hands. Assuming there are no changes in priorities it should take at least a year before you would see a draft. And then, depending on how smoothly this whole rewriting and other procedure, it could be anywhere from six months to another year to issuance of a final.

It also depends on the budget. My boss told me Friday, before I left, that he might not have a job when I got back. They might abolish our unit and merge the rest of us into another group. We are also in a furlough situation. In short, a number of things into play when estimating time.

As far as what you can do to help with the study, remember that I am going to be here until Wednesday. Let me know about the kinds of issues you think are important. If you want to get yourself a little more organized first write up your concerns, perhaps work through your personnel shop. Every one of your offices, you call it regional offices,

has a personnel shop. You can go and talk to the personnel people. They can help you edit and define your concerns in personnel terms. They can tell you the kinds of things that really wouldn't carry any kind of weight; things they are extraneous to the classification process.

Or you can send it direct to me. A final note, as far as making comments go, the purpose of the study is not to upgrade, it is to update the standards. We are going to look at changes in the occupation, and we are going to convert it to the FES format.

Generally, conversion to FES has little effect on grade levels. In a few instances, there have been upgrades. The best example of that is nurse; though the reason for the upgrades were due to changes in the occupation rather than FES criteria.

However, I think those examples are anomalies. The more usual thing would be nothing much happening at all in terms of grade levels unless significant grade controlling changes were found to have occurred in an occupation.

Finally, the big reason I wanted to come down here was for the -- because of all the presence of all the equipment manufacturers. Most of the kinds of things you can tell me in terms of what you feel about the occupations I can find in on-site visits, but such an impressive array of machinery/equipment in one centralized site is hard to find. As I said earlier, I think the most challenging thing is going to be understanding the equipment.

I hope that gives you a little bit of an idea what we do. I have hit you a little bit hard with cold facts; but I would hate for you all to leave here thinking that this study is going to result in these massive upgrades, and then, two years from now, when the things come out, nothing much happens in terms of grade levels.

As a final note, it might help you to know that while I will have a lot to do with the final product, I will not be the only person involved. There are two levels of OPM review above me after development of the draft, plus review by all the agencies and other non-OPM interests.

So that is about it. Do you have any questions?

Mr. Miles: I would like to make a few remarks and then we will open it up for questions for Mr. Jackson.

First of all, I would like to say, we really appreciate Mr. Jackson coming down. They are having some cut-backs in OPM. We wrote a letter to Carl's boss, from Mr. Lloyd Duscha, the Chief of the Engineering Division, Civil Works Directorate at OCE, and I think, as a result of that letter we were able to get Carl down here.

We broke the chain of command somewhat. We didn't go through personnel channels, through the Army, and through the Pentagon to get him here. I understood, from these past meetings, the importance of this problem in the Corps of Engineers and how it impacts us. Once I knew that OPM was going to start the revision process, I thought it was most important that we have Carl at this meeting.

For many years, as you know those attending these meetings have been stressing the need to revise standard. I know you all are hoping for the best, but as you have heard from Mr. Jackson, we can't count on the best.

Another thing I would like to note is that Mr. Jackson's appearance here is a first for the Army and maybe for D.O.D. The personnel people in the Secretary of the Army's Office tell us this is the first time OPM people have come out to a meeting of a peer group like this to discuss such an issue. They asked us to take care of Carl and treat him real well. We might want to do it again for another classification series.

For background, could everybody in the 817 series raise their hands, so we will see how many we have (show of hands). Now a show of hands for those who supervise 817 people. (Show of hands)

So you see Carl, basically they are all either 817's or they supervise 817's. How about 1373's? We have four. That is half of those in the Corps. I think Ed said ten, but I think it is really only six or seven. Remember to stand up and tell who you are and where you are from, and speak so the recorder can hear you. We are going to publish two documents as a result of this meeting, a technical volume of all the technical papers that are given in the next four days, and another document just for Corps of Engineers attendees on this management session. Everything said and presented here today will be put in a proceedings. The documentation will be used to help Ed and myself recommend changes at the OCE level. With that, we will open it up for questions.

Mr. Boone: I am Glenn Boone, from the Wilmington District. Would you please try to explain to me, and possibly some of the others here, the rationale that went into the development of the computer specialist series and how that had a negative or somewhat of a negative effect on the grade situation there?

Mr. Jackson: It wasn't computer specialist, it was computer operator.

Mr. Boone: Computer operator?

Mr. Jackson: Yes, the computer specialist or programmer didn't suffer "negative impact" to speak of. But the computer operator -- the computer operator was sort of there before they had a fully developed computer specialists occupation. You now have computer aide/technician and then you have computer operator. And then you have computer specialist, then you have the computer scientist. And the problem with

the operators is as the computer specialist or programmer occupation emerged they sort of took over the higher grade level or grade controlling type work that had formerly been assumed to be with the operator positions.

And the net effect was that the operators were doing the less demanding aspects of the work in the total computer field.

There was also the negative impact of machinery on work processes. The machinery is getting so sophisticated that basically an operator -- not programmer or specialist or engineer -- pushes a button.

I know it is not really that simple, but thing of it that way just for the sake of understanding what happened.

More specifically I was out here looking at some of the equipment. Now, this pamphlet I picked up is talking about a wonderful new machine they have out here. I quote it is fully automatic... anyone can use it... touch a key and it measures... single level and calibration are automatically controlled... simply read the slope distance after ten seconds... "I mean, if that is true -- (laughter) so you see, that is the kind of thing I am talking about.

I am not saying I believe a marketer's pamphlet. I am just looking around and listening to all views. But, I don't know that you guys should put all your eggs in the equipment basket. Yet I can't image anything negative happening, even if your use of the new equipment was found to be less demanding than it used to be, because it is not the equipment that ever controlled the grades.

What controlled the grades was something more akin to math knowledge; the skills, abilities, and the knowledge of systems and procedures execution and theory application.

For example, when your boss says, "go do a survey," you get yourself together and go out there and do a survey; or, did he have to go out there and lead you by the hand? Such things as this are the kinds of criteria on which the upper grade levels are based; not the equipment, or the fact that you dragged a chain in the past rather than used a laser beam.

Still, the machinery can possibly have a positive effect. I don't know for sure yet. But I don't think the machinery is going to have a negative effect because the current grade levels are not based on equipment knowledge, skills and abilities. Does that help?

Mr. McCormick: I understand that you are not concerned with pay, and I can sort that out. Where in the OPM system, or where in the determination process do we arrive at the question of comparability for the same kind of responsibility on the outside?

Because that is really the bottom line. We need to be competitive in hiring and retaining people in the government service doing comparable jobs.

Mr. Jackson: For special pay rates you would have to convince your agency level pay people to request special rates from the Office of the Assistant Director for Compensation Planning and Pay Programs, Compensation Group Office of Personnel Management.

It is important to remember that you would work through your agency. You should not approach OPM, nor should an organization within an agency. It has to be is a Department, like Department of the Army. You would have to convince Army and they would have to come in with quite a bit of paperwork and justification. It is very, very difficult. Frankly, I would say that, if you tried it, your chances of success are very small. Very likely, you would know whether you could get it after contacting the agency level, because, the agency is either going to proceed or not proceed, and they are going to proceed on the basis of whether they thought they could get it.

For input to the annual GS pay comparable study contact the President, your Congressman and/or the President's pay agent care of the Office of the President of the United States.

Mr. Vanhaverbeke: I don't have a big gripe with the standards as they are. But one thing I would like to suggest is in the 817 series, a party Chief to someone that's trying to get some work done with some surveyors is a guy that you can send out maybe 500 miles from the district office and not see him for three months, and tell him, you know, "here is a job," very briefly, and he is supposed to go out there and figure out what he is supposed to do and get the job done.

And the way I feel about it, there should be a title in that series of surveyor. There should be a definite distinction between a party chief and a guy whose responsibility is to be able to operate the instruments.

You can go down there and take the piece of equipment you looked at, and you could go out there and measure between two sticks out there. The difference between somebody that knew what he was doing and the guy operating that instrument and the guy that looks at the answer and he says, "yeah, that was 10,000 miles," and he wrote it down and said, "that's it," that's the kind of guy you are talking about.

And the kind of guy we are talking about is the kind of a guy who just said, "well, that answer is no good."

Our big gripe is not with the standards, it is with the Corps of Engineers' Personnel Departments interpretations of the standards. As I understand it, us, BLM, everybody goes by the same set of standards for certain classifications.

You take BLM, they have got land surveyors classified as high as GS-15.

Mr. Jackson: An 817?

Mr. Vanhaverbeke: No, a 1373.

Mr. Jackson: According to our statistics, the highest 1373 in all the government is a GS-14, and there are only four of them. I know the department they are in, the agency, but I have no idea what they do so it is impossible to assess the accuracy of the grade level.

Mr. Vanhaverbeke: How many 13's are there?

Mr. Jackson: According to the statistics I have here, there are only 18 in the government and they are all in one agency.

Mr. Vanhaverbeke: How many of them are there in the Corps?

Mr. Miles: If your question was how many 1373's are in the Corps, we have about six or seven and the highest one in the Corps is a GS-12.

Mr. Vanhaverbeke: Right.

Mr. Miles: We have two or three GS-12's and some 11's.

Mr. Jackson: But anyway, back to your big gripe -- I didn't quite finish with --

Mr. Wilcox: My name is Doug Wilcox, and I am from the Bureau of Land Management, Cadastral Survey Division in Washington. My boss is a 1373. GS-15. (Laughter)

Mr. Jackson: Did this happen within the last year and a half?

Mr. Wilcox: No, sir. He's been that way for about eight years.

Mr. Jackson: The error's the computer's fault, not mine. (Laughter)

Mr. Wilcox: There are several hundred 1373's in the Bureau of Land Management. I am a 1372, the Chief Geodesist, but there is only a handful of us in the bureau. There are going to be some more but not right now.

There are about four GS-14's about 12 to 15 GS-13's, and a whole bunch of GS-12's. And it is a very respected series, because the work we do is legal, legal work. 1373 is very fine series.

Mr. Jackson: You mean the grades are based on legal knowledge?



Mr. Wilcox: May I, before I answer that question, your office must have sent to a guy by the name of Jim Pritchard, who is in my office, a copy of the standards, and he is responding to you.

So I don't know if you sent them to him. It was just last Friday, he got something.

Mr. Jackson: We haven't written it.

Mr. Wilcox: Pardon?

Mr. Jackson: We haven't written it.

Mr. Wilcox: The draft for the 1373 is already written. We have got it. Yes, sir. (Laughter)

Mr. Jackson: I think I know what you have, you have got a draft that some people in land surveying with the Bureau of Land Management --

Mr. Wilcox: No, sir. This is from OPM. (Laughter). One thing that bothers me about --

Mr. Jackson: Are you talking about a surveyor, 1373? You are not getting your numbers mixed up or anything?

Mr. Wilcox: No. I don't get my numbers like that mixed up.

Mr. Jackson: I can assure you, the one thing I can say and be very, very sure of is that we have no draft for the 1373 out for review or comment. I mean, I am writing it. I know. We don't.

Mr. Wilcox: Well --

Mr. Jackson: And we won't for another, like I say, it may be a year.

Mr. Wilcox: Well, I work in the Legal Office of the National Surveys Program --

Mr. Jackson: Yes.

Mr. Wilcox: -- And all we do is establish the policy and the budget for the program, and I assure you, we have a draft 1373, descriptions for that series, and we didn't write them.

Mr. Jackson: Draft 1373?

Mr. Wilcox: I'll tell you what I will do, I will give you my card and you can call.

Mr. Jackson: Are you sure you are not talking about the civil engineer? That is out in draft.

Mr. East: I would like the Corps people to understand that there are other agencies that are just as screwed up as we are. (Laughter)

Mr. Jackson: Back to your question about the titles. Remember what I said earlier about the fact that the current standard has a lot of reference to party chief, chief-of-party, that sort of thing and that there is a supervisory grade-evaluation guide as well as a work leader grade evaluation guide? Work leader grade-evaluation guide is intended for one grade interval work, where it is not truly supervisory. Maybe this relates to this crew chief; this would be a person that doesn't do performance appraisal, doesn't do career planning for the employee, that sort of stuff. But if you use that, there would be a titling process wherein one would probably change the job title to lead surveying technician.

I will remember to look at the titles, remembering that you would like something in there to differentiate with titles between grade levels.

Mr. Vanhaverbeke: There is definitely a wide gap in responsibility and what he has got to know. And there should be a distinct difference between the classifications.

Mr. Jackson: Well, there is a difference in the classifications, e.g., grade levels; just not a difference in title.

Mr. Anderson: With this work leader, they have made this basically our field supervisor, is a work leader. Our party chiefs are survey technicians. They have no special designation over the instrument-man.

Mr. Jackson: That is like somebody would be supervisor but maybe not supervising them in terms of the way the government has defined supervision.

It is like the word "complexity." You can say, "my job is very complex," but in FES complexity is one of these nine factors. And it is very specifically, defined.

Unfortunately, job titles and that sort of thing are probably more geared for use by the personnel people in the personnel world than the people in the jobs. But as things are structured, a crew leader is not a supervisory job in the sense that the government uses the word. However, it could be work leader.

Mr. Vanhaverbeke: Well, I agree with that.

Mr. Jackson: And so if it is work leader, maybe we should be ginning that in somehow.

Mr. Miles: I would like to fill you all in on another item. I have already, furnished Mr. Jackson with some job descriptions of the 817 series and the organization charts, of the districts where they are located.

If I can remember them correctly, I want to let those in these districts know which ones he has. He has some from Walla Walla, Philadelphia, Baltimore, Portland, and Norfolk.

The reason I gave him Norfolk, Philadelphia and Baltimore is because they are most likely in range of him visiting and talking with those people.

I also picked jobs out of those offices that seem to be somewhat representative. For instance, those in Philadelphia deal heavily with hydrographic surveying. Some of those in Baltimore deal heavily with boundary or land surveying. Those in Norfolk are multi-purpose job descriptions that cover many categories of surveying. We picked Portland and Walla Walla to give him a view of what was happening on the West Coast and some of the other variations.

We didn't want to inundate him with hundreds of job descriptions. Also, I would like to point out that in our sessions coming up Wednesday and Thursday night one of our user groups discussions will be on this particular issue of personnel. We might want to get into some of the other details then.

I have been looking into this for quite a while. I am not a personnel expert by no means, but I do have some feel for the problems. I would like to ask a question as to the coverage of the series.

In the Corps of Engineers, the surveying technician is a field person who makes measurements, and an office person who makes computations from those measurements is a civil engineering technician.

I can see that the 817 series implies making field measurements, and doing the computations from field measurements seems to be in the engineering technician series.

You talked about the civil engineering series being revised, and it had to be done before the 817. I understand that. And I believe the 802, Civil Engineering Technician series, is fairly recent and on the factor evaluation system. I am just wondering how the 802 and 817 will relate?

Mr. Jackson: I am not really sure. One of the things that has crossed my mind is just to recommend getting rid of the 817 and making them all engineering technicians, I mean combining the two occupations. That will probably never fly. But it would answer a whole lot of problems for the Corps.

As far as the problem you are talking about, I already sensed that you wanted me to notice that, just from the way you laid out these job sheets. I mean, I see it as an issue. I don't know if it is a problem.

One of the things I found is that some agencies use a lot more civil engineering technicians, when they can in any way justify it, than they use surveying technicians even though both are doing surveying. And the thing I understand is that the classifiers in the field -- I have talked to a couple -- say that they find the criteria in the engineering technician series more flexible; they can get higher grades. But those are the kinds of things that need to come up so that we can look at them closely.

Mr. Miles: Does the surveying technician series end once the field measurements are made? Is it then truly an engineering technician's responsibility to make survey computations?

Normally that is the way it is in the Corps. The surveying technician makes the measurements, and the engineering technician computes data from the measurements.

Is there any possibility that the surveying series will be extended after party chief and go into computations and adjustments of survey data?

Mr. Jackson: I don't know. One of the things I need to look at is that question. I can give you an example of a standard that was rewritten about five years ago, e.g., the accounting technician.

We used to have accounting technician and accounting clerk and then an occupation called accounts maintenance clerk. When we rewrote the occupation, they superseded all three of them and had one standard called accounting aide and technician. I don't know if that would be appropriate in this case. I haven't looked at it. Like I say, I am just starting to look at all this.

Mr. Miles: You are saying that those things are possible?

Mr. Jackson: On, Yes. But chances are that you, the Corps of Engineers might like it, but everybody else will say it is a terrible idea, and that you needed to keep all these functions very, very separate it probably wouldn't fly.

And you haven't told me really that you think maybe they should be combined. I mean, if you have --

Mr. Miles: No. I am not saying that they should be combined. I'm just noting that when you look at our organization charts that we are furnishing you from these districts, you will see surveying technicians (817's), civil engineering technicians (802's), civil engineers (810's), cartographic technicians, and a few land surveyors.

In our survey function, we encompass all these series. Would there be a possibility of just massaging them all into one series, like you suggested in the accounting area?

Mr. Jackson: Oh, Yes. I mean, that is what a study is all about. If we were to come to the conclusion that there was a good reason for it, that it was valid, we could do it. However, we do not do something for the hell of it, for no real good or logical reason.

We are moving away -- there would have been an era, maybe six years ago, when I would have said probably not, because it was generally thought good to have as many standards as possible, as many separate occupations as possible.

But we are in a trend now where there is no problem, if there is a good, logical, sound reason for combining occupations, then we will. But do you want that? Would you want that?

Mr. Miles: I am not saying we want it. I'm just asking if it is possible.

Mr. Jackson: Yes.

Mr. Miles: Mr. Jackson also said you could contact him direct. However, I am going to ask that you either work through personnel channels or work directly through me.

I am also going to be on the ACSM position classification committee. ACSM asked me to represent the Corps of Engineers on this committee. I am going to be active in that society effort, and also, from the technical standpoint through the Corps of Engineers and government channels.

Instead of going directly to Mr. Jackson, I would like to be sure I know what we are giving him from our different offices. If you would send it to me, you have got my office symbol in the literature there, in a plain envelope with my name and office symbol, I will get it to him in a more organized manner. I think it would make us appear much more organized than if he gets random phone calls and letters from individuals in the Corps.

Mr. Jackson: Well, that is what I said about maybe going to someone in personnel. They can help you get it more organized as could using you as a funnel. The more organized we get it, the more time it saves. It is somewhat selfish on my part to say that, but what I mean, is: The more organized the material, the faster I can get through it, the faster I can get this thing done. That is the bottom line.

Mr. Young: I am Harold Young, from Kansas City. Speaking of ACSM, I see, later on this week, and in Houston they talked about doing it also,

the certification program for hydrographers. If they go ahead with it, and some of us who work for the Corps become certified through this, would the 817 series include that?

Mr. Jackson: Well, I don't know anything specific about what you are talking about. But I think it would relate to the qualification standard rather than the classification standard -- you see, what I am doing is writing the classification standards and the qualification standards. That could have an effect on the criteria in the qualification standards. We could make it one of the ways of showing that you have the knowledge, skills and abilities for entry or experience to qualify for the higher grade levels. Most people who don't have experience in the occupation would enter at the GS-2 level. Maybe with such certification it would say you could automatically come in at the GS-5 grade level or higher. I am just speaking hypothetically. But it wouldn't have any bearing on classification standards, No. Using it as classification criteria would be like having a guy has got an M.D., a doctor, but is running the elevator. You don't pay him because he is a doctor, you pay him for running the elevator.

Mr. Young: Yes. But if he was running the elevator and then became a doctor, you would give him the raise.

Mr. Miles: No, because you are still paying him to run the elevator, not to be a doctor. I think what you are really saying is that in the 1373, land surveyor series; a degree was required to get into this professional series and they recently changed it to allow people registered as a land surveyor by the states to enter the professional series without a degree. That was like a substitute qualification.

Mr. Young is asking the question, if he becomes a certified hydrographer, what does it do for him as a 817, surveying technician? Part of the problem is that we don't have a hydrographer series to put you in. Becoming a certified hydrographer doesn't lend a whole lot of credence in the surveying technician series, especially as it stands now, because, the 817 series mentions very little about hydrographic surveying. At this time it is really difficult to even address that question. We are having ACSM talk about that certification program. I am very interested in it. I think we are going to support it. However, I can't figure out how it is going to fit into our earlier discussions on contracting, requiring licensed land surveyors, requiring registered engineers, etc. We are going to throw one more certified person in the pot to sort out. It is like certified photogrammetrists. What are they: Are they engineers, architects, cartographers, surveyors? Well, if you talk to them, they are certified photogrammetrists, but we don't have a series for certified photogrammetrists in the government. So it is hard to address that question.

Mr. Young: I was just wondering if you know.

Mr. Jackson: Another thing about any kind of certificate is that you can hardly require them anymore as a basic qualification. The courts

have been knocking such requirement down because what they see it as is discrimination. You are blocking other people from the occupation that possibly have the ability to do the work. When we accepted the state credentialing for the engineers or for the professional land surveyors, they made it as an option; but it is not a basic requirement in the government.

And the government, well, we don't even require an accounting degree for an accountant. We require, as a minimum, only 24 semester hours of accounting plus experience.

You just don't set hard and fast minimum requirements like that. Somebody takes you to court, and you lose.

Mr. Hansen: I am Chief of Position and Pay Management at Jacksonville District. I was going to sit here like a fly on the wall and just say nothing. But you are right into the area that, as a classifier and as a former staffing specialist in personnel offices, we have had problems with. First, there is the difference between a professional and nonprofessional, particularly in reference to that land surveying series that is out there. I have been given sets of duties to classify that could have very easily been classified in the professional land surveying series. We had no problems getting grades like 11 and 12 for professional jobs in this series. However, with our pattern of employment in the Corps, management has a preference, to have an engineer doing this professional work, to better interface with the rest of engineering.

We sometimes have difficulty classifying these jobs in engineering, because this criteria you are dealing with is more likely found in professional land surveying than the civil engineering standards.

What this gentleman over here is saying, is that if he becomes qualified -- and I have seen this where we have surveying technicians with professional qualifications for professional land surveying, we don't have a place for him to go.

As you mentioned, we have few professional land surveying positions in the entire Corps. So what might be useful and provide a better career ladder is for you, the body surveying, to consider placing more emphasis on the professional land surveyor running, planning, organizing, and setting up your survey programs, and phase more of those people in, to free engineers to work as engineers.

The other problems we have with that are that the factors that you typically grade engineers in surveying, don't have the engineering grade moxy that other things do such as planning and design work, for example.

So if you get really sharp engineers into your surveying organizations, they don't want to stay there very long, because they want to move on more responsibility and challenge and future higher graded engineering jobs.

The problem is that you have got a lid on the technician who becomes professionally qualified in land surveying, mostly because of an employment pattern we have within the Corps.

I don't know whether this is a significant problem the way it is, but it is something that you people should consider in looking at the future.

Mr. Miles: In regard to that, have you seen the tentative standards for the 810 Civil Engineer?

Mr. Hansen: Yes.

Mr. Miles: If the tentative standards are enacted, although there are no bench mark job descriptions in that series dealing with surveying positions, the series, will cover the professional aspects of surveying as they relate to the engineering profession. That is why Carl said that they had to wait until the 810 was done to work on the 817 and 1373.

Also, the 1373 series deals with only one type of surveying. We are using the word "surveying," a lot. Surveying to the Corps of Engineers means five or six categories of surveying: Hydrographic, topographic, control, boundary line, photogrammetry, and other miscellaneous types of engineering surveys.

But in the land surveying series, 1373, it makes it very clear that that series only covers property line, boundary, real estate-type surveys. That is why that series is used so much by the Bureau of Land Management. That is what they do: property, boundary surveys.

The Corps also does property and boundary surveying. If you saw the slides this morning, you saw that only 15 or 20 percent of our surveying work is in that area. We are doing larger amounts of work in hydrographic and topographic surveying.

I think that the 810 series, civil engineering, is the series for our people that are in charge of our survey functions. I think they have to understand both the surveying requirements and the engineering requirements. They have to put the two together. They must know enough about the engineering functions to understand what surveying is required to support it, and enough about the surveying function to be sure those needs are met.

Unless the 1373 series is vastly expanded to be an all-purpose surveying series, I don't think that the Corps' surveying section Chiefs should be in the series.

If the 1373 series is only modified to update it as far as boundary surveying is concerned, I don't think we should have any 1373 people in the Corps of Engineers, unless they happen to be in the real estate function and they deal solely with boundary surveying.



We have a few people like that, but not very many. I think the people who run the survey functions at the districts need to be civil engineers with a strong background in surveying and a strong background in civil engineering. I think the 810 series implies, in the introduction, it is the series they should be in with those types of responsibilities.

Mr. Hansen: I am not saying they are misclassified. I am saying that the way we use them, we create the problem for the technician with professional land surveying qualifications who is saying, "where do I go from here?"

Within the Corps, at this point in time, we don't have a place for the professionally qualified surveying technician to go.

Mr. Miles: That's right. We don't have a division level function in surveying and mapping, and we have only one and one-half people at OCE in surveying and mapping. We have 1,300 at the district level. That is why they don't have anyplace to go. I don't know that it will always be that way. Maybe it won't, but that is the way it is right now.

I would like to make another comment before we break up here. Some of you have fallen asleep, I see. When you go to your district personnel people and you tell them that you have talked to Mr. Jackson and you are interested in working on helping OPM revise the series, go to them with a positive attitude. Don't go to the personnel people with the typical attitude that we showed on the slide up here, "Bitchin'." Because now is the time to work with the personnel people and get their advice and understand what some of their problems are, and work with them. Don't work against them.

I get the feeling that personnel is on one side of the room and surveyors are on the other. I hear complaints that the classifiers don't understand what we do and we can't even carry on a conversation with them. Well, really bend over backwards to work with the classifiers and the personnel people now in this effort, so that we can have a consolidated effort and hopefully a well-organized effort to get OPM to revise the standard in the Corps best interest.

Mr. Jackson: Occupations are set up. We have a lot to do with setting up occupations. But one of the biggest things that controls what we do is what the agencies want.

What does agency management want? How do they want to organize the work in their agency, bureau, whatever? The figures I have on the number of surveyor and surveyor technicians in the government, in no way reflects the number of people doing that kind of work in the government.

You have an awful lot of people in a number of other occupations that are doing surveying. The surveying standard specifically says: Anytime

you have anybody doing surveying in conjunction with any other function, and the other function is grade-controlling, put them in the other series, don't put them in surveying.

The surveying and the surveying technician series are, as constructed now, strictly for surveyors and surveyor technicians. They don't do anything else. They certainly don't do anything else that has a grade-controlling significance to it.

That was like I was saying a lot earlier, about this thing of contract and procurement with the professionals. If they are going to be doing a lot of this and getting really heavily into it, and it starts controlling their grade, then they are going to become contract and procurement specialists, the way the system is set up now, rather than being surveyors, unless the surveying work they are doing is of a higher grade, which I don't know how that would work.

Does that help what you were talking about? It is sort of like those series are there for people who aren't doing anything but that kind of work.

Anytime you start doing anything but that kind of work, it is almost as if you move over. And in your case, it could be -- I don't know -- hydrologist as well as a civil engineer, maybe.

It could be some kind of atmospheric expert or it might be a computer specialist.

Mr. Miles: I would like to remind you that we have hand-outs on the field survey techniques course, so you can see what is going to be taught next month.

Don't forget, we are supposed to be back here at 7:30 pm to talk about resource management.

(Whereupon, at 5:30 o'clock p.m., the meeting was recessed, to reconvene at 7:30 o'clock p.m., the same day in the same place)

## EVENING SESSION

MANAGEMENT SESSION 5 (7:35 p.m.)

### In-House Capabilities

Mr. East: Gentlemen, we really want to get started. We don't have anything too structured for these couple hours, or however long it is, but, we thought we would just go through the items in Section II of the Management Study.

So if you all would turn to the first item under Work Force, In-House Capabilities. I think what we would like to do is go through these items and anybody who would like to -- and it would be very appropriate for the different districts who submitted these things to comment - just go ahead, and we will have some discussion and then move on to the next item.

How about the first comment, from New Orleans? Anybody want to address that? We certainly agree in OCE. We will do everything we can. Bill McCormick, I hate to put you on the spot on that. Would you want to comment?

Mr. McCormick: New Orleans District is not one of ours, but we agree with this particular comment. We certainly feel that we have got to look at how we are going to maintain our expertise and our in-house capability.

We like someone mentioned today, still have a lot of the old-times, some of them right here. We have several folks here, Jimmy Reaves, and people like that, who have come up through the ranks and did surveying and know about it, and therefore are in a capable position to administer contracts.

Without that, we are going to be in deep trouble. An it isn't going to be long before that occurs. So I do think that we need to do some in-house surveys. We can't just contract out.

I guess that is basically what you all were just saying. Jimmy Reaves submitted that, but he has put New Orleans name on it! (Laughter)

Mr. East: Yes, any comments while Bill is here? I think we all share that view. We can't be professional if we don't have the troops to do the job.

Mr. McCormick: You know, the same comment applies to some other things we do that perhaps are irrelevant here but maybe not. Core drilling is another area that we are under severe pressure to go out of the in-house business.

Another one is our laboratories, the division lab in our case. You cannot "run the railroad" without those kinds of functions, and you can't do it by contract without knowing something about it.

Mr. East: Thank you, Bill. As we go down the list, is there anybody who would like to make a comment? I noticed the Huntington District says they have the capability to perform in the surveying and mapping profession.

And this brings to mind, one of the things we need to work at in OCE. One of the things that we hope to accomplish through our working groups is sharing the expertise we have in the Corps, between the districts. That is certainly not the total answer, but it might help. There certainly is capability in certain areas, in certain districts. And we would like everyone to become aware of what that capability is, and work out some methods whereby that capability maybe could be tapped.

Mr. Miles: You see in those comments where the Huntington District talks about a mapping center of competence. Maybe we could get Bobby Applegate, Huntington District, to tell us what happened in ORD during those years when they had a center of competence in ORD.

Mr. Applegate: Very briefly, I will give you some idea, but I would like to address previous statements as far as the in-house expertise. This is one of the problems that we have, and I am sure a problem common to all the districts -- we are all in the same boat, same problems, funding problems, manpower, and in-house capability. The question is - "what can be done to progress and be competitive?"

But as far as the mapping center, several years back we were doing work for ORD, we were basically mapping for the other Divisions, Nashville, Louisville, and Pittsburgh on a limited basis. At that particular time, we were operating with two Kelsh Plotters, camera and plane, all in-house. Due to our growing capability and techniques, decisions by others mandated that we would revert to survey branch.

At this particular time we are a survey branch. We have been in the surveying and mapping business for several years now and feel that it is our expertise. If we can of assistance in either field, we would be more than happy to assist.

In surveying -- more particularly inertial surveying, we have utilized "span" in the Huntington District. We would be more than glad to pass on any information we have gained from that past experience.

We are also in the hydro business and have our own system. One major item concerning our district is the fact that it is compatible with the Louisville District and also very similar to the Pittsburgh District system. We assist the other districts as much as we can with whatever capability we have.

Mr. Miles: Bobby, I was more interested in how it worked and why you have abandoned that concept, especially in light of personnel reductions and less experienced personnel. Do you think it would be a good idea to consider consolidating some of our surveying and mapping activities at a division level to compensate for some of the districts who may not have the expertise and may not be able to get the people back, or get the spaces back?

Mr. Applegate: I think that division-level representation for the districts could consolidate ideas and methods.

Mr. Taylor: It would be a good idea, but I would keep it at a district level. I don't want to bad-mouth our division or other divisions, but they are more the supervisory, total scope, which they should do.

We are the grunt level, if you want to put it in plain terms. I would keep it like his district, my district, keep it at a district level. It could make one district lose and another one gain, but whomp it up to division, they are not used to day-to-day scheduling problems.

Mr. Miles: I didn't mean to imply that existing division people would perform the work. You are from Omaha, right?

Mr. Taylor: Right.

Mr. Miles: In Omaha and Kansas City you have competent people and reasonable size work forces. However, some of the other districts, have little or no in-house surveying capability such as Albuquerque. There is one person in Albuquerque contracting for surveying work. At this point, it would be hard for them to reestablish an in-house surveying work force with experienced people. So, in that division, SWD, if they had a center of expertise established, say, in Tulsa or Little Rock, Albuquerque could obtain resources to meet their needs, instead of going to contract. We would like to hear your thoughts on this concept of centers of expertise and capability.

Mr. East: To develop an adequate scope of work.

Mr. Spies: I think we have more or less done this in N.A.D., as you are well aware, M. K. I mean, both you and I have bailed Baltimore out a couple of times. We have helped New York. I am not bad-mouthing Baltimore because I don't see any representatives here, but --

Mr. East: You better not. They are probably going to do a lot of dredging up there soon.

Mr. Spies: Well, if they do, they better get some survey capability. But Norfolk and Philadelphia, both, helped out Baltimore on a number of occasions. And we have done the same for New York on another job that they had.

So essentially, even though the district itself may not have that capability, if the capability is available within the division, it can very well be handled on that type of a basis, as long as they establish some sort of a rapport between the survey personnel within the division themselves, so they can pick up the phone and make a phone call.

Mr. Miles: We would like to point out that we have a few of our surveying and mapping coordinators here from the division offices. Maybe this would be a good time to recognize them. I think we have three or four of them here.

Mr. Thompson, from N.A.D. stand up so the people here can see you.

Mr. Miles: Right behind him is John Leon, from SPD. Right beside him is Roger Brown, from S.A.D. You guys are all sitting together. Where is Frank Johnson, from LMVD? He is here at the conference, but I don't see him right now.

We do have a few other division coordinators here. Admittedly, these people are not experts in surveying and mapping, but they are the division contacts.

Comments they hear from you, especially the people in their divisions, would make some impression on them, as far as trying to better coordinate the activities in their division and getting more involved.

We have talked to them this summer, when they came in to OCE, but they need to hear directly from you fellows in the districts. I would like this session to be a chance for the districts to talk to OCE and to the divisions and air some of the things that are important in the area on work force.

Mr. East: We asked the fellow from Albuquerque to come up here. Is he still around? Why don't you both come up?

Mr. Miles: They have doubled their work force.

Mr. East: In view of the comment that was made under the in-house capabilities, could you comment?

Mr. Miles: Are you familiar with the statements we are referring to?

Mr. Luna: Yes, at the time of the study I was in charge of the survey function, and did respond to the questionnaire. Previously, Mr. George Baca, who is present tonight, was in charge. We are currently undergoing a reorganization in the Albuquerque District and Mr. Baca will again assume the surveying responsibility.

As for in-house capabilities, we don't have any. All work is contracted out. However, our hydrographic sedimentation surveys are performed for us by the Tulsa District.

Mr. East: Am I hearing you right? You are getting the job done?

Mr. Luna: We are getting the job done through various contractors. However, one major problem is quality control. We don't have the in-house personnel to inspect or check every survey. We have to take most surveys at face value. Every survey and inspect it. And we are more or less at their mercy. But we are getting the job done, or the jobs that we do have. Right now it is pretty limp.

Mr. East: Any comment, M. K.?

Mr. Miles: Also in the study, it indicated you had about \$600,000 or \$700,000 worth of con-contract surveying a year. That was supposed to be an estimated annual average. Is that about the size of the Albuquerque workload.

Mr. Luna: Averaged over the previous year, yes. The bulk of that being aerial mapping contracts.

Mr. Miles: You mean it was a one-time requirement and it has been met and now you don't have that annual requirement?

Mr. Luna: It depends on the money supply. As fiscal year end money seems to be more available, which accounts for a tremendous amount of work at one time. We do have projects that do come up during the year that average about \$400,000.

Mr. Miles: The sheet here in the hand-out that we put together shows about \$650,000.

Mr. Luna: That should be an average of \$400,000 for aerial surveys alone, with the total workload average being about \$650,000. However, this past year has been very slow, but will probably pick up at year's end.

Mr. East: Okay, thank you. Does anyone else have any more comments on the in-house capabilities, anything related to that area.

Mr. Alford: Lowell Alford, Portland District. In-house capability, we are sort of like everybody else, we are being reduced to a point where contracting, is necessary. We have open-end contracts, \$100,000 limitation, \$25,000 per work order.

I believe that has been raised to 250,000 and 40,000 per work order.

Mr. Miles: Are you referring to architect-engineer limitations?

Mr. Alford: Right.

Mr. Miles: If we are dealing with architect-engineers. We are not sure we are dealing with architect-engineer-type contracts for our surveying requirements. Are you in Portland?

Mr. Alford: Yes.

Mr. Miles: Does Portland have a split function, engineering and operations and navigation performing surveying?

Mr. Alford: That's Right.

Mr. Miles: Which one of those functions are you with?

Mr. Alford: With the surveying.

Mr. Miles: In the engineering division?

Mr. Alford: Right. We are using this limitation. You are saying that is strictly A-E type.

Mr. Miles: Yes. That's the limitations on open-end A-E contracts.

Mr. East: You can use indefinite-delivery contracts without price limitations, as far as I can understand. So, there are some good things that go along with not keeping surveying and mapping in the A-E arena.

Mr. Alford: Well, in line with this then, we do have a lot of small jobs, in the \$10,000 to \$20,000 range, which are very small lead-time occurrences. Right now it's a \$10,000 limitation for a purchase order.

I talked to procurement about this, and they said, "somebody back in OCE is looking at this now, as far as raising that limitation," which is almost a necessity, since we can't do all of our work in-house.

It is necessary to raise that to a \$25,000 limitation. Have you been approached with this at all?

Mr. East: Yes. There is something happening on A-E open-end contracting. OCE is looking at raising the threshold value for the single work order.

But on surveying and mapping, unless it is a requirement to have that work done by an A-E, then you don't have this requirement. I believe we are in a different ball game and, we can use the indefinite quantity services contract, without any limitation either to the total value of



the contract, or the work order. That is going to be of value to you, and I think you need to understand the implications of that.

Mr. Miles: What we are saying is that you are outside the A-E arena, if you don't use the Brooks Bill procedures. We are not talking about \$250,000 limitations per contract and \$40,000 per work order. That only applies when you use the Brooks Bill selection procedures for open-end A-E contracts.

I am not talking about the selection process. I am talking about obtaining works through a purchase order by competitive bid.

Mr. Miles: Are you talking about small purchases under \$10,000?

Mr. Alford: We are talking about competitive bid.

Mr. Miles: I believe you are talking about small purchases under \$10,000 which do not require formal advertisement in the Commerce Business Daily.

Mr. Alford: Right.

Mr. Miles: We were off track. We did not understand the situation.

Mr. Alford: Okay.

Mr. Miles: How does this limitation impact on your in-house capability? What really are you trying to tell us?

Mr. Alford: Well, what I am trying to say, if it is held to the \$10,000 limitation we cannot perform all our functions on time. We don't have the in-house capability to perform all of our surveys on schedule. Some contracting is necessary.

If we can raise it to the \$25,000, then we won't have a serious problem, because we can go contract and pick up the small jobs and stay on schedule.

Mr. East: Well, I guess I have a problem with that. Why are you packaging jobs in such small increments in the first place?

Mr. Alford: That's the nature of some of the surveys that we have.

Mr. Miles: I don't question that Mr. Alford. Ed has, I guess, been in OCE too long. (Laughter). I don't question the small requirements. But I do have another question which gets into one of these other areas that we will talk about in a minute, but we can get into it now, scheduling.

## Planning and Scheduling Resources

Mr. Miles: I'm getting from you the same thing I hear from a lot of other people. The surveyors say that the engineers, planners, or real estate people, come to them today and say, "we have got this money and we have got to spend it. We have got to get the job done by the end of the month. We need the survey tomorrow."

Mr. Alford: That's correct.

Mr. Miles: And the surveyors say, "You mean you didn't know until today that you might have to have this tomorrow?"

This is a good lead in for this. I know is a general opinion. Is any of the districts doing anything to work with the engineering division and operations, so that these things don't come up all of a sudden?

Mr. Blackwell: This is really a sore spot with me. These guys come in all the time, and they are out of breath, the project engineers, and say, "look, we have got to have something right now." And it's usually surveying or mapping.

And I say, "well, why didn't you schedule this?" We send a letter out annually asking, you know, what they want to contract the next year, so we can plan for it.

And do you know, we hardly ever get a response back. The chief engineer signs the letter, hydrology, foundations, so on. But then, when their schedule gets tight and they have got to have it done, it is usually surveying.

They come in and say, "well, we've got to have it right now." So that \$10,000 work order he is talking about -- not work order -- purchase order, has gone up to 25,000. And it is a lifesaver, or will be.

Mr. Miles: To me, that is a way around the problem. Th problem is that somebody obviously knows the requirement is coming. They don't bother to communicate. Somebody is shaking his head back here. Mr. McLeod, do you want to address this issue?

Mr. McLeod: I am Danny McLeod, from Mobile District. Our problem in the Mobile District is that we have a lot of quick-start projects, especially in the military area.

Sometimes we may know only five days ahead of time about a project. And with the open-end type of contract, if it's A-E, which we practiced heretofore but we can't do now, we cannot respond to the requirements. It normally takes about two months to get an open-end package out to the contractor.

And talking about the purchase order, that is really a different process than the A-E or the competitive negotiating. It is a good tool for small projects.

Of course, we can use that. We couldn't use it very well.

Mr. Miles: Mobile is one of our bigger districts, doing quite a large workload. What percent of the work, would you say, is on such a short notice basis?

Mr. McLeod: I'd say over 50 percent.

Mr. Reaves: Last year, in May, this same question came up. And we responded to the Chief of the Engineering Division there. At that time, on our RAPM printouts, and AMPRS, report of all the projects that we had work on about 75 percent were nonscheduled projects.

Mr. McLeod: And this is not the project engineers only. This is when these projects come to us either from other agencies or sometimes in-house. This happens frequently. It is a big problem.

Mr. Reaves: When you get the foundations people out there, with as many rigs as they have going, and as much trouble as they have had in some areas finding the foundation, we got out and lay out 50 or 60 holes.

They may run into adverse conditions and completely abandon the site. When they have four drill rigs sitting out there, you can't wait two or three weeks to negotiate some kind of contract with somebody to go out there and lay out core drill holes.

It is just not feasible to do something like that.

Mr. Miles: Are you saying that the workload in this area is so large it would be impossible to maintain an in-house work force to respond to these short-fuse requirements? Is that right?

Mr. McLeod: M. K., in fact, that is what we have done recently in the Mobile District, we have eliminated our in-house capability, because of the contract situation. We are going into that type organization.

Our work now will mainly be pertain of scopes of work and negotiations, when they are needed. But right now we are on the street with ten contracts.

We have tried to -- let's see, we are getting approval from S.A.D. for six deviations. This is past history.

Now, we also are going out with a lump-sum contract. We anticipate there will probably be 50 lump-sum contracts in the A-E area or the competitive negotiations.

I am talking about large contracts. We do not know, at the beginning of the year, what we are going to survey during that year. We just have no way of developing a schedule.

We really develop our schedule based on past history.

Mr. Reaves: We support operations, construction, real estate, and it is like if you have -- say you are supporting operations, and you discover a sand bar, that has traffic backed up, how do you tell a contractor what to go survey?

You have got to develop some kind of scope of work -- what our contracting people procurement and supply tell us we are going to have to do. Is package everything lump sum. There will be no open-end-type contract.

We have got to come up with a package. We can go up there, give it to them. They are going to negotiate with the contractor. They are going to do it. All we are going to do is administer the work after they negotiate with the contractor on the price.

Mr. Miles: I understand the situation.

I don't need more examples of why you have short fuses. I would like to discuss some of the possible solutions.

Danny, I think it is great for some of these surveyors to hear somebody that generates the short-fuse requirements, to realize that you also have the short fuse.

Mr. McLeod: Well, let me say this, M. K. But what I foresee in the competitively negotiated process, the biggest problem is response. Based on past experience, and just the procedures you have to go through, it is going to take two months, minimum, to get a work order out.

We cannot respond to the requirements of the district under those procedures. There is no way.

Mr. Miles: How long does it take you now to get a work order out under the A-E procedures?

Mr. McLeod: Under the old procedures, which is alluded to be illegal, we can get a party out in the field the next day, under our past type of contracting procedure.

Mr. Miles: Well, you can have the same indefinite delivery type contracts whether the firm is selected by A-E procedures or selected by other procedures. You can still use the indefinite delivery type contract.

Mr. McLeod: Well, let's say we had an open-end contract. First of all, you go by the SF-30, I think that is the form. You have to negotiate a lump sum with an open-end contract.

You also have to get it approved by the contractor himself, which he is going to go out there and look at the job. He is not going to give you a figure unless he goes and looks at it.

Then, after that, it has to come back in, go through the paperwork. Then the contracting officer has to sign it.

There is no way in the world, under our procedures in government, that we can move faster than two months.

Mr. Miles: How do you do it now in less than two months?

Mr. McLeod: The way we would do it now, we negotiate ourselves a lump-sum figure over the phone. We go ahead and obligate the money. This is under the old type of contract we had.

We go ahead and obligate the money on the delivery order, and we have a lump-sum figure that we have estimated. And this is the way we proceed.

But as we understand, now we can no longer do this.

Mr. Reaves: The one thing that we have that maybe some districts don't have, is that in-house we keep all of the paperwork on our contracts.

I am an ordering officer. In the section we have four ordering officers that can order work against those contracts. That means that we don't have to go through supply and legal -- everything that we do. When you start going to these other contracts, it is going to go through our legal department three times before it goes up to be signed.

Now we don't have those restrictions. You can respond to the work.

Mr. McLeod: There are certain other things that happen. We used to, even on a contract, we gave a notice to proceed after we negotiated the figure. We gave a notice to proceed. It was by letter.

Now the procedure is that the contract is sent to the contractor and he signs it. He may take two or three weeks for his people. It is sent back to the district. The D. E. signs it. The contracting officer signs it. That may take two or three weeks.

So even in an A-E process, we have extended our time to obtain a contract. And one final note, just to give you an idea on our only competitively negotiated contract that we have so far, we started last April. It was awarded two days ago, two or three days ago.

Mr. Miles: Well, since Jerry Yager is not here to address this, I'll try. From my understanding of contracting policy, the only difference in the A-E open-end and any other open-end is the selection process.

Right now you are talking about using open-end contracts with A-E firms using A-E selection procedures and indefinite delivery type work with work orders. The process you are telling me you use now, to get these guys on the phone, for this quick overnight requirement would be no different, no matter which selection procedure was used, one you get the firm on-board and are ready to order him up to do the individual work-orders.

Mr. McLeod: The difference now, M.K., is that we have ordering officers, like Jimmy just stated. They order the surveys. We no longer can do that under the competitively negotiated procedure or the open-end contract -- open-end procedure.

Mr. Miles: All I can say is, if what you are doing now for work-orders is legal under the A-E process, it is also legal under competitive negotiations.

Mr. McLeod: That is one of the points I am trying to make. It has been determined that it is not legal.

Mr. Miles: We will question that determination.

Mr. McCormick: I think part of Danny's problem is a local thing that Mobile District has gone through a procurement revolution, you might say. And it has reexamined all of what it has been doing, and it has concluded, unfortunately, that a lot of what it was doing wasn't right.

I personally don't agree with that. A lot of us in the engineering side of the house don't. But nevertheless, these fellows are stuck with much more rigorous procedures than they used to have.

It is just the timing. It just happened to fall right at the same time as the new EC came out. But I think there are two things here. One has to do with the change in policy from the top.

The other one is a change in policy at the district level. For example issuing notice-to-proceed to A-E's for years we have been putting A-E's to work the day we finished negotiating. Virtually right then we gave them a notice-to-proceed. Now we can't give them a notice to proceed until we go through this exchange of paperwork and have a formal contract.

Mr. Miles: The point is that is not the selection process, it is another local problem.

Mr. McCormick: That's right.

Mr. Miles: I think that is a good point for all of you to understand. If you don't have this particular problem.

Mr. East: Yes. We are going to try to work on that problem, too. It has been there for a while in Mobile.

Mr. Miles: Ed said that, not me.

Mr. East: Well, I think Jerry Yager feels the same way, that there is some problem down in Mobile District. But I can tell you, we get along with the procurement people at OCE. And we get along pretty good with the lawyers. And we are still pushing the idea that we want, the best quality product that we can get at a fair and reasonable price. Do you remember the price sign moving back and forth along that rope? You folks are the ones who are really going to be putting those technical factors on that contract and having a real input to that price factor. We just have got to get this problem solved at the district level, and at the division level, in the same fashion that I think we have solve it in OCE. Mobile -- it is getting late -- we have known that you've had a problem for quite a while. Jerry Yager knows the problem, and we are going to try to address it.

Mr. Miles: Bill, would S.A.D. and Mobile like a team visit from OCE, dealing with surveying contracting or something like that?

Mr. McCormick: Probably wouldn't hurt. I would like to ask the Mobile District Engineer how he feels about it.

Part of what has happened here is the result of emphasis from the top, in stiffening up contract administration. Of course, if you get to reading those books too closely, you get so afraid of doing anything that you just stop dead in your tracks. Part of that is probably contributing to the difficulty here.

I would think it would be a good idea, but let's pursue that separately.

Mr. Miles: Get back with us.

Mr. McCormick: Okay.

Mr. Miles: We have had some discussion with Jerry Yager and he has indicated maybe we should look into the situation in Mobile. We have given him some horror stories that we have gotten through engineering channels. He tends to get the opposite opinion through his procurement channels.

Although we are both prejudiced, I think he realizes neither one of them are the real truth.

Mr. McCormick: Okay.

Mr. Miles: Let's get back on planning and scheduling.

Mr. Roof: I'm Ed Roof, ETL. That is what I want to address. In some of the work that I did for OCE, visiting some of the districts, the habit of surveyors being given work orders and saying, "you have got 24 hours to respond," just absolutely floors me.

I believe -- I may have to be educated here -- but I believe all the projects are done by funding, which is planned a year or so ahead. So people can't tell me that they don't know what the survey requirements are at the beginning of the project.

You have a project. A survey requirement should be in the funding of that project. And if they are not, maybe you should call the survey people in to assist you in the actual planning.

Now, if you are going so far down the project and determine, "whoops, maybe we better call the surveyor in," that's why you have the short lead time.

In a couple of districts I have seen -- let's just take, for instance, levees. I have seen a survey on a levee stop at 5500-50, a month later pick up from 5500-50 and go on another five, six miles, open-end contract.

They would have a mobilization-demobilization fee. Someplace along the line it has to be planned. Not only that, you, the engineering division, or the survey, or whoever, somebody in there should have the responsibility of having survey jobs they would love to see accomplished but are not funded.

I heard a couple of allusions to this end-of-the-year money. There is a good place to use end-of-the-year money. Have a couple jobs slipped away under your desk that you would like to see done but you don't have under funding.

I have been in the surveying and mapping racket for a good 35 years, and I have never seen anything like I have seen in some of the districts, work order after work order, tag a job onto a job that has been done previously.

It points out to me that there is a lack of planning someplace, and I don't think it is the survey branch.

The survey branch only can do what they are told to do. If you don't bring them into the planning field, you are not going to get their particular expertise, because they can give you costs, they can give you



what are the accuracies you want, I mean, what you are looking for, they can help determine the type of survey that is actually required for that particular project.

This is a feeling from the outside, somebody who is not in it. But that just flabbergasts me that these three- to four-day work orders keep coming down to the surveyors. No wonder so many of you are frustrated. (Laughter)

Mr. Miles: Basically, I think we realize that we have some of these short fuses that can't be avoided. Maybe we can work on eliminating some of them, reducing the number of them.

I know some of them really are short fuses. But like Mr. McLeod suggested, I don't think there are as many of them as there appear to be.

I know, when I was in a district, the planning people would ask for a seat-of-the-pants cost estimate so they could submit something in a funding document.

They would say, "This will probably never be done, but if it was, what would it cost?"

Then I would say, "Well, do you want me to do a detailed estimate and get bods with you?"

They would say, "No, right here on the phone, just tell me." So I'd give them a ball-park figure. Then about eight or nine months later I would get a phone call saying "you know that estimate you gave me eight months ago? How about getting the work done by next weekend?"

I couldn't believe those planning people would let it drop like that, and then call eight months later for the work on a week's notice. I think we have some short fuses that we could avoid.

Does anybody else want to address planning and scheduling?

Mr. Marvin Taylor: I have the same problem. But I go around and actually make visits. One day I will get two jobs. I won't get it in writing, but I will get, you know, "Let's go up to Detroit for a couple of days and do this," or, "Let's go here and do that."

One of the biggest jobs I had this past year was in Louisiana. I heard about it from the street, outside the building, from somebody else who was going to do similar-type work, geotechnical work. That was the first I heard about it.

And I figured out who was responsible and I said, "Is this true? Are we going to do it?"

And he said, "Yeah. The Chief of Engineering Division says we are going to do it."

I said, "Fine. How about in the fall?" This was early spring. And I said to the contractor, "All right, fine. Next winter." They just expect top-priority service. I gave it to them. But it was just a lack of communication.

And I go around and hustle the work, really make them tell me, scare them a little bit.

Do you think that this is a well-known fact to the Chief of the Engineering Division, or the Chief of Operations, whichever the case may be, where your survey function is?

Nobody has any comments on the Chief of the Engineering Division or the Chief of CONOPS, whether they know of this situation? They could help you improve it.

Mr. Marvin Taylor: We are small peanuts compared to the total projects.

Mr. Roof: But you are a very important small part of the project.

Mr. Marvin Taylor: I agree.

Mr. McCormick: I am pretty familiar with the Mobile District's workload, and I can attest to the fact that most of what they are talking about is in fact unknown, very short fuse.

They have been involved, for instance, in the Coosa River Navigation Project. We have been looking for a suitable site for a lock. We have drilled out about six or eight sites for that lock each time, we find unsuitable materials, and have to move they have to run back up there and do additional surveys.

And the area, the potential site, is pretty large so it wasn't a matter of going in and surveying the whole area. That is just one example.

We have had many military projects which were turned on literally overnight and had to be done immediately.

We did all the treaty work in Panama. That took a real crash effort to get that done. So I really believe that the Engineering Division, Planning Division, Construction and Operations, in Mobile, are pretty good about giving them the jump, where they have the opportunity.

Now, of course, in Civil Works, like Tenn-Tom, for instance, that was planned, programmed, money was put in the budget and we knew we were going to go ahead with the work. That surveying was done on a fairly orderly basis.

But even on Tenn-Tom, we have had some lock wall movements, guide wall movements, things like that, that required immediate monumentation and reading, that had to be done overnight.

We had some serious problems with our bankhead gates failure a couple of years ago. And these people had to mobilize and get in there and monument and measure the deflections in the walls.

So we have had a lot of that sort of thing.

Mr. McLeod: We are not trying to embellish a situation or blow it up. To give you an idea -- and I don't know the workloads of other districts -- we had approximately 670 work orders -- isn't that right? -- last year.

Even if you planned them, it is a large workload for a survey section, which we try to plan. To give you an example of what Billy is saying on the Tenn-Tom, at the Aberdeen site, we knew about it a year ago, but we could not start it until it was funded. It was funded here about three or two months ago.

So we had to jump on it just like that, to keep the schedule. You are talking about planning. When you have a workload of that scope, and plan -- we do a lot of planning. But you cannot anticipate all the workload in the district.

In fact, I wouldn't be surprised if you don't have a couple orders on your desk right now, Jimmy, just while we have been gone.

It is a pretty big problem. I keep hearing this planning. But I think they are very good planners. We have always planned our work. We have handled some very large projects.

Here again, in the survey area, we have quick-start projects overnight. We have to respond to them. In the case of the Aberdeen as-built plans, if we had gone the route that we are talking about now, we would not have the surveys until next year, Billy.

Mr. Miles: Okay. I guess we have established the fact that the short-fuse jobs are minimized and we can't do anything about them. We have got to live with them.

Mr. Howe: I am Elgia Howe, from Vicksburg. You asked if my boss was aware that we had short-fuse jobs. I thought I better respond to that.

The Chief, Engineering Division, is aware that we have shortfuse jobs. And he gives them to me and expects the Survey Branch to take care of them, which we do.

Mr. Miles: And he signs your performance appraisal?

Mr. Howe: Yes. And, asking the indulgence of the people here, Mr. East addressed the meeting this morning and said, "gentlemen and lady." I would like the lady to stand up. Jane Evans.

Ms. Evans: Hi.

Mr. Howe: She is all mine. (LAUGHTER)

Mr. East: I had a boss who just retired, after 30 years of service. He had a little saying that he always would say to me. He said, "plan your work, and work you plan." And it sounds like most of you are doing that. We will go back to OCE and talk with Jerry Yager, and look for ways in which will allow you procedurally to do some of the things that you have to do. What I am hearing is that the procedures, and the rules, and the regulations you are working under are stifling your ability to get the work accomplished. And we are going to address that, and do something about it.

Okay, M. K. thinks we ought to talk about organization structure now.

#### Organization Structure

Mr. Miles: In doing this, I would like to organize the comments as follows:

- (1) Survey personnel in the Engineering Division only,
- (2) Then from operations, and
- (3) Then from the districts that have the split function, where the surveying is in separate organizations.

Would somebody who has all their surveying function in the engineering division like to relate to us how it works, or if it has any drawbacks or anything of that nature?

Mr. Corr: My name is Jerry Corr, from the Louisville District. And we have all our surveying functions and the mapping functions, too, in the Survey Branch, and that is out of the Engineering Division.

And we support the real estate operation, construction. And we really don't have that many problems with scheduling.

What we do, we do have an open-end contract, which is real helpful. Now, what we do is schedule our crews, and then the jobs that we don't have the crews available for, we will just put them out on open-end.

Mr. Miles: I often hear comments from one division that because the survey function is in the other division we can't get good service from them because we never rate a high priority.

Have you ever heard anything like that from the operations' people you support?

Mr. Corr: No, sir, not to my knowledge. What we do, we try to schedule the work the first of the year. And I think all the elements so far have been happy.

Mr. Miles: Earlier we talked about losing in-house capability and spaces and how hard it is to maintain a good work force. You might have 30 surveyors in the district, but they are so scattered you don't have enough in any one place to develop any expertise or any substantial in-house work force.

It seems logical to me to at least consolidate the survey function at the district level. Put it in whichever one of the divisions that seems to have the biggest surveying workload, whether it be engineering or operations.

I know these split districts say it is the only way they can operate, to have the surveying function split, some in engineering, some in operations, some in navigation, etc.

Is anybody from one of those types of districts? Maybe Portland? Would anybody like to address that? Mr. Glenn Boone from the Wilmington District. I believe the surveying function in Wilmington is in operations, isn't it?

Mr. Boone: That is correct. A few years ago, the Survey Branch was changed from a branch to a section. And about the same time, it was transferred over to CONOPS. Construction-Operations Division this was before my time, however, if I remember this correctly, the reason, or rationale for the change had quite a bit to do with an assessment of what the Survey Branch was actually doing.

The Survey Branch was primarily at that time functioning in the hydro area, and it was in support of the dredging program. This was the primary basis for which it was transferred over to CONOPS.

I feel personally that it is still in support of the dredging program, which represents about 90 percent of our work. The other land based survey work done by the district, is handled through the negotiating and estimating section, which is part of the design branch in the engineering division.

That office takes care of the A-E contracting surveying that is done. And in these more recent times, the competitive negotiating, for competitively negotiated contracts.

Just recently I went through an experience with a negotiated contract in the negotiating and estimating section. It had to do with a contract on some sedimentation ranges on one of our lake projects, a lake project near Raleigh.

I was involved from the standpoint of the review of the proposals. There were some 37, I believe, proposals. There were approximately seven evaluation factors that were used to rate these proposals.

I will just briefly reiterate some of my experiences there. The price ranges were anywhere from \$20,000 to over \$200,000. The Government estimate was in the neighborhood of \$80,000 for this work.

The 37 proposals were essentially boiled down to about 15. Those 15 contractors were asked to submit a best and final offer. And we rereviewed those 15 proposals. And I am not sure exactly what Hydraulics Branch is doing with that package right now, but it is back in their office.

This whole process has taken about four to five months now, and they (negotiating and estimating' Dept) are fairly close to awarding a contract.

I think, in Wilmington, the way it is set up right now, it is working fairly well. From time to time I get requests from Engineering Division elements for work which they require, whether it is that they didn't plan for it properly or they feel like we are better equipped to get that particular type of work, they come to us.

Generally, this work is in the hydro area and not in the land-based survey area.

Mr. Miles: So you are saying, in Wilmington, your in-house surveying capability is mostly hydrographic and it is in operations?

Mr. Boone: That's correct.

Mr. Miles: The surveys that the engineering division need, they contract?

Mr. Boone: For the most part, yes.

Mr. Miles: They have no in-house surveying capability in the engineering division, and as far as you know, this works fairly well?

Mr. Boone: There is no in-house capability along the survey lines in engineering division.

Mr. Miles: Who writes the scopes of work in the engineering division for those contracts?

Mr. Boone: I think it is probably a combination of the project managers and the negotiating personnel that take care of this.

Mr. Miles: How do they have the expertise in the surveying area to do that?

Mr. Boone: That's a good question.

Mr. Spies: Since Glenn is up there, I think I just want to address your last question, M. K. we have a similar setup in Philadelphia, since dredging is really the bread and butter of the district.

We do quite a bit of the surveying work for Engineering Division in terms of subsurface exploration, layout, any of the surveys, usually, that they are doing, say, for design of something.

But in recent years that workload has declined considerably. However, if there are any jobs that are not within our capability of performing within the time frame that they are scheduling, then we will assist them in preparing the scope of work, reviewing the Government estimate on it, and also in reviewing any of the -- up until now -- the selection, or the preselection and selection board.

My assistant and I would sit on one or the other board. I was usually on the selection board for surveys, he was on the preselection board for surveys, generally made up of five members, say, from Engineering Division.

So it works out very well for us in that respect. But we assist them. I mean, if there is something that they don't quite understand, we will sit down and assist them in writing both the scope of work and their estimate.

Mr. Miles: Do you think it would work better if you had the expertise in your shop to handle all the surveying, whether it be in-house or contract?

Mr. Spies: Basically the greatest majority of the survey work that is done, we handle in-house. As I have said before, M. K., there is a small amount that is done in engineering, as I said. We don't have the capability of providing it within the time that they want it. It is a relatively small amount, when you compare it with their overall workload.

The only other time that we get involved is if they are going out for a survey, to deal directly with some project that they have going with an A-E firm, and request them to do the surveys as part of the project that they are working on.

Mr. Miles: Has anybody had any similar situations, where they support an A-E support section or contract section.

I understand that some of the survey functions support the A-E section in the engineering division by writing the scope of work or helping them with the government estimate and don't really have control of the contracting. They support somebody else in the contracting effort.

Does that seem to work well, or does anybody have any problems with being a technical support function in contracting for surveying work.

Mr. Howe: Elgia Howe, I am Chief of the Survey Branch in Vicksburg. I can't answer any of those questions affirmatively, M. K. I thought I would describe our organization.

In our Survey Branch in Vicksburg, we have the Mapping Section, the Survey Section and the discharge work. We monitor many types of contracts; E. D. M contracts, automated survey contracts, mapping, aerial photography, and survey boat contracts, and in my position as Chief of the Survey Branch, I am the contracting officer on all of those contracts. I write the scopes of work and act as chairman of negotiation teams.

Mr. Miles: Excuse me. Are you the contracting officer or the contracting officer's representative?

Mr. Howe: C. O. R.

Mr. Miles: You are the contracting officer's representative.

Mr. Howe: We find that it works very satisfactorily.

Mr. Miles: Are you saying that you are in, more or less, control of the contracting for the surveying effort?

Mr. Howe: If you want to put it that way.

Mr. Miles: Well that is my assumption from your statements.

Mr. Howe: Yes, that is generally correct.

Mr. Martin: I am Gerald Martin from Walla Walla District. And we handle all of the surveying there. We have the hydrographic survey party and the land surveys. And we are under engineering.

And I write all the work orders and do the negotiating. And I think it works quite well, especially with probably 15 people left in the section. We are a section.



The only trouble we have, I think, is that photogrammetry is a separate section. And I think it could be done better if it was one branch. But other than that, I think handling the total surveys is a little better.

Mr. East: How are you contracting your work? Through what process?

Mr. Martin: We just now got our survey -- indefinite quantity type. And we started last September, and we have just gotten through, after Christmas. And I haven't written any work orders yet.

We have been able, with three crews, two and a half crews, been able to hold our own. As soon as I get back, I will have to write a work order. But it is indefinite quantity type.

Mr. East: Yes. Thank you. I think we better start using the term "indefinite-quantity contract" in lieu of this term open-end contract. This is really not a good term to use. It brings to mind too many bad connotations.

M. K. has just scolded me for getting back on that subject. Anybody else? Yes, Bill McCormick.

Mr. McCormick: I hate to hog the floor, but let me comment on Wilmington, because I was there when we created that particular arrangement.

We had in mind maintaining a minimum expertise in engineering division to handle the landbased surveys. I think what in fact happened was that we ran out of people.

And Bill Sanderson, who was then Chief of our CON-OPs, was a very strong individual, had good organization, was quite capable in assuming the hydrographic part of it, which was the bulk of the work then, and I guess still is.

So, quite frankly, I think we left ourselves vacant in the engineering division, and we really need to restore that. We have asked the district to look toward that.

But they haven't had a big workload, and I don't think there has really been a big surveying load in engineering. But we have been exposed in that area.

The gentleman who handles that work in engineering is good in contracts and that sort of thing, so it is probably not totally uncovered. But as far as having the string expertise in engineering for surveying, we don't have it right now. But I think the district recognizes that.

Mr. East: Thank you. Any more comments on this particular item, organization structure? Okay.

### Professionalism

Mr. East: Moving right along we have Professionalism. Please look at that part of the report.

Mr. Miles: We touched on this a little bit with the fellow from OPM, registration requirements, state licensing of our people as engineers, as land surveyors, things of this nature.

I get the general opinion that the great majority of our people are not licensed as surveyors. Only a few are licensed as engineers. I think we understand the lack of incentive or initiative for these people to become licensed, because there is no on-the-job reward for such an activity.

However, on the engineering side of the house, I think you will find the great majority of our engineers are registered in our typical engineering functions.

There is no particular on-the-job reward associated with them becoming registered, but they do it anyway.

I would like to hear some comments on what you think as far as trying to encourage our people to become registered as surveyors, become more active in surveying societies, such as ACSM and the American Society of Civil Engineers, who also have a big surveying and mapping division, some of the benefits that people get from these professional-type activities.

Mr. LaFountain: I am Jack LaFountain, from Buffalo District. You talk about licensing, certification, and so forth. What is the advantage to you, whether we are licensed or not, if we are qualified to do the job?

Mr. East: Wait a minute. I would like to answer that. I can't let that go. I am a registered professional engineer, and I guess I don't care what it means to anybody else out there, but it means quite a bit to me. I think it is more an attitude. Registration was something that I saw as a personal goal, something I personally wanted to attain.

Now, I did work in the private sector, and being licensed was important, because the firm could put my name up in the corner to show they had another registered engineer in the firm. But I really couldn't sit back and not react to your statement, because it is not so much what it means to the organization, as what it should mean to you personally. And if you have that attitude it means to me that you have set a personal goal, that you want to become identified as a professional, and in doing so, be recognized by your peers as a professional. It is not so much for the organization. I guess that is what I am saying. It

is something personal, a personal desire and goal. I would like to see people having registration a personal goal, rather than an organization goal.

Mr. LaFountain: Well, in New York State, in a very short time, you are going to have to have a four-year degree to be a licensed land surveyor. At the salary rates that we pay our people, a man who has a license, is a licensed land surveyor, would be a damn fool to work for the Corps of Engineers. He can make a lot more money someplace else.

So as soon as that man gets his license -- and most of the work that we do in Buffalo, as far as experience being applied to be a licensed land surveyor, would not even be recognized.

Hydrographic surveys have nothing to do with boundary surveys. And we do very little boundary surveying. And what we do is contracted out to the A-E, through the A-E process, I believe. I don't have anything to do with it.

But you say that most of the people on the engineering side -- I am in construction OPS. You say that most of the people in the engineering side are licensed engineers.

Mr. Miles: I think we have at least a 50-percent licensing ratio. I think it is closer to 75 percent.

Mr. LaFountain: It is not that in Buffalo.

Mr. East: Well, that is not to say that it shouldn't be.

Mr. LaFountain: No, that's not to say that it shouldn't be.

Mr. East: That is what I am encouraging.

I just that it is part of being a professional, to want to seek registration, without getting into all the ramifications of the fact that the state only licenses boundary line surveyors, etc.

Mr. LaFountain: Do you think you can't be a professional without a license?

Mr. East: No, Not --

Mr. LaFountain: That you can't be a professional person?

Mr. East: Not at all. But where there is that possibility to become licensed, the attitude that an individual should have is to seek that license. Now you are pointing out an area where that is not the case and I appreciate that. I have known people who are registered who, in my view, are not professional.

Mr. Crook: Chuck Crook, Baltimore. Along this line is this thing between registration and surveying and engineering. There is a long history behind that.

There has been friction in the private field between property surveyors and engineers. In Florida, back in 1952, when we started the first society for surveyors, the setup was that engineering is building something and any surveying connected with that is one field, (engineering).

Property (survey) is another field. Both use the same techniques, but there is a lot broader base behind property surveying, in judgments and professional experience, (interpreting deeds, evaluating found in the field, etc.)

So what it amounts to is, if you have a registered man, he is qualified clear across the surveying field. If you have a fellow who is a darned good surveyor, hydrographic, whatever, stake-out, but he has not the expertise to go qualify for boundary survey work, there is one area that he is lacking.

I strongly believe that any surveyor who can qualify should be registered, particularly if he is working with property lines.

Mr. Marvin Taylor: I am not going to talk about -- I don't want to -- I have got my own opinions on that. My point of view is not relevant to anything on that.

What I want to say is, I am a P.E., and I am going to work on getting the licensed surveyor. But professionalism in general, which I am hoping it is open to, we have got a nice block in our district of professional anythings, biologists, the whole bit.

And I don't know whether it is our district or division or OCE that registration is a requirement. You are considered a professional, and some of that is just three years' experience, period, in that general field, or \$20 and a member of so-and-so society will make you a professional whatever it is.

If you are a lawyer, and engineer, a surveyor, if you study, whether it is a degree or a substitute, that is a whole other topic, but if you have studied and have taken some kind of, what I call a decent test, not filled out a form and sent some society \$20 or \$50, to me you have taken a test, a bar exam, whatever, which is a lot worse than our test, but that to me would be professional status, not three years' experience, not \$50 and an application form for whatever society it is.

I don't know what the requirements for being a professional biologist are, but I don't think they have to take a test to be it. That is my two bits.

Mr. East: I don't know if that is recognized at OCE.

Mr. Marvin Taylor: There is some kind of directive out on it.

Mr. East: I will have to look into that. I see the registered engineers' roster that is developed after the Corpwide survey every year, and I don't recall seeing a professional biologist on it. Not that they may not be professionals, but not in the same way that engineers become professional engineers, through state licensing.

Mr. Sheriff: I am Jim Sheriff, of the Jacksonville District. And I think a person should pursue all avenues that they can to become registered professionals, or to become registered within the state where they work.

For one thing, I have to agree with Ed, it is a personal something inside you to make you pursue this. And a lot of use surveyors -- I have been in survey now for about 15 years, or close to that.

And off and on, traveling through Georgia, South Carolina, I have worked the Mobile District as a subcontractor or with a contractor. Now I am on board here in Jacksonville District.

And so I pursued -- I said, "okay, I want to be an engineer. How do I go about that?" I have asked engineers wherever I was at, "how do you become an engineer or a surveyor?" They told me various things.

I finally had to go to the state board. First place I went, they told me -- they gave me a pamphlet, said, "can you fill out the blanks?" So, after a ten-year period of time -- Florida right now happens to have a ten-year period of time that you can qualify if you don't have a degree. So your experience counts. So it is a matter of filling out the form.

Then you have a series of tests that you have to take, two eight-hour exams. They are very rigid and structured, and everybody is afraid of them.

So becoming a licensed surveyor or becoming a licensed engineer, professional engineer, is just a matter of that person wanting to take that responsibility and say, "I want to be registered." And then that clarifies the problem, because you have got -- you have taken the steps on yourself to become a registered surveyor or engineer. And that is the price you have to pay.

And from there, then there is no question.

Now, it goes back to what M. K. said a little while ago, it is a matter of: Do you want to do it? or, you know, can you handle -- or can you go down and stand those eight-hour exams?

I know you and I have put forth the work, and I know that we have worked that hard. And I know that you have done the job. But can you do that under pressure, in eight hours? And that is probably the biggest objection, I think, to becoming registered.

Mr. East: Let me say one more thing. While I have been in the Engineering Division, I've seen people write in to ask, "when is the Corps going to pay the cost for me to take this course so I can take the E.I.T. or P.E. exam?" It is my personal feeling, if you have that kind of an attitude, this is not a professional attitude. Taking these exams is something that you want to do, on your own. It is not something that you necessarily have to do. But if you don't have this attitude, then I think you have a problem.

Mr. Anderson: I am Dennis Anderson, Fort Worth District, Corps of Engineers. It is a little bit difficult to sell registration to your employees when the organization treats you as a subprofessional.

To give you an example, I am a coordinator for engineering technicians. I am supposed to encourage them in the district. There is a system of recordkeeping to show your registration.

There is only one blank, and you can mark surveying or engineering technician, but you can't do both because there is only one column on the card.

I marked surveying because I am a little bit proud of that. One took a box top and a letter and the other one took quite a grueling test.

Personnel called me and said, "Since engineering technician certification is so much more important than registering as a public surveyor," that they would code me as a certified engineering technician.

And with that kind of an opinion, with the expensive license, and if you join the association, it is very difficult to convince my people to go ahead and get it. "What's in it for me?" And that is the answer I get each time.

The only time it becomes important is when United States attorney wants somebody to testify. And that's how come I have to get in a car and drive out and walk over the sites, so I can go in and testify. And it is pretty discouraging.

Another problem that came up earlier, you were asking the man from OPM about engineering technicians and survey technicians. In our organization, if you change an engineering technician -- or, a survey technician to an engineering technician, he will probably get a grade raise for that same job description just for the change in title, due to the relative esteem held by the people who grade those things in personnel.

Mr. Miles: I take it you are a licensed surveyor?

Mr. Anderson: Yes, I am a licensed surveyor, and two of my people are licensed surveyors.

Mr. Miles: You have told us why it is hard to encourage your people to become registered. Why did you become registered?

Mr. Anderson: I became registered for personal satisfaction. I wanted to see if I could do it. But it did not help me in my career. I spent 20 years in the Corps of Engineers. I came in the Survey Branch as a GS-7, stayed ten years, transferred out, worked my way up to a 12 and transferred back in.

Mr. Miles: I think that is what we are talking about here, this personal motivation, and the feeling of esteem that you give yourself and other people attribute to you, if you have gone the extra mile to become registered.

I tend to think of the Corps of Engineers as a core of professional people, whether they be engineers or surveyors or lawyers or real estate people, even procurement.

We would like to encourage you to encourage your people either to become registered or to become members of the local surveying societies or engineering societies, to get out and meet the people in the surveying and engineering societies where you can learn and find out what other people are doing.

I have heard a lot of comments about this particular meeting, what great satisfaction some of you have had from coming here and meeting your peers and talking about surveying and mapping problems, and how great you think this is.

There are local organizations in every state, and even in some cities and counties and regional areas, that have professional organizations of surveyors and engineers. These offer people a chance to get together every month or so and have similar discussions about what they are doing in their jobs, whether they work for private firms or government agencies.

If you enjoy getting together here with your peers and people with surveying backgrounds, I think you would also enjoy some of the activities that some of the societies provide.

I do, and I would like to encourage you to become registered and be active in the societies in your areas. Do we have anything else on registration and professionalism?

#### Open Discussion

Mr. Miles: I guess not. At the meetings we have had in the past, there was always a session at the end of the meeting, an open session, a

bitch session, where we talked about personnel classification and such. We are not going to have that on Friday. We are going to have a wrap-up or summary session. These user groups that are going to meet Wednesday and Thursday nights are going to give their reports.

So, with that, if anybody has any general statements on anything they would like to bring up or talk about I think this would be the appropriate time to do it.

Mr. Young: I am Harold Young, from Kansas City. And my question was -- maybe I am wrong -- but I understand this is going to be an every three year occurrence instead of every other year thing.

Mr. East: We hope we can guarantee a meeting every three years.

Mr. Young: And what I am wondering is -- and I don't think there is anybody in here who will argue with me -- that you do get a log out of these meetings. And probably, you know, one person can maybe save enough, from finding out from somebody else a problem that they have had with equipment or a contractor, or something like that, to pay for everybody coming down here.

So why are they going to cut these from having them every year to every three years?

Mr. East: Well, I will try to explain what happens in OCE, and it is very difficult. Essentially what we tried to do was combine and/or redirect the previous meetings, conferences and training that had been going on in the survey and mapping area.

And as M. K. mentioned, we had the Hydrographic Surveying Conference, as well as the Field Surveying Techniques Workshop.

Maybe we haven't stated it, but Engineering Division has also assumed the responsibility for the hydrographic surveying at OCE from CONOPS at OCE. So CWE is the point-of-contact at OCE for both Engineering and CONOPS. When we assumed these responsibilities, we decided we needed to restructure our meetings, conferences and training.

M. K. has explained how we are going about revising our training program, which will be on a yearly basis, with different courses at different skill levels. He also mentioned that our field surveying techniques workshop was more of a symposium, as opposed to training.

But we looked at what had gone on in the past, and we concluded, with the other restraints, that travel and conferences were being looked at harder and harder, and our best hope was to go for a triennial meeting.

It is not something that we want necessarily. It is basically what we think is practicable and supportable, and realistically be approved.



So we are doing our homework. You will just have to trust us, I think, that we are going to do as much as we can as far as meetings are concerned.

Mr. Miles: We also envision the Division offices picking up on this concept and bringing the Districts together more often, in between these meetings.

We hope these technical user groups who are going to be set up Wednesday night, can get together periodically throughout the three-year period and work as a team in some of these special areas, with the hope that the divisions will pick up some coordination efforts.

I think a meeting of this size, around 100 or 125 Corps people, is easier to sell, like Ed said, with these things happening in the intervening years.

I think we are going to try to get the division coordinators together at OCE again, between now and the next three years. We are trying to get these division coordinators more active in this role, as I think they need to be.

Some of the ones there are going to see this equipment and technology and hopefully gain some knowledge and get more involved in coordinating these activities in their divisions.

With the divisions picking up in the interim three years, the user groups, and us having the division coordinators meet in the interim, hopefully, when you come back in three years there will be enough technology advancements in the exhibit area that you will really see some new things.

I am anxious to see if there really are that many new developments since our last meeting in Wilmington.

I think most of you would like to come just to meet your peers and see what is happening in the other districts. I think we could do some of this at the division level and through these user groups.

Mr. Young: Something like this, just one or two days, you know, I didn't really mean a whole week.

Mr. Marvin Taylor: I would like to reinforce or agree with them, that -- I took over the surveying job a week after I came back, more or less, from the Geotechnical Conference, of what I think this is kind of patterned after, at least in my own mind, the same thing as --

Mr. East: No, no. They are patterned after us.

Mr. Marvin Taylor: But they have been doing it for years, every two years, but the same thing we are doing now, and we have spent an awful

lot of money. All we have got to do is save a couple thousand dollars, couple days cruise time, and we have paid for the trip. Three years ain't great, but it is better than every ten years.

But it is the same thing, technology in the different disciplines, working together, and bitching and moaning about everything else. But, sure, it would be great to have it every year or every two years, but three is better than nothing.

Mr. Thomas Taylor: I am Tom Taylor, Pittsburgh District, Survey Branch. I would like to see, if possible, two bits of information documented, and I think -- which might be helpful to the group. One bit of information pertains to the states that it has been determined, maybe through Mr. Powers or your effort -- that they are -- their definition of surveying is included in the engineering profession.

There are some states that don't know whether surveying is part of the engineering profession. Some say that surveying isn't part of the profession.

I think this leads into the Circular 173. Rather than all of us going back, trying to determine from our own State Boards what their definition is, it might help to have that documented.

Someone has gone to a log of work to get this information.

Mr. Miles: In their regard, the American Congress on Surveying and Mapping has a report which consolidates all States' surveying registration requirements.

They summarized the States Codes and give the detailed definition of surveying and the time requirements in each state. It is about a 100-page document. And they update it once every couple years, as the State Boards furnish them new information.

We simply ordered a copy of that document from ACSM and read through all the State Registration Laws. But that is only on the surveying side. None of these engineering organizations have such a consolidated report, that I know of, on the engineering side.

We tried NSPE, ASCE, and the National Council of Engineering Examiners, and we couldn't find such a consolidation of state requirements on the engineering side.

Mr. Thomas Taylor: That is how you derived your information, from going to each individual state?

Mr. Miles: Well, that is exactly what ACSM did. They went to each individual state and compiled and condensed the States Codes and got the definitions.

Mr. Thomas Taylor: The other one is the opinion that surveying, within an engineering division, or unless it is not in real estate and a function of real estate, should be an 800 series.

I don't think that is the opinion of a lot of personnel people. And if that is an opinion of OCE, that that is the way it should be, I would like to see that documented or at least sent to our district, because that is not the opinion of our personnel people.

Mr. Miles: You would like to see something that says OCE supports putting our survey function heads in the 810 series?

Mr. Thomas Taylor: If that is your decision.

Mr. Miles: The record of this day's activities, the discussions we had early on, will be published and distributed. This document should be enough.

Mr. Thomas Taylor: Can we hold that under their nose?

Mr. Miles: Well, you can try. If that doesn't work, maybe we can give you something else. The 810 series is being revised, and in the tentative standards, it is clearly spelled out in the introductory meeting.

Mr. Thomas Taylor: Okay. Thank you very much.

Mr. McCormick: You all just issued a new staffing guide. I don't know if everybody has seen it. I just saw it before I came down here. It is about a half inch thick. It kind of goes back to the E.R. We used to have an organization, but it suggests standard type organizations for various functions. And I suspect that surveying is covered in there. I don't remember specifically what it said, but it is a brand-new publication. You might want to look at that.

Mr. East: What type of publication was it?

Mr. McCormick: It is called a Staffing Guide.

Mr. East: Is it an O.M. or something like that?

Mr. McCormick: Yes. It's an OCE -- I think it is an E.R. or an E. M. -- E.R., I think.

Mr. East: Okay.

Mr. McCormick: It is a brand-new document. It even suggests the position titles in the various units.

Mr. East: Okay.

Mr. Miles: Does that probably come under the Resource Management Office, that document?

Mr. McCormick: Yes.

Mr. Thompson: This is probably out of sequence, but I just wanted to mention that one thing that contributed to the success of the case project was that Dr. Radhna Krishnan had good OCE funding, especially for travel for the task groups to meet. That certainly removed a lot of hassles, when people were trying to get to those meetings.

Mr. Miles: On Wednesday night, when the Technical User Groups get together, we are going to have a fellow, Rich Malm, from the Engineering Division at CWE, and this is computer-aided graphics, or something.

He is one of our little sections off to the side with a few people, that handles computer-aided computations.

And we are of the opinion that he supported that case program maybe, and he is going to be talking to you all about computer applications and engineering. And he was involved with the Case and Cage Programs.

We sit right next door to the fellow who -- Don Dressler -- who was the OCE contact for the case program. So we are checking out those leads.

What we are trying to do here is plant those seeds, to see if we have got the interest here with the district people, if they want to get together and work on such an effort. And we are going to work on our end to support it however we can.

Mr. East: Well, if there is no further business, I do want to compliment you. I apologize if I hurt anybody's feelings about trying to hold you down from commenting and so forth. But I think we really did want to make a positive impact, particularly on the fellow from OPM.

And I have already heard comments about the bulletins that the manufacturers put out about just having to push a button, and we are going to get him straightened out on that real quick.

And so I do appreciate your positive reaction and support today. I know we will have a real good conference for the rest of the week.

I would encourage you to come out to the night meetings. I know we have been working you real hard, and I apologize for it, but when you only have the opportunity every three years, you want to cover the technological developments and the management aspects, and there is just not enough time.

So we would encourage you to come out on Wednesday and Thursday and get involved with these working groups. M. K., do you have anything else?

Mr. Miles: Doug Wilcox, from BLM has a comment. By the way, Doug is on the schedule Friday, just before lunch, to talk about BLM activities.

Mr. Wilcox: M. K., I just want you to know that I am the new editor of the "Members in Government" Column of the ACSM Bulletin. And I have just written my first article.

And Monty Urban, who is the Chairman of the Members in Government Committee has nominated me. And what it is all about, if you have any complaints with the ACSM, you write ACSM, and they tell me. And I write you up in the bulletin.

And it gives you an opportunity to complain. I just wanted you to know that.

Mr. Miles: Thanks, Doug. Also along that line, there is an ACSM meeting on the agenda for Wednesday afternoon.

The South Atlantic States Unit of the Interdivisional Committee on Marine Surveying and Mapping of ACSM is going to have their quarterly meeting at that time.

They asked me if they could have the meeting here so they could take advantage of the exhibits and the talks. We agreed and scheduled it on one of the days we are having hydrographic survey talks.

We tried to schedule the speakers that day that would interest them. They want to invite all of you to come to that meeting. If you look at the agenda, you will see the new President Elect of ACSM and others are going to be talking about some of the professional benefits that you can derive from being part of that organization.

You will see how the South Atlantic States Unit works. Glenn Boone, Chief, Survey Section, Wilmington District, has been active in that unit.

In keeping with our earlier discussions on professionalism, I would like to encourage you to sit in on that session learn a little more about ACSM. You may find you share a lot of interest with them. Thank you.

Mr. East: We will see you at 8:00 in the morning.  
(Whereupon, at 9:20 O'clock  
P.M., the meeting was adjourned)

- - -

APPENDIX A

OFFICE OF THE CHIEF OF ENGINEERS

VIEW-GRAPHS

and Supporting Materials

to Accompany

TRANSCRIPT OF

MANAGEMENT SESSIONS

PROCEEDINGS

1 February 1982

Developed by  
DAEN-CWE-BU

JANUARY 1982

# Surveying & Mapping

SURVEYING AND MAPPING

ORGANIZATION

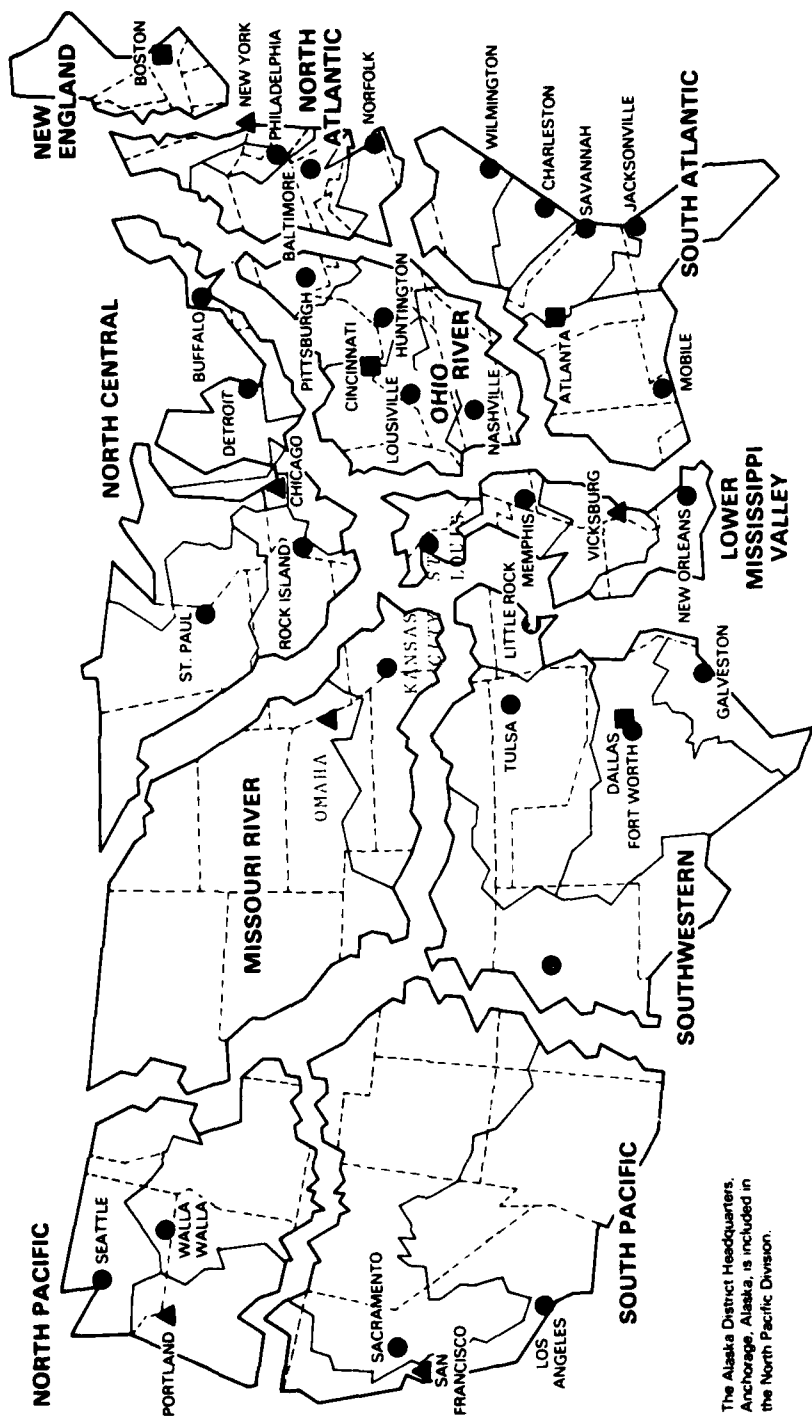
DISTRICTS - PEOPLE WIDELY DISTRIBUTED

DIVISIONS - PEOPLE DISTRIBUTED / (POINT OF CONTACT, ENGR. DIV.)

OFFICE OF CHIEF OF ENGINEERS (OCE) - POINT OF CONTACT:  
CWE / EAST & MILES



# DIVISIONS AND DISTRICTS FOR CIVIL WORKS ACTIVITIES



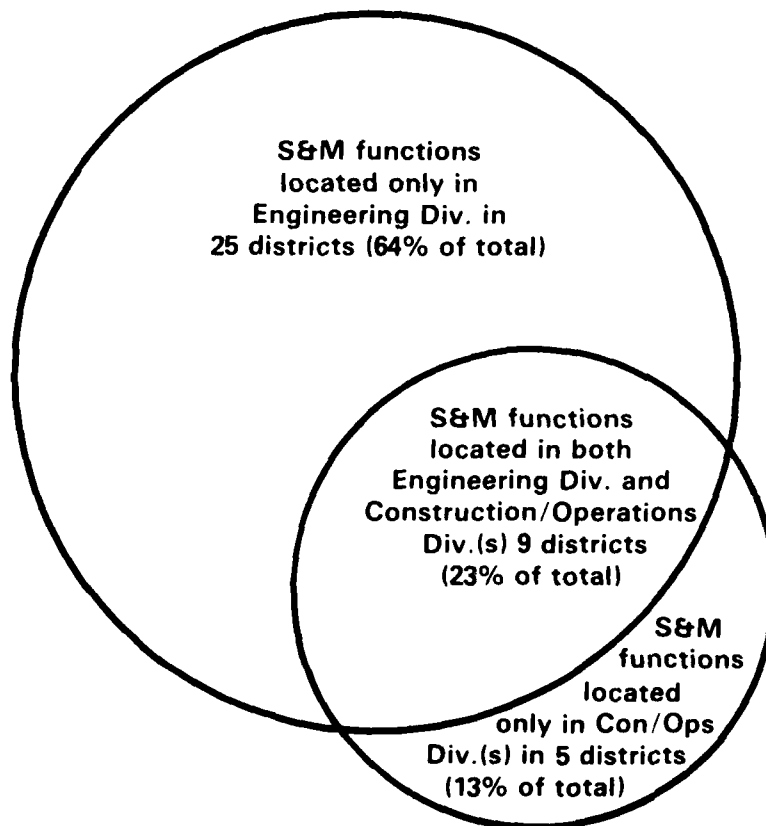
The Alaska District Headquarters, Anchorage, Alaska, is included in the North Pacific Division.

The State of Hawaii and Islands in the Pacific are included in Honolulu District, Pacific Ocean Division, with Headquarters at Honolulu, Hawaii.

The Territory of Puerto Rico and adjacent Islands is included in Jacksonville District, South Atlantic Division.

- DISTRICT BOUNDARIES
- DIVISION HEADQUARTERS
- DISTRICT HEADQUARTERS
- ▲ DIVISION AND DISTRICT HEADQUARTERS

# ORGANIZATIONAL PLACEMENT OF SURVEYING AND MAPPING (S&M) FUNCTIONS IN THE U.S. ARMY CORPS OF ENGINEERS



**NOTE:**

Compiled from official organization position charts dated 1 Feb 1980. Districts or operational divisions that did not have positions identified as surveying or mapping were not included.

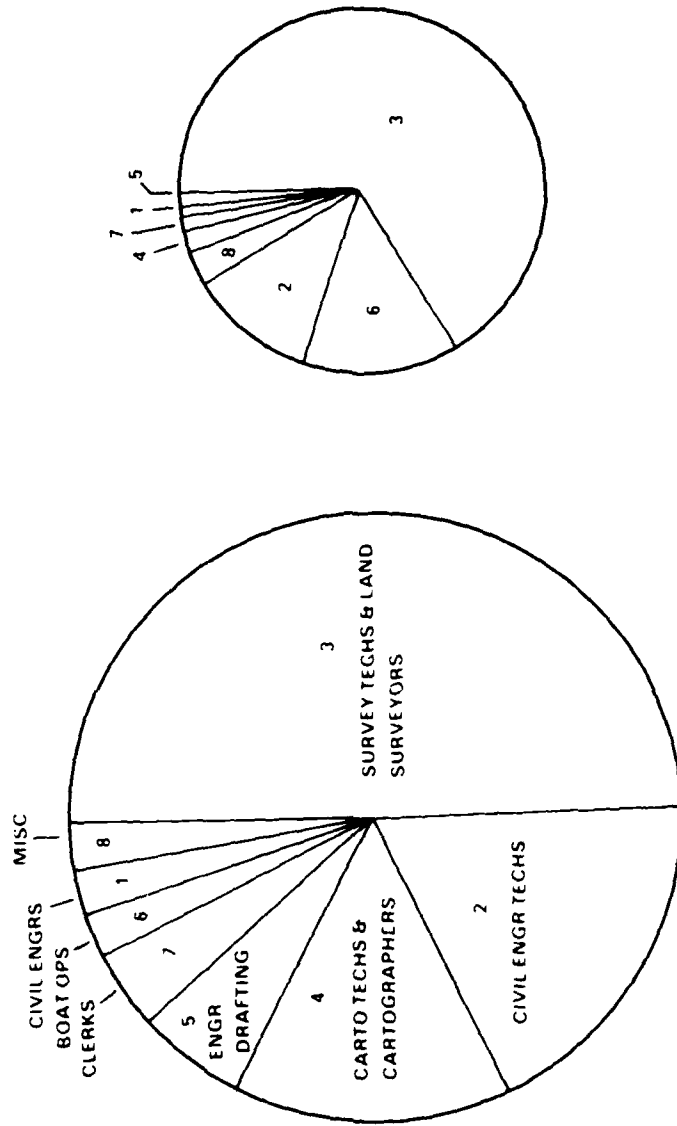
## Position Allocations of Surveying and Mapping (S&M) Personnel in the US Army Corps of Engineers

### SUMMARY TABLE

NO.	POSITIONS	CON/OPS	ENGR	TOTAL
1	CIVIL ENGINEERS	4	24	28
2	CIVIL ENGINEERING TECHNICIANS	39	174	213
3	SURVEYING TECHNICIANS & LAND SURVEYORS	231	471	702
4	CARTOGRAPHIC TECHNICIANS & CARTOGRAPHERS	7	145	152
5	ENGINEERING DRAFTSMEN	2	54	56
6	BOAT OPERATORS	48	24	72
7	CLERKS	3	43	46
8	MISCELLANEOUS OTHER GS & WG PERSONNEL	11	15	26
TOTALS		345 (27%)	950 (73%)	1295

TABLE #

**Position Allocations of Surveying and Mapping (S & M)  
Personnel in the US Army Corps of Engineers**



**ENGINEERING DIVISIONS  
(73% OF TOTAL POSITIONS)**

**CON/OPS DIVISIONS  
(27% OF TOTAL POSITIONS)**

NOTE: COMPILED FROM OFFICIAL ORGANIZATION CHARTS, 1 FEB 1980

POSITION ALLOCATIONS OF SURVEYING AND MAPPING (S&M) RELATED  
PERSONNEL IN THE U.S. ARMY CORPS OF ENGINEERS

SUMMARY

NUMBER OF POSITIONS PER DIVISION OR OFFICE

% OF DUTIES RELATED TO S&M ACTIVITIES	NUMBER OF POSITIONS PER DIVISION OR OFFICE					TOTAL
	ENGINEERING DIVISIONS	CON-OPS DIVISIONS	PLANNING DIVISIONS	REAL ESTATE DIVISIONS	AREA OFFICES	
100% OF DUTIES	725	203	-	29	181	1138
LESS THAN 100% BUT MORE THAN 50%	34	81	-	6	34	155
LESS THAN 50% BUT MORE THAN 30%	10	5	-	2	4	21
LESS THAN 30%	251	47	6	11	23	338
TOTALS	1020	336	6	48	242	1652

DISTRIBUTION OF  
ESTIMATED ANNUAL SURVEYING & MAPPING (S&M) WORKLOAD  
U.S. ARMY CORPS OF ENGINEERS

SUMMARY TABLE

S&M ACTIVITIES	TOTAL WORKLOAD (\$1,000,000)	IN-HOUSE WORKLOAD (\$1,000,000)	CONTRACT WORKLOAD (\$1,000,000)	% OF ACTIVITY CONTRACTED	REMARKS
MANAGEMENT	\$11	\$11	-	-	
HYDROGRAPHIC	41	23	\$13	32%	HYDROGRAPHIC: ~ 2/3 IN-HOUSE
TOPOGRAPHIC	26	10	16	62	~ 1/3 CONTRACT
BOUNDARY	13	4	9	69	
CONTROL	8	4	4	50	62% LAND BASED:
PRECISE	4	2	2	50	~ 1/3 IN-HOUSE
OTHER	11	4	7	64	~ 2/3 CONTRACT
TOTALS	\$114	\$63	\$51	-	
		(55%)	(45%)		

Surveying and Mapping (S&M) Resource Information  
U.S. Army Corps of Engineers

DISTRICT and DIVISION	EQUIPMENT VALUE	IN-HOUSE EFFORT (estimated average annual man-years)								CONTRACT EFFORT (estimated average annual expenditures)							
		Management Supervision	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying	TOTALS	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other	TOTALS	
1 MEMPHIS	774	7	19	22	1	3	-	2	54	300	340	305	40	1	400	1,386	
2 NEW ORLEANS	3,865	38	26	4	-	-	-	31	99	3,808	2,500	200	1,300	200	2,192	10,200	
3 ST. LOUIS	400	7	7	2	3	1	3	-	23	350	350	250	50	-	-	1,000	
4 VICKSBURG	1,400	13	16	7	1	8	1	8	54	3,370	1,780	250	150	150	800	6,470	
4 MID (6666)	6,159	65	68	35	5	12	4	41	230	7,828	4,940	1,005	1,500	351	3,772	19,056	
5 KANSAS CITY	686	3	3	6	5	4	2	-	23	-	250	2,000	300	-	265	3,015	
6 OKAMA	900	4	5	6	2	1	5	8	31	27	20	30	28	-	160	265	
6 MD (6666)	1,586	7	8	12	7	5	7	8	54	27	270	2,030	528	-	425	3,280	
7 NEB (6665)	752	5	20	2	1	-	-	3	31	300	-	175	-	-	-	675	
8 BALTIMORE	3,000	6	17	16	4	-	1	-	46	277	443	-	-	-	-	722	
9 NEW YORK	800	2	17	2	1	-	-	-	22	-	800	50	-	-	-	850	
10 NORFOLK	1,155	3	17	2	-	4	1	1	28	-	40	-	-	-	-	40	
11 PHILADELPHIA	1,228	7	34	7	-	1	1	-	50	45	621	85	30	8	59	838	
11 MD (6665)	4,983	18	87	27	5	5	3	1	146	324	1,044	35	30	8	59	2,470	
12 BUFFALO	300	4	5	7	-	-	-	-	26	-	-	-	-	-	50	50	
13 CHICAGO	100	1	1	1	-	1	-	-	4	173	100	-	30	-	-	303	
14 DETROIT	6,630	9	45	12	5	8	-	2	81	173	588	120	115	-	535	1,331	
15 ROCK ISLAND	230	4	6	1	3	1	2	1	18	40	100	200	-	-	-	340	
16 ST. PAUL	450	2	8	4	-	1	1	1	17	56	185	20	80	20	32	403	
16 MD (6666)	7,930	20	75	25	8	11	3	4	146	442	983	340	25	20	417	2,427	

Surveying and Mapping (S&M) Resource Information  
U.S. Army Corps of Engineers

DISTRICT and DIVISION	EQUIPMENT VALUE	IN-HOUSE EFFORT (estimated average annual man-years)							CONTRACT EFFORT (estimated average annual expenditures)								
		Management Supervision	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying	TOTALS	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying	TOTALS	
17 ALASKA	533	1	2	4	2	1	-	-	-	10	60	215	10	-	30	-	315
18 OREGON	2,751	14	23	9	6	11	4	-	-	67	79	99	90	20	-	-	288
19 SEATTLE	503	4	14	10	6	6	-	-	-	40	5	25	100	-	-	100	230
20 WALLA WALLA	4,978	4	6	3	2	3	3	2	2	23	-	-	100	-	-	100	200
21 WPD (boats)	8,771	23	45	26	16	21	7	2	2	140	144	339	300	20	30	200	1,033
21 WASHINGTON	500	2	4	11	3	2	3	3	3	28	100	1,200	500	500	100	100	2,500
22 LOUISVILLE	445	4	5	8	3	4	2	-	-	26	56	232	125	52	31	-	600
23 NASHVILLE	2,688	3	1	3	5	1	3	1	1	17	200	570	1,335	50	-	-	2,375
24 PITTSBURGH	220	1	1	3	4	1	4	1	1	15	-	100	160	5	15	174	454
24 ORD (boats)	3,853	10	11	25	15	8	12	5	5	86	356	2,122	2,340	711	146	274	5,749
25 POD (boats)	600	3	12	11	4	1	-	-	-	31	117	345	85	10	-	168	825
26 CHARLESTON	732	2	22	12	2	1	-	-	-	39	333	179	39	15	-	-	536
27 JACKSONVILLE	2,125	4	33	12	6	2	2	9	6	68	107	504	236	-	-	1,205	3,036
28 MOBILE	2,385	23	29	8	1	-	7	3	7	71	1,500	1,600	1,000	800	1,000	600	6,500
29 SAVANNAH	1,127	5	15	3	5	3	-	-	-	31	50	80	182	20	20	-	352
30 WILMINGTON	758	2	19	1	-	1	-	-	-	23	-	305	200	-	15	205	752
30 SAD (boats)	7,327	36	118	36	14	7	9	12	12	232	2,974	2,668	1,657	835	1,035	2,010	11,179
31 LOS ANGELES	550	6	4	3	1	2	1	1	1	18	-	160	30	40	-	70	300
32 SACRAMENTO	100	3	-	10	1	-	4	-	-	18	-	270	90	-	-	-	360
33 SAN FRANCISCO	660	5	15	4	1	1	-	-	-	26	180	300	90	-	50	-	620
33 SPD (boats)	1,310	14	19	17	3	3	5	1	1	62	180	730	210	40	50	70	1,280





Surveying and Mapping (S&M) Resource Information  
 U.S. Army Corps of Engineers

DISTRICT and DIVISION	EQUIPMENT VALUE	IN-HOUSE EFFORT (estimated average annual man-years)										CONTRACT EFFORT (estimated average annual expenditures)									
		Management Supervision	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying	TOTALS	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying	TOTALS					
LMD	6,139	65	68	35	5	12	4	41	230	1828	4940	1,005	1,540	151	3,372	19,059					
MKD	1,386	7	8	12	1	5	7	8	54	27	270	2,030	528	-	485	3,280					
NED	752	5	20	2	1	-	3	3	31	300	-	175	-	-	-	675					
NAD	4,983	18	87	27	5	5	3	1	146	324	1,904	135	30	8	59	2,470					
NCB	7,280	20	75	25	8	11	3	4	146	442	983	340	225	20	417	2,427					
NPD	8,771	23	45	26	16	21	7	2	140	144	357	300	20	30	200	1,033					
ORD	3,853	10	11	25	15	8	12	5	86	356	2,122	3,340	711	146	274	5,949					
POD	600	3	12	11	4	1	-	-	31	117	345	25	110	-	168	825					
SAD	7,327	36	118	36	14	7	9	12	232	2,974	3,668	1,657	835	1,035	2,000	11,179					
SPD	1,310	14	19	17	3	3	5	1	62	180	730	210	40	50	70	1,280					
SWD	2,278	17	49	22	18	9	4	19	138	367	1,319	192	76	179	266	3,199					
CORPS TOTALS	45,549	218	512	238	96	82	54	96	1,296	13,459	15,620	9,069	4,115	1,829	7,281	51,313					

Surveying and Mapping (S&M) Resource Information  
U.S. Army Corps of Engineers

IN-HOUSE EFFORT  
(estimated average  
annual expenditures)

CONTRACT EFFORT  
(estimated average  
annual expenditures)

DISTRICT and DIVISION	GRAND TOTAL	IN-HOUSE EFFORT (estimated average annual expenditures)							CONTRACT EFFORT (estimated average annual expenditures)							TOTALS
		Management Supervision	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other Surveying		
1 MEMPHIS	3785	350	1045	946	43	129	-	86	2599	300	340	305	40	1	400	1386
2 NEW ORLEANS	15,015	1,900	1,450	172	-	-	-	1,333	9835	3,808	2,500	200	1,300	200	2,192	10,200
3 ST. LOUIS	2,122	350	385	86	129	43	129	-	1,122	550	350	250	50	-	-	1,400
4 VICKSBURG	9,075	650	880	301	43	344	43	344	2,605	3,370	1,150	250	250	250	800	6,470
L.M.V.D. (totals)	30,217	3,250	3,740	1,585	215	576	172	1,263	11,161	7,828	4,940	1,005	1,540	351	3,372	19,056
5 KANSAS CITY	4,061	150	165	258	215	172	86	-	1,046	-	250	2,000	500	-	265	3,015
6 OMAHA	1,696	200	275	238	86	43	215	544	1,421	27	20	30	28	-	160	265
M.R.D. (totals)	5,747	350	440	576	301	215	301	344	2,767	27	270	2,030	528	-	425	3,280
7 WED (totals)	2,283	250	100	86	43	-	-	129	1,608	500	-	175	-	-	-	675
8 BALTIMORE	2,970	300	1,045	638	172	-	43	-	2,248	279	443	-	-	-	-	1,212
9 NEW YORK	2,014	100	935	86	43	-	-	-	1,164	-	800	50	-	-	-	850
10 NORFOLK	1,469	150	935	86	-	172	43	43	1,489	-	40	-	-	-	-	40
11 PHILADELPHIA	3,465	350	1,870	301	-	43	43	-	2,607	45	621	85	30	8	59	858
M.A.D. (totals)	7,918	900	4,785	1,161	215	215	129	43	7,448	324	1,904	135	30	8	89	2,470
12 BUFFALO	1,376	200	825	301	-	-	-	-	1,326	-	-	-	-	-	50	50
13 CHICAGO	494	50	55	43	-	43	-	-	191	173	100	-	50	-	-	303
14 DETROIT	5,417	450	2,478	576	215	344	-	86	4,086	173	588	120	115	-	335	1,331
15 ROCK ISLAND	1,214	200	330	43	129	43	86	43	874	40	100	200	-	-	-	340
16 ST. PAUL	1,244	100	440	172	-	43	43	43	841	56	75	20	80	20	52	403
M.C.D. (totals)	9,745	1,000	4,125	1,078	344	473	129	172	7,318	442	983	340	225	20	417	2,427

Surveying and Mapping (S&M) Resource Information  
U.S. Army Corps of Engineers

DISTRICT and DIVISION	GRAND TOTAL	IN-HOUSE EFFORT (estimated average annual expenditures)							CONTRACT EFFORT (estimated average annual expenditures)							
		Management Supervision	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other	TOTALS	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other	TOTALS
17 ALASKA	776	50	110	172	86	43	-	-	461	60	215	10	-	30	-	375
18 PORTLAND	3,543	200	1,265	387	258	473	172	-	3,233	77	99	90	20	-	-	288
19 SEATTLE	2,146	200	770	430	258	258	-	-	1,916	5	25	100	-	-	100	230
20 WALLA WALLA	1,287	200	330	129	86	129	129	86	1,087	-	-	100	-	-	100	200
21 NPD (666's)	2,754	1,150	2,475	118	688	903	301	86	6,721	144	539	300	20	30	200	1,013
22 HANTINGTON	3,766	100	220	473	129	86	129	129	1,266	100	1,200	500	500	100	100	2,300
23 LOUISVILLE	1,806	200	275	344	129	172	86	-	1,206	56	232	125	126	31	-	600
24 NASHVILLE	3,159	150	55	129	25	43	129	43	764	200	570	1,535	50	-	-	2,375
25 PITTSBURGH	1,118	50	55	129	172	43	172	43	664	-	100	160	5	15	174	457
26 ORO (666's)	9,849	500	605	1,025	645	344	576	215	3,700	536	2,122	2,340	711	146	274	5,949
27 POD (666's)	2,323	150	660	473	172	43	-	-	1,498	117	345	85	10	-	168	825
28 CHARLESTON	3,511	100	1,210	576	86	43	-	-	1,933	333	179	39	15	-	-	536
29 JACKSONVILLE	6,384	200	1,815	576	258	86	86	387	3,348	1,091	504	236	-	-	1,205	3,036
30 MOBILE	10,062	1,150	1,575	344	43	-	301	129	5,322	1,500	1,600	1,000	800	1,000	600	6,500
31 SAVANNAH	1,700	250	825	129	215	129	-	-	1,538	50	80	182	20	20	-	352
32 WILMINGTON	1,986	100	1,045	43	-	43	-	-	1,231	-	305	200	-	15	205	725
33 SAD (666's)	22,923	1,800	6,470	4,579	602	301	387	576	16,644	2,974	2,668	1,657	835	1,035	2,040	11,179
34 LOS ANGELES	1,164	300	220	129	43	86	43	43	864	-	160	30	40	-	70	300
35 SERRANO	1,153	150	-	430	43	-	172	-	775	-	270	90	-	-	-	360
36 SAN FRANCISCO	1,753	250	825	172	43	43	-	-	1,333	180	300	90	-	50	-	620
37 SPD (666's)	4,272	700	1,045	73	129	129	215	43	2,972	180	730	210	40	50	70	1,380



Surveying and Mapping (S&M) Resource Information  
U.S. Army Corps of Engineers

DISTRICT and DIVISION	GRAND TOTAL	IN-HOUSE EFFORT (estimated average annual expenditures)							CONTRACT EFFORT (estimated average annual expenditures)							
		Management Supervision	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other	TOTALS	Hydrographic Surveying	Topographic Surveying	Boundary Surveying	Control Surveying	Precise Surveying	Other	TOTALS
LMVD	30,217	3,250	3,740	1,385	215	516	172	1,763	11,761	7,828	4,944	1,005	1,546	351	537	2,056
MED	5,797	550	440	516	301	215	301	344	2,467	27	270	2,030	528	-	425	3,280
NED	8,883	250	1,100	86	43	-	-	129	1,608	280	-	175	-	-	-	675
NAD	9,278	900	4,785	1,161	215	215	129	43	7,448	324	1,904	331	30	18	57	2,470
NCD	9,745	1,000	4,125	1,015	344	473	129	172	7,318	442	983	340	225	20	417	2,427
NPD	7,754	1,150	2,475	1,118	628	903	301	86	6,721	144	359	300	20	30	200	1,013
ORD	9,849	500	605	1,075	615	344	516	215	3,940	356	2,122	2,340	711	146	274	5,749
POD	2,323	150	660	473	172	43	-	-	1,498	117	345	85	110	-	168	825
SAD	22,823	1,900	6,490	1,578	602	301	387	516	11,644	2,974	2,668	1,657	835	1,035	2,001	11,779
SPD	4,872	700	1,045	731	129	129	215	43	2,972	180	730	210	40	50	70	1,280
SND	9,840	850	2,695	946	774	387	172	817	6,641	267	1,319	772	76	179	266	3,779
CORPS TOTALS	114,771	10,900	28,160	10,234	4,128	3526	2,322	4,128	63,378	13,455	15,620	9,069	4,115	1,829	7,281	57,323

NARRATIVES ON SPECIFIC NEEDS AND PROBLEMS

- GENERAL COMMENTS
- WORK FORCE
- PERSONNEL
- TRAINING
- CONTRACTING
- TECHNICAL
- RESEARCH AND DEVELOPMENT
- CONSULTATION / COORDINATION

FEDERAL SURVEYING & MAPPING (S&M) COORDINATION

- OMB CIRCULAR NO. A-16

MAPPING/U.S.G.S.

CONTROL/N.G.S./F.G.C.C.

- OTHER EFFORTS

HIGH ALTITUDE PHOTOGRAPHY/U.S.G.S.

DIGITAL CARTOGRAPHY PROG./U.S.G.S.



FEDERAL GEODETIC CONTROL COMMITTEE - PROJECT REQUIREMENTS AND PLANS REPORT

<b>PROJECT IDENTIFICATION</b>					
(1.0) Map Coordinates	Lat ___° ___' Long ___° ___'				
(1.1) Submitting Agency and Subcomponents:	_____				
(1.2) Agency Project No.	_____				
(2.0) Report Status	<input type="checkbox"/> Scheduled Operation	<input type="checkbox"/> First Submission	<input type="checkbox"/> Deletion		
	<input type="checkbox"/> Requirement	<input type="checkbox"/> Update	<input type="checkbox"/> Completion		
<b>PROJECT DESCRIPTION</b>					
(3.0) Type of Project:	<input type="checkbox"/> Horizontal	<input type="checkbox"/> Vertical	<input type="checkbox"/> Gravity	<input type="checkbox"/> Research	
	<input type="checkbox"/> Other (explain in 8.0)				
(4.0) Location:	_____				
(5.0) Fiscal Year:	_____	(5.1) Person Years of Effort Required:	_____		
Funded by: (5.2)	<input type="checkbox"/> Agency \$ _____ K				
(5.3)	<input type="checkbox"/> Reimbursable \$ _____ K Source: _____				
Completion (5.4) desired by:	<input type="checkbox"/> Agency _____ (name)				
(5.5)	<input type="checkbox"/> Contractor _____ (name)				
<b>SURVEY DESCRIPTION</b>					
	<u>Accuracy</u>	<u>Number of Stations</u>		<u>Area (sq. km)</u>	<u>Method of Survey</u>
		Old	New		
(6.0) Horizontal					
(6.1) Vertical					
(6.2) Gravity					
(6.3) Other					
(7.0) Field reconnaissance completed		<input type="checkbox"/> yes	<input type="checkbox"/> no		
(7.1) Survey will be tied to National Networks		<input type="checkbox"/> yes	<input type="checkbox"/> no (if no, explain on back)		
(7.2) Sketch or diagram of survey attached		<input type="checkbox"/> yes	<input type="checkbox"/> no		
(7.3) Proposed starting & completion dates (month & year):	Start _____	End _____			
(7.4) Actual starting & completion dates (month & year):	Start _____	End _____			
(7.5) Disposition of data:	<input type="checkbox"/> NGS to adjust and publish				
	<input type="checkbox"/> Retained in agency files				
	<input type="checkbox"/> Available to public				
(8.0) RESEARCH DESCRIPTION OR PURPOSE OF SURVEY PROJECT: _____					
_____					
_____					
(continue on back)					
This report prepared by: _____ Date: _____					
Title: _____ Telephone: _____					
Section: _____					
Mailing Address: _____					

Return to: FGCC Secretariat, 6001 Executive Boulevard, Room 305-CA/C1  
Rockville, Maryland 20852

Explanation of FGCC "Project Requirements and  
Plans Report" Form

- (1.0) Map Coordinates: Approximate geographic center of the project.
- (1.2) Agency Project Number: Agency assigned identification number.
- (2.0) Report Status: A project is either a "Scheduled Operation" or a "Requirement" for the fiscal year appearing in (5.0). An "Update" is submitted during each annual canvass, as significant information is available that was not submitted previously, or when requirement is deleted or completed.
- (3.0) Type of project: Check appropriate boxes plus explain with a short narrative in (8.0) or with attachments.
- (4.0) Location: State, county, and some geographic reference within the state. Often an assigned project title gives this reference.

Funded by:

- (5.2) Agency - Estimated "in-house" cost of project including labor and overhead.
- (5.3) Reimbursable - Estimated amount to be received from another source. Specify who under "Source."

Completion desired by:

- (5.4) Agency - Enter either "in-house" or the name of the Federal agency from whom you will be requesting assistance.
- (5.5) Contractor - Enter name of contractor if an award has been made.

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(8.0 continued) RESEARCH DESCRIPTION OR PURPOSE OF SURVEY PROJECT:

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TECHNICAL USER GROUPS

- ESTABLISH AND ORGANIZE USER GROUPS
  - LAND-BASED TECHNICAL
  - HYDRO-BASED TECHNICAL
  - TRAINING
  - PERSONNEL
  - CONTRACTING
  - RESOURCE MANAGEMENT
- IDENTIFY GOALS, OBJECTIVES AND TASKS
- PREPARE STATEMENTS FOR WRAP-UP SESSION

TECHNICAL GUIDANCE

TYPES OF GUIDANCE

LACK OF GUIDANCE

OUTDATED WHEN EXISTING

RESEARCH & DEVELOPMENT

RESEARCH AND DEVELOPMENT

WHY DO IT?

WHAT ARE WE DOING?

WHO'S DOING IT?

HOW ARE WE DOING IT?

R & D

DIRECTED TOWARDS

FIELD AND OFFICE IMPROVEMENTS

FIELD SURVEYING AND MAPPING ACTIVITIES:

LAND-BASED DATA ACQUISITION METHODS  
WATER-BASED DATA ACQUISITION METHODS  
AIRBORNE BASED DATA ACQUISITION METHODS

OFFICE SURVEYING AND MAPPING ACTIVITIES:

DATA PROCESSING AND COMPUTING  
ANALYSIS OF SURVEYING AND ENGINEERING DATA  
DIGITIZING ENGINEERING AND CARTOGRAPHIC DATA  
AUTOMATED MAP AND CHART PRODUCTION

R & D

Q: WHY DO IT?

A: BOTTOM LINE - TO ASSURE THE CORPS CAN  
PRODUCE HIGH QUALITY S & M PRODUCTS IN  
THE MOST EFFECTIVE AND EFFICIENT MANNER  
POSSIBLE.



R & D

Q: WHAT ARE WE DOING?

A: OUR R & D LABORATORY PEOPLE ARE  
REVIEWING, EVALUATING, MODIFYING,  
DEVELOPING AND/OR DEMONSTRATING  
PROCEDURES, TECHNIQUES AND EQUIPMENT  
TO PRODUCE THESE S & M PRODUCTS.

R & D

Q: WHO'S DOING IT?

A: SOME OF YOU ARE, HOWEVER OUR R & D  
LABORATORIES; THE ENGINEER TOPOGRAPHIC  
LABORATORY (ETL) AND THE WATERWAYS EXPERIMENT  
LABORATORY (WES), ARE CARRYING OUT THE  
FORMAL R & D PROGRAM.

R & D

FUNDING

- GENERAL INVESTIGATION (GI) APPROPRIATION  
(RESEARCH AND DEVELOPMENT OFFICE / OCE)

RESEARCH AREA - "SURVEYING AND SATELLITE APPLICATIONS"

RESEARCH PROGRAM - "SURVEYING AND MAPPING"

CHRONOLOGICAL DEVELOPMENT  
OF THE CIVIL WORKS  
SURVEYING AND MAPPING (S&M)  
          R & D PROGRAM          

- PRIOR TO FY 81 - PRECISE MEASUREMENT OF THE MOVEMENT OF STRUCTURES -  
UNDER MATERIALS/CONCRETE R & D PROGRAM.
- IN FY 81 A NEW PROGRAM WAS IDENTIFIED, APPROVED (INTERNALLY) AND INITIATED.
  - INITIAL FUNDING: \$99.9 K
  - ADDITIONAL MID-YEAR ALLOCATION: \$18.6 K
  - TOTAL FUNDING: \$108.6 K
- IN FY 82 THE S & M PROGRAM WAS BROKEN OUT AS A SEPARATE R & D PROGRAM  
BUDGET ITEM (OMB/CONGRESSIONAL RECOGNITION)
  - INITIAL FUNDING: \$120.0 K
  - "INTEGRATED HYDROGRAPHIC SURVEY SYSTEMS" W.U. TRANSFERRED FROM "IOMT"  
R & D PROGRAM: \$70.0 K
  - PROPOSED FY 82 FUNDING: \$190.0 K
  - BUDGET CUTS, NOW: \$170.0 K
- IN FY 83
  - WISH \$400

FY82 CW R&D PROGRAM

SURVEYING AND MAPPING

<u>PRIORITY</u>	<u>W. U. NO.</u>	<u>TITLE</u>	<u>FY82 FUNDING (\$000)</u>
1	31748	Use of Modern Technology to Meet Survey Needs (ETL)	<del>40</del> 20
2	31099	Integrated Hydrographic Survey Systems (WES)	70*
3	31785	Application of Inertial Surveying Systems (ETL)	20
4	31749	Tilt Monitoring Devices for Large Structures (ETL)	20
5	31786	Application of Analytical Photogrammetric Positioning System (ETL)	20
6	31787	Mapping by Three-Dimensional Airborne Laser Scanner (WES)	20
TOTAL			<u>190</u> 170

\* Transferred from JOMT R+D Program.

FY81 CW

SURVEYING AND MAPPING

R&D PROGRAM

<u>W.U. No.</u>	<u>TITLE</u>	<u>FY81 FUNDING (\$000)</u>
31748	Use of Modern Technology to Meet Survey Needs (ETL)	38
31749	Tilt Monitoring Devices for Large Structures (ETL)	43
31747	Consulting Services for Precise Survey of CW Structures (ETL)	<u>9</u>
	SUB-TOTAL	90.0
New	Inertial Surveying Systems Baseline Report (ETL)	<u>18.6</u>
	TOTAL	108.6

R & D

Q: HOW ARE WE USING IT?

A: THAT'S WHAT THESE NEXT GENTLEMEN  
WILL BE TELLING YOU !

R & D

T E C H N I C A L U S E R G R O U P S

- IDENTIFY NEEDS AND PROBLEMS
- WORK WITH THE DISTRICTS, THE LABS, AND  
OCE TO MEET THOSE NEEDS AND ANSWER THOSE  
PROBLEMS.



SURVEYING & MAPPING (S&M) CONTRACTING POLICY

THE POLICY IS THAT WE SHOULD, AS A MINIMUM, DO ENOUGH SURVEYING AND MAPPING (S&M) IN-HOUSE: (A) TO MAINTAIN A HIGH ORDER OF PROFESSIONALISM IN ALL OF THE S&M DISCIPLINES REQUIRED TO ACCOMPLISH OUR S&M PROGRAMS AND (B) TO EXECUTE OUR S&M PROGRAMS IN A TIMELY MANNER. WE BELIEVE IT IS ESSENTIAL THAT AN IN-HOUSE S&M CAPABILITY BE MAINTAINED AND EXERCISED TO INSURE RETENTION OF THE LEVEL OF EXPERTISE WHICH IS NOT ONLY NECESSARY TO KEEP PACE WITH THE STATE-OF-THE ART BUT ALSO TO PROVIDE ADEQUATE SUPERVISION AND REVIEW OF THE S&M CONTRACT WORK.

DISTRIBUTION OF  
ESTIMATED ANNUAL SURVEYING & MAPPING (S&M) WORKLOAD  
U.S. ARMY CORPS OF ENGINEERS

SUMMARY TABLE

S&M ACTIVITIES	TOTAL WORKLOAD (\$1,000,000)	IN-HOUSE WORKLOAD (\$1,000,000)	CONTRACT WORKLOAD (\$1,000,000)	% OF ACTIVITY CONTRACTED	REMARKS
MANAGEMENT	\$11	\$11	-	-	HYDROGRAPHIC:
HYDROGRAPHIC	41	28	\$13	32%	~ 2/3 IN-HOUSE
TOPOGRAPHIC	26	10	16	62	~ 1/3 CONTRACT
BOUNDARY	13	4	9	69	
CONTROL	8	4	4	50	62% LAND BASED:
PRECISE	4	2	2	50	~ 1/3 IN-HOUSE
OTHER	11	4	7	64	~ 2/3 CONTRACT
TOTALS	\$114	\$63 (55%)	\$51 (45%)	-	

SURVEYING AND MAPPING

CONTRACTING STRATEGY

WHAT'S YOUR SITUATION?

WHAT WORK CAN YOU CONTRACT?

HOW MUCH CAN YOU CONTRACT?

HOW CAN YOU MAINTAIN AN ADEQUATE IN-HOUSE CAPABILITY?

HOW CAN YOU PROPERLY SUPERVISE CONTRACTOR'S WORK?

HOW CAN YOU GET MANAGEMENT'S ATTENTION?

SURVEYING AND MAPPING

CONTRACTING STRATEGY

- PAST: A-E/ENGINEER SERVICES CONTRACTS
- CURRENT: A-E THROUGH LOW BID (CONFUSION)
- FUTURE: BASED ON SPECIFIC WORK AND REQUIREMENTS  
OF THE STATES

AD-A126-254

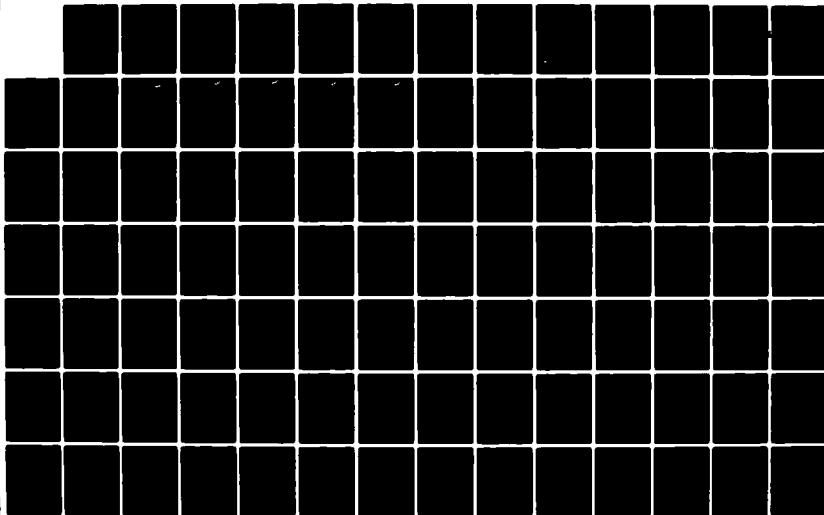
SURVEYING REQUIREMENTS MEETING MANAGEMENT SESSIONS 1-5  
FEBRUARY 1982(U) OFFICE OF THE CHIEF OF ENGINEERS  
(ARMY) WASHINGTON DC E J EAST ET AL. FEB 83

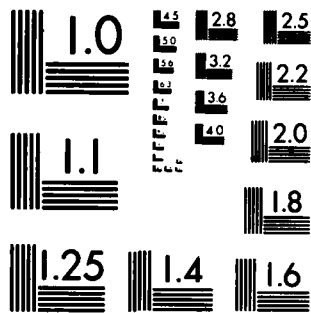
3/4

UNCLASSIFIED

F/G 8/2

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

TWO BASIC TYPES OF  
PROCUREMENTS

- NEGOTIATED
- FORMALLY ADVERTISED

- NEGOTIATED

ARCHITECT-ENGINEERS (A-E) CONTRACTS



ARCHITECT-ENGINEER (A-E)  
PROCUREMENT PROCESS

- WORK (SYNOPSIS) PUBLICALLY ANNOUNCED
- FIRMS RESPOND WITH QUALIFICATION DATA (SF 254 & SF 255)
- EVALUATION AND SELECTION BASED ON CRITERIA (SYNOPSIS)
- APPROVAL OF FIRMS IN ORDER OF PREFERENCE
- STATEMENT OF WORK (SOW) ISSUED
- NEGOTIATION PROCESS (A-E PROPOSAL/GOV'T ESTIMATE)
- AGREEMENT REACHED (DETAILED APPROACH OF A-E RESOLVED)
- CONTRACT EXECUTED AND FORWARDED TO A-E FOR SIGNATURE
- CONTRACT AWARDED

- FORMALLY ADVERTISED

CONSTRUCTION CONTRACTS (LOW BID)

SUPPLIES/MATERIALS CONTRACTS (LOW BID)

SERVICE CONTRACTS:

NON-PROFESSIONAL (LOW BID)

PROFESSIONAL (PRICE & TECHNICAL FACTORS)

- FORMALLY ADVERTISED  
SERVICE CONTRACT - PROFESSIONAL  
(NON-A/E)

MANY METHODS OF PROCURING

PROCUREMENT METHOD BASED ON MERITS OF INDIVIDUAL  
REQUIREMENTS

TECHNICAL REQUIREMENTS BY TECHNICAL PROPONENT

EVALUATION FACTORS BY JOINT AGREEMENT  
(C.O. THE FINAL SAY)

SURVEYING AND MAPPING

CONTRACTING STRATEGY

<u>CONSIDERATION</u>	<u>A-E</u>	<u>OTHER</u>
EXPERTISE	X	X (YES)
EXPERIENCE	X	X
CAPABILITY	X	X
LOCATION	X	NO
SPREAD-THE-WORK	X	NO
PRICE	NO	X



EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF MANAGEMENT AND BUDGET

OFFICE OF FEDERAL  
PROCUREMENT POLICY

JAN 13 1982

MEMORANDUM TO HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES AND  
TO OFPP AGENCY AND DEPARTMENTAL CONTACTS

SUBJECT: Procurement of Architect-Engineer Services

A recent review of the snyopses appearing in Section R of the Commerce Business Daily (the Architect-Engineer section) indicates that several agencies are using the Public Law 92-582 (Brooks Bill) process to procure professional services other than professional architect-engineer services.

The statutory definition of professional architect-engineer services contained in Public Law 92-582 has been further defined in Comptroller General Decision B-184770 of March 9, 1977, as those services that generally require performance by a licensed architect or engineer and which concern Federal construction and related programs such as alterations and renovation projects. The use of the Public Law 92-582 procurement process should be limited to those services meeting the Comptroller General's definition. Such services normally involve or are incident to the preparation or submission of designs, plans, drawings or specifications for construction projects.

Services performed by architects or engineers other than those defined in the Comptroller General's decision as "professional architect-engineer services" should be procured pursuant to standard procurement procedures; i.e., price should be considered in the selection process. The amount or degree of consideration given to price in the selection process will, of course, vary depending on the nature of the procurement and should be clearly specified in the selection and evaluation criteria formulated by the contracting officer.

  
Donald E. Sowle  
Administrator



Public Law 92-582  
92nd Congress, H. R. 12807  
October 27, 1972

## AN ACT

To amend the Federal Property and Administrative Services Act of 1949 in order to establish Federal policy concerning the selection of firms and individuals to perform architectural, engineering, and related services for the Federal Government.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471 et seq.) is amended by adding at the end thereof the following new title:*

### "TITLE IX—SELECTION OF ARCHITECTS AND ENGINEERS

#### "DEFINITIONS

"Sec. 901. As used in this title—

- "(1) The term 'firm' means any individual, firm, partnership, corporation, association, or other legal entity permitted by law to practice the professions of architecture or engineering.
- "(2) The term 'agency head' means the Secretary, Administrator, or head of a department, agency, or bureau of the Federal Government.
- "(3) The term 'architectural and engineering services' includes those professional services of an architectural or engineering nature as well as incidental services that members of these professions and those in their employ may logically or justifiably perform.

#### "POLICY

"Sec. 902. The Congress hereby declares it to be the policy of the Federal Government to publicly announce all requirements for architectural and engineering services, and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualification for the type of professional services required and at fair and reasonable prices.

#### "REQUESTS FOR DATA ON ARCHITECTURAL AND ENGINEERING SERVICES

"Sec. 903. In the procurement of architectural and engineering services, the agency head shall encourage firms engaged in the lawful practices of their profession to submit annually a statement of qualifications and performance data. The agency head, for each proposed project, shall evaluate current statements of qualifications and performance data on file with the agency, together with those that may be submitted by other firms regarding the proposed project, and shall conduct discussions with no less than three firms regarding anticipated concepts and the relative utility of alternative methods of approach for furnishing the required services and then shall select therefrom, in order of preference, based upon criteria established and published by him, no less than three of the firms deemed to be the most highly qualified to provide the services required.

86 STAT. 1279

Pub. Law 92-582

- 2 -

October 27, 1972

#### "NEGOTIATION OF CONTRACTS FOR ARCHITECTURAL AND ENGINEERING SERVICES

"Sec. 904. (a) The agency head shall negotiate a contract with the highest qualified firm for architectural and engineering services at compensation which the agency head determines is fair and reasonable to the Government. In making such determination, the agency head shall take into account the estimated value of the services to be rendered, the scope, complexity, and professional nature thereof.

"(b) Should the agency head be unable to negotiate a satisfactory contract with the firm considered to be the most qualified, at a price he determines to be fair and reasonable to the Government, negotiations with that firm should be formally terminated. The agency head should then undertake negotiations with the second most qualified firm. Failing accord with the second most qualified firm, the agency head should terminate negotiations. The agency head should then undertake negotiations with the third most qualified firm.

"(c) Should the agency head be unable to negotiate a satisfactory contract with any of the selected firms, he shall select additional firms in order of their competence and qualification and continue negotiations in accordance with this section until an agreement is reached."

Approved October 27, 1972.

#### LEGISLATIVE HISTORY

HOUSE REPORT No. 92-1186 (Comm. on Government Operations);  
SENATE REPORT No. 92-1219 (Comm. on Government Operations);  
CONGRESSIONAL RECORD, Vol. 118 (1972):  
July 26, considered and passed House.  
Oct. 14, considered and passed Senate.

Architects and  
engineers.  
Federal ac-  
cession policy,  
63 Stat. 3771  
62 Stat. 1104.

86 STAT. 1278  
86 STAT. 1279

DEPARTMENT OF THE ARMY  
Office of the Chief of Engineers  
Washington, D.C. 20314

EC 1180-1-171

DAEN-PRP

Circular  
No. 1180-1-171

30 September 1980

EXPIRES 30 SEPTEMBER 1981  
Procurement  
APPLICABILITY OF ARCHITECT-ENGINEER SELECTION PROCEDURES

1. Purpose. This circular provides guidance in determining when the use of the A-E selection procedures are appropriate.
2. Applicability. This circular is applicable to all field operating activities which engage directly in procurement of Architect-Engineer services.
3. References:
  - a. The Brooks Act (P.L. 95-582).
  - b. DAR Section XVIII, Part 4.
  - c. ER 1180-1-1 Section LXXV, Part 2
  - d. ER 1180-1-1, Appendix A-205
4. Background.
  - a. The Brooks Act (P.L. 92-582) sets forth procedures to be used for the procurement of "Architectural and Engineering services." This term is defined as "those professional services of an architectural or engineering nature, as well as incidental services that members of these professions and those in their employ may logically or justifiably perform."
  - b. The Comptroller General, in *Ninneman Engineering*, B-184770, 77-1 CPD 177, March 9, 1977, stated that only those services which require performance by individuals or firms professionally licensed in a state as "architects" or "engineers" or are incidental to such services, must be procured by the A-E procedure.
  - c. The Comptroller General has also determined that the A-E selection process is not a competitive method of procurement because the criteria to be used in ranking the firms for selection and final negotiation does not include or relate to the fees paid to the firm.

EC 1180-1-171

30 Sep 80

d. The Armed Services Procurement Act and DAR 1-300.1 require competition to the maximum practicable extent in the purchase of goods or services.

e. DAR 18-402.1(v) requires an equitable distribution of A-E contracts among A-E firms including small and small disadvantaged business firms and firms that have not had prior DoD contracts.

5. Instructions and Guidance.

a. If the service to be procured requires a licensed architect or engineer (A-E) for performance of the work, or if the work is incidental to that requiring such licensed professionals, the A-E selection procedure will be used.

b. If the service to be procured does not require a licensed architect or engineer for performance of the work, even if it may be performed by a licensed A-E as well as an entity not so licensed, the A-E selection procedure will not be used.

c. The services of non A-E professionals, such as archaeologists, biologists or economists, will normally be procured using the competitive negotiation procedures of DAR, Section III, price and other factors considered.

d. Technical services, such as aerial photography, electronic data processing, airborne magnetometer and radar altimeter data, and the compilation of maps, charts, and mosaics, will normally be procured using the formal advertising procedures of DAR, Section II.

6. Limitation - Open-End Contracts for Architect-Engineer Services. All open-ended, or any other indefinite delivery type contract, for A-E services are subject to the \$250,000 per contract and \$25,000 per work order limitations set forth in ER 1180-1-1, A-205 as amended. This includes contracts for miscellaneous design (Title I), supervision or inspection (Title II), or any other work requiring the services of a licensed architect or engineer, where the A-E selection procedure is used.

FOR THE CHIEF OF ENGINEERS:



G. A. YAGER  
Chief, Office of Contracting  
Policy



DEPARTMENT OF THE ARMY  
Office of the Chief of Engineers  
Washington, D. C. 20315

Regulation  
No. 1110-1-1000

15 October 1965

ENGINEERING AND DESIGN

Procurement of Surveying and Mapping Services

1. Purpose and Scope. This regulation sets forth the policy of the Chief of Engineers regarding procurement of professional and sub-professional services insofar as it relates to surveying and mapping services. It is applicable to all elements of the Corps of Engineers which contract for surveying and mapping work.
2. Reference. "Professional Practice of Surveying and Mapping within Civil Engineering", a report of American Society of Civil Engineers Task Subcommittee on Professional Practice in Surveying and Mapping (published as ASCE Manual and Report on Engineering Practice No. 45A (Supplement to ASCE Manual No. 45, "Consulting Engineering - A Guide for the Engagement of Engineering Services".))
3. Extracts from the report mentioned in paragraph 2 are attached as Appendix I. As indicated in this extract, the subcommittee judged that the technician and preprofessional levels are not separable from professional level services in the categories of surveying and mapping considered by the Subcommittee. The Subcommittee further stated that contracts for all services in those categories should be negotiated. Except as provided in the inclosed extract, the Subcommittee's findings do not apply to non-engineering technical services such as the technical operations for aerial photography, electronic data processing, airborne magnetometer and radar altimeter data and the compilation of maps, charts, and mosaics from existing source materials. The Task Subcommittee's report has been adopted by the ASCE Board of Direction and the report has become the considered judgement and policy statement on surveying and mapping of the major organization representing the civil engineering profession.
4. The Chief of Engineers desires to support the ASCE policy statement in all applicable procurement of surveying and mapping services.

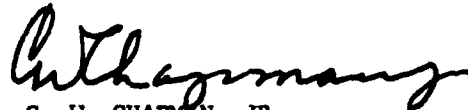
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This regulation rescinds Multiple Letters ENGDC dated 4 January 1963, subject: "Surveying and Mapping" and ENGCV-EZ dated 13 August 1965, subject: "Procurement of Surveying and Mapping Services".

ER 1110-1-1000  
15 Oct 65

Hence, all procurement of surveying and mapping services within the categories set out by the Task Subcommittee (i.e. excluding non-engineering technical services such as those mentioned above) will be accomplished through negotiated contracts.

FOR THE CHIEF OF ENGINEERS:



C. W. CHAPMAN, JR.  
Colonel, Corps of Engineers  
Executive

1 Appendix

APPENDIX I

**Policy Pertaining to Negotiation for Surveying and Mapping**

The basic policy governing the procurement of surveying and mapping services within the civil engineering field is:

Engineering services at the technician or preprofessional level as listed in Category I, Land Surveying; Category II, Engineering Surveying; Category III, Geodetic Surveying; and Category IV, Cartographic Surveying, of the Final Report of the Task Committee on Status of Surveying and Mapping\* are not separable from services at the professional level. Therefore, contracts for all services in these categories should be negotiated in conformance with established Society procedure.

Preprofessional and technician services are not separable from professional services in surveying and mapping within the civil engineering profession for the following reasons:

1. An Engineer is responsible for the acceptability of work done by his preprofessional employees and technicians, hence, professional supervision of their work is required.
2. Preprofessional and technician services in surveying and mapping involve multiple operations which require professional coordination and supervision.
3. Preprofessional and technician services provide data on which engineering judgments and decisions are based, thus becoming an integral part of the professional engineering service, and a direct responsibility of the engineer providing that service.

\*\*\*\*\*

**Non-Engineering Technical Services**

The suitability of any non-engineering technical services necessary to the undertaking should be determined by the Engineer. Such services might include technical operations for aerial photography, electronic data processing, airborne magnetometer and radar altimeter data, and the compilation of maps, charts, and mosaics from existing source materials.

The Engineer should have no financial or controlling interest in these non-engineering technical services, when they are utilized in connection with a professional engineering engagement, if such services are obtained for that specific engagement by competitive bidding.

\*See Page 2 following

**Table 1.—Classification Chart for Surveying and Mapping**

- I. Land or Property Surveying (Cadastral)**
  - A. Property and Boundary Surveys\*
  - B. Subdivision Surveys and Plats\*
  - C. Public Land Surveys\*
  - D. Surveys for Plans and Plats\*
    - 1. Architectural (Building Site) Surveys
    - 2. Tax Maps

**Professional Level:** Land Surveyor  
**Technician or Preprofessional Level:** Instrumentman, Computer, Draftsman, Tapeman, Rodman
- II. Engineering Surveys (for Design and Construction)**
  - A. Design Data Surveys (including Route Surveys)\*
    - 1. Control, Horizontal and Vertical
    - 2. Culture and Topography
    - 3. Profiles and Cross Sections
  - B. Construction Surveys\*
    - 1. Layout Surveys
    - 2. Quantity and Measurement Surveys
    - 3. "As-Built" Surveys
      - a. Utility Surveys
  - C. Mine Surveys

**Professional Level:** Survey Engineer  
**Technician or Preprofessional Level:** Instrumentman, Computer, Draftsman, Tapeman, Rodman
- III. Geodetic Surveying, Geodetic Engineering, or Geodesy (not to be confused with precise plane surveying)**
  - A. Control Surveys, First- and Second-Order Accuracy\*
    - 1. Horizontal: triangulation, traverse, and electronic trilateration
    - 2. Vertical: spirit and trigonometric leveling
  - B. Geodetic Astronomy
  - C. Gravity Surveys, Magnetic Declination Surveys, Figure-of-the-Earth Studies

**Professional Level:** Geodetic Surveyor or Geodetic Engineer, Mathematician  
**Technician or Preprofessional Level:** Instrumentman, Observer, Computer, Gravitometric Operator, Recorder, Signaller, Tapeman, Rodman
- IV. Cartographic Surveying, Cartographic Engineering, or Map and Chart Surveying (surveys for constructing original maps and similar products)**
  - A. Control Surveys, Third- and Fourth-Order Accuracy\*
    - 1. Horizontal
    - 2. Vertical
  - B. Topographic-Planimetric Surveys and Maps\*
    - 1. Photogrammetric Aero-Triangulation
    - 2. Mapping Surveys
      - a. Ground-Survey Methods
      - b. Photogrammetric Methods
    - 3. Field-Edit Surveys of Photogrammetric Compilations\*
  - C. Hydrographic Surveys\*
    - 1. Soundings: fathometer, hand-lead, sounding pole
    - 2. Sounding Fixes: three-point, electronic
    - 3. Wire-Drag Surveys
    - 4. Tidal and Current Surveys

**Professional Level:** Topographic Engineer, Hydrographic Engineer, Photogrammetric Engineer, Survey Engineer (Control), Geodetic Surveyor or Geodetic Engineer  
**Technician or Preprofessional Level:** Plane-Table Operator, Instrumentman, Observer, Computer, Recorder, Draftsman, Tapeman, Rodman, Stereo-Plotter Operator, Leadsman

\* Photogrammetric procedures used when applicable on these and other activities.

° Electronic measuring procedures used when applicable on these and other activities.

DAEN-PRP  
DAEN-CWE  
DAEN-MPE

DEPARTMENT OF THE ARMY  
US Army Corps of Engineers  
Washington, D.C. 20314

EC 1180-1-173

**DRAFT**

Circular  
No. 1180-1-173

1 March 1982

EXPIRES 30 SEPTEMBER 1982

Procurement

PROCUREMENT OF SURVEYING AND MAPPING SERVICES

1. Purpose: This circular sets forth interim policy for determining source selection procedures for procurement of surveying and mapping services.
2. Applicability: This circular applies to all field operating activities which procure surveying and mapping services.
3. References:
  - a. Public Law 92-582 (Brooks Bill)
  - b. DAR Section II, Section III, & Section XVIII, Part 4
  - c. EC 1180-1-171
4. Background:
  - a. Section 902 of Public Law 92-582 declares it to be the policy of the Federal Government to publicly announce all requirements for architect-engineer services, and to negotiate contracts for such services on the basis of demonstrated competence and qualification for the type of professional services required and at fair and reasonable prices. DAR Section XVIII, Part 4, sets forth procedures to be used in the procurement of architect-engineer services.
  - b. Section 901 of Public Law 92-582 defines architect-engineer services as "those professional services of an architectural and engineering nature as well as incidental services that members of these professions and those in their employ may logically and justifiably perform." Architect-engineer firms are defined as "any individual, firm, partnership, corporation, association, or other legal entity permitted by law to practice the profession of architecture or engineering." State law determines who is an architect or engineer and what services they are exclusively licensed to provide.
  - c. Surveyors are also professionally licensed in all fifty states. Some state laws define surveying as part of the profession of engineering, while others do not. State laws also define what services surveyors are exclusively licensed to provide.
  - d. Various categories of professional surveying and mapping services are indicated in Appendix A.

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This circular supercedes ER 1110-1-1000, 15 Oct 1965

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5. Interim Policy:

a. The A-E selection procedure set forth in DAR Section XVIII, Part 4, will be used in the procurement of all surveying services in any state whose laws define surveying as part of the profession of engineering.

b. In all other states;

(1) The A-E selection procedure shall be used in the procurement of those types of surveying services requiring performance by a licensed engineer under the law of the state in which the surveying is to be performed.

(2) The A-E selection procedure shall not be used in the procurement of those types of surveying services requiring performance by a licensed surveyor under the law of the state in which the surveying is to be performed.

(3) Whenever state laws are unclear as to which profession, engineering or surveying, is required to perform the surveying services, an engineering judgement shall be made as to which profession should logically and justifiably perform these services.

(a) When an engineering judgement is made that the surveying services require performance by a licensed engineer, the A-E selection procedures shall be used.

(b) When an engineering judgement is made that the surveying services require performance by a licensed surveyor, the A-E selection procedures shall not be used.

(c) When an engineering judgement is made that the surveying services may be performed by either a licensed engineer or licensed surveyor the A-E selection procedure may not be used.

c. Although it may be determined that A-E selection procedures cannot be used, surveying services are considered professional services within the meaning of DAR 3-204. Surveys and maps become integral parts of project planning and funding, real estate acquisition, engineering and design, construction layout, and contract payment. These functions are directly dependent upon the quality of the surveying and mapping services. These services often involve many unknowns which preclude development of specifications sufficient for procurement by formal advertising. Unlike other products or services, surveys and maps cannot be verified without completely reaccomplishing the surveying or mapping. Errors or inadequate surveys or maps take years to discover and often result in costly corrective actions. It is, therefore, imperative that surveying and mapping services be performed by the best qualified firm;

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competence, experience, price and other factors considered. When, for one or more of these reasons, formal advertising is not feasible or practicable, the competitive negotiation procedures of DAR Section III should normally be used. Technical evaluation factors should be developed by requirements personnel. Relative importance and weight of all evaluation factors, including price, should be developed jointly by requirements and procurement personnel.

FOR THE COMMANDER:

G. A. YAGER  
Chief, Office of Contracting  
Policy

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APPENDIX A

PROFESSIONAL SURVEYING AND MAPPING SERVICES

The following 5 categories of surveying and mapping services involve performance and multiple operations by a variety of professionals, preprofessionals, and technicians. These activities should be coordinated and supervised by a professional who must be responsible for the acceptability of the work.

1. Land Surveying:
  - a. Property and Boundary Surveys 1,2,3
  - b. Surveys for Real Estate Plans and Plats<sup>1,2,3</sup>
  - c. Cadastral Surveys 1,2,3,
  
2. Engineering Surveying:
  - a. Land Based Methods 1,2,3
    - (1). Design Data Surveys
      - (a). Control, Horizontal and Vertical
      - (b). Topography, Utility, and Culture
      - (c). Profiles and Cross Sections
      - (d). Route Surveys
    - (2). Construction Surveys
      - (a). Layout Surveys
      - (b). Quantity and Measurement Surveys
    - (3). "As Built" Surveys
      - (a). Topography
      - (b). Utility Surveys
  - b. Hydrographic Based Methods 2,3
    - (1). Design Data Surveys
      - (a). Control, Horizontal and Vertical
      - (b). Bathymetry or Hydrography
      - (c). Profiles and Cross Sections
      - (d). Wire Drag Surveys
      - (e). Tidal and Current Surveys
      - (f). Water Quality Surveys
    - (2). Construction Surveys
      - (a). Layout Surveys
      - (b). Quantity and Measurement Surveys
    - (3). "As Built" Surveys
      - (a). Bathymetry or Hydrography
      - (b). Profiles and Cross Sections
  
3. Precise Surveying of Dams and Other Large Structures (to determine the magnitude and direction of movement):
  - a. Horizontal: electronic trilateration and similar techniques
  - b. Vertical: spirit and trigonometric leveling



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4. Geodetic Surveying, Geodetic Engineering, or Geodesy (not to be confused with precise plane surveying):<sup>2,3</sup>
  - a. Control Surveys, First and Second Order Accuracy
    - (1). Horizontal: triangulation, traverse, and trilateration
    - (2). Vertical: spirit and trigonometric leveling
  - b. Geodetic Astronomy
  - c. Gravity Surveys, Magnetic Declination Surveys
  
5. Cartographic Surveying, Cartographic Engineering, or Map and Chart Surveying (surveys for constructing general maps and similar products):
  - a. Control Surveys, Third and Fourth-Order Accuracy <sup>2,3</sup>
    - (1). Horizontal
    - (2). Vertical
    - (3). Photogrammetric Aero-Triangulation
  - b. Topographic-Planimetric Surveys and Maps
    - (1). Mapping Surveys
      - (a). Ground-Survey Methods
      - (b). Photogrammetric Methods
    - (2). Field-Edit Surveys of Photogrammetric Compilations
  - c. Hydrographic Surveys <sup>2,3</sup>
    - (1). Soundings: fathometer, hand-lead, sounding pole
    - (2). Sounding Fixes: electronic, wire measurements, three-point
    - (3). Wire-Drag Surveys
    - (4). Tidal and Current Surveys

Notes

<sup>1</sup> Photogrammetric procedures used when applicable on these activities.

<sup>2</sup> Electronic measuring procedures used when applicable on these activities.

<sup>3</sup> Electronic, Inertial, and Satellite Positioning Systems used when applicable on these activities.

T R A I N I N G

WHY HAVE IT?

WHO NEEDS IT?

WHO CAN PROVIDE IT?

TRAINING

- OCE SPONSORED COURSES

HYDROGRAPHIC SURVEY TECH.

FIELD SURVEY TECH.

PHOTOGRAMMETRY FOR MANAGERS

- ANNUAL TRAINING NEEDS SURVEY

- OTHER TRAINING SOURCES

P E R S O N N E L

THE CORPS MOST IMPORTANT RESOURCE

PEOPLE PROBLEMS ARE OCE'S MAJOR CONCERN

P E R S O N N E L

LOW GRADE STRUCTURE

LOW SELF-ESTEEM

LOW MORALE

P E R S O N N E L

LOW GRADE STRUCTURE

- OUTDATED JOB DESCRIPTIONS
- CLASSIFIERS DON'T UNDERSTAND THE JOB
- CAUTION!

P E R S O N N E L

LOW SELF-ESTEEM

- INTERNAL

- EXTERNAL

P E R S O N N E L

- CLASSIFICATION STANDARDS

-- SURVEYING TECHNICIAN SERIES, GS-817

-- LAND SURVEYING SERIES, GS-1373



RESOURCE MANAGEMENT

- PLANNING AND SCHEDULING RESOURCES
- ORGANIZATION STRUCTURES
- IN-HOUSE CAPABILITIES
- EXPERTISE REQUIREMENTS
- PROFESSIONALISM

SURVEYING AND MAPPING  
ACTION PLAN

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PERSONNEL

TECHNICAL GUIDANCE

TRAINING

RESEARCH AND DEVELOPMENT

CONSULTATION

MANAGERIAL / ADMINISTRATIVE SUPPORT

C O N S U L T A T I O N

- NEED TO KNOW YOUR PROBLEMS / POSITIONS

- YOU NEED TO UNDERSTAND LIMITATIONS / RESTRAINTS

MANAGERIAL / ADMINISTRATIVE SUPPORT

EFFECT CHANGE

A SPONSOR NEEDED

MUST KNOW THE SYSTEM

MUTUAL SUPPORT REQUIRED

APPENDIX B

OFFICE OF THE CHIEF OF ENGINEERS

SURVEYING AND MAPPING  
MANAGEMENT STUDY

NARRATIVES  
ON  
SPECIFIC NEEDS AND PROBLEMS  
FURNISHED BY  
FOA'S

JUNE 1981

COMPILED BY  
DAEN-CWE-BU  
JANUARY 1982

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## GENERAL COMMENTS

### ON THE MANAGEMENT STUDY

The suggestion to form a Corps Hydrographic Survey Committee which was proposed during the Hydrographic Conference in Wilmington, NC in December 1979 has not been implemented. It is felt that formation of this committee is extremely critical if the Corps is to maintain leadership in the hydrographic survey community. (Philadelphia)

OCE has provided much rhetoric, but no action to resolve, either the 1974 Survey for Milt Millard (OCE), or the 1979 survey for Mr. Murden (WRSC). (Detroit)

An ad-hoc steering committee to guide R&D, education/training and consistent specifications and contracting is needed. (Mobile)

In order to properly reply to a comprehensive survey such as this, much more time is required. At today's reduced manpower, supervisors need more float time to fit unscheduled items in between previously scheduled work. This short suspense date resulted in replies from only 3 of 11 District elements who perform or contract for survey work. (Philadelphia)

It is obviously desirable to improve efficiencies in S&M activities and the potential is strong. If actual improvement results from this study, it will be most welcome. If, however, as seemingly happens in many study efforts, it results chiefly in more external controlling mechanisms, upward reporting requirements, an increase in the already voluminous paperwork burden, and contributes generally to the information explosion, it will have been a staggering blow to S&M activities. (St. Louis)

Engineering Division does not have the authority to implement plans that would increase efficiency. (New Orleans)

The Corps of Engineers expends a vast amount of money annually on surveys of all types, yet there is no organizational structure in the surveying field beyond the local organization in each District. The Surveying field has been more or less considered a necessary evil and it has received little care or attention. The field of surveying has changed drastically over the past 10-20 years with the development of electronics, hand calculators, computers, survey systems, etc., the surveyor today must have a good math background, be trained in the use of a multitude of instruments and types of equipment, and must accept responsibility for expenditure of large amounts of money. Our survey parties travel constantly. They are away from home at least 4 nights a week. They are away from the office and any direct supervision. They must make many decisions on their own, must take care of equipment, vehicles, right-of-entry, irate land owners, etc. They are in direct contact with the public daily and are usually the first Corps personnel



in the field on a new project. We are responsible for accomplishing all types of surveys over a large geographical area and expenditure of several million dollars per year. This must all be accomplished within the survey section with no technical help or advice. On A-E contracts, this section writes the scopes of work, makes preselections of contractors, advises selection committees, writes specifications, makes Government estimates, negotiates contracts, monitors work, and accepts or rejects completed work, all without technical advice or review. In my opinion, quite a bit could be done to improve the situation. The surveying series is a low graded series. Effort should be expended to compare surveying positions with other related positions and raise the grade of surveying personnel to the level of comparable fields. There should be a well defined organizational chart in the surveying field from the field to OCE, including District Surveyors, Division Surveyors, and an OCE Surveyor. I have spent a great deal of time and effort the past 15 years trying to accomplish some of the above things. It has been an impossible task. There has been no way to get my thoughts out of the District, and if there had been, there was no one above me in the surveying field to send the data to. I have put in suggestions and submitted proposals for Value Engineering, all to no avail. This particular study seems typical to me of the situation. OCE has appointed an OCE coordinator for surveying who is probably a fine fellow, but by his own admission knows nothing about surveying. OCE has appointed a surveying coordinator for each Division. The coordinator for our division is the Value Engineer. I do not recognize the names of surveyors or survey personnel among the other Division Coordinators, yet, there are personnel in each District who have made a career of surveying and are familiar with the situation, the many problems, and means of improving the situation. Why aren't the people directly involved in surveying presenting the requested data? I don't know when this particular conference and request for data was decided upon, but I first became aware of the request for data on June 2, 1981. If I had known what was going on and what data was desired a month or so in advance, I could have written a book in detail with examples, samples, copies of suggestions, value engineering proposals etc. Instead, I have very briefly and hurriedly written down a few thoughts on major issues.  
(Kansas City)

## WORK FORCE

### IN-HOUSE CAPABILITIES

Despite constant pressure over the past few years for Districts to contract more and more survey work, we need to rethink the desirability of reestablishing better in-house survey capability. (New Orleans)

The current trend toward contracting out an increasing amount of survey work is questionable in that it weakens our abilities for rapid response in emergency and other situations. Without a nucleus of trained personnel, any expansion of surveying capabilities would be extremely difficult to accomplish. (Jacksonville)

Personnel space reductions over the past years have had an adverse effect on the section's ability to respond to the District's survey needs. The Survey Section's strength has been reduced from 38 spaces in February 1973 to the current strength of 24 spaces without a reduction in workload. This has been accomplished, for the most part, by a reduction in hired labor field survey capabilities and the increased use of contract survey crews. These past reductions in strength have already adversely effected our ability to monitor and coordinate our field activities. The current shortage of field personnel will probably be aggravated when the new contractors, acquired by competitive bid contracts, begin to provide services. (Ft. Worth)

Not having in-house land surveying capabilities creates various problems. Qualified personnel are not available to make inspections of contract survey work in progress or make field checks of surveying or mapping obtained by contract. During floods, the placement of high water marks cannot be properly supervised. Small survey jobs requiring only one or two days work required 10-14 days to get results by the contract method even though the data is needed much sooner. At the present time, our Survey Branch hired labor work force includes about 15 drafters, 3 surveyors, 8 gage and discharge employees, 5 contract survey inspectors, plus clerical-budgetary, and supervisory employees. In the past year we have had up to 35 contract parties on board consisting of about 125 contract employees. We also have 3 mapping contracts, 1 survey boat contract, 1 aerial photography contract, and an electronic distance measuring system contract, all of which taxes our inspection capability to the fullest, even with supplemental help from the branch and section chiefs. (Vicksburg)

The Huntington District has the capability to perform in the surveying and mapping profession. The expertise has enabled this District to meet command goals. Our in-house program has also in the past, served as a mapping center responsible to the Ohio River Division. The Survey Branch has experience and competence of 15 years. They take great pride in their work and want to present a quality product at a reasonable cost. The response time for the standard survey team to react to a navigation problem is much too long. We have found an in-house

party in operations can respond and generally produce adequate work much quicker. It is recommended that this concept be expanded and strengthened. More development in equipment and expertise is required however. (Huntington)

ORD Districts are involved with the following surveying and mapping processes: cadastral, hydrographic, photogrammetric mapping, plain table mapping, precise alignments and elevations to measure the deformation of dams and locks, etc. The main use of survey work is for real estate purposes and for the development of project designs, including such things as using photogrammetric methods for obtaining earthwork quantities. One ORD District is almost wholly dependent on A/E work for anything other than deformation surveys. Another ORD District has almost complete in-house capability for performing almost any type of survey work. All Districts are using electro-distance measuring equipment. In the early 1970's, the ORD Division used a Mapping Center of Competence. The use of a Center of Competence upgraded the ability and capability of all of the District survey branches. (ORD)

A three-man survey party (in-house) is used for the majority of field surveying. Other in-house personnel (GS-04 to GS-09) perform mapping updates and supplementation based on field data/observations. Most mapping is procured from existing sources or developed by contract. (Philadelphia)

Use cannot respond to priorities for emergency work (too few people to do the work). (Portland)

The Albuquerque District contracts out all surveying work. There is currently one person in the surveying section whose main function is Contract Administrator and Project Coordinator. The predominant problem with a one-man surveying section is insufficient time and personnel to observe and inspect all field surveying procedures performed by the contractor. The individual's expertise in surveying is greatly enhanced because all aspects of surveying are handled by that individual. I believe contracting out the surveying work is the way to go. (Albuquerque)

#### PROFESSIONALISM

OCE encourages registration and certification but there are no material or monetary incentives to achieve this goal. Some form of recognition is needed. (Seattle)

Professionalism is a problem when personnel with a State Survey Licence are not given professional status by the Corps. (Portland)

The legal and technical knowledge required to become a registered land surveyor increases yearly. This is particularly true in coastal states where establishing Mean High Water Lines and Erosion Control Lines required knowledge of state statutes and regulations, as well as, a sophisticated technical background. The Corps' grade structure for

surveyors tends to discourage personnel who have the ability and aspirations to learn all that is required to qualify to take the state exam which are also becoming more stringent. It is recognized that all survey personnel do not require registration but that their abilities must be upgraded along with the overall requirements of the profession. (Jacksonville)

Government and industry has departed from one of the traditional promotional series, namely; going from surveying and construction work to design work, etc. The former practice provided promotion potential. Some thought needs to be given to providing survey personnel with more promotion potential plus providing more professional status to top grade survey personnel. (ORD)

Surveying technicians should be encouraged to become Registered Land Surveyors. This is an on-going problem, as the personnel classification people will not recognize the need for Registered Land Surveyors. Example: The Chief, Survey Section is registered in California and Arizona and is classified as a Civil Engineering Technician, GS-12. The Chief Contract Survey Unit is not registered and is classified as a Land Surveyor, GS-12 (a professional series). The technicians in the Survey Section do not see the need for registration and are reluctant to take the required examination because they know it is not required for advancement.

The problems of encouraging Professional Registration and attracting experienced surveyors are concerns of the highest priority in this Survey Section. There is a prevailing attitude of many Corps people that it is not important to hire well paid professionals for surveying and mapping because we can always contract to professionals. This brings up the question, "who will administer, monitor and review these contracts in the future: professional surveyors or contract clerks?" Surveying organizations should be headed by Registered Land Surveyors and they should be recognized as such by the Corps. This is the only way to attract and keep professional surveyors. (Los Angeles)

There have been few improvements in the personnel aspect in the past 20 years. After much arguing with CSC, we did finally get them to accept Registration as a Land Surveyor in lieu of 30 hours college credit. (Kansas City)

Perhaps the Government should require all A-E survey party chiefs to be registered in the trade. This, however, could be a problem when heavy workloads require more parties than are required in the contract. (New Orleans)

Recent graduates from Engineering programs have very little or if any knowledge of surveying and thus cannot intelligently define survey requirements or survey support for project planning and design. (Detroit)

## EXPERTISE REQUIREMENTS

Impending and future personnel reductions, especially in the civil works program may seriously affect the expertise and capabilities in all S&M elements. If the Corps expects to maintain this expertise, consideration should be given to consolidating functions. (Seattle)

Since we have lost practically all of our old-line experienced personnel, especially in the survey area, and no longer have the cadre to build upon, our expertise is vested principally with our contractors. Their staffing is adequate. Their surveying and mapping equipment is generally the best obtainable. (Vicksburg)

Surveying and mapping often provides the basis for project formulation, design and construction. Millions of dollars are expended each year based on before-and-after-construction surveys. Therefore, it is important that the Corps maintain surveying expertise by additional training, recognition and compensation for those employees in this career field. (Charleston)

In the Survey Branch we have the personnel to perform their functions in an expert manner in cadastral work and administrative work. The importance of cadastral work has increased considerable and continued expertise is necessary. Also, we feel the administrative unit is the heart of the organization and have developed and will continue to develop this unit. (Portland)

The utmost concern is the average age of the field personnel. Only two out of twelve employees assigned to the field have less than twenty-five years time. The local community college offers very good two-year students from their technical programs that have the potential for good surveyors, but this section is unable to recruit permanent employees. The field supervisors or Party Chiefs are long time employees with excellent experience in almost every phase of surveying and are first line surveyors. The other positions are held by employees of equally long experience, but generally require very close supervision and are not capable of further advancement. Survey Section has field personnel that are eligible to retire and should be replaced by young technicians with at least two years of college and surveying experience to insure the capability of the survey section. (Walla Walla)

The Corps of Engineers will only attract expertise in the Surveying and Mapping field (including Photogrammetry and Hydrographic Surveys) when its grade structure is equal to that of other Federal Agencies and Industry. (Mobile)

The Corps maintains a distinct edge in the area of expertise in hydrographic surveying. The complexity of the electronic hardware utilized in hydrographic surveying has increased tremendously during the past few years. The change has placed additional responsibilities and skill requirements on field surveying personnel; however, promotions have not kept up with the developments. (Charleston)

Our surveyors are just that: Surveyors. They are not electronics technicians. To operate the electronic equipment, both surveyors and electronics technicians are needed. Therefore, a space should be allocated for an electronics technician on the Hydrographic Survey Team as required on a District-by-District basis. However, all 3 Districts have adequate "Know-How" to operate conventional equipment. (SPD)

The Survey Section at the Walla Walla District has purchased some of the best and latest equipment on the market. One such system is hydrographic positioning and processing equipment. This system is highly accurate and much faster than previous methods. However, this system requires an electronics technician at least part-time and has created lost field time due to equipment failures. The hydrographic crew now has a couple years experience with this system and the party chief is becoming very good at diagnosing problems and prescribing cures. An engineering technician in the Computing Unit of Survey Section has field experience with the system (Motorola) and is abstracting incoming data. He is very good at solving errors and predicting potential errors. This employee is very helpful in updating and ordering replacement components by contacting the manufacturer directly. With all the electronics distance meters, positioning and processing and potential of the 'total station' for automatic mapping, in the future, a full time electronics technician may be necessary. (Walla Walla)

A distinct specialized field of technical knowledge is involved in dealing with each of the S&M activities; i.e., hydrographic, topographic photogrammetry, cadastral, geodetic, etc. S&M Divisions, primarily concerned with only one type activity, in other agencies have grades reaching higher than those in the Corps S&M organizations. Yet we are expected to provide, skillfully and competently, any or all of the several specialized activities, whether with hired labor forces or through effective contractual action. (St. Louis)

There are two problems are created by a lack of expertise and capability in modern surveying and mapping methods. First, a District will not have a proper background for A/E contracting (Government Estimates and negotiations). Secondly, a District will not be able to properly inspect and control the work of an A/E. (ORD)

We are trying to recruit a surveyor/ADP oriented type of person for the hydrographic survey team. (POD)

Please note, even though more contracting may be necessary we should never completely eliminate Government expertise. (Portland)

The rapid rise in electronic surveying, mapping, and photogrammetric technologies had not been matched by an equal rise in the skill levels of employees supposed to utilize these technological advancements. Therefore, expensive plant and instrumentation is not always being effectively or efficiently utilized. Many automated survey systems -- primarily hydrographic -- are of such complexity that few existing personnel fully understand their operating structure (hardware/software

and configuration or interaction); consequently, more technically qualified personnel are needed. Too much emphasis is being placed on automation of survey-related functions without a commensurate emphasis on increasing the skill level of the employees responsible for these functions. This has resulted in a continuing drop in quality. This drop is further compounded by the turn-over rate -- inexperienced people are operating complex automated survey systems with little or no feel for a data point's magnitude or quality. The obvious increase in quantity may be more than offset by the decrease in data quality. This loss in data quality represents a critical problem on both automated and conventionally run surveys. The grade structure of the Survey Branch is not commensurate with the increased engineering responsibilities resulting from the addition of duties involving volumetric quantity calculation for pay and other purposes and structural deformation monitoring functions. Digitized hydrographic survey data stored on magnetic tapes is used to compute excavation quantities for contractor pay purposes and for engineering estimates. Volumetric calculations used for contract pay purposes are normally accomplished by Construction-Operations Division; however, when using highly sophisticated electronic survey systems the same computer hardware can be used to produce highly accurate volumetric calculations. Often extensive data manipulation is required where complex dredging areas and multiple partial pay surveys occur. In such cases extensive engineering judgmental decisions are often required. The Survey Branch is also responsible for obtaining, processing, adjusting and interpreting precise structural deformation measurements at twenty-two navigation and flood control structures in Florida with other structures possibly being added in the future. Throughout this process, familiarity with surveying practices of the highest order and a basic understanding of structural mechanics is essential. These measurements are to an accuracy in excess of 1st order surveys. (Jacksonville)

In our opinion, a survey branch which does \$5-10 million of contract survey work each year, in addition to in-house survey work and a large stream gaging and water quality data collection mission, needs to be managed by someone with higher capabilities than what can ordinarily be found at the GS-12 level. The management of the contract effort within that organization requires management capabilities rarely, if ever, found at the GS-11 level. (New Orleans)

The Nashville District survey personnel average over 16 years of experience in the surveying and mapping profession. Over the past 30 years they have performed all of the survey requirements of the District. The Survey Section wishes to maintain this capability and adequate personnel strength must be maintained to perform in-house work and monitor Surveying and Mapping contract work. (Nashville)

A critical area involves the office preparation of contract assignment technical specifications and cost estimates. A highly qualified individual is required to perform this work. He should have experience in various mapping, construction, and photogrammetric survey techniques, and a good verbal command to convey such information to the contractor in writing. Recruiting and retaining such individuals in a GS-7 level

position with little future advancement capability is a difficult problem. Few field personnel have a desire to work in an office environment performing this critically needed work. As more work is being performed by A/E contractors, a method of attracting the experienced (highly qualified) field personnel into the office will be necessary. (Jacksonville)

Selection of one crew per District to perform precise movement monitoring surveys on large dams would allow this crew to receive special training in the techniques required to achieve the necessary accuracy. (Louisville)

In order to provide additional training for junior inspectors and to provide greater flexibility in meeting survey requirements, the New Orleans Area Office has added a survey technician to their work force to perform duties of a survey party chief. The members of the survey party are made up of junior inspector, engineer trainee, and/or temporary construction inspectors. (New Orleans)

There seems to be a perception problem regarding S&M activities, partially self-induced through absence of promotional action by the pertinent professional societies; to wit, S&M activities are regarded as little more than commercial/industrial activities available for over-the-counter acquisition. Most S&M activities are, in fact, engineering disciplines, equivalent in nature to the several recognized disciplines, but this concept may be too hard to sell at this late date. (St. Louis)

There are also problems associated with the use of architect-engineer firms to accomplish all surveying and mapping work. One of these problems is the availability of expertise in the trilateration area. Presently the Portland District has the only expertise in this geographical area for trilateration surveys that are essential for our dam inspection work. It is therefore essential that the District maintain in-house capability to perform these surveys. In addition, the District needs to maintain some expertise to be able to do emergency and "on the spot" surveys. (Portland)

#### ORGANIZATION STRUCTURE

Recent personnel ceilings, declining workload and future uncertainties could seriously impact the S&M activity. Loss of expertise is imminent unless action is taken soon. One alternative may be to consolidate district surveying efforts to effect better utilization of existing staff. (Seattle)

The Survey Section does work for all the divisions in the district. There is no one outside of the Survey Section whose main interest is surveying and who is remotely knowledgeable in the surveying field. It seems to me the surveying organization should be a separate office responsible to the District Engineer. There would be no loss of Technical Supervision, because there is none, and one division would not receive priority, over another. The biggest problem is that there is no organized chain of command in the surveying field. There is no one above



the District level directly involved in surveying. There is no exchange of ideas, experience, or know-how. In most other fields in the Corps of Engineers there is a chain-of-command from the bottom to OCE. In the surveying field, the Chief of Surveys at the District level is the end of the chain. He must make decisions based on his knowledge and experience because there is no surveying expert above him in the chain of command. (Kansas City)

The organization structures are hierarchical and self-serving. (Portland)

Organization structures and personnel allocations are often dictated by political pressures, but this is probably true in every organizational structure within the Corps. (Little Rock)

Applying an appropriate organization structure by individual Districts should be permitted to utilize personnel most effectively. The current policy of one group of surveyors in each District is not appropriate in some cases. (Baltimore)

The only apparent substantive reason for including precise monitoring of dam movements in S&M activities is that some of the measurements are obtainable with surveying type devices. The activity has little relation to S&M otherwise. It is better related to instrumentation physics. The measurements fit hand-in-glove with and as a part of the overall engineering instrumentation system of measurements to ensure integrity of structures in connection with the Periodic Inspections Program. This District, therefore, is in the process of transferring this measurement function from the Survey Section to the Instrumentation Section of the F&M Branch to gain better management control of the function and to increase efficiency of the comprehensive instrumentation effort through the considered appropriate degree of specialization. (St. Louis)

The organizational structure is a problem at times in that the field data is not processed and reduced in the survey section. Hydrographic and topographic information is processed in other sections. Judgements or interpretations should be performed by hydrographers, topographers and surveyors with much experience in these fields. All the hydrographic data is processed in the Photogrammetry/Graphic Data Processing Section. I feel the Survey Section has lost control of interpretation of data that was for surveyors to interpret. However, we have an experienced field man abstracting data from incoming tapes and he coordinates closely with the processing section and it is working better. Looking to the future, I would like to acquire a 'total station' for mapping automatically using such equipment as the Wild Tachymat and peripheral equipment and to be able to control plotting and contouring within this section by topographers. (Walla Walla)

Savannah District Survey Section is in F&M Branch of Engineering Division. We have experienced no major problems with this organizational structure. We do work for Engineering, Construction, Planning and Real Estate Divisions. Automated hydrographic survey systems to suit our

conditions has been a problem area. The Survey Section collects hydro survey data which is processed and mapped in Hydrology and Hydraulics Branch. (Savannah)

The District has only two active survey crews. One assigned to Operations Division for hydrographic and routine surveys in conjunction with its navigation responsibilities and a second crew assigned to Engineering Division for routine surveys. All other surveying functions are handled by Construction personnel or by A-E contract. A reorganization and consolidation of the District's limited and fragmental resources is underway. For the past few years, the District has satisfied most of its surveying and mapping needs through the utilization of open-end surveying contracts. The District does not propose to change this practice in the future, but it is reorganizing and consolidating its surveying and mapping responsibilities. This reorganization should be completed soon. (Tulsa)

It seems that survey units have been established with little reference to the task or to the relationship of the Engineer and Surveyor in regard to their respective tasks, the tools used or the end product. The surveyor, with the "tools" of his trade, may be looked upon as the provider of the product or "data" that the engineer needs to conceive of, justify, design, build, operate and or maintain a structure or facility, which is his "product". The surveyors "tools" are looked upon as his equipment and instruments, however, all that expensive equipment is worthless without the "mental" tools or education that may be required. If we may use the term "design" to cover construction, operation, etc., the product of the engineer is his "design". With these rather loose statements we have divided the two groups by task and product with total disregard for education, degrees registration, etc. and are thereby forced to admit that many of our professional people (Engineers) are in fact surveyors. Or to put education, training and expertise of the fully qualified engineer in many areas. As an example, an engineer with a PHD in Field Hydraulics is employed in our Hydro Engineering Branch, Water Quality and Sedimentation Section. His primary task is the gathering of data from which he writes reports which are used by Engineering or Operations Divisions to design or maintain a project. Another example could be the Real Estate appraiser who determines the value of a piece of property so that an engineer may use the data in a cost analysis. While this definition would place these people in a survey organization, it does not and should not detract from their professional standing. The surveyor seems to be the least respected and most dispensible person in the Corps and the unit in which he works is too often the leprosarium of his District. It is required that a professional engineer head the section in which I work; however, any young engineer that sits in that job for more than a couple of years has probably killed his career. Some years ago (about 10) the Chicago District abolished their survey organization completely. A few years later, while under severe manpower restrictions, they were desperately trying to reestablish their unit. The Albuquerque District (in more recent years) very nearly abolished their survey unit. I haven't heard what luck they've had but Chicagos' was a hard lesson for them. I feel that an analysis and reorganization of each District, along the lines discussed would not only improve the survey unit but could drastically improve the response time and productive quality of every District. (Omaha)

## PLANNING & SCHEDULING RESOURCES

Suggest S&M goals be established to attain the best available S&M product which can have the greatest interdisciplinary or multi-program usefulness. That is establish standards and/or procedures so that each S&M job has the widest range of District applicability and long-rang usefulness. This could be especially cost effective where remote sensing techniques can be used to serve a multitude of purposes. (Philadelphia)

Survey requirements are identified too late to meet milestones.  
(St. Paul)

Scheduling processes have some problems. Using elements are waiting until the last second before requesting survey work. Most districts need a better scheduling system. (ORD)

One tendency seems to prevail in a large number of surveying and mapping requests. This is the tendency to postpone the request until the information is needed. Improved planning by units requesting such information would allow a smoother flow of work and could allow better utilization of aerial photography and reduce the need for cutting brush. (Louisville)

The requirement of topographic surveys is often the critical item that impacts a project schedule. The AE process to obtain these surveys frequently delays schedules. (San Francisco)

It must be recognized that the first requirement in the design process is a topographic survey along with a project development book and criteria. One of the common reasons for project delays is the lack of a timely survey. There appears to be insufficient funding and time allocated to perform complete surveys and subsurface exploration to avoid the common costly construction modifications which result from "changed" field conditions. (Baltimore)

It is difficult to meet delegated responsibility and requests for performance without support or providing the tools to execute (i.e. travel restrictions, overtime restrictions, procurement restrictions, etc.). The old adage of getting what one pays for is most apparent now. This applies to both in house and contract effort in that without the tools (equipment, training experience and support from all element necessary), there is a strong possibility of not getting the results desired. All too often, funding for surveys on projects receives small consideration especially in the planning and design phases. (Detroit)

Many times the survey work in a district is severely affected by travel restrictions. These restrictions generally stop such work in the summer which is the most productive time for field surveys. Action should be taken to avoid any problems caused by travel restrictions.  
(ORD)

## PERSONNEL

### CLASSIFICATION STANDARDS

NCRED-S has experienced a high turn-over rate due, we believe, to pay levels and associated classification standards. We believe that the current standards are unrealistic due to advances in technology, methods, and product requirements. Today's survey technician has at his disposal sophisticated equipment valued at \$25,000 to \$100,000, or more. This equipment requires training in mathematics, data processing, and electronics for operation and trouble-shooting. Knowledgeable, trained, and productive professionals and/or technicians are needed to provide the constant productive use of the equipment for greatest economy of time and resources. Job descriptions and classification standards written 30, or even 5 years ago are just not sufficient to describe the work or classify the job and set pay scales. Party chiefs and other technicians commonly have as much responsibility as engineers but are usually 2-5 grades lower in pay. We have had only minimal success getting party chief jobs raised above grade GS-7 and that was usually only possible because their supervisory duties were stressed. (Rock Island)

The classification standards, or interpretation of the standards by the Corps and some other agencies, seem insensitive to any possible advancement in the surveying profession beyond the 19th century stereotypes (hip boots, tobacco-stained shirt, etc.) Low pay levels have eroded professionalism. (St. Louis).

Position and classification standards for most S&M positions are outdated. They do not reflect the latest changes in state-of-the-art, nor the technical competence necessary to perform the work. (Seattle)

The problem is there is no job classification series for Surveyors. Job classifications do exist for survey technician and survey aids. The primary function of the Surveyor relative to the Engineer has never been defined. (Omaha)

There is a need to revise and update classification standards. More frequent promotions are necessary to prevent personnel turn-over and low pay status. (Huntington)

Classification standards do not reflect the technical competence necessary to perform the work. (Portland)

The guidelines used by the civil service to rate personnel should be changed to upgrade personnel according to their job-related expertise. (Charleston)

The present classification standards and pay levels are grossly unequitable between districts and sections within districts. All positions within the section have been filled for the last five months with no turn-over. This is probably due to the tight job market. One of the biggest problems involved in the surveying and mapping area is the

low grades for surveying and mapping personnel. Other Federal agencies appear to be able to give higher grades for the same work and are, therefore, able to hire people away from us. There must be some way to resolve this inequity in grading classification. (Portland)

Classification standards for surveyors have not been updated to include knowledge, ability and skills, required to utilize and perform surveys with state-of-the-art instruments and methods. For example, party chiefs have the responsibility to complete surveys on their own, supervise the survey party, be responsible for a truck and thousands of dollars of equipment, etc. Yet the pay level is not equal to similar positions of responsibility and job requirements in other series. (Baltimore)

Classification standards are generally outdated and have not kept up with techniques and equipment. The standards are written around the missions of the Defense Mapping Agency, Coast and Geodetic Survey and the Geological Survey. Standards do not address requirements of the Corps of Engineers as to the level of difficulty required to accomplish its missions. This includes persons in the following classification: Civil Engineer, Civil Engineering Technician, Geodesist, Cartographer or Hydrographic Surveyor. (Mobile)

The skill level required for use of modern electronic surveying and ancillary data processing equipment is inconsistent with existing job classifications and grade structures. (Jacksonville)

The classification standards are outdated and do not reflect the responsibility and technical knowledge required for surveying using electronic and other sophisticated equipment. (Chicago)

Classification standards are outdated and not in line with current survey requirements, equipment and state-of-the-art. Basically, promotions are non-existent for the "New" survey personnel, thus, the turnover rate is relatively high. A high percentage of the "New" and "Lower Graded" people are temporary by necessity which adds significantly to the turnover rate. Job Descriptions, classification standards revisions as well as guidance to provide personnel officers with standards and background required to evaluate fairly the new state of the art of surveying. (Detroit)

We have personnel in the field responsible for several million dollars worth of work accomplished by our survey parties and A-E survey parties. Our personnel supervise the work, inspect the work, and accept or reject the work. Yet the personal office allows no credit for the work done by A-E contractor under our supervision. As far as the personal office is concerned, if one of my field supervisors was responsible for one of our parties and 50 contract parties, they would credit him with responsibility for only one party. (Kansas City)

The difficult and time consuming process of securing promotions for qualified and deserving personnel. Classification standards should be

revised to induce a cross training program to be instituted which, when operational, would result in more diversified employees. (Nashville)

Current Corps of Engineer's position classification standards for Surveying Technicians are out dated. It would be more appropriate to define them as Physical Science Technicians. (Jacksonville)

Performance standards and new appraisal system should improve the dialogue between the supervisor and employee. (Seattle)

Job discriptions and Performance Standards are adequate. (Portland)

An all out effort is being made to upgrade all positions. Job descriptions are being revised to add more responsibility and use of modern survey equipment. Hopefully this will be "brought by the Civilian Personnel people." Only then will we be able to recruit qualified survey personnel. (POD)

There appears to be a basic problem with the position classification standard for Surveying Technician Series GS-817, dated October 1970, insofar as hydrographic surveying is concerned. The standards evidently were written at a time when hydrographic surevying was in a rudimentary state. Since that time, the art of hydrographic surveying has evolved into a highly technical precise science. Full utilization of presently available electronic hydrographic surveying equipment has placed great demands on survey technicians. The net result of this evolution is that field survey technicians find themselves independently planning surveys with a much higher level of responsibility. It is suggested that the above mentioned standards be revised to acknowledge the science of hydrographic surveying as it is currently practiced. Only when this revision is completed will survey technicians engaged in hydrographic surveying be given fair and appropriate classification standards. (Wilmington)

Classification standards are applicable to land surveying and road construction and not to hydrographic surveying, which represents over 90 percent of the NED surveying workload. The standards do not relate to either the electronic surveying equipment utilized or to our hydrographic survey requirements. Party chief grade is GS-8. A GS-9 grade should be established for party chiefs because of the sophisticated type of electronic equipment employed, extensive traveling and willingness to adapt to all weather conditions. For the same reasons other grades in a survey party should be raised one grade level (GS-5 thru GS-8). (NED)

Classification standards and related pay rates do not reflect present day expertise and responsibilities in connection with survey and photogrammetric work. Comparisons with other elements in the Districts show that survey and mapping personnel are rated at least one grade lower for work requiring similar technical competence and ability. A method needs to be evolved to reduce the turnover rate to retain high caliber personnel. (ORD)

Classification standards for photogrammetrists are outdated, pay levels are below average, and promotions are negligible. Professional work is being done but not generally regarded as such by the engineers and the personnel office. Job descriptions and performance standards have been updated and are accurate. The turnover rate is low for higher grades. The potential for promotion is virtually non-existent.

Classification standards are not properly utilized to determine grade and series for administrative personnel in Survey Branch. The Branch is large enough to support as GS-7 Administrative Officer and requires this classification. Duties include budget control, procurement and personnel management. We presently have a GS-5 Budget Tech position. The Civil Engineer Technician position requires cadastral expertise and should be classified in a professional series, since this position is responsible for all property and boundary survey in the district. (Portland)

There is a problem in our capability to provide the necessary grade level to competent people. Also, there is a problem with the apparent prevailing attitude of the personnel office and the classification standards that survey personnel do not need to be highly competent and do not perform technical efforts as compared to engineering standards. (Detroit)

#### MANPOWER REDUCTIONS

As a result of manpower reductions, this district does not have a land survey crew and the work load of the hydrographic survey crew precludes using it for land surveying functions. (San Francisco)

Survey Section has been reluctant to purchase expensive State-of-the-Art equipment due to the uncertainty of our potential long range personnel space problems. Any additional space reductions would probably result in the loss of our one remaining field survey party. Therefore, the purchase of additional equipment at this time is not deemed advisable. (Ft. Worth)

The long-term intent to procure most, if not all, surveying and photogrammetric services has had a definite adverse effect on personnel retention. The impact on career goals is obviously negative. Any corrective actions contemplated by this management review must consider the potential non-existence of government survey forces, along with the removal of the aforementioned "personnel problems." (Jacksonville)

The trend is toward fewer and fewer engineers in S&M activities. Turnover has decreased experience levels because most vacated positions are cancelled in accordance with the space cuts imposed on the District. (St. Louis)

In the past several years, reductions-in-force, transfers, retirements and resignations, and the hiring freeze have reduced the Survey Branch strength from over 100 spaces to the present level of about 50. (Vicksburg)

Several years ago, limitations on overall personnel strength directed that the E&D work done by contract be progressively increased to make additional personnel apaces available in critical design areas. While this approach was successful in terms of meeting the desired objective, it has resulted in serval adverse side effects including the following:

(1) A decline in the number of people in Survey Branch who are technically knowledgeable in surveying. (2) A reduced ability to keep survey procedures and methods at the state-of-the-art. We have attempted to ameliorate this by tasking our Sytems and Programming Branch with the responsibility of seeking out ways in which ADP can make maximum contributions to our survey effort. (3) A loss in our ability to respond quickly to urgent and emergency survey needs. Our in-house survey capability is down to less than two full parties and these people are, for all practical pruposes, tied up permanently on two jobs. Although we have an almost unlimited overall capability through our survey contractors, the procedure for putting them to work is cumbersome and not well suited to immediate response. (New Orleans)

The current shortage of personnel will reduce Survey Section's ability to obtain right-of-entry, monitor, coordinate and direct the activities of the 7 to 12 contract crews and one hired labor crew engaged in acquiring field data. The current shortage of field personnel will probably be aggravated in July when the current negotiated survey contracts expire and survey services are acquired by competitive contracts. (Ft. Worth)

Contracting policies and procedures are presently adequate; however, space limitations do curtail field monitoring to some degree. (Jacksonville)

As the trend continues to contract work, in-house personnel levels must be maintained. The current survey personnel will be utilized for both surveying and inspection of Contractor's work. (Nashville)

This District has all the equipment for complete in-house photogrammetric mapping capabilities; however, because of the lack of manpower, the equipment is not utilized. (San Francisco)

Personnel requirements and manpower must be maintained at adequate levels to maintain in-house capability and to administer A-E contracts. (Huntington)

#### TURNER-OVER RATE

The Survey Section has one of the highest turn-over rates in the district in lower grade employees. (Savannah)

A high turnover rate represents the most critical problem facing this district's S&M functions. The reasons for this rate are as follows: (1) Low grade structure in comparison to other technician-level fields within the Corps or other agencies. (2) Minimal advancement potential due to current grade structure. Younger employees quickly realize their



future advancement potential in surveying is minimal compared to other construction fields or other governmental agencies. Unfortunately, the more highly qualified younger employees rapidly depart, leaving behind the less qualified personnel content with the grade structure. Other governmental agencies offer higher grades in surveying work by changing the classification series to a higher grade-structured one (e.g. substituting Physical Science Technician, Cartographer, Geodetic Technician, Land Surveyor, Geodesist, etc.) even though the work is essentially identical. Survey related areas of the Corps are generally acknowledged to be "dead-ended" fields due to their low relative grade structure; thus the high personnel turnover. (Jacksonville)

The field of surveying and mapping (and those who perform these tasks) has been neglected by the Corps in recent years. At one time it was an area that many employees enjoyed and remained loyal to for their career. This is no longer the case. Individuals realize that the importance of their work is neither recognized, appreciated nor rewarded; hence, the higher turnover rate. (Charleston)

A high turn-over rate in survey personnel is a major problem in maintaining a highly efficient survey capability in the Little Rock District. This is especially true in the lower grades. Current standards call for a regular party chief to be a GS-7, instrumentman a GS-5, and the rodman or chairman a GS-4 or 3. All of these grades require some experience to qualify and when a laborer WG-2 (which can be hired without any experience) earns more than a GS-3 (requiring experience) it is easy to see the reason for the high turn-over rate. Personnel are encouraged to attain registration as professional land surveyors and to attend training courses to enhance their professionalism goals. (Little Rock)

We typically hire high school graduates at the GS-2 level. We provide on-the-job training and promote them up through the ranks to GS-4 or GS-5. They then transfer to the construction division as an inspector where they are two grades higher, do not have to travel constantly, and have less responsibility, but their pay doubles or triples. (Kansas City)

An increase in grade structure would decrease the turnover rate which often occurs as good employees find better opportunities in other functions within the Corps. (Louisville)

The turnover rate in the Drafting Branch has always been high since the better employees seek and are able to find higher paying jobs in private industry and other elements of the District. Positions under the wage board pay system have historically paid more than drafting positions (GS system) for the same drafting work by contract. This had led to employees spending more and more time administering contracts which tend to lower moral and reduce in-house expertise. (New Orleans)

Turn-over rate is high due to low pay levels. (Portland)

Large turn-over rates result from low Corps pay levels and availability of jobs with higher salaries in the private sector after

employees are trained by the Corps. Performance remains at a lower efficiency level as a result of the turn-over rate. The dilemma of lost time caused by travel and adverse weather, extended TDY, and hazardous duty tend to affect some personnel. (Galveston)

The turn-over rate is high, especially with field personnel. The exact reasons are difficult to pinpoint. It could be boredom with travel, low wages, limited training opportunities, no upward mobility, lack of recognition, no incentive to stay on, etc. The office staff is more stable. (Seattle)

High turnover with field crews is a problem. (St. Paul)

The primary personnel problem is the fact that it is extremely difficult to upgrade personnel, professional or otherwise, if they are in any way connected with surveying. In the field of surveying, an individual's value to an organization is his experience level. The more times he performs a particular job, the more efficient he becomes; hence, the more valuable he is to the organization. Our system allows for promotion based on the duties contained within a job description and not on an individual's proficiency and skills. This has led to an ever-increasing turnover rate. New employees are quick to realize that there is limited opportunity for advancement, and either quit or transfer to another career field. A surveying background provides good training for such career fields as Engineering Technician, Construction Inspector, Permit Inspector, Naval Architect Technician, and Construction Layout. These career fields allows for more rapid career development, and generally are less strenuous physically. The high turnover rate is expected to continue because the grades and money are not ample to support a family. (Charleston)

Overall professionalism of personnel has been improving as a result of increased supervisory emphasis and counselling. Setting of performance standards, use of appropriate motivator factors, and effective two-way communication is serving to lessen the dampening effect of the turn-over situation. Additionally, creation of developmental assignments and proposals to upgrade the entry level grades from GS-2 to GS 2/3 should provide some job enrichment at that level. (Galveston)

Survey Sections are good places to break in new employees within the federal government. But once key positions are filled they hold these positions. This leaves no room for younger employees to move up unless they are very patient and ride through time for retirements, etc. to take place. Those moved up by advancement are well trained and qualified with necessary expertise for the key positions. We recently lost one of our future party chiefs due to better advancement at Fort Stewart. We have lost three employees to Fort Stewart over the last year. We have provided sufficient training mostly on the job for lower grade employees. With the training and experience received in Survey Section, they can advance faster by moving around. (Savannah)

The turn-over rate, due to in-house lower grades and attractive salaries in the private sector, presents a management problem in developing resources. Steps are being taken to improve the situation through analysis of positions and grade structure. (Galveston)

#### RECRUITING PROBLEMS

Two Districts in ORD have indicated that they have problems updating their workforce. Part of the problem may have been caused by a lack of a strong Civil Engineering background at the first line supervisory level. There is a relationship between the problems involved in updating the work force and the Districts problem with retaining a high caliber of personnel, and also, there is a relationship to the policy of depending completely on performing work by A/E forces with some supplemental in-house survey work using chain and transit methods. (ORD)

We have experienced problems in conveying personnel staffing requirements to those involved. Regulations requiring the use of FTP versus FTT spaces are not well understood and work to our disadvantage in manpower cuts or decrementing exercises. (Rock Island)

Stringent Government hiring and firing procedures can often result in positions being occupied by persons who are poorly motivated. (Louisville)

We hire mostly at the GS-2 level and train the personnel on the job. OPM criteria for tests at this level are unrealistic. Takes several months to go through process and hire someone. We should have the authority to hire in the field at project sites. We could find local young men willing and able to do field work. This would generate good will with the public, which is badly needed. (Kansas City)

We have had trouble recruiting land surveyors or land surveyor trainees. The problem was manifested when regulations would not allow the hiring of a graduate of a 4 year surveying degree program at the GS-5 level since he was not yet on the correct OPM register. (Rock Island)

Potential sources for S&M technicians are local community college and trade schools. Cooperative agreements between the Seattle District and the schools have been signed, but a hiring freeze has placed the program in abeyance. (Seattle)

We are able to keep our key people only because of good working relationships, fringe benefits (not just salary) and pride in surveying work. This (keeping crews staffed) is one of our biggest problem areas. One improvement we have made is participating in a co-op program with Savannah Vocational Technical School. We currently have three co-op students that are working one quarter and going to school the next quarter. We are alternating one student so that we have at least one working at all times. We also employ about two temporary workers. The only way we have managed to stay abreast of our workload is by using and co-op employees. We also let openend survey contracts (two or

three per Year) for surveys above what we are staffed to do. (Also see item IV., Training.). (Savannah)

Continuous use of temporary personnel is a problem. (St. Paul)

Although about 90 percent of our surveying and mapping work is performed by contract, we are unable to recruit qualified employees to inspect and monitor the contract work because of the imposed low grade structure. (Vicksburg)

The greatest problem is hiring personnel in the lower grades who have any knowledge of surveying. Higher grades would help. The greatest problem is hiring personnel in the GS-5 to GS-7 level positions who have any knowledge of hydrographic surveying. (Portland)

Personnel and contract services continue to be the major managerial problems. The higher graded field positions are very difficult to fill. The grade structure, travel requirements, and experience requirements limit the number of candidates available. Additionally, about half of the office positions in Survey Section require a complete understanding of field surveys. In the past the field forces have provided a source of experienced survey personnel to fill these positions. As a result of the past reductions in field personnel, the quality of the candidates available to fill those office positions has suffered. Historically, the field survey positions tend to be difficult to fill and therefore remain vacant an inordinate period of time. The turnover rate and time required to fill vacant positions contribute to the problems involved in managing the field survey effort. For example, a request to fill a vacant GS-7 survey position (Crew Chief) was submitted to the personnel office. The position was advertised and no qualified applicants were found. A register of applicants was requested and received from OPM. All applicants on the register declined the position. Outside hiring authority was requested from OPM. The request was denied; however, OPM opened the register for additional applicants. OPM certified one additional applicant. This applicant also declined the position. OPM is now recruiting additional applicants. (Ft. Worth)

In light of the manpower reduction and the lower priority placed on in-house surveying positions, it is becoming increasingly difficult to recruit new talent with the potential to fulfill the capabilities of those experienced personnel who are retiring or leaving the Corps. Existing surveying organizations must maintain an experienced core group of people to assure proper management and quality control of the significant (multimillion) contract surveying and mapping program. To effectively monitor this growing program, about 20% of the contracted manpower capability is needed in-house.

Attracting well qualified surveying and mapping professionals will require, not only adequate monetary compensation, other kinds of professional development and psychic income opportunities. To this end, the evolution of the Survey Engineer must be recognized as a vital and necessary in-house capability for the Corps. Promoting this kind of

in-house professional development through inclusion of professional survey personnel in the Corps Advanced Study Program would be a demonstrative step exemplifying Corps recognition, support, and development of this critically needed capability. (NCD)

#### LOW GRADE & PAY LEVELS (GENERAL)

At present pay levels, it is most difficult to attract registered surveyors who, in cases of property and boundary disputes, could save the Government millions of dollars by being expert witnesses. (Baltimore)

The biggest problem facing the Districts is securing and keeping capable personnel. This problem is related to the pay status of personnel. (ORD)

Some upgrading of technicians to higher levels of responsibility have been accomplished, partially offsetting the loss of engineers. This is desirable in some instances; barely tolerable in others. (St. Louis)

Potential for promotion for all positions are non-existent. Expertise required in all positions should produce higher grades. The lack of higher grades constantly frustrates and ruins individuals incentive to push on even though they enjoy their work. (Portland)

The complexity of today's survey technology and the subsequent personnel expertise and responsibilities must be recognized. The grade structures of survey organizations should reflect the requirements if a capable, stable work-force is to be maintained. (Philadelphia)

Upward mobility opportunities within and outside the S&M element are limited. If a technician is at or above the GS-5 level, cross-over to another technical area is nearly impossible without a cut in grade level. (Seattle)

The Corps of Engineers must place more emphasis on the surveying and mapping program and upgrade pay levels in order to attract and maintain qualified people. (Huntington)

The updating and incorporating state-of-the-art equipment has not been a major problem. Obtaining grade levels high enough to attract qualified personnel to operate the equipment is paramount. (Mobile)

Promotions are nearly non-existent. When OPM and Corps of Engineers recognize other professions such as surveying and adjust the pay accordingly, most of these problems will be solved. (Portland)

The Corps of Engineer along with private industry should feel the need to upgrade the surveying and mapping profession to attract more professional and qualified applicants. More promotion potential for present employees would produce a more stable working environment. (Nashville)

Inadequate grade structure is a problem. (St. Paul)

It seems that a moral problem exists among personnel of the survey section due to a low grade structure. Due to low wages, hiring of experienced survey aids or technicians is practically impossible. (POD)

The concept of a survey party consisting of a part chief, instrumentmen, rodmen and chainmen is also completely outdated and restricts grade levels and opportunity for advance. (Chicago)

#### LOW GRADE & PAY LEVELS (COMPARED TO OTHER FUNCTIONS)

The surveying field in general is low graded in the Corps of Engineers, dating back to the early river days when surveying was mostly rough construction layout on the rivers. In my opinion, the surveying field has been used to hold down the average grade. The Surveying Technician series is one grade below other technical series. Most, if not all surveying job descriptions are under graded. In most cases, the job description evaluated under the Civil Engineering Technician series would come out one grade higher. (Kansas City)

Traditionally, and at all levels, grades of employees engaged in surveying and mapping in the Survey Branch have been the lowest in the Vicksburg District, resulting in considerable turnover, limited promotion potential and some morale problems. (Vicksburg)

Grade level is a major problem associated with surveying and mapping personnel. A comparison with personnel in other elements within the Corps with similar levels of technical competence and responsibility reveals a discrepancy. Surveying and mapping personnel appear to be rated at least one grade below other areas. This holds true for nearly the full spectrum of positions from the Branch Chief down to members of survey parties. For example, the responsibilities of Branch Chief (now a GS-12) should warrant a GS-13 level, a Party Chief (now a GS-7) should warrant a GS-9. (Louisville)

Problems exist in the grades of survey personnel, including both field and office personnel. The grades for most survey personnel, especially those in supervisory positions, are lower than positions in other divisions and branches with less responsibility. This is usually attributed to the "standards". However, it is felt by most survey personnel that they are used as "shock absorbers" to cushion the overall grade average. This is not unique to Philadelphia but is the consensus of nearly every district. In spite of efforts over the years to resolve these legitimate problems, Personnel Offices continue to ignore them and no progress has been made. (Philadelphia)

Throughout the past, the grade structure for survey personnel has consistently been below that for other technicians. With the advent of sophisticated electronic instruments, computers, plotters, etc., for use in surveying related activities, there is a definite need for higher grades to attract and retain qualified and competent surveying personnel. (Memphis)

Command emphasis is being given at higher District echelons to personnel and resource problems. (Galveston)

Grades are generally too low to attract trained personnel. (Portland)

#### LOW GRADES & PAY LEVELS (COMPARED TO PRIVATE SECTOR)

Survey Party Chiefs and Instrument Operators when compared with their counterparts in A/E firms and union construction forces are ranked lower in many professional and economic respects by the Government. In addition there is very little monetary recognition to these people for being away from their families and homes for four nights and five days a week on almost a continuous basis. Endeavors normal to most people such as their children's functions, church interests, community interests, night school attendance are virtually eliminated. (Pittsburgh)

Pay levels are too low to attract experienced surveyors.

Example:

Corps of Engineers Party Chief, GS-8=21,875 per yr.

=10.52 per hr.

Int'l Union of Operating Engineers =15.48 per hr.

This leaves us with the option of hiring young, inexperienced surveying aids, training them for a few years, hoping that they will choose a career as a government surveyor. Very few do so. As soon as they get a little experience they leave the Corps to take better paying jobs elsewhere. Higher grades are most definitely needed. (Los Angeles)

It is redundant to observe that pay scales for surveyors in the Corps suffer by comparison with the private sector. The difficulties inherent in this situation are compounded by the fact that surveyors occupy GS positions. The GS pay schedules suffer by comparison with WG wage rates. (New Orleans)

Pay levels of survey personnel are low compared with salaries paid by private business in this geographical area. Recruiting qualified survey personnel is hampered by this fact. (San Francisco)

Although several universities throughout the area and nation graduate personnel in Surveying and Mapping field, the archaic OPM Position Classification Standards, and required entry level into government service, do not offer sufficient pay or advancement to attract these persons. Of the three persons the District attempted to recruit in the past three years, industries starting salary was 70-100% higher than that of the Corps of Engineers. Other Federal Agencies have Party Chiefs in the GS-9 to GS-11 grades where the Corps Party Chiefs generally range from GS-5 to GS-7. Only with an extremely difficult job and much paperwork do Corps of Engineers Party Chiefs rise above the GS-7 level. (Mobile)

The pay level of Government Survey Technicians is considerable below similar jobs in private industry and below Government wage board labor

rates for jobs requiring other similar types of technical knowledges. In the Chicago area it is extremely difficult to hire competent survey personnel. (Chicago)



## TRAINING

### GENERAL COMMENTS

Technical and Management training is needed at all levels both in the office and field. A large majority of personnel have only on-the-job training which has been handed down without refinement by some formal training. Only a small minority of the surveying and mapping personnel take advantage of the limited formal training afforded them. Personnel do not feel that the effort required in these courses will in any way enhance their ability to progress past the low GS grade level set for the top of their classification. For the Corps of Engineers to adequately accomplish its mission in the surveying and mapping area, it must make a commitment to train and recruit technically qualified personnel. (Mobile)

As the State-of-the-Art requires, training must be current and made available at the technician and management levels. Seminars by ASP, ACSM, and Remot Sensing by OCE and other technical agencies are essential to assist the profession. Uniform training must be maintained by OCE to effectively administer the survey and mapping program within the Corps of Engineer. (Huntington)

Training classes for field personnel are very hard to make. This is due to being understaffed and a large percentage of our work being out of town. It's a problem we have to live with and do the best we can. (Savannah)

We have attempted to send our field surveyors to training sessions at various times. Sometimes we are stopped by travel restrictions and sometimes we are stopped by a heavy workload and not enough people to handle it. (Los Angeles)

Training schedule lead time is a major detriment to finding suitable courses at suitable locations a year or more in advance. (Rock Island)

Training for S&M personnel must receive a higher priority. At the present time, they have a low district priority and they are the first to be cancelled when travel restrictions are imposed. (Seattle)

The record indicates that field personnel have fewer opportunities to attend training courses than office personnel. One reason seems to be that the field personnel cannot be spared the time to attend without production loss to the office; whereas, office personnel seem to be spared with less loss to production. (Charleston)

Operations personnel need training in hydrographic surveys. Nominees for course at WES are bumped from the list. Preference is given to someone located in a Survey Branch. (ORD)

We have been trying unsuccessfully to get the hydrographic survey training at WES for all of our employees. Nominee is usually bumped from the list by someone actually located in the primary survey section. (Huntington)

### EXISTING TRAINING IS ADEQUATE

The following OCE sponsored training has been very practical and useful: (1) A/E Contracting Procedures and Negotiations (2) Field Survey Techniques (3) Hydrographic Survey Techniques and (4) Photogrammetric and Remote Sensing Courses. (Pittsburg)

Training is available at local universities and trade schools and on the job. (New Orleans)

Most of the training is on the job. However, various courses offered by the Corps and private business provide the necessary training to adequately perform the work required. (Albuquerque)

Personnel in the GS-5 thru GS-7 grades have attended the hydrographic survey class conducted by WES. Many personnel attend university night classes to further their knowledge in the field of surveying, while others require the normal on-the-job training. (POD)

State-of-the-Art equipment is available and all advanced training is available and utilized by the Survey Branch. (Portland)

Most training is conducted in-house, on-the-job. Survey personnel are scheduled, as required, for OCE sponsored courses offered by WES in hydrographic survey work and ETL courses in precise surveying. In addition, personnel are encouraged to participate in correspondence courses offered by the Army Engineer School, Fort Belvoir. (Philadelphia)

Training is provided for branch personnel in the technical and management field. Also, individuals obtain training on their own through correspondence and local colleges. This training does reflect in their performance. Six of seven photogrammetry personnel have college degrees: two have masters degrees, one has graduate credit. Six members have taken self-improvement evening courses in the cartographic or related fields. Federal training (OPM) in other related scientific and engineering fields should be more accessible to cartographers. (Portland)

As our Survey Branch workforce has evolved from hired labor to contract, the operating element has had to adjust and train employees, not only in surveying and mapping, but in the art of tactful communication with a work force that is non-Government. Overall training methods are good. (Vicksburg)

We have had success in obtaining training in procurement, contracting, and hydrographic surveying for some employees. (Rock Island)

Upper grade field employees have received sufficient training from government sponsored and private enterprise (equipment manufacturers) training courses. Over the past two years we have managed to sufficiently train our key personnel. (Savannah)

## EXISTING TRAINING IS NOT ADEQUATE

Most OCE established training programs geared towards surveying and mapping personnel apparently do not accomplish their desired goals. This is based on debriefings of returning personnel from these sessions. The most applicable training programs are those sponsored by equipment manufacturer and approval for these course is often more difficult to obtain. Higher level, more technically structured courses in surveying, programming, mapping, geodesy, and photogrammetry are non-existent. This excludes "elementary" courses for non-S&M engineers. (Jacksonville)

There are few opportunities for formal training of the lower or intermediate levels for surveying personnel. It is possible that an individual could advance to the position of party chief without ever having attended a Corps-sponsored training course. Due to the travel requirement, it is almost impossible to send lower-grade personnel to locally available technical schools. The only training available is on-the-job training and correspondence courses, which are somewhat outdated. Limited training opportunities have been offered by WES, ETL or Corps-sponsored training courses. (Charleston)

The school training available may not necessarily apply to the type of modern electronic equipment being used by the District. Surveying techniques have been advanced by adapting modern electronic equipment such as the EDM's. No formal schooling is required to operate this type of equipment. (Galveston)

Not much training opportunity is available relating to hydrographic surveys, OCE sponsors one course. Training is available to agencies who purchase electronic equipment from Motorola, Inc. This training has been very helpful in providing the knowledges and skills required for the operation of electronic surveying equipment. (NED)

Survey equipment and methods have changed so drastically, training courses and conferences are most necessary when available to us. (Walla Walla)

Except for on-the-job training, there are few effective training mechanisms available to survey personnel. (New Orleans)

Survey Section personnel are hired as GS 2 or 3 and receive training under higher grade party members, including the party chief. Seldom are outside courses or training available. To perform well and advance in surveying, training courses should be established at all grades. (Baltimore)

We have been unable to find sufficient Government sponsored technical training for GS-5 to GS-9 level technicians. (Rock Island)

There is a lack of support by management and training officer to secure the needed suitable training for personnel. (Detroit)

### LOWER GRADE TRAINING

Corps of Engineers sponsored courses which teach the fundamentals of surveying is needed for lower grade technicians to supplement their on the job training. (Norfolk)

A course should be developed for lower grade personnel so that the party chief would not have to spend his time teaching basics. This could be correspondence. A course has been developed by WES which imparts a great deal of information to supervisory personnel. Training in technical aspects of the job are presently on-the-job or informal classes instructed by the first line supervisor. (Portland)

Training, especially for the lower grade levels, is limited to OJT or correspondence courses. This type of training seldom fulfills the need for the employee or the employer. "Hands on" training that will quickly provide the employee with the basic skills and knowledge to adequately perform his duties and responsibilities is needed. This would also greatly improve the efficiency and capability of the respective S&M unit. (Seattle)

There is a definite need for technical training. A Corps sponsored training program would help beginners to better understand technical procedures. The available training is limited to workshops sponsored by various surveying organizations. However, these are not intended for the beginning surveyor. (Tulsa)

The only real technical training we have available is provided by workshops sponsored by ACSM and local professional survey organizations. One exception to this is the Hydrographic Survey Training Course sponsored by OCE and WES. Traditionally, most surveyors learn by on-the-job training which may or may not provide real technical information as to why of certain procedures. Generally this type training just provides the how to do certain functions and hampers the employees total understanding of the work. It is recommended that the Corps sponsor training for beginning surveyors who demonstrate the ability to become instrumentmen, party chiefs, and ultimately registered professional land surveyors. (Little Rock)

### SPECIFIC TRAINING REQUIREMENTS

For the most part, training for Survey Section personnel is limited to on-the-job training. Several section personnel have attended the Corps sponsored biennial course entitled "Field Survey Techniques" sponsored by USAETL. It is recommended that this course be continued and possibly be redesigned into two courses, one for field survey personnel and another for S&M managers and administrators. (Ft. Worth)

Additional training is needed on precise monitoring of movement on large dam and locks. We suggest including data that will permit the use of very simple field methods for monitoring and measuring movements. Districts recommend the following courses: A/E Contracting Procedures

and Negotiation, Field Survey Techniques, Hydrographic Survey Techniques, and Photogrammetric and Remote Sensing Courses. (ORD) Specific areas of training requirements for both office and field personnel: Monumentation and Deformation Surveys of Existing Structures (1st Order Surveying Practices, Triangulation, Trilateration, etc.), Photogrammetric Mapping Procedures and Techniques, Hydrographic Surveying and State Plane Coordinate Systems Computations. The Nashville District continues its endeavors to maintain State of the Art Expertise in Surveying and Mapping. As the need for precise and sophisticated surveys continue, seminars and workshops by different agencies must be made available for survey personnel. (Nashville)

Required Training: Training in photogrammetry at all grade levels, Contract management GS-8 and GS-10 level and Annual State-of-the-Art Conferences. We are presently setting up a local course in photogrammetric mapping. In general, we should take advantage of commercial demonstrations. (St. Paul)

Management should receive increased emphasis at all levels. Additional training in this field could improve the utilization of time, money, and manpower resources. (Louisville)

In the Nashville District the majority of Hydrographic Surveying and all Photogrammetric Mapping is handled by A-E contract. There is a need to implement a training program for current survey personnel to familiarize themselves with State-of-the-Art Equipment presently used in these areas. The benefits of the training would be twofold: (1) a better understanding of current practices and equipment would produce a more thorough cost analysis and time requirements for negotiation of contracts and work orders; and (2) better inspection and control of contract work. The use of State-of-the-Art Equipment (Theodolites, Electronics Distance Measuring Equipment, etc.) in the production of field surveying work. (Nashville)

Specialized training courses designed specifically for surveying and mapping personnel who perform field and office functions using state-of-the-art automated systems is needed to improve the district capability. (Norfolk)

Generalized training of methods, techniques, and new technologic developments would prove beneficial to the project managers and civil engineers involved in contract management of surveying and mapping investigations. (Baltimore)

Required training: Grades GS-9 to GS-12, supervisory and mid management training, grades GS-8 to GS-11 (supervisory), advanced technical training in trilateration and other high order surveys, grades GS-3 and GS-4, basis math and survey courses, and grades GS-5 and GS-6, advanced survey techniques course. Courses have generally been made available, largely through our own efforts. Training has not been one of our major problems. Funding may become a problem. (Portland)

There is a strong need to know the nomenclature of both aerial photography and the products that can be derived from it. The greatest need is for various levels of civil engineers. (Detroit)

Required training has been especially well managed and effective over the past few years, thanks to OCE, ETL, WES, etc. The District's level of knowledge in aerial photogrammetry may require some upgrading through training within a few years. (St. Louis)

Lack of personnel trained in photogrammetry and lack of available training in photogrammetry and aerial photography is a continuing problem. (Omaha)

More training could be helpful in state-of-the-art technology, including remote sensing, for both working level and managerial personnel. (Philadelphia)

The only required training I know of is supervisory training courses. The hydrographic survey conferences, the field survey techniques workshops, and the hydrographic surveying course at WES are the first and only training offered by the Corps in the Surveying field and are a big improvement and a step in the right direction. Our field survey parties travel constantly over an area encompassing parts of five states. The only training possible is on-the-job and correspondence courses. They cannot attend night school as they are away from Kansas City 4 nights a week. The above mentioned workshops, conferences, and the course at WES provide an opportunity to send some personnel for training. It would be great if the Corps would set up similar 2 or 3 week courses on computations, instrument operation, land surveying, etc. (Kansas City)

For the most part, lower grade personnel hired for survey work lack the experience, education, and ability to progress rapidly in the field. Other than on-the-job training, there are no provisions for providing the theory that must accompany the practice to develop the thought processes in surveying. Office positions are usually of higher level and therefore, can be filled with personnel with better surveying and mathematical experience. The hydrographic autocarta equipment requires formal training and much field practice. The school training available at WES focused on a different type of unit than owned by Galveston. Additionally, other factors limiting OJT opportunities on the autocarta system are: (1) Survey personnel are reluctant to use system to its potential because the boat containing the equipment is too small and poses a safety hazard when used in other than calm, Gulf Coast waters, (2) size of the working area limits the number of personnel onboard, and (3) the irregularity of the hydrographic workload. Opportunities for additional proponent sponsored training are being explored in hydrographic work, remote sensing, etc. In addition to OJT of lower grade personnel by the Party Chief, opportunities for more formalized training through Survey Branch assets and/or correspondence courses are being explored. (Galveston)

Today's technological advances dicate that survey personnel be better trained in a variety of both old and new skills. In order to utilize personnel capabilities to the fullest practical extent, it is necessary for all personnel to be capable to perform the duties of any other person on the survey party. (Philadelphia)

## CONTRACTING

### POLICY (IN-HOUSE VS. CONTRACT)

There is a lack of uniformity in determining the amount of work that must go to A/E firms. Such a variable policy keeps survey and mapping personnel in a quandry with respect to their work and their job status. Management needs to establish a uniform policy on the use of A/E forces. (ORD)

Each District is an individual case as far as determination of proper percentage of work to contract out without sacrificing quality, flexibility, and cost effectiveness. Externally imposed percentages may be technically unjustified and could have harmful effects. (St. Louis)

A-E contracts are used to obtain the various types of surveys whenever in-house forces cannot meet required deadline due to heavy workload. The Chief of the Survey Section spends about 85% of his time preparing the scope of work and negotiating the contacts. (POD)

The general trend over the past 10 years has been to contract out more and more work and constantly decrease the number of in-house personnel. As the workload has increased, our staff has steadily decreased. Contract surveys are very expensive, costing 2 1/2 to 3 times what it would cost to do the work in-house, and you still do not get exactly what you want. At best, you get a useable product. In nearly every case, you must train the contract personnel from the ground up. Most jobs we contract out are large jobs covering a large area, involving geodetic control, travel, extensive reconnaissance and planning, and use of state plane coordinate systems. Most contract survey firms are experienced in construction layout surveys in small areas. A lot of the type of work we do is done only by Government agencies and the only contractors you find with this type of experience have done work for other Districts or other Government agencies. In addition, when you complete a contract job, you have trained personnel for the contractor and must then begin again with a new contractor and go through the same training process. (Kansas City)

In the immediate future it appears, because of Administrative cutbacks, that our survey workforce will be reduced approximately 50% (from 4 to 2 parties) and surveys for dredging contracts and condition surveys will have to be contracted out. At the present time we have one GS-11 utilizing about 50% of his time in negotiating contracts and about 50% of his time preparing plans and specifications for dredging contracts. With the anticipated reduction in staff and corresponding increase in the FY 82 and FY 83 Operations and Maintenance workload, it is expected that approximately \$500,000 to \$750,000 of dredging and condition surveys will have to be contracted. Three people will be required to adequately prepare, negotiate and monitor survey contracts. Under our current procedures construction work receives priority attention. Consequently, with one exception, all dredging surveys have been done with in-house forces. The only hydrographic surveys contracted



are condition surveys which are not as critical and do not bear the same consequences as construction surveys. The one construction contract awarded to an A-E is presently underway. This contract has created considerable problems and a possible claim by the contractor because of surveying and/or plotting errors. In addition to the latter, we discourage the use of contractor surveys for construction contracts for the following other reasons:

Liability - This is a prime factor. We are responsible for clear and safe passage over waterways following dredging. Depths are reported to NOAA and USCG for navigation purposes. Should surveys be in error and a vessel hits bottom, we would bear the liability - which could be significant.

Conflict of Interest - There are often big dollars at stake when computing quantities. While it's not professionally ethical to question the integrity of a firm, the financial temptation and pressure for completing a project could easily lend themselves to modifying survey data.

Uniformity of Surveys - The majority of pre-dredge surveys are, in fact, the specification surveys. Specification surveys are precontract and are usually performed by our forces. If the contract were to conduct after-dredging surveys, a conflict could result between the pre (or spec) and after dredge surveys. By having one source conduct both surveys - and progress surveys if necessary - any potential conflict can be reconciled.

Flexibility - Our ability for quick response would be dampened because of the contractual nature and related administrative requirements. Under present procedures, should a localized problem develop, e.g., a questionable shoal area, we have the flexibility to react immediately by sending a crew to check the area. This short response time can be an important factor.

Quality of Product - Several years ago, very little hydrographic expertise was available. More firms have since developed capabilities with the advent of the automated systems and potential workloads. A comfortable level of confidence, however, has not been realized. We have experienced errors in some of our A-E surveys.

Erosion of Expertis. - While perhaps overlooked, this dimension is essential to the Corps. Reliance on outside firms tends to push us toward reviewers rather than doers. The expertise gained from doing is much deeper and broader than that realized thru reviewing. When the time comes for the Corps to react to emergency situations, our response could be shallower and more tenuous. The basic tenets of the Corps are strained. (NED)

## PROCEDURES

Contracting policies & procedures are obscure and confusing. If we are to rely more on contract survey parties we must train people in contract negotiating and administration. Contracting policies and procedures are far too complicated for this work. Since contracting may be the way of the future, simpler procedures must be developed. Because of the procedures involved in hiring architect-engineer firms, it is impossible to meet these short time frame emergency survey requirements by the use of architect-engineer contracts. (Portland)

Although a fair measure of success has been achieved in contracting for S&M services, the procurement procedures are still too long and unwidely. (St. Louis)

The area of greatest concern is the trend to low bid for surveying and mapping contracts. To maintain professionalism and to continue to receive the highest quality product, the Nashville District emphatically believes that negotiations with qualified firms for surveying and mapping must be continued. (Nashville)

There is a lack of coherent Corps wide policy on procurement of professional services that are needed to meet the missions of the organization. There is a lack of support Corps wide to assist in the preparation and execution of contracting for highly specialized surveys. (Detroit)

A recent problem has been the indecision at higher levels as to the method to be used to procure surveying services. (Charleston)

There is a need within the Corps to standardize, to the maximum extent possible, the contracting procedures. Even though we are all working under the same guidelines and regulations we often hear the comment, "that's not the way they do it in X District". This creates a problem especially when the two Districts are within the same Division. (Little Rock)

Recent procurement guidance indicates that future S&M contracts will be obtained by competitive negotiation rather than the conventional A-E selection process. Although, the procedure has been untested in the Seattle District, there is evidence that it is a failure in other Government agencies. Work delays and inferior products are common. (Seattle)

Contracts for Surveys and Mapping should be negotiated, not procured by bid. This is the stated policy of the American Congress on Surveying and Mapping as shown on the attached letter from the Executive Director, A.C.S.M. (Los Angeles)

In the past we have been able to obtain quality work at a fair and reasonable cost to the Government by negotiating AE Contracts for surveying and mapping. If we are forced into low bid process, it is felt that in the long term our integrity and engineering excellence will suffer and this action will pave the way for low bidding of all engineering within the Corps of Engineers. (Huntington)

Contract survey services are apparently being obtained by a variety of methods in the various districts. Fast Worth Distirct has interpreted EC 1180-1-171 to require competitive bid procedures for acquiring contract services. We are in the process of awarding four per diem type survey contracts to the low bidder. Apparently other districts are obtaining survey services by other methods. A listing of the various contractual methods used by the districts and their evaluation of the method used would be of value to the S&M Managers. (Ft Worth)

The majority of the surveying work performed in the Memphis District is done by contract. Recently there has been a change from A-E type contracts to Competitive Negotiation Procurement (DAR Chapter III). During this transition, numerous questions and problems have arisen concerning proper contractual procedure and methodology. Based on this experience, there appears to be definite need for more clear-cut guidance on methodology for procurement under the Competitive Negotiation method so that all Divisions/Districts can use similar proceedings. (Memphis)

A major problem is the present contracting procedures which make it difficult and expensive to obtain and execute a contract. Contracting survey work out of A/E firms increases the cost of the work from 25% (small jobs) to 15% (large jobs) to cover administrative, coordination and verification (survey checks) costs. Since the majority of mapping is developed by contract, state-of-the-art advancements are incorporated at the discretion of the A/E, unless specific needs are specified in the contract. Unless S&M contracts can, when necessary, be awarded through the A/E selection process rather than by competitive (non-professional) bidding, the incorporation of new techniques and equipment can be stifled. The "low-bidder" invariably relies primarily upon traditional methods rather than newer methodologies, which although slightly more costly, may produce a better and more useful product. The principal problem at the present time appears to be the requirement to advertise bid for survey work to be performed by A/E. Even with the negotiated bid type of procurement, restrictions are placed upon managers which inhibit the ability to get work accomplished within reasonable time frames. It is also felt that the requirement to bid for survey services degrades the professional status of the surveyor, who is just as much a professional as an engineer, perhaps more so in view of the technological advances which have occurred in surveying over the past decade. These advances have surpassed the advances made in engineering over the last century. (Philadelphia)

Contracting policies for surveying are too time consuming and do not permit obtaining surveys in a timely manner. For example, to procure topographic surveys for a project takes up to three months unless included in an existing open-ended A-E contract. Managerial/-Administrative - Paper work requirements for contract could "best" be handled by contract personnel with input provided by the project manager/civil engineer. (Baltimore)

Contracting procedures are much too slow: 8-12 months for a contract, 3 months for a work order. Regulations are incompatible with demands Ceiling of \$25,000 per work order on Open-End Contracts are too low for the present market. (St. Paul)

Since all surveying work done by the Albuquerque District is contracted out, contracting policies are a prime concern. Our newest and biggest problem is the current policy of procuring surveying contracts by low bid. The quality of the work may suffer simply low bids. Another problem area is the "option to renew the contract" clause deleted by ER

1180-1-1 dated 1 July 1980. About the time the contractor becomes familiar with the Corps policies and procedures, his contract has expired. (Albuquerque)

There should be a greater disbursement of A/E contracts for basic field surveying. A higher ranking priority should be given to A/E firms which are an average of 2 to 4 hours drive from their office to the work site. This would eliminate excessive travel and per diem costs paid to the A/E. A review should be made as to where each District's workload will occur during the contract year and that information should be an important part of ranking the A/E if possible. Every state in our District requires a professional license to perform a legal boundary survey. I think state licensing requirements should be considered when selecting an A/E to do boundary surveys, particularly encroachment surveys. This would assure us that our boundaries are being surveyed or supervised by individuals in a firm considered competent by the state and that these surveys will withstand a day in court brought about by an adjoiner or encroacher armed with his survey which will be done and sealed by his licensed land surveyor. The same prequalification would apply to bid survey work. (Pittsburgh)

Only one Contract Clerk is available to keep all administrative accounting records of the 13-15 A/E contractors. The number of different projects encountered each year ranges from 500-600 which requires approximately 1,500 Delivery Orders (DA 1155) and 1,200 DA 4480 records. A basic computer program for contract accounting is now available but will require approximately four months to enter all back data to become operational. It is estimated that the system will be completely operational in 6-12 months. Three spaces are available to manage the 500-600 projects accomplished by contract surveys. The change in policies and procedures for acquiring surveying and mapping contracts has strained the ability of the District to accomplish its various projects. Only by unilaterally extending some of our present A/E contractors, has the District been able to maintain its contract work force. The District is preparing a request for waiver of the following provisions of EC 1180-1-171: (1) The \$250,000.00 limitation be raised to \$850,000.00. (2) The \$25,000.00 limit per work order be raised to unlimited amount of contract. (3) The requirement for use of "Work Order" (SF 30) be changed to "Delivery Order" (DA 1155). (Mobile)

Problems in managing and administering contracts relate principally to meeting time schedules when adverse weather and atmospheric conditions cause unscheduled delays. (Galveston)

A Contract Management Group (branch level) has been established within the District's Engineering Division. This is also potentially beneficial to contracting for S&M activities. (St. Louis)

States in ORD require a professional surveyor licensed in that state for cadastral surveys. This licensing requirement should be included in our selection procedures when cadastral surveys are involved. Top

management emphasis on obtaining A/E's through a bidding process is causing problems we need to reexamine the A/E selection process and give a priority to A/E firms within a 2 to 4 hour drive of the work site. (ORD)

The government should streamline the procedure for placing A/E contracts with minority firms under Section 8a. (Pittsburgh)

#### CONTRACTOR PERFORMANCE & CAPABILITIES

Assuring the accuracy of work provided by A/E firms is a big problem. There is neither universal recognition nor universal appreciation of this problem. (ORD)

Verification of contractor effort in connection with photogrammetric contracts is highly desirable. (Jacksonville)

You never get what you want, but if you monitor the work closely through field supervision and inspection, you can get a useable end result. In the end, you hopefully have some useable data and the contractor has some trained personnel. Resulting data from use of contract surveying has been improved in this District through the use of field supervisors monitoring the contractors work constantly and development of detailed specifications on what you want, how it is to be done, field note format, etc. (Kansas City)

In the past few years the quality of surveys performed has gone down due to use of contractors. Surveying firms have more of a problem with turnover of personnel than the Corps. The Corps has not had the personnel to check on contract work. (Charleston)

Each of the 6 contractors currently providing survey services through negotiated contracts have a great deal of experience with the unique survey requirements of the Corps. By changing to competitive bid-type contracts, we will most likely obtain contractors unfamiliar with district survey requirements. This will put an additional burden on our already inadequate field staff. (Ft. Worth)

Due to the ICP dredging program, hydrographic surveying services were obtained by A-E contract procedures. This procedure required the contractor to perform timely dredging acceptance surveys with highly technical, computerized equipment. The administration of such a contract was difficult due to performing dredging for unit price payment versus rental or hired labor. Also, only a few contractors had the capability to perform surveying with state-of-the-art equipment. With these restraints, inspecting, and administering this type of contract was very difficult. (Memphis)

The Lafayette and New Orleans Area Offices each have one Government survey party with no apparent problem areas. The remaining survey requirements are performed by A-E contracts. Some A-E firms provide excellent survey capabilities; others are poor. In time, the poor firms will probably be "weeded" out of the bidding process. During the heavy

construction season, even the excellent A-E firms are often overtaxed to the point where less than superior survey results are attained. This, however, is expected when more survey parties are utilized than the contract requires. The Shreveport Area Office's survey requirements are performed by A-E contracts. Ideally, all survey requirements should be performed with Government personnel as in the past. Government survey parties learn their jobs through experience, whereas A-E personnel are not "on board" a sufficient length of time to learn Government policies and procedures. The greatest problem with contracting-out is personnel inexperienced in what the Government desires as the end product. (New Orleans)

## TECHNICAL

### GENERAL COMMENTS

There is a great need to monitor equipment and technical advancements and to maintain expertise in all areas of surveying and mapping. (Nashville)

Many surveyors and mappers are comfortable with dated procedures and are not enthusiastic in applying new advancements. (Louisville)

Computers have been used by the branch for about 20 years. Automated hydrographic survey systems and electronic calculators and distance measuring devices have been in use for nearly 10 years. Contracting for automated hydrographic survey services has been quite successful over the past few years. A couple of years of experience has been gained in geodolite precision measurements. Work is now proceeding toward gaining interactive graphics system capability. (St. Louis)

Much advancement and improvement has been made in angle measuring equipment, distance measuring equipment and overall know how. New electronic theodolites, EDM's and computers have revolutionized the surveying industry. (Portland)

Seattle District has been fortunate in being able to update and incorporate the latest state-of-the-art advances in all S&M functions. (Seattle)

Most of our technical guidance is derived from the Engineer Topographic Laboratory (ETL) or from the American Congress on Surveying and Mapping (ACSM). (Tulsa)

No more than normal workaday problem situations exist with improvement to techniques and equipment. No special guidance appears to be needed. (St. Louis)

Technical advancement, improvement, and guidance is readily available and appears to offer no problems at this time. (Baltimore)

The contractor's desire to stay competitive has forced him to keep abreast with state of the art advancements. This directly affects all contracted surveying work within the Albuquerque District. Problems can arise when the state-of-the-art advancements are proposed to the Corps for the first time. Caution must be exercised by the Corps to be certain that the data obtained is the accuracy desired. (Albuquerque)

Additional time and effort is required to reset horizontal and vertical control destroyed as a result of vandalism, and to adjust to changing field conditions due to high rate of development in coastal urban areas. Corps of Engineers guide specs, manuals and training programs have not been updated nor have professional societies performed their function in establishing criteria and standards for performing and/or checking, surveying, and mapping work. (Galveston)

## EQUIPMENT

Consolidation and standardization of state-of-the-art equipment and systems used in surveying and mapping is needed to reduce duplication of effort and improve the interchange of information and technics related to district capabilities. (Norfolk)

The tools of the trade for both surveying and mapping have changed drastically over the past few years due to the adaptation of electronic technology to these fields. The guiding source of information available to the prospective buyer/user is a sales pitch or a company-prepared brochure. The problem is that the systems are so complex that field personnel simply do not know what factors should be evaluated nor how to evaluate them. This is true in the equipment selection for both hydrographic and topographic surveying. We should evaluate new equipment at a central point, and provide some general information to the field as to its capabilities, strong and weak points. (Charleston)

The process of updating and incorporating state of the art advancements and/or utilizing currently developed routines and practices from other Corps sources are dependent on the willingness of the several disciplines to work together towards one common goal. Each District is probably of the opinion that they are currently utilizing the most efficient approach and equipment. Fragmentation and duplication of effort is currently the rule rather than the exception. Since the inception of "automated" survey equipment, the primary emphasis has been placed on field equipment. Little thought, and little or no intradistrict cooperation have prevented full utilization of field data in most of the Corps' Districts. Automation should include inhouse mapping, quantity estimates, cross section plots, coordinate geometry computations as well as field survey equipment and techniques. A single unified approach will produce a workable survey system, as has been demonstrated by this District. (Wilmington)

Awarding of computer software contracts to low bidders who have no expertise in the field of Hydrographic Surveys creates problems. There should be an on going program of updating surveying equipment, software, and survey boats. In the past 10 years the gathering of survey data in the field has progressed from 10 line miles per hour to 25 with half the personnel. (Portland)

Incorporating State-of-the-Art advancements is usually limited to updating conventional techniques and equipment as a result of limited personnel capabilities, unless formal training opportunities are provided. Distributors of sophisticated electronic equipment are not always reliable trouble-shooters. (Galveston)

We have the Del Norte Electronic Hydrographic Positioning System. The greatest difficulty with this system is constant malfunction of the equipment. This necessitates either sending the malfunctioning equipment to the factory at Euless, Texas or requesting an electronics expert to come to Los Angeles to make repairs. The resultant downtime is costly. In most cases we complete the survey by conventional methods, i.e., a



transit and radios for alignment of the boat and planetable and alidade to cut in the position on the rangeline. (Los Angeles)

Procurement of equipment is nearly outdated before procurement is possible. (Detroit)

One of the biggest problem areas is in the procurement of more advanced equipment, particularly computer type equipment. We have definite needs but are not able to purchase the desired equipment because of the purchasing moratorium placed on equipment of this type. (Memphis)

We had very long delays purchasing new equipment because of Plant Replacement and Improvement Program constraints. (NED)

In-house studies have indicated that an automated drafting system would be cost effective. However, before the Engineering Division can purchase such equipment, the Corps ADP chain must approve both the justification and the purchase, and Operations Division must include funds in the PRIP funds system. It seems that Engineering Division should have more control over their own operations. Many survey problems are traceable to old floating plant. Boat breakdowns are frequent since boats are old and keeping them operational is very difficult, yet funds for new equipment are very limited. (New Orleans)

There is a major problem of lack of space for equipment. We try to make state-of-the-art equipment available and attendance at related seminars/classes is encouraged. We are unable to set up expensive necessary equipment due to the lack of space. (Portland)

Difficulties exist in obtaining proper S&M plant installation, repair, and maintenance services, especially for survey boats and electronic equipment. Due to imposed space ceilings there is very little capability in-house for such support, and procurement from outside sources can be quite a burden under present regulations. (St. Louis)

Our in-house workload is not adequate to justify the purchase and use of the latest field equipment (total station, etc.) The use of the latest calculators, with printout capabilities, significantly reduces the time for field-note computations. (St. Paul)

With the advent of micro circuits we have probably seen more advancement in basic surveying and mapping in the last ten years than in the previous 50 years. Some of these advancements are: electronic distance measuring instruments, including the total station concept of measuring horizontal, vertical and slope distances, plus horizontal and vertical angles. This data can also be stored in memory & all at one set up of the instrument. Fully automated hydrographic survey equipment which collects, for plotting, the position and depths all time related. The system also includes navigation capability for following predetermined lines or courses; and many other advances such as computer driven

plotter, programmable calculators, photographic letter producing machines for graphic arts. The Corps has been very receptive and responsive to these advancements at the District level. We have had the opportunity to review equipment and techniques. Purchase has been authorized where need is shown. Training has been provided. (Pittsburgh)

Communication problems are frequently experienced as a result of inoperable portable radios. Factors which contribute to radio failures include poor quality batteries obtained through GSA, rough working conditions, and need for additional maintenance emphasis. Steps are being taken to improve these deficiencies by increasing emphasis in care and preventive maintenance. Plans are being made to monitor and inspect the battery situation to determine the percentage of batteries not meeting required standards. Security requirements for trisponder and other expensive electronic equipment while in the field have added to the survey manpower effort. (Galveston)

#### HYDROGRAPHIC

Enough pressure has not been placed upon the manufacturing of surveying equipment to produce equipment suited to the Corps mission. An example is in the area of automated hydrographic survey system for confined areas and rivers. Equipment is available to measure to 10 feet over 50 miles but not to 0.1 foot at 50 feet. Depths can be obtained to 30,000 feet but equipment fails in 3 feet of water. No manufacturer has attempted to develop a complete system. (Mobile)

Incorporation of automation is continuing in both the field survey operation and office processing. Continuing emphasis on application of state-of-the-art technology is necessary if the Corps of Engineers is to maintain a position of leadership in the field of hydrographic surveying. (Philadelphia)

The Wilmington District's approach to automated hydrographic surveys has, from its inception, been to acquire and process to completion our hydrographic surveys. Inhouse processing was developed in concert with the field data collection systems, and new methods were adopted to be compatible with each other. Mapping was initially completed with field depths overplotted on predrawn sheets in the District Office. Quality estimates and cross section plots were subsequently added. Later on, shore elevations and offshore profiles for beach renourishment projects were incorporated into the District's operating software. (Wilmington)

Our newly purchased automated hydrographic survey system encountered lots of "bugs" during the early stage. This was due to lack of knowledge or expertise by personnel of the survey section. However, with guidance and advice from the manufacturer and knowledgeable people in the ADP field, we have conquered most of the "bugs". It may be a while before we get perfection in the operation of the new equipment. (POD)

Recent emphasis in river mapping has been on the pool reach chart type work. Channel maintenance and operation people need the

hydrographic information found on the old surveys. These surveys need to be updated. (Huntington)

We currently have a Hastings-Raydist range-range integrated hydrographic survey system and also a Mini-Ranger III range-range system. With these two systems we are able to automate surveys in lower reaches of Savannah Harbor and large open waters. We have not experienced any problems in other type surveys that could not be solved satisfactorily.

Automated integrated hydrographic surveys have changed drastically over the last decade. Many systems are available. Pressure has been applied to fully automate. Mapping has advanced. (Savannah)

#### PHOTOGRAMMETRY

Recent acquisition of 1st and 2nd order Stereo Plotters interfaced with plotting capability has modernized and enhanced our surveying and mapping program. All field crews are current on the State-of-the-Art in photogrammetric surveys with current and modern equipment (Theodolites, Electronic Distance Meters). The Huntington District is active, maintains expertise and is anticipating acquiring an in-house analytical photogrammetric capability in the near future. Our computer background and capability is effective and adequate. (Huntington)

All Districts in ORD have and use electro-distance measurement equipment and sonic fathometer. The Louisville District has a certain amount of stereo-plotting capability. The Huntington District has a good capability in photogrammetric work. Huntington has 1st and 2nd order stereo plotters and attached digitizers plus computer capability. They plan on acquiring in-house capability to handle analytical adjustment of photogrammetric coverage. During the period 1971-1973 inclusive, the Huntington District had the Division Mapping Center of Competence. They performed photogrammetric work including aerial photography and use of the Wilde Pug machine and DBA comparator which permitted some analytical bridging work. There have been several examples in ORD where A/E contractors have produced photogrammetric mapping with large errors (Rough terrain is especially conducive to this problem). Careful reviews of field computations from A/E firms have revealed inaccuracies which are reflected in the final product. Most of the time such errors will not appear until many years later unless someone is closely checking the work. Generally, such errors become costly when they are brought to light, but field checks of photogrammetric work is time consuming and also costly. The most useful check of an A/E firm's work is to make a computerized check of field computations and a stereo-plotter check of the mapping product. Our Huntington District is the only District with this capability. Present workloads and management philosophy are not conducive to developing such capability for each District. A means should be developed to assure that A/E firms are providing each District with accurate work. (ORD)

The single most noted advancement is the use of aerial photography for taking digitized cross-sections. It is particularly useful in taking cross-sections of sedimentation and degradation ranges in lieu of conventional methods, which are expensive. Technological advancements in aerial photography are occurring daily. Surveys now conducted by conventional methods may soon be superceded by photogrammetric methods. (Albuquerque)

#### INERTIAL

The New Orleans District has not had a lot of outside help in upgrading methods and procedures. We are now attempting to demonstrate the value of inertial surveying to our program using an A-E contractor, after more than a year of fruitless attempts to obtain such assistance from within the Corps. (New Orleans)

#### STRUCTURE MONITORING

We have had reasonable success in purchasing and using state-of-the-art equipment and methods. We are particularly pleased with our program for structure monitoring, based on ETL developed methods and in-house computerized data reduction. (Rock Island)

RESEARCH AND DEVELOPMENT  
GENERAL COMMENTS AND MISC. TOPICS

Technological information exchange with others needs improving. There is a lack of technological information exchange with other agencies/firms. (Portland)

The type and amount of survey and mapping done by POD does not require R&D due to the fact that standard procedures and equipment are used to obtain the mapping. (POD)

Need exists for more involvement from the labs (ETL & WES) in district S&M activities. Their assistance and guidance in solving S&M problem areas would be most beneficial. Seattle)

Problems will continue to be recurring as in any R&D effort, but are mostly resolved at the field operating level. (Philadelphia)

Universal problems are equipment, methods and procedures to be developed and used to accomplish our mission. (Kansas City)

The U.S. Army Engineer Topographic Laboratories (ETL) at Ft. Belvoir primarily does research for the active Army. We receive their newsletter but their research is not relative to our work. (Omaha)

Advancement mainly is in electronic distance and angle measuring equipment. Advancement has been made in photogrammetric equipment. (Portland)

Development of standardized or guide specifications for S&M automated/electronic systems, for equipment acquisition or service contracts, might be helpful to the Districts. (St. Louis)

The Nashville District has worked in the past with both WES and ETL and will continue to do so in the future for R&D needs. (Nashville)

Districts do not normally perform research and development but must depend on such work by other Corps elements. In the past, it appears that we have not always been provided results that would have been useful to us. (New Orleans)

We have no problems here as we do not have the people or time required for such activities. (Los Angeles)

WES and ETL are adequate back-up for R&D. (Huntington)

Research and Development should be accomplished by industry. (NED)

Fort Worth District is not currently involved in any research and development activities directly related to surveying and mapping. (Ft. Worth)

Districts, particularly those with heavy workloads, are ill equipped to do other than identify perceived research needs. (New Orleans)

We have not had any problems in this area. We are made aware of the research and development projects being performed by ETL, WES, etc. through Corps publications. We have worked closely with WES and a private A-E firm on trilateration surveys for dam deformation studies. (Little Rock)

We have no problems here as we do not have the people or time required for such activities. However, if a research and development problem arises, such as dam monitoring, the Engineer Topographic Laboratory (ETL) is generally available for assistance. (SPD)

Our Survey Branch is principally a contract management organization. Our in-house surveying equipment includes sonic depth sounders, first-order theodolite and leveling equipment, but no electronic distance-measuring equipment (EDME), although we are in the process of purchasing an EDME. However, our present staffing is not capable of full utilization of the above equipment. Through one of our contractors, we have developed an automated surveying procedure for surveying revetment ranges on the Mississippi River that should be an improvement costwise over our present method. Also, our contractors are using trilateration procedures outlined by the U.S. Army Engineer Topographic Laboratories on our structure movement surveys. (Vicksburg)

In the past, district sponsored R&D efforts are not known to have had a direct impact on the district's surveying, mapping, and photogrammetric functions. Technology transfer has largely been effected by direct interaction with private industry instrumentation and equipment manufacturers. Numerous topics could be submitted that are applicable for R&D efforts primarily in automated hydrographic surveying, photogrammetry, and optimization of structural deformation monitoring procedures/networks. The National Geodetic Survey (NGS) has extensive geodetic data adjustment programs which would be directly applicable to the analysis of data derived from the structural monitoring program; in particular, the analysis of absolute structural deformations. (Jacksonville)

#### PRECISE MONITORING SURVEYS

Dam monitoring and instrumentation is difficult and almost impossible using the older methods of triangulation and straight line observations. I believe the Engineer Topographic Laboratories solved our problems by visiting Walla Walla District's Dworshak Dam Project. They instructed us on methods and geometry of control figure through a three-day seminar for the surveyors on the project site. Mr. Ken Robertson of ETL visited the District's Dworshak Dam Project and recommended geometric figure and methods to monitor this dam. He was excellent in his instructions and has continued to be most helpful as I consult him occasionally on our dam instrumentation programs. (Walla Walla)

Additional guidelines and techniques in the form of an EM or ETL are needed to perform surveys appropriate for monitoring concrete locks and dam on large streams. Desired accuracy levels should be given. (Louisville)

ETL has developed an instrument to measure the deformation of lock walls between the full and empty conditions. (Mobile)

ETL has developed procedures for alinement surveys. (Kansas City)

Fort Belvoir (Ken Robertson) has helped us considerable in the field of trilateration systems and the use of EDM's. (Portland)

Seattle District has developed a cost effective system to monitor structural deformation, using photogrammetric methods. The system and procedure has been successfully employed for monitoring buildings and potentially dangerous slide areas on a routine basis. The same system has also been used to measure artillery induced dust clouds for WES. (Seattle)

We have benefited greatly from: ETL demonstrations, training and equipment developments in the area of high precision capability for monitoring structural movements by surveying techniques. We utilize, where possible, the techniques and equipment advanced by ETL. It is our intention to implement more of what we have learned over the next few years. (Pittsburgh)

ETL has been very helpful in connection with precise distance measurement technology, especially geodolite. (St. Louis)

Trilateration method of precise dam movement measurements is an excellent example of research beneficial to the surveyor and the Corps. (Baltimore)

#### INERTIAL

No specific problems. It would be desirable to continue on toward achieving "black box" S&M capability, probably through inertial systems and/or earth satellite technology. (St. Louis)

Technology transfer was not ably successful in connection with the inertial surveying system (Auto-Surveyor). Huntington used this system on the Muskingum Reservoirs. Detailed surveys are showing that the inertial surveying data is very reliable. (ORD)

#### PHOTOGRAMMETRY

As part of an informal R&D exercise with a photogrammetric firm, the Philadelphia District utilized the punched-paper tape output of UTM coordinates and elevations from orthophoto production to produce digital topo/slope data as part of computer data bank construction. This process proved advantageous to the alternative of digitizing contour data for a 56 square mile study area. (Philadelphia)

Development of new computer programs for photogrammetric purposes; cooperative transfer of technological information and work load assistance with the Portland Region Forestry Service. (Portland)

#### HYDROGRAPHIC

There is a need for an automated hydrographic survey system for small rivers with increased position and depth accuracy. (Mobile)

Most problems have been solved by our research and development. Our helicopter sounding equipment is an example. We developed this totally on our own. Delay in the development of accurate wide area positioning equipment and/or passive reflector systems creates a problem. We are improving our knowledge of firms in the computer field of the requirements of the hydrographic surveyor. A growing number of firms are engaged in the development of hydrographic survey equipment. (Portland)

A survey team located in the Operations Division appears to be somewhat forgotten by most District, Division and WES staff. We frequently are left out on technology transfer. Solution would be to include CON-OPS in the process. (Huntington)

Some reaches of Savannah River have fluff areas. Dredged material at a consistency of 1100 grams per liter is reported for payment. Less dense material is considered fluff and payment is not required. Automated hydrographic survey systems and components: Which system is appropriate for local areas? Once a system and methodology is decided upon, which components (manufacturer, type, etc.) are best suited? (Savannah)

We have benefited greatly from the Hydrographic Survey Conferences and demonstrations and WES development of a small portable fully automated hydrographic survey system. We now own such a system with navigation capabilities. (Pittsburgh)

The Wilmington District has several development projects underway, all of which are related to the automated survey system. Highlights of these projects are as follows:

Marine Archaeological Surveys. A District survey system is used with a magnetometer on board a small survey vessel to generate magnetic anomalies. These are recorded in the depth position of the survey system. This survey is processed through our standard set of programs.



A map may be produced with the magnetic anomaly values plotted rather than depths. An additional program converts these readings into a format a standard control program can use, thus producing a contour map of magnetic anomalies in the area surveyed.

Development is well along the way to completion in our efforts to supply NOAA with a digital data tape of our hydrographic surveys. The digital data that is used to plot our maps are written to a magnetic tape in N.C. State Plane Coordinates and Depths. This tape is mailed to NOAA, who in turn incorporates this data into their data base for charting, and updating their coast charts.

An automated mapping program has been developed, which combines topographic survey data, digitized aerial photography data and our hydrographic data, into a total hydrographic map plot.

All of our programs are of the interactive type using programmed question and answer input and output. Operator controlled edit and display on tektronix terminal allows error correction and data verification at critical points to assure reliable, accurate, reproducible results. The total plotting of a survey map assures accuracy and scale control.

The maintenance of permanent data file programs allows historical retention and data retrieval. There are typically four types of working files: coordinates of field positions and depths, mapped cross section data, coordinates of topographic control data, and control data maps. The 5th required file is the current background map file. This file has all necessary data to plot a complete background map, upon which survey data is plotted.

District survey and ADP personnel have developed software for three-dimensional viewing of hydrographic survey data, along with a general purpose contouring program. The programs are on line, but are seldom used, because a (contouring) practical, working need has not developed.

A remote tracking duplex data link has been developed by Motorola and this office, and is currently being installed on one of our survey vessels. This data link will permit a very small boat to acquire a portion of a hydrographic survey that is conducted in areas too shallow for our regular vessel to operate in. This small boat will be the mobile portion of the survey system gathering position and depths and relaying them to the larger vessel, which acts as a fixed reference station. The computer on board the larger vessel determine the coordinates of the small boat as it moves through the area being surveyed. Position and depth data are recorded and processed through our regular survey system programs as if it was a regular survey.

The District has entered into a cooperative, cost sharing research program with Natural Aeronautics and Space Administration (NASA) to compare the effectiveness of an airborne laser survey system to conduct hydrographic surveys in the nearshore zone. Conventionally acquired hydrographic survey data collected by District floating plant is being

compared with laser data acquired by NASA. If these data compare favorable, the future possibility exists of remotely acquiring hydrographic survey data in areas where surface vessels cannot always safely operate, such as rough ocean bar channels. (Wilmington)

Hydrographic survey conferences have provided exchange of ideas, knowledge and experiences with hydrographic equipment, methods and procedures. (Kansas City)

WES has been very helpful in providing coordination and training in connection with EDM equipment and automated hydrographic survey systems. (St. Louis)

Current projects being worked on by Philadelphia District include two projects in conjunction with WES. One is the development and application of a heave, roll, pitch corrector for hydrographic surveys, the other is a passive, precise positioning and guidance system for dredging with possible survey application. Philadelphia is continuing to upgrade automated capability for hydrographic surveying in both the field surveys and the office compilation. (Philadelphia)

Savannah District has constructed and operated the WES designed tide gate structure which has eliminated a lot of the fluff problem. We have also recommended that WES re-start their fluff study research and develop a multi-frequency or whatever type necessary fathometer to show an analog clearly defining dredging material with a density of 1100 grams per liter and greater. (Savannah)

## CONSULTATION/COORDINATION

### NEWSLETTER

There is a need for District wide distribution of a newsletter to inform Corps personnel of research and development, technology assessment and transfer as it relates to the civil works field. (Philadelphia)

A newsletter dealing with new techniques would be appreciated by the Districts. (ORD)

A newsletter or other publication providing a forum of ideas from across the country could include information on new techniques to solving common problems. Such a communication could provide useful information and stimulate interest in discovering and applying new technology. A similar newsletter concerning hydrologic studies is published by the Hydrologic Engineering Center. (Louisville)

Certainly more consultation and coordination with the other districts to improve procedures, techniques, equipment, etc., would be both beneficial and welcome. Maybe some sort of monthly newsletter with input from all districts concerning new procedures, techniques, equipment, etc., that they are currently using or experimenting with, would help accomplish this. (Albuquerque)

### OTHER COMMENTS

There is very little consultation between the Los Angeles District and other Districts of the Corps. This is probably due to unique requirements in the various Districts for surveys and mapping, especially in Hydrographic Surveys. I do not feel a strong need for such consultation. (Los Angeles)

Seldom will surveys have to be coordinated with other Districts because, the major effort in surveys pertains to a project area within the District boundaries. (Baltimore)

There is a need to obtain addresses of consulting agencies and reference material that is available to improve procedures and techniques. More information is coming to this coordinator all the time. This very program is most useful in helping me state our needs and declaring some of the problems. Along this same line, the people forwarding information and requests, such as this S&M Management Study letter, don't always find the right person to respond. (Walla Walla)

### COORDINATION TO PREVENT DUPLICATION

The various Corps of Engineers Districts have varying types of survey work. Between them all, we have personnel who have a vast amount of experience and expertise in every field of surveying. Yet, until 1972, there was very little communication between districts concerning

surveying activities. Each district operated on their own and undoubtedly a great deal of time and money has been expended learning the same thing at several different places independently. (Kansas City)

Improved methods and/or techniques for routine problems are always helpful. When unusual problems develop one often wonders if he is trying to solve it in the most efficient manner and if some other district has had any experience on the same problem. With the shortage of and restraints on experienced personnel, one must keep aware of new technical advances in equipment in order to maintain an efficient program. (Huntington)

This district has had few contacts with other organizations regarding S&M activities. Such contacts would be an effective method of viewing different procedures and techniques. All S&M related activities would benefit from any inter(intra) agency consultations/ coordinations. At present, many districts seem to independently research, develop, and procure similar survey systems. In many cases, a more centralized reviewing level might eliminate redundant procurement of similar, but incompatible, systems. The present autonomous nature of S&M activities has some disadvantages in this respect. Coordination with outside agencies (USGS, NOS, etc.) is not usually beneficial in that these agencies do not engage in construction engineering related activities. Thus, their seemingly higher precision and accuracy standards are not applicable to the standards required in construction. (Jacksonville)

#### REQUIREMENTS

There is a lack of communication with most other district offices, federal and private companies with regards to improved procedures, techniques, equipment, etc. There is good co-ordination with agencies/firms in the areas of general maintenance, workload assistance, and equipment delivery. (Portland)

Consultation and coordination with other districts, divisions, OCE and other S&M agencies is minimal. (Galveston)

There is enough communication between the districts exists concerning surveys. (Albuquerque)

There is a lack of coordination and dissemination of policy and procedures between the Corps and other agencies. Separate and indefinite district actions have not been fruitful with all agencies. (Detroit)

Consultation with other districts is essentially by telephone. We have very limited access to other districts to observe how they accomplish their surveys and what equipment is used. In the past, SAD and OCE have been no help in providing guidance regarding surveying/ mapping-related problems, either technical or personnel matters. (Charleston)

Consultation and coordination with other districts, divisions, OCE, and other S&M agencies has been limited to infrequent informal contacts to determine how others were handling common problems. Improved consultations and coordination to provide for an exchange of ideas and methods would be very desirable. (Ft. Worth)

There is obviously a great need for increased interaction between Corps offices. In particular, it would seem that those engaged in developing advanced methodologies, such as ETL, could make a more effective contribution to the districts than is now the case. (New Orleans)

Field Survey and Hydrographic Workshops are excellent but they only satisfy the needs of the surveyor. Consideration should be given to sponsoring a similar meeting for all S&M activities (like geotechnical meetings). This would be an ideal focal point for exchanging information and ideas. (Seattle)

A need exists for a conference similar to the one being held for SM&RS coordinators, to aid the personnel actually performing the S&M work. Portland and Seattle Districts have photogrammetric units and should be considered for location of such a conference. (Philadelphia)

The Survey Section has been unable to send deserving personnel to these very good conferences because of funding. (Walla Walla)

Coordination with other districts and divisions is a viable means of maintaining expertise in the surveying and mapping field. (Nashville)

#### REPORTS OF COORDINATION WITH OTHERS

The St. Louis District has obtained extensive assistance from the U.S. Geological Survey and the Bureau of Land Management, and is presently anticipating a mutually beneficial arrangement with the National Ocean Survey to establish precise bench marks on project levees. Other districts, divisions, and agencies are just a telephone call away. (St. Louis)

With all the industry progress made recently, Savannah District has stayed up-dated through the WES training courses, ETL manuals, etc. and help from other districts. (Savannah)

In the last 2 years, New Orleans District has met with and contacted OCE and ETL several times concerning state-of-the-art methods in surveying. These meetings/contacts have been very useful. (New Orleans)

There are not too many problems in this area now. Since the Mt. St. Helens eruption we have had extensive contact with USGS, WA State Hwy Dept, WA State Dept of Natural Resources, and various county and state offices. Cooperation has never been better. This cooperation between agencies is very good. Due to a steady upgrade of the precisions of our

survey work, we are no longer ashamed to publish our work. Through the St. Helens emergency we have learned that cooperation and consultation with other agencies is a necessity. (Portland)

Response from U.S.G.S. and N.G.S. to requests for information is much improved. (St. Paul)

Due to our location, consultation and coordination with other districts must be done by telephone. However, working relationship with other federal agencies in this area has been very good. (POD)

Working relations are good between this operating element and other mapping agencies. (Vicksburg)

It would prove very useful if all surveying and mapping data gathered by all state and federal agencies could be compiled by location (longitude and latitude) for easy identification of available data, i.e., computer access. (Baltimore)

#### DIVISION AND DISTRICT S&M COORDINATORS

All district and division surveying and mapping coordinators should have a conference at least every three years to improve our procedures and efficiency. (Mobile)

Suggest that each division sponsor an annual conference of the Survey and Mapping Chiefs from their districts. This would afford an opportunity to discuss problems common to all districts within the division. (Little Rock)

District managers of surveying and mapping would like to have annual division level meetings and periodic meetings with OCE to discuss various aspects of surveying and mapping. ORD suggests that annual regional meetings might be more productive. (ORD)

There should be a meeting of responsible surveying and mapping managers at the division level at least once a year, and at the chiefs level at least every two years to discuss aspects of surveying and mapping. (Pittsburgh)

More meetings (branch and/or section chief conferences or symposiums) with SAD and districts, ETL and OCE personnel on one division basis would be helpful. (Savannah)

In general, the coordination between districts within the North Atlantic Division is excellent, via telephone contact on a personal basis between counterparts. (Philadelphia)

This is the item that should receive more attention from SAD and OCE. Closer ties should be established with the districts and meetings

should be sponsored by SAD so that district survey chiefs can meet with other district chiefs and discuss workload, methodology, equipment and "state-of-the-art" systems. (Savannah)

#### APPOINTMENT OF S&M COORDINATORS

The establishment of a position in OCE and at the division level for surveying and mapping has established means to transfer information regarding requirements, problems and assistance request. (Mobile)

Having an OCE S&M coordinator has improved the results of interchanges between agencies when direct relations were initiated between the OCE coordinator and agency coordinator. (Detroit)

Establishment of surveying/mapping coordinators may be of some help in that districts will have a point of contact at a higher level. (Charleston)

This is something that is too often neglected within the Corps. However, the appointment of Survey and Mapping Coordinators within each division and holding conferences such as the one this month (June 1981) should help solve this problem. As stated previously, the division coordinators should schedule group conferences within the division for attendance by district survey and mapping chiefs. (Little Rock)

Consideration should be given to appointing coordinators at the district level to meet periodically to exchange ideas and methods and to help coordinate a uniform surveying and mapping program within the Corps. (Huntington)

Some possible improvement may be visible from higher echelon, but it would be merely speculative from this level. (St. Louis)

Construction-Operations Division is responsible for nearly all of the Detroit District survey efforts. The S&M coordinator is in the Engineering Division and Construction-Operations needs are not being represented at the June 1981 SM&RS Coordinators Conference. (Detroit)

#### SUPPORT FOR EXISTING CONFERENCES & WORKSHOP

The Hydrographic Survey Conferences held every other year are an excellent tool to keep advised of state-of-the-art technology and also to provide an interchange of ideas on equipment and procedures between all Corps districts. (Philadelphia)

OCE-sponsored periodic training and conferences, e.g., hydrographic surveying and field survey techniques, provide an excellent forum for keeping in touch. (St. Louis)

Communicating new approaches and methods is best accomplished through the Corps' Hydrographic Survey Conference, provided the emphasis can be

directed toward the total automated surveying and mapping concept and emphasizing the inhouse processing of field survey data. (Wilmington)

Consultation with other Districts has been minimal in the past, however, the biennial survey symposium has helped and should be continued. (Omaha)

The biennial national meetings of surveying and mapping and hydrographic personnel should be continued. (Mobile)

A biennial seminar for the surveyors is recommended. This would enable the surveyors to keep abreast of the "state-of-the-art". (SPD)

Appropriate conferences are available for field supervisors and party chiefs. The Corps sponsored Technical Field Problems and Hydrographic Survey Conferences are ideal for gathering and exchanging information and ideas. (Walla Walla)

The hydrographic survey conferences have been the only improvement in this area. Through these conferences, personnel from all districts have gotten together at a formal meeting and interchanged ideas, experiences, and technical know-how concerning hydrographic surveying equipment, methods, and procedures. Until very recently, there were no organized survey meetings whereby you met your counterparts from the other districts and it was difficult to even know who to contact or what their knowledge and experience was. The Corps of Engineers Hydrographic Survey Conferences, which began in 1972, provide us an opportunity to meet personnel from all districts and divisions, find out what they did, how they did it, equipment used, personnel problems, etc. I think these conferences have accomplished a great deal more than just provide data and information on hydrographic surveying. I have met most of my counterparts throughout the Corps of Engineers, found out what other districts work consists of, what equipment they utilize, type of personnel they have, and many other things of common interest. (Kansas City)

#### RECOMMENDED MODIFICATIONS TO EXISTING CONFERENCE

The annual hydrographic conference was one of the best tools we have ever been offered. It should be expanded to include the total staff not just the one or two individuals that the district could afford to send. (Huntington)

Conferences such as the hydrographic conference should be held on other types of survey, such as Land Surveying, where we are spending millions of dollars annually. (Kansas City)

OCE Survey Conferences should be held on an annual basis instead of every two years. This will allow industry to demonstrate their equipment in field conditions. (NED)



OCE sponsored Field and Hydrographic Survey Workshops have been well received and should be continued possibly on an annual basis. (Seattle)

The Hydrographic Survey Conference should be a yearly occasion. (Portland)

We do not have a real problem obtaining technical guidance, etc. We were fortunate to be one of the first districts in the Corps to obtain an automated hydrographic survey system. The Engineer Topographic Laboratory (ETL) employees have been very helpful in furnishing guidance on technical problems. The Hydrographic Survey Conference and Field Survey Techniques Conference held on alternate years have proven very informative. One suggestion would be to hold these conferences concurrently with the American Congress on Surveying and Mapping (ACSM) Annual Meeting to provide opportunities for the Corps employees to view the many technical exhibits available at the ACSM function. (Little Rock)

Survey equipment and techniques is continually being improved and it is necessary to be aware of the advancement. It is suggested that attendance at the American Congress on Surveying & Mapping (ACSM) Conference be encouraged. (Chicago)

APPENDIX C  
WORKING GROUPS PURPOSE  
AND  
SUMMARY STATEMENTS

WORKING GROUPS PURPOSE AND SUMMARY STATEMENTS

PURPOSE OF WORKING GROUPS

Working groups were established for several subject areas. Goals, objectives and tasks that should be accomplished to improve surveying and mapping activities throughout the Corps were developed. The groups are composed of both technical experts and/or those with special interest in the subject area. These groups will submit their recommendations to the OCE surveying and mapping coordinators and work directly with OCE to develop necessary guidance to implement these recommendations.

The goals, objectives, tasks, milestones and membership of these groups are included herein.

SUMMARY STATEMENTS

LAND-BASED TECHNICAL . . . . .	C-2
HYDRO-BASED TECHNICAL . . . . .	C-5
TRAINING . . . . .	C-7
PERSONNEL . . . . .	C-9
CONTRACTING . . . . .	C-11
RESOURCE MANAGEMENT . . . . .	C-14

## LAND BASED TECHNICAL WORKING GROUP

### GOAL

Resolve land based surveying technical concerns which have proved refractory to solution.

### TASKS

1. To produce a catalog of special skills and areas of expertise within the Corps.
2. Where possible, to standardize procedures and techniques among the districts.
3. To coordinate mapping and control requirements among the districts and to look at the impact of the upcoming readjustment of the North American Datum. (To find out what becomes of the requests to the Mapping and Control Requirements surveys that are submitted annually to USGS and NGS.)
4. To remain aware of research and development (R&D) advances and the state-of-the-art in surveying and mapping. To make the R&D needs system available to the surveyors in the districts.

### MEMBERS

1. Ken Robertson, Engineer Topographic Laboratories, Chairman  
Research Physicist  
ETL Bldg 2592  
Fort Belvoir, VA 22060 ETL-TD-EA  
(703) 664-6194 FTS 544-6194

#### Task 1

2. Steve Burns, Kansas City District, Chairman  
Land Surveyor  
700 Federal Bldg.  
Kansas City, MO 64106 MRKED-FS  
(816) 374-5354 FTS 758-5354
3. Harold L. Young, Kansas City District  
Surveying Technician  
700 Federal Bldg.  
Kansas City, MO 64106 MRKED-FS  
(816) 374-5354 FTS 758-5354

4. Jerry Carr, Louisville District  
Land Surveyor  
P.O. Box 59  
Louisville, KY 40201 ORLED-S  
(502) 582-5661 FTS 352-5661

TASK 2

5. Jim Stapleton, Sacramento District, Chairman  
Chief, Survey Section  
650 Capital Mall  
Sacramento, CA 95814 SPKED-F  
(916) 440-3364 FTS 448-3364
6. J. T. Long, Little Rock District  
Chief, Survey Branch  
P.O. Box 867  
Little Rock, AR 72203 SWLED-S  
(501) 378-5661 FTS 740-5739
7. Bill Riebe, Rock Island District  
Chief, Survey Branch  
Clock Tower Building  
Rock Island, IL 61201 NCRED-S  
(309) 788-6361 FTS 386-6268

Task 3

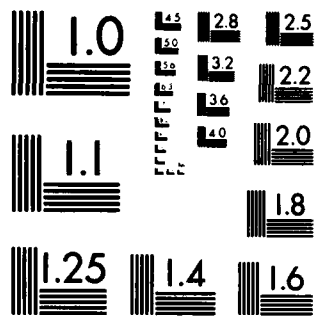
8. Don Eames, New Orleans District, Chairman  
Chief, Survey Section  
P.O. Box 60267  
New Orleans, LA 70160 LMNED-R  
(504) 733-5150 FTS 687-2204
9. Elgia Howe, Vicksburg District  
Chief, Survey Branch  
P.O. Box 60  
Vicksburg, MS 39180 LMKED-S  
(601) 634-5703 FTS 542-5703
10. Darrel Martin, Walla Walla District  
Chief, Survey Section  
Bldg. 602, City-County Airport  
Walla Walla, WA 99362 NPWEN-FM  
(509) 525-5500 ex 401 FTS 442-5401

Task 4

Ken Robertson, Engineer Topographic Laboratories, Chairman  
Research Physicist  
ETL Bldg 2592  
Fort Belvoir, VA 22060 ETL-TD-EA  
(703) 664-6194 FTS 544-6194

11. J. Jack Erlandson, Seattle District  
Chief, Survey Branch  
P.O. Box C-3755  
Seattle, WA 98124 NPSEN-SY  
(206) 764-3535 FTS 399-3535
  
12. Tom Thompson, North Atlantic Division  
Surveying and Mapping Coordinator  
90 Church Street  
New York, NY 10007 NADEN-TS  
(212) 264-7117 FTS 264-7117





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



## HYDRO BASED TECHNICAL WORKING GROUP

### GOAL

Standardize technical and cost effective procedures for hydrographic surveys throughout the Corps.

### OBJECTIVE

Complete a hydrographic surveying field manual.

### TASK

Schedule a technical working group meeting for detailing requirements to meet the goal.

### MEMBERS

1. Roger Pruhs, Norfolk District, Chairman  
Chief, Survey Section  
803 Front Street  
Norfolk, VA 23510 NAOEN-WS  
(804) 441-3130 FTS 827-3130
2. Marvin Taylor, Omaha District  
Chief, Survey Section  
Rm. 6014 USPO & Courthouse  
Omaha, NE 68102 MROED-A  
(402) 221-4613 FTS 864-4613
3. Bob Spies, Philadelphia District  
Chief, Survey Section  
U.S. Custom House  
2nd & Chestnut Streets  
Philadelphia, PA 19106 NAPOP-S  
(215) 597-4745 FTS 597-4745
4. Glenn Boone, Wilmington District  
Chief, Survey Section  
P.O. Box 1890  
Wilmington, NC 28402 SAWCO-NS  
(919) 343-4840 FTS 671-4840
5. Jack LaFountain, Buffalo District  
Chief, Survey Section  
1776 Niagara Street  
Buffalo, NY 14207 NCBCO-M  
(716) 876-5454 ext 2287 FTS 473-2287
6. Jon Koszuth, Buffalo District  
Surveying Technician  
1776 Niagara Street  
Buffalo, NY 14207 NCBCO-M  
(716) 876-5454 ext 2287 FTS 473-2287

7. Raymond Elmore, New York District  
Engineering Technician  
26 Federal Plaza  
New York, NY 10278 NANOP-S  
(212) 264-0181 FTS 264-0181
  
8. George Downing, Waterways Experiment Station  
Chief, Design and Deveopment Branch  
Instrumentation Services Division  
P.O. Box 631  
Vicksburg, MS 39180 WESJD  
(601) 634-2747 FTS 542-2747
  
9. John Clyde, New England Division  
Engineering Technician  
424 Trapelo Road  
Waltham, MA 02254 NEDED-D  
(617) 647-8460 FTS 839-7460
  
10. Dick Carlson, New England Division  
Assistant Area Engineer  
424 Trapelo Road  
Waltham, MA 02254 NEDED  
(617) 647-8111 FTS 839-7400
  
11. James S. Poland, Sacramento District  
650 Capitol Mall  
Sacramento, CA 95814 SPKCO  
(916) 440-2232 FTS 448-2232

## TRAINING WORKING GROUP

### GOAL

Insure that personnel conducting Corps surveying and mapping responsibilities are adequately trained.

### OBJECTIVE

Revise the Corps training program to meet the needs of surveying and mapping personnel.

### TASKS

1. Determine training programs available and training needs:
  - a. Determine training programs available
    - (1) Federal
    - (2) Non-Federal
  - b. Conduct Corps survey to determine needs
    - (1) Training needs
    - (2) Problems associated with obtaining needed training
    - (3) Needed revisions to existing training
2. Consolidate training needs:
  - a. Based on survey of training needs
    - (1) Recommend new courses
    - (2) Recommend revisions to existing courses
    - (3) Recommend policy changes to improve access to training
  - b. Submit recommendations to OCE
3. Revise training programs to meet determined needs:
  - a. Initiate new courses
  - b. Revise courses where needed
  - c. Follow up on recommended policy changes
  - d. Publish surveying and mapping training manual including complete listing of surveying and mapping training courses.

### MILESTONES

October 1982	Complete task 1
July 1983	Complete task 2
January 1985	Complete task 3

**MEMBERS**

1. Dale Hart, Waterways Experiment Station, Chairman  
Chief, Prototype Evaluation Branch, HL  
P.O. Box 631  
Vicksburg, MS 39180 WESHIP  
(601) 634-2258 FTS 542-2258
2. Bobby Applegate, Huntington District  
Chief, Survey Section  
P.O. Box 2127  
Huntington, WV 25721 ORHED-SS  
(304) 529-5698 FTS 924-5698
3. Bill Bergen, Jacksonville District  
Chief, Survey Branch  
P.O. Box 4970  
Jacksonville, FL 32232 SAJEN-S  
(904) 791-2434 FTS 946-2434
4. Charles Malphrus, Savannah District  
Chief, Survey Section  
P.O. Box 889  
Savannah, GA 31402 SASEN-FB  
(912) 944-5474 FTS 248-5474

## PERSONNEL WORKING GROUP

### GOAL

Maintain a highly qualified professional staff for the Corps of Engineers surveying and mapping mission.

### OBJECTIVE

Establish appropriate role, responsibility and career development structure for surveying and mapping personnel.

### TASKS

1. Committee organization
  - a. Establish membership
    - (1) Obtain personal data
    - (2) Disseminate information
  - b. Identify all additional membership needs
  - c. Pursue coordination as required with other committees and/or organizations
  - d. Establish schedule of efforts
2. Identify problems to be addressed
  - a. Grade structure and classification series
  - b. Organization structures
  - c. Recruitment
  - d. Retention
3. Identify solutions to problems addressed.
  - a. Grade structure and classification series
    - (1) Develop career structure for survey profession which will determine levels of responsibility and roles which will provide for career opportunity.
    - (2) Address revision of job standards and prepare for significant input to and review of OPM standards review of 0817 series.
      - (a) obtain standards materials - standards, history, etc.
      - (b) Establish relationship between 0817, 0802, 0810, 1372, 1373 series. Expand as necessary.
      - (c) Develop detailed data for development of Factor Evaluation System for surveying positions.
      - (d) Develop detailed data for establishing knowledge, skills, and abilities standards for surveying positions.
      - (e) Actively participate as part of ACSM committee on personnel classification.
    - (3) Evaluate uniformity in application of 0817 standards in classification process.
  - b. Organization Structure
    - (1) Develop a detailed organizational structure for the survey function which identifies and/or assures integration of its involvement and participation in the organizational management and decision making process.

- (a) Address centralization-centers of expertise
- (b) Address decentralization
- (c) Address continuity of survey mission structure from field units, thru districts, thru divisions to OCE
- (d) Identify existing involvement of surveying personnel in decision making process
- (e) Determine management attitudes as to utilizing professional level personnel in surveying function
- (2) Increase level of involvement and responsibility of surveying and mapping personnel in the decision making process in management efforts.
- c. Recruitment
  - (1) Identify nature of difficulties - extent, etc.
  - (2) Review how surveying is identified in overall recruitment process
- d. Retention
  - (1) Identify extent to which retention is problem
  - (2) Identify factors which discourage retention
  - (3) Salary comparison - other agencies, industry, etc.
- 4. Reports/Recommendations
  - a. Identify need, types, extent, etc. of reports and recommendations to be submitted to OCE
  - b. Submit recommendations to OCE

#### MEMBERS

1. Juris Jurisons, Portland District, Chairman  
Chief, Hydrographic Surveys Section  
P.O. Box 2946  
Portland, OR 97208 NFPND-T-3  
(503) 221-6301 FTS 423-6301
2. Marvin Taylor, Omaha District  
Chief, Surveys and Mapping Section  
Rm 6014 USPO & Courthouse  
Omaha, NE 68102 MROED-A  
(402) 221-4613 FTS 864-4613
3. Michael Weaver, Louisville District  
Cartographer  
P.O. Box 59  
Louisville, KY 40201 ORLED-S  
(502) 582-5661 FTS 352-5661
4. Melvin E. Simpson, Detroit District  
Chief, O&M Section  
Grand Haven Projects Office  
P.O. Box 629  
Grand Haven, MI 49417 NCEOD-G  
(616) 842-5510 FTS 372-1744

## CONTRACTING WORKING GROUP

### GOAL

Insure high quality surveying and mapping services are received from contractors at prices which are fair and reasonable to the government.

### OBJECTIVE

Improve surveying and mapping contract solicitations and methods for insuring technical specifications are met by the contractors.

### TASKS

1. There exists a need for a basic contract from which all districts can obtain quality contractors for surveying and mapping services. The combined knowledge and experience from all districts can produce a contract that will best protect the government's interest and produce quality products. The contract will be developed around the following sections:
  - a. General Requirements
    - (1) Define the types of services required.
      - (a) Topographic Engineering Surveying
      - (b) Hydrographic Engineering Surveying
      - (c) Land Surveying
      - (d) Geodetic Surveying
      - (e) Cartographic Surveying
      - (f) Mapping and Charting
    - (2) Define the types of equipment required to perform services
    - (3) Define the types of personnel required to perform services.
    - (4) Method of payment.
    - (5) Work area of contract.
    - (6) Period of service.
    - (7) Etc.
  - b. Technical Requirements and Specifications: Develop a Corps surveying and mapping manual with accompanying guide specifications to be used as the bases for the technical specifications portion of a solicitation or contract.
  - c. Evaluation Factors for Award: Develop a method and standard format that can be used to rate competing firms' capabilities and expertise to perform the required services.
  - d. Performance Rating: Develop a method and standard format for checking the contractor's work and rating his performance. Research districts, divisions, OCE, etc., to assure there is no existing form.

In summary, the basic contract will be of sufficient detail to allow award of a contract by filling in job-specific information in the appropriate sections. Only those sections related to the work need be used. Contracts requiring unique services will require additional district input.

2. Surveying & Mapping Capability Directory: Assemble a directory by district and by subject area of the resources available throughout the Corps of Engineers. This will give managers a quick reference of where assistance can be obtained to aid in solving their problems.

#### MILESTONES

##### Basic Contract

- 01 Mar 82      Each member will send samples of his contracts to all other members.
- 01 Jun 82      Committee members will have completed review of all contracts submitted. Each should have "cut and pasted" together a draft contract. Conference call to committee members to be established at 11:00 a.m. PST. After discussion members will be assigned to complete draft copy for assigned section.
- 01 Aug 82      Each committee member will have received assigned section draft of contract from other members.
- 15 Aug 82      Review of total draft contract completed. Conference call to all committee members at 11:00 a.m. PST.
- 15-17 Sep 82    Committee conference in Portland District to complete draft of contract.
- 01 Nov 82      Mail draft of contract to all Districts for their comments.
- 15 Jan 83      Comments to draft contract received by Dennis G. Anderson, Chief, Survey Section, Forth Worth District.
- 01 Feb 83      Committee members receive comments by Districts.
- 01 Mar 83      Evaluation of District Comments Completed. Conference call to committee members 11:00 a.m. PST.
- 01 Jun 83      Final draft of contract to OCE.
- (Require Survey Instruction Manual be completed by Land and Hydrographic Committees.)

##### Survey Capability Directory

- 01 Jun 82      Directory of surveying and mapping capabilities distributed to all districts.



### MEMBERS

1. Jimmy W. Reaves, Mobile District, Chairman  
Chief, Cartography, Geodesy and Photogrammetry Section  
P.O. Box 2288  
Mobile, AL 36628 SAMEN-US  
(205) 694-3761 FTS 537-3761
2. Dennis G. Anderson, Fort Worth District, Vice-Chairman  
Chief, Survey Section  
P.O. Box 17300  
Ft. Worth, TX 76102 SWFED-FS  
(817) 344-2281 FTS 334-2281
3. Mickey Blackwell, Tulsa District  
Chief, Survey Section  
P.O. Box 61  
Tulsa, OK 74121 SWTED-GV  
(914) 581-7842 FTS 736-7842
4. Vernon B. Kalion, Pacific Ocean Division  
Chief, Survey Section  
Bldg. 230  
Ft. Shafter, HI 96858 PODED-G  
(808) 438-2420 FTS None
5. Robert R. Applegate, Huntington District  
Chief, Survey Section  
P.O. Box 2127  
Huntington, WV 25721 ORHED-SS  
(304) 529-5698 FTS 924-5698
6. Carl E. Lamphere, Detroit District  
Chief, Survey Section  
P.O. Box 1027  
Detroit, MI 48231 NCECO-M  
(313) 226-6816 FTS 226-6816
7. Lowell L. Alford, Portland District  
Chief, Survey Section  
P.O. Box 2946  
Portland, OR 97208 NPPEN-SY  
(503) 221-6474 FTS 423-6474
8. George Baca/Don Luna, Albuquerque District  
Contract Management  
P.O. Box 1580  
Albuquerque, NM 87103 SWAED-TG  
(505) 766-2713 FTS 474-2713

## RESOURCE MANAGEMENT WORKING GROUP

### GOAL

Improve the Effective Use of Corps Survey and Mapping Resources.

### OBJECTIVES

1. Improve planning and scheduling of surveying and mapping activities.
2. Improve effectiveness of surveying and mapping functions through proper organizational placement.
3. Maintain in-house capabilities' to meet mobilization and other requirements.
4. Improve the professionalism of Corps surveying and mapping personnel.

### TASKS

1. Develop an ER or other policy document defining OCE's policy on planning and scheduling of surveying and mapping resources.

- a. Develop draft ER
- b. Review and modify the draft ER
- c. Submit the final draft ER to OCE for review and publication.

Comments: It is the opinion of this committee that the survey resources (people, equipment, time, and money) are not being utilized to their fullest extent because project managers are not keeping survey personnel fully aware of their needs. Survey resources are constantly being under-utilized "putting out fires" because of untimely coordination.

2. Develop guidance for determining the most effective placement of surveying and mapping resources within a district organization.

- a. Develop a questionnaire to be completed by district survey personnel
- b. Evaluate and interpret completed questionnaires
- c. Recommend guidance to OCE for review and publication

Comments: The Survey Function is located in different positions in the District's organizational structures. The two most common locations are ConOps and Engineering. This committee does not believe that either position should be the only one. However, we do believe it necessary to know which location is best suited to each individual District.

3. Develop guidance for insuring in-house capabilities are maintained.

- a. Determine/define current OCE Policy regarding Mobilization Requirements for in-house survey resources.
- b. Develop a questionnaire to be completed by District survey personnel

- c. Evaluate and interpret completed questionnaires.
- d. Recommend changes, if required.

Comments: It is the opinion of this group that some districts may not be able to meet OCE's Mobilization Requirements for surveys.

- 4. Provide employee incentive and recognition by encouraging:
  - a. Increases in membership and participation in professional societies
  - b. Increases in professional registration as engineers and land surveyors and certification as engineering technicians and photogrammetrists
  - c. Increases in placing and recruiting employees in the professional series, i.e., civil engineer (GS-810), land surveyor (GS-1373), cartographer (GS-1371)

Comments: It is the opinion of this committee that surveying as a profession is looked down upon by other elements of the Corps. This idea probably stems from the misunderstanding of survey practices. Some colleges and universities are now giving BS degrees in surveying. This should help to make it "its own profession".

Additional Note: Expertise will not be addressed at this time as this committee feels that if the in-house capabilities and professionalism needs are met, expertise will follow.

#### MEMBERS

- 1. Harleen "Bud" Anderson, Los Angeles District, Chairman  
Chief, Contract Survey Unit  
P.O. Box 2711  
Los Angeles, CA 90053 SPLED-S  
(213) 688-5550 FTS 798-5550
- 2. Charles D. Crook, Baltimore District  
Chief, Planning and Control Branch (R.E.)  
P.O. Box 1715  
Baltimore, MD 21203 NABRE-P  
(301) 962-3005 FTS 922-3005
- 3. James F. O'Leary, New England Division  
Chief, Maintenance Dredging and Survey Unit  
424 Trapelo Road  
Waltham, MA 02254 NEDED-D  
(617) 647-8111 FTS 839-7267
- 4. Jack Erlandson, Seattle District  
Chief, Survey Branch  
P.O. Box C-3755  
Seattle, WA 98124 NPSEN-SY  
(206) 764-3535 FTS 399-3535

APPENDIX D

U.S. ARMY CORPS OF ENGINEERS  
SURVEYING AND MAPPING (S&M) POINTS OF CONTACT

U.S. ARMY CORPS OF ENGINEERS  
SURVEYING AND MAPPING (S&M) POINTS OF CONTACT

Office of the Chief of Engineers

Ed East  
OCE S&M Coordinator  
(DAEN-CWE-BU)  
Office of the Chief of Engineers  
20 Massachusetts Ave., N.W.  
Washington, DC 20314  
(202) 272-0216 FTS 272-0216

M. K. Miles  
OCE S&M Coordinator  
(DAEN-CWE-BU)  
Office of the Chief of Engineers  
20 Massachusetts Ave., N.W.  
Washington, DC 20314  
(202) 272-0216 FTS 272-0216

Lower Mississippi Valley Division

Frank N. Johnson  
Div. S&M Coordinator (LMVED-TS)  
U.S. Army Engr. Div.  
Lower Mississippi Valley  
P.O. Box 80  
Vicksburg, MS 39180  
(601) 634-5935 FTS 542-5935

Donald W. Eames  
Chief, Precise Survey Sect. (LMNED-R)  
U.S. Army Engr. Dist. New Orleans  
P.O. Box 60267  
New Orleans, LA 70160  
(504) 733-5150 FTS 687-2204

William J. Selvo  
Chief, Engr. Data Section (LMMED-LD)  
U.S. Army Engr. Dist. Memphis  
B-314 Clifford Davis Federal Bldg.  
Memphis, TN 38103  
(901) 521-3238 FTS 222-3238

Carl E. Myers  
Chief, Survey Branch (LMSED-S)  
U.S. Army Engr. Dist. St. Louis  
210 Tucker Blvd. N.  
St. Louis, MO 63101  
(314) 263-5668 FTS None

Tom Verna  
Chief, Dredging & Nav. Sect. (LMMCO-RD)  
U.S. Army Engr. Dist. Memphis  
B-314 Clifford Davis Federal Bldg.  
Memphis, TN 38103  
(901) 521-3465 FTS 222-3465

Elgia L. Howe  
Chief, Survey Branch (LMKED-S)  
U.S. Army Engr. Dist. Vicksburg  
P.O. Box 60  
Vicksburg, MS 39180  
(601) 634-5703 FTS 542-5703

Wayne W. Weiser  
Chief, Survey Branch (LMNED-R)  
U.S. Army Engr. Dist. New Orleans  
P.O. Box 60267  
New Orleans, LA 70160  
(504) 733-5150 FTS 687-2204

Jason Sykes  
Chief, Geodesy Section (LMKED-SY)  
U.S. Army Engr. Dist. Vicksburg  
P.O. Box 60  
Vicksburg, MS 39180  
(601) 634-5712 FTS 542-5712

Middle East (Rear) Division

Rodney J. Bencke  
Land Surveyor (MEDED-F)  
U.S. Army Engr. Div. Middle East (Rear)  
P.O. Box 2250  
Winchester, VA 22601  
(202) 554-7960 ext 2357 FTS 652-2357  
(703) 667-2295 ext 2357

Missouri River Division

Ted Dahlberg  
Div. S&M Coordinator (MRDED-TG)  
U.S. Army Engr. Div. Missouri River  
P.O. Box 103 Downtown Station  
Omaha, NE 68101  
(402) 221-7307 FTS 864-7307

W. L. Allcock  
Maintenance & Inspection Branch  
(MRKOD-MI)  
U.S. Army Engr. Div. Kansas City  
700 Federal Bldg.  
Kansas City, MO 64106  
(816) 374-5671 FTS 758-5671

Duane M. Vanhaverbeke  
Chief, Survey Section (MRKED-FS)  
U.S. Army Engr. Dist. Kansas City  
700 Federal Bldg.  
Kansas City, MO 64106  
(816) 374-5354 FTS 758-5354

Marvin W. Taylor  
Chief, Surveys and Mapping Section  
(MROED-A)  
U.S. Army Engr. Dist. Omaha  
Rm. 6014, USPO & Courthouse  
Omaha, NE 68102  
(402) 221-4613 FTS 864-4613

New England Division

Fred Ravens  
Div. S&M Coordinator (NEDED-D)  
U.S. Army Engr. Div. New England  
424 Trapelo Road  
Waltham, MA 02254  
(617) 894-2460 FTS 839-7460

James F. O'Leary  
Chief, Survey Maintenance and  
Dredging Section (NEDED-D)  
U.S. Army Engr. Div. New England  
424 Trapelo Road  
Waltham, MA 02254  
(617) 894-2460 FTS 839-7460

North Atlantic Division

Tom Thompson  
Div. S&M Coordinator (NADEN-TS)  
U.S. Army Engr. Div. North Atlantic  
90 Church Street  
New York, NY 10007  
(212) 264-7117 FTS 264-7117

Clifford Burdeaux  
Dist. S&M Coordinator (NAEEN-R)  
U.S. Army Engr. Dist. Baltimore  
P.O. Box 1715  
Baltimore, MD 21203  
(301) 962-4920 FTS 922-4920

Richard Buck  
Civil Engineer (NABOP-N)  
U.S. Army Engr. Dist. Baltimore  
P.O. Box 1715  
Baltimore, MD 21203  
(301) 962-3663 FTS 922-3663

Everett Moore  
Chief, Survey Section (NABEN-DS)  
U.S. Army Engr. Dist. Baltimore  
P.O. Box 1715  
Baltimore, MD 21203  
(301) 962-2308 FTS 922-2308

Raymond Elmore  
Civil Engineering Tech. (NANOP-S)  
U.S. Army Engr. Dist. New York  
26 Federal Plaza  
New York, NY 10278  
(212) 264-0181 FTS 264-0181

Gilbert Nersesian  
Dist. S&M Coordinator (NANEN-DN)  
U.S. Army Engr. Dist. New York  
26 Federal Plaza  
New York, NY 10278  
(212) 264-5174 FTS 264-5174

Roger Pruhs  
Chief, Survey Section (NAOEN-WS)  
U.S. Army Engr. Dist. Norfolk  
803 Front Street  
Norfolk, VA 23510  
(804) 441-3130 FTS 827-3130

Vincent Calvarse  
Dist. S&M Coordinator (NAPEN)  
U.S. Army Engr. Dist. Philadelphia  
U.S. Custom House  
2nd & Chestnut Streets  
Philadelphia, PA 19106  
(215) 597-4753 FTS 597-4753

Bob Spies  
Chief, Survey Branch (NAPOP-S)  
U.S. Army Engr. Dist. Philadelphia  
U.S. Custom House  
2nd & Chestnut Streets  
Philadelphia PA 19106  
(215) 597-4745 FTS 597-4745

North Central Division

Ed Metka  
Div. S&M Coordinator (NCOED-T)  
U.S. Army Engr. Div. North Central  
536 S. Clark Street  
Chicago, IL 60605  
(312) 353-0659 FTS 353-0659

Jack M. LaFountain  
Chief, Survey Branch (NCOBO-M)  
U.S. Army Engr. Dist. Buffalo  
1776 Niagara Street  
Buffalo, NY 14207  
(716) 876-2287 FTS 473-2287

Dick Kloker  
Chief, Survey Branch (NOCPE-T)  
U.S. Army Engr. Dist. Chicago  
219 S. Dearborn Street  
Chicago, IL 60604  
(312) 353-6468 FTS 353-6468

Carl E. Lamphere  
Chief, Survey Section (NCECO-M)  
U.S. Army Engr. Dist. Detroit  
P.O. Box 1027  
Detroit, MI 48231  
(313) 226-6816 FTS 226-6816

William C. Riebe  
Chief, Survey Branch (NCREDS)  
U.S. Army Engr. Dist. Rock Island  
Clock Tower Bldg.  
Rock Island, IL 61201  
(309) 788-6361 ext 268 FTS 360-6268

George S. Kletzke  
Chief, Hydrographic Survey Unit  
(NCSOO-M)  
U.S. Army Engr. Dist. St. Paul  
1135 USPO & Custom House  
St. Paul, MN 55101  
(612) 725-7544 FTS 725-7544



North Pacific Division

Charles Galloway  
Div. S&M Coordinator (NPDEN-TE)  
U.S. Army Engr. Div. North Pacific  
P.O. Box 2870  
Portland, OR 97208  
(503) 221-3863 FTS 423-3863

Wendell Moore  
Chief, Surveying and Drafting Branch  
(NPAEN-SY)  
U.S. Army Engr. Dist. Alaska  
P.O. Box 7002  
Anchorage, AK 99510  
(907) 752-2207 FTS None

B. J. Adams  
Chief, Hydrographic Survey Section  
(NPACO-NF-H)  
U.S. Army Engr. Dist. Alaska  
P.O. Box 7002  
Anchorage, AK 99510  
(907) 752-4341 FTS None

Juris Jurisons  
Chief, Hydrographic Surveys Section  
(NPPND-T-3)  
U.S. Army Engr. Dist. Portland  
P.O. Box 2946  
Portland, OR 97208  
(503) 221-6301 FTS 423-6301

Lowell L. Alford  
Chief, Survey Branch (NPPEN-SY)  
U.S. Army Engr. Dist. Portland  
P.O. Box 2946  
Portland, OR 97208  
(503) 221-6474 FTS 423-6474

Jack Erlandson  
Chief, Survey Branch (NPSEN-SY)  
U.S. Army Engr. Dist. Seattle  
P.O. Box C-3755  
Seattle, WA 98124  
(206) 764-3535 FTS 399-3535

Robert E. Parker  
Chief, Navigation Section (NPSOP-NP)  
U.S. Army Engr. Dist. Seattle  
P.O. Box C-3755  
Seattle, WA 98124  
(206) 764-3413 FTS 399-3413

Darrel Martin  
Chief, Survey Section (NEWEN-FM)  
U.S. Army Engr. Dist. Walla Walla  
Bldg. 602, City-County Airport  
Walla Walla, WA 99362  
(509) 525-5500 ext 401  
FTS 442-5401

Ohio River Division

Griffth Ray  
Div. S&M Coordinator (ORDED-T)  
U.S. Army Engr. Div. Ohio River  
P.O. Box 1159  
Cincinnati, OH 45201  
(513) 684-3024 FTS 684-3024

K. Richard Ash  
Chief, Survey Branch (ORHED-S)  
U.S. Army Engr. Dist. Huntington  
P.O. Box 2127  
Huntington, WV 25721  
(304) 529-5670 FTS 924-5670

Robert R. Applegate  
Chief, Survey Section (ORHED-SS)  
U.S. Army Engr. Dist. Huntington  
P.O. Box 2127  
Huntington, WV 25721  
(304) 529-5698 FTS 924-5698

Boyd K. McClellan  
Chief, Survey Branch (ORLED-S)  
U.S. Army Engr. Dist. Louisville  
P.O. Box 59  
Louisville, KY 40201  
(502) 582-5661 FTS 352-5661

Don Purvis  
Chief, Navigation Section (ORLOP-WN)  
U.S. Army Engr. Dist. Louisville  
P.O. Box 59  
Louisville, KY 40202  
(502) 582-5720 FTS 352-5720

William C. Abbott, Jr.  
Chief, Survey Section (ORNED-I)  
U.S. Army Engr. Dist. Nashville  
P.O. Box 1070  
Nashville, TN 37202  
(615) 251-5954 FTS 852-5954

Hilton Davis  
Chief, Navigation Section (ORNOP-W)  
U.S. Army Engr. Dist. Nashville  
P.O. Box 1070  
Nashville, TN 37202  
(615) 251-5607 FTS 852-5607

Thomas E. Taylor  
Chief, Survey Branch (ORPED-S)  
U.S. Army Engr. Dist. Pittsburgh  
William S. Moorehead Fed. Bldg.  
1000 Liberty Ave.  
Pittsburgh, PA 15222  
(412) 644-6826 FTS 722-6826

Pacific Ocean Division

Vernon B. Kalino  
Chief, Survey Section (PODED-G)  
U.S. Army Engr. Div. Pacific Ocean  
Bldg. 230  
Ft. Shafter, HI 96858  
(808) 438-2420 FTS None

South Atlantic Division

Roger Brown  
Div. S&M Coordinator (SADEN-F)  
U.S. Army Engr. Div. South Atlantic  
510 Title Bldg.  
30 Pryor Street, S.W.  
Atlanta, GA 30303  
(404) 221-4696 FTS 242-4696

Jimmy Reaves  
Chief, Survey Section (SAMEN-US)  
U.S. Army Engr. Dist. Mobile  
P.O. Box 2288  
Mobile, AL 36628  
(205) 694-3761 FTS 537-3761

I. Braxton Kyzer  
Chief, Dredging Management Branch  
(SACEN-S)  
U.S. Army Engr. Dist. Charleston  
P.O. Box 919  
Charleston, SC 29402  
(803) 724-4365 FTS 677-4365

Charles E. Malphrus  
Chief, Survey Section (SASEN-FB)  
U.S. Army Engr. Dist. Savannah  
P.O. Box 889  
Savannah, GA 31402  
(912) 944-5474 FTS 248-5474

Edward N. Bishop  
Chief, Survey Section (SACEN-S)  
U.S. Army Engr. Dist. Charleston  
P.O. Box 919  
Charleston, SC 29402  
(803) 724-4365 FTS 677-4365

Glenn Boone  
Chief, Survey Section (SAWCO-NS)  
U.S. Army Engr. Dist. Wilmington  
P.O. Box 1890  
Wilmington, NC 28402  
(919) 343-4840 FTS 671-4840

William A. Bergen  
Chief, Survey Branch (SAJEN-S)  
U.S. Army Engr. Dist. Jacksonville  
P.O. Box 4970  
Jacksonville, FL 32232  
(904) 791-2434 FTS 946-2434

South Pacific Division

John Leong  
Div. S&M Coordinator (SPDED-TG)  
U.S. Army Engr. Div. South Pacific  
630 Sansome Street, RM. 1216  
San Francisco, CA 94111  
(415) 556-3225 FTS 556-3225

Earl M. Bratcher  
Chief, Survey Section (SPLED-GS)  
U.S. Army Engr. Dist. Los Angeles  
P.O. Box 2711  
Los Angeles, CA 90053  
(213) 688-5550 FTS 798-5550

Harlan D. Anderson  
Chief, Contract Survey Unit  
U.S. Army Engr. Dist. Los Angeles  
P.O. Box 2711  
Los Angeles, CA 90053  
(213) 688-5550 FTS 798-5550

James Stapleton  
Chief, Survey Section (SPKED-F)  
U.S. Army Engr. Dist. Sacramento  
650 Capitol Mall  
Sacramento, CA 95814  
(916) 440-3364 FTS 448-3364

James S. Poland  
Valley Resident Office (SPRRV)  
U.S. Army Engr. Dist. Sacramento  
P.O. Box 935  
West Sacramento, CA 95691  
(916) 371-7550 FTS 448-7550

J.W. Dickson  
Civil Engineering Technician  
(SPNCO-CO)  
U.S. Army Engr. Dist. San Francisco  
211 Main Street  
San Francisco, CA 94105  
(415) 974-0872 FTS 454-0872

Ron Ard  
Chief, Hydrographic Survey Section  
(SPNCO-OH)  
U.S. Army Engr. Dist. San Francisco  
211 Main Street  
San Francisco, CA 94105  
(415) 974-0872 FTS 454-0872

Bill Angeloni  
Chief, Technical Support Br. (SPNPE-T)  
U.S. Army Engr. Dist. San Francisco  
211 Main Street  
San Francisco, CA 94105  
(415) 974-0393 FTS 454-0393

Southwestern Division

Bill Johnson  
Div. S&M Coordinator (SWDED-TG)  
U.S. Army Engr. Div. Southwestern  
1114 Commerce St.  
Dallas, TX 75242  
(214) 767-2372 FTS 729-2372

George Baca/Don Luna  
Contract Management (SWAED-TG)  
U.S. Army Engr. Dist. Albuquerque  
P.O. Box 1580  
Albuquerque, NM 87103  
(505) 766-2713 FTS 474-2713

Dennis G. Anderson  
Chief, Survey Section (SWFED-FS)  
U.S. Army Engr. Dist. Fort Worth  
P.O. Box 17300  
Fort Worth, TX 76102  
(817) 344-2281 FTS 334-2281

David Campbell  
Chief, Geotechnical & Survey Branch  
(SWGED-S)  
U.S. Army Engr. Dist. Galveston  
P.O. Box 1229  
Galveston, TX 77553  
(713) 766-3178 FTS 527-3178

J.T. Long  
Chief, Survey Branch (SWLED-S)  
U.S. Army Engr. Dist. Little Rock  
P.O. Box 867  
Little Rock, AR 72203  
(501) 378-5661 FTS 740-5739

Ted Cook  
Chief, Con-Ops Division (SWLOO)  
U.S. Army Engr. Dist. Little Rock  
P.O. Box 867  
Little Rock, AR 72203  
(501) 378-5679 FTS 740-5679

DeWayne Combs  
Pine Bluff Resident Office (SWLPB)  
U.S. Army Engr. Dist. Little Rock  
P.O. Box 7835  
Pine Bluff, AR 71601  
(501) 534-0451 FTS None

T. Spencer  
Dardanelle Resident Office (SWLDN)  
U.S. Army Engr. Dist. Little Rock  
P.O. Box 1087  
Russellville, AR 72801  
(501) 968-5088 FTS 740-5137

Mickey Blackwell  
Chief, Survey Section (SWTED-GV)  
U.S. Army Engr. Dist. Tulsa  
P.O. Box 61  
Tulsa, OK 74121  
(918) 581-7842 FTS 736-7842

Harry Hartwell  
Hyd.-Hyd. Engr. Section (SWTED-HE)  
U.S. Army Engr. Dist. Tulsa  
P.O. Box 61  
Tulsa, OK 74121  
(918) 581-7205 FTS 736-7205

Engineer Topographic Laboratories

Ken Robertson  
Research Physicist (ETL-TD-EA)  
U.S. Army Engineer Topographic Labs.  
ETL Bldg 2592  
Ft. Belvoir, VA 22060  
(703) 664-6194 FTS 544-6194

Ed Roof  
Geodesist (ETL-TD-EA)  
U.S. Army Engineer Topographic Labs  
ETL Bldg 2592  
Ft. Belvoir, VA 22060  
(703) 664-3583 FTS 544-3583

Waterways Experiment Station

Dale Hart  
Chief, Prototype Evaluation Branch  
Hydraulics Laboratory (WESHP)  
U.S. Army Waterways Experiment Station  
P.O. Box 631  
Vicksburg, MS 39180  
(601) 634-2258 FTS 542-2258

Jack Stoll  
Chief, Environmental Analysis Group  
Environmental Laboratory (WESER)  
U.S. Army Waters Experiment Station  
P.O. Box 631  
Vicksburg, MS 39180  
(601) 634-2620 FTS 542-2620

George Downing  
Chief, Design and Development Branch  
Instrumentation Services Div. (WESJD)  
U.S. Army Waterways Experiment Station  
P.O. Box 631  
Vicksburg, MS 39180  
(601) 634-2747 FTS 542-2747

Ed Link  
Chief, Environmental Constraints Gp.  
Environmental Laboratory (WESEN)  
U.S. Army Waterways Experiment Station  
P.O. Box 631  
Vicksburg, MS 39180  
(601) 634-2606 FTS 542-2606

Water Resources Support Center

Dave Licky  
Remote Sensing Research Coordinator  
Water Resources Support Center  
(WRSC-C)  
Kingman Bldg.  
Ft. Belvoir, VA 22060  
(703) 325-0671 FTS None

APPENDIX E

PHOTOGRAPHS OF CORPS OF ENGINEERS ATTENDEES

PHOTOGRAPHS OF  
U.S. ARMY CORPS OF ENGINEERS  
SURVEYING REQUIREMENTS MEETING  
ATTENDEES

(Note: Some attendees were not photographed)

OFFICE OF THE CHIEF OF ENGINEERS



Ed East  
Civil Works



M. K. Miles  
Civil Works



Sam Gillespie  
Military Programs



LOWER MISSISSIPPI VALLEY DIVISION



Frank N. Johnson  
LMVD



William J. Selvo  
Memphis



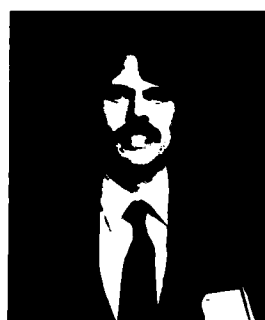
Sam A. Lehr, Jr.  
Memphis



Randy Kilmore  
Memphis



Donald W. Eames  
New Orleans



Fred Schilling  
New Orleans



G.N. Brown  
St. Louis



Elgia L. Howe  
Vicksburg



Jayne H. Evans  
Vicksburg

MIDDLE EAST  
DIVISION (REAR)



Rodney Bencke

NEW ENGLAND  
DIVISION



Richard Carlson



Fran Donovan

MISSOURI RIVER DIVISION



Duane M. Vanhaverbeke  
Kansas City



Steven R. Burns  
Kansas City



Harold L. Young  
Kansas City



William L. Allcock  
Kansas City



Marvin W. Taylor  
Omaha



Joe Volpert  
Omaha

NORTH ATLANTIC DIVISION



Tom Thompson  
NAD



Everett Moore  
Baltimore



Raymond Elmore  
New York



Gilbert Nersesian  
New York



John Zammit  
New York



Roger A. Pruhs  
Norfolk



Eugene R. Batty  
Norfolk



Stephen K. DeLoach  
Norfolk



Bob R. Spies  
Philadelphia

NORTH CENTRAL DIVISION



Jack LaFountain  
Buffalo



Carl E. Lamphere  
Detroit



George S. Kletzke  
St. Paul

NORTH PACIFIC DIVISION



Billy Joe Adams  
Alaska



Juris Jurisons  
Portland



Darrel Martin  
Walla Walla

OHIO RIVER DIVISION



Robert R. Applegate  
Huntington



David E. Claxon  
Huntington



Thomas E. Taylor  
Pittsburgh

PACIFIC OCEAN  
DIVISION



Vernon B. Kalino

SOUTH PACIFIC  
DIVISION



N. John Leong  
SPD



James G. Stapleton  
Sacramento

SOUTHWESTERN DIVISION



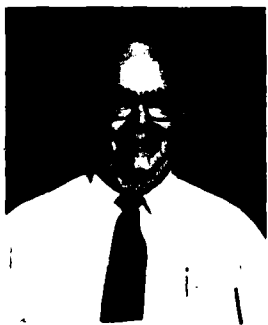
George A. Baca  
Albuquerque



Donald C. Luna  
Albuquerque



Dennis Anderson  
Fort Worth



James T. Long  
Little Rock



Mickey Blackwell  
Tulsa



Paul L. Bisdorf, Jr.  
Tulsa

SOUTH ATLANTIC DIVISION



Roger A. Brown  
SAD



Edward N. Bishop  
Charleston



William A. Bergen  
Jacksonville



Cleveland E. Powell  
Jacksonville



James F. Sheriff  
Jacksonville



Leo Rewis  
Jacksonville



Haskgl Moses  
Jacksonville



John Rooney  
Jacksonville



Robert Payton  
Jacksonville

SOUTH ATLANTIC DIVISION  
(con't)



Jimmy W. Reaves  
Mobile



Donald Thrower  
Mobile



Rex D. Wells  
Mobile



Roger D. Bush  
Panama City



Dennis G. Wilson  
Panama City



Charles E. Malphrus  
Savannah



Lloyd C. Fulcher, Jr.  
Savannah



Will Martin  
Savannah



Glenn Boone  
Wilmington

COASTAL ENGINEERING  
RESEARCH CENTER

ENGINEER TOPOGRAPHIC LABORATORIES



William Birkemeier



Kenneth Robertson



Edward Roof

WATERWAYS EXPERIMENT STATION



George Downing



Dale Hart



Lewis E. Link



N. Radhakrishnan



END

DATE  
FILMED

4 - 83

DTIC