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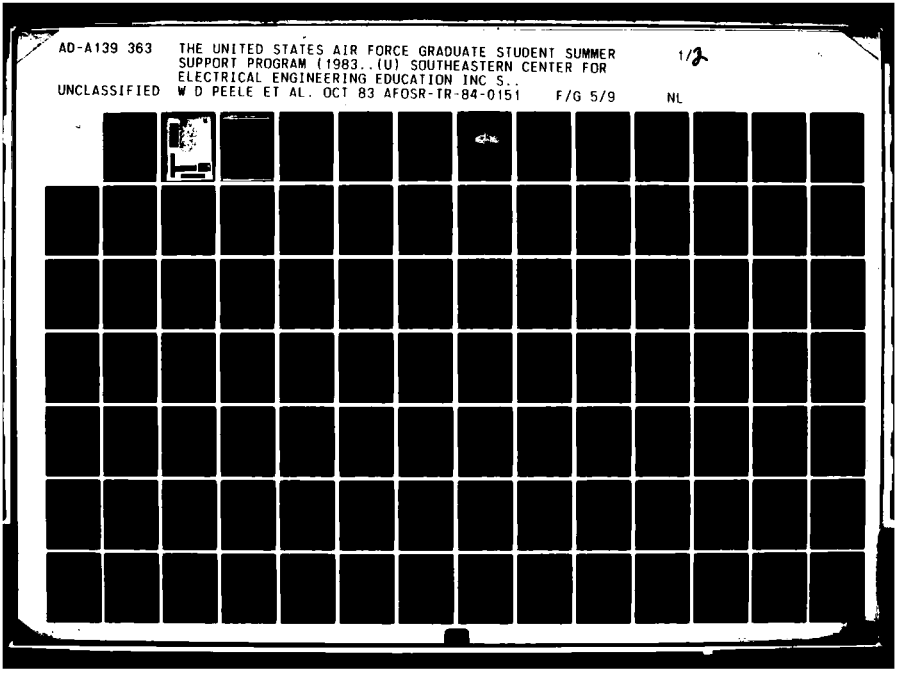

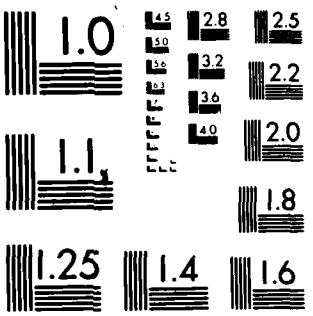

AD A139363

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

THE UNITED STATES AIR FORCE GRADUATE STUDENT SUMMER SUPPORT PROGRAM

1983

MANAGEMENT REPORT

CONDUCTED BY

SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION (SCEEE)

AFOSR-TR- 84-0151

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AIR FORCE GRADUATE STUDENT

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A pilot program for Graduate Student Summer Support via the AFOSR Summer Faculty Research Program(SFRP) was initiated by contract modification on 26 March 1982. The program was developed as an adjunct effort to the SFRP. Its purpose is to provide funds for selected graduate students to work at an appropriate Air Force Laboratory or Center with a supervising professor

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#20) ABSTRACT:

who holds a concurrent SFRP appointment. SCEEE appointed 17 graduate students representing fifteen (15) schools and ten (10) disciplines in science and engineering in the 1982 Program. In 1983 the Program was expanded to 53 students representing 36 schools and 18 disciplines. The 53 participants were selected from 117 applicants.

To be eligible, all candidates had to be currently registered in a graduate program. The graduate students were selected from the fields of engineering, computer science, mathematics, or the physical sciences and were supervised by a faculty member who held an appointment as a SCEEE Fellow for the summer of 1983 under the Summer Faculty Research Program. The students were U.S. citizens, working toward an appropriate graduate degree, and currently enrolled in the graduate school at their respective institutions.

1983 USAF/SCEEE

GRADUATE STUDENT SUMMER SUPPORT PROGRAM

Conducted by

Southeastern Center for

Electrical Engineering Education

under

USAF Contract Number F49620-82-C-0035

PROGRAM MANAGEMENT REPORT

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Major Amos L. Otis

Submitted to

Air Force Office of Scientific Research

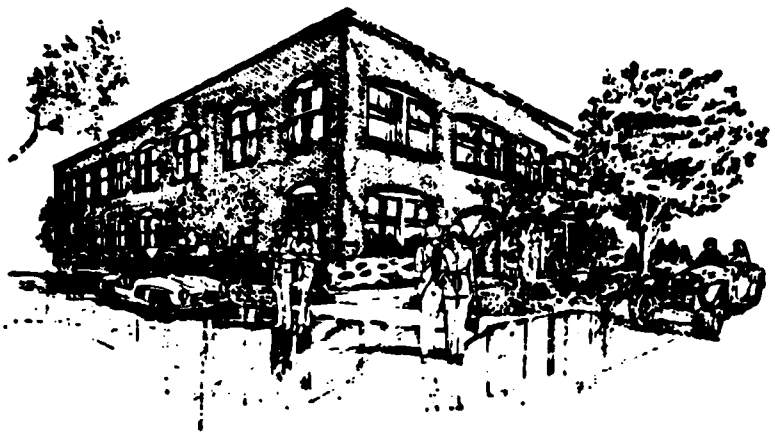
Bolling Air Force Base

Washington D.C.

by

Southeastern Center for
Electrical Engineering Education

October 1983



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Note: Complete Technical Reports on the Graduate Student Research are published in a Supplementary Technical Report Volume.

INTRODUCTION & HISTORY

A pilot program for Graduate Student Summer Support via the AFOSR Summer Faculty Research Program (SFRP) was initiated by contract modification on 26 March 1982. The program was developed as an adjunct effort to the SFRP. Its purpose is to provide funds for selected graduate students to work at an appropriate Air Force Laboratory or Center with a supervising professor who holds a concurrent SFRP appointment. SCEEE appointed 17 graduate students representing fifteen (15) schools and ten (10) disciplines in science and engineering in the 1982 Program. In 1983 the Program was expanded to 53 students representing 36 schools and 18 disciplines. The 53 participants were selected from 117 applicants.

To be eligible, all candidates had to be currently registered in a graduate program. The graduate students were selected from the fields of engineering, computer science, mathematics, or the physical sciences and were supervised by a faculty member who held an appointment as a SCEEE Fellow for the summer of 1983 under the Summer Faculty Research Program. The students were U.S. citizens, working toward an appropriate graduate degree, and currently enrolled in the graduate school at their respective institutions.

The graduate student researchers in this program had the following specific obligations:

1) To participate in research under the direction of a Faculty Member at an Air Force Laboratory or Center;
2) To prepare a report at the end of the summer period describing the summer research accomplishments. The report must have been approved by or co-authored with the supervising faculty member;
3) To complete an evaluation questionnaire on the Graduate Student Summer Support Program.

1983 GSSS OBJECTIVES : (1) To provide a productive means for a graduate student to participate in research under the direction of a faculty member at an Air Force Laboratory or Center; (2) To stimulate continuing professional association among graduate students, their supervising professors, and professional peers in the Air Force; (4) To enhance the research productivity and capabilities of engineering and science graduate students.

PREREQUISITES FOR APPOINTMENTS: To qualify as a Graduate Researcher in the 1983 GSSS program, applicants must have been: (1) U.S. citizens; (2) holders of a BS or

MS degree in an appropriate technical specialty; (3) registered in a Graduate School working toward an appropriate graduate degree; (4) willing to pursue their summer research work under the direction of a supervising professor who holds an appointment under the SFRP for the summer of 1983.

RESEARCH PERIOD: The period of the student appointments was for ten continuous weeks at the research site between May 1, 1983 and September 30, 1983. The students research period coincided with the appointment period of the supervising professor with whom the student worked.

APPLICATION DEADLINE: April 15, 1983

FINANCIAL TERMS: Stipends for graduate student researchers were paid as follows:

$55.00 per day ($275 per week) for B.S. degree holders
$65.00 per day ($325 per week) for M.S. degree holders

Travel expenses were reimbursed to the student for round trip travel between the researcher's school location and the Air Force facility in accordance with SCEEE travel policy. A living expense allowance of $25.00 per day was paid for each day the researcher spent at the Air Force Location.

Evaluations have been requested of the Laboratory Contacts and all have responded in writing or verbally. The common opinions among government laboratory scientists, faculty, and students are:

(a) that the program is a valuable addition to the Summer Faculty Research Program;
(b) that the program should be continued;
(c) that students should be supervised by faculty researchers;
(d) that the students are highly motivated and contribute significantly to the research effort;
(e) that exposure to USAF R&D produces a positive student opinion of the USAF.

This report contains detailed and summarized data relevant to the 1983 Graduate Student Summer Support Program.

INFORMATION BROCHURE

The Information Brochure which follows was sent to each Graduate Student who received an appointment under this program. It describes the operational details of the program especially with regard to the procedures for remuneration of expenses, travel and compensation. It also emphasizes the students obligations for technical reports and program evaluation. The reactions to this detailed brochure have been very positive.

SOUTHEASTERN
CENTER FOR
ELECTRICAL
ENGINEERING
EDUCATION (SCEEE)

Management Office
Central Florida Facility
11th & Massachusetts Avenue
St. Cloud, FL 32769
(305) 892-6146

Please reply to:

1983 USAF-SCEEE
GRADUATE STUDENT SUMMER SUPPORT ,RA.

INFORMATION BROCHURE

for

GRADUATE STUDENT RESEARCHERS

May 1983

I. GRADUATE STUDENT RESEARCHER OBLIGATIONS

SCEEE is required by contract to impose certain obligations on you in your status as a Graduate Student Researcher. This section outlines those obligations, and you should read them thoroughly. You are required to sign and return the statement of understanding before the final processing of your appointment can be completed. The following is a list of these obligations:

1. RESEARCH GOALS AND OBJECTIVES: A statement of research objectives must be provided to SCEEE near the beginning of the Summer Research period. It should outline your goals and the approach you intend to follow in researching these goals. It should be submitted with your first invoice for payment. Neither travel expenses nor expense allowances will be reimbursed until after receipt of your statement of research objectives. The report should also clearly indicate the date of your first working day of the summer research period.

2. REGISTRATION: You should be registered in your graduate school for summer 1983. This can be under a special studies category or equivalent.

3. FINAL REPORT: At the end of your summer research effort, you are required to submit to SCEEE a completed, typewritten scientific report stating the objective of the research effort, the approach taken, results, and recommendations. Information on the required format will be sent to you with a "FINAL REPORT INFORMATION BULLETIN" and sample report. However, the final report must be approved by your SFRP Supervising Faculty Member and then transmitted so as to reach SCEEE by Monday September 19, 1983. Payment of "Compensation" for the final four weeks of your ten-week research period cannot be made until SCEEE has received and approved this report in the required format.

4. PROGRAM EVALUATION QUESTIONNAIRE: You will be asked to complete a critique form at the end of your research period regarding your impressions of the program. This critique form should be completed and returned to SCEEE by Monday, September 19, 1983 along with your final report. Return of this form is a program requirement. Final Compensation will not be paid until the critique is also received at SCEEE.

5. U.S. Air Force-SCEEE Graduate Student Researcher Relationship: The U.S. Air Force and SCEEE understand and agree that the services to be delivered by the SCEEE Graduate Student Researcher under this contract will be non-personal services and the parties recognize and agree that no employer-employee or master-servant relationships will exist between the U.S. Air Force and the SCEEE Researcher. Non-personal services are defined as work performed by an individual who is responsible for an end item (such as a report), free of supervision of the U.S. Air Force and free of an employer-employee relationship.

As a SCEEE Graduate Student Researcher, you will not:

(a) Be placed in a position where you are appointed or employed by a Federal Officer or are under the supervision, direction, or evaluation of a Federal Officer, military or civilian.

(b) Be placed in a staff or policy-making position.

(c) Be placed in a position of command, supervision, administration, or control over Air Force military or civilian personnel or personnel of other contractors or become a part of the U. S. Air Force organization.

The services to be performed under the GSSS Program do not require SCEEE or the SCEEE Researcher to exercise personal judgement and discretion on behalf of the U.S. Air Force; rather, the SCEEE Researchers will act and exercise personal judgement and discretion in coordination with their SFRP Supervising Faculty Member on their research programs on the GSSS Program conducted by SCEEE.

The Air Force will have unrestricted use of and access to all data developed during the period of this appointment.

II. ALLOWABLE TRAVEL EXPENSES

The GSSS Program provides potential funding for one round trip between your home and your assigned research location. As soon as you have signed and returned your appointment letter along with the budget sheet, you will be authorized to receive reimbursement for travel expenses as described below.

As outlined in the SCEEE Graduate Student Researcher Obligations section in this brochure, you are authorized reimbursement for travel to your assigned research location at the start of your summer effort and a return trip at the end of the summer research period. You are expected to make your own arrangements for this travel; after each trip you may invoice SCEEE for reimbursement of allowable expenses in the format described in the Instructions for Invoicing for Compensation and Reimbursement section of this brochure. Closely coordinate your travel plans with your SFRP SUPERVISING FACULTY MEMBER.

All travel reimbursements under SCEEE GSSS appointments are made according to current SCEEE policy, and deviations from the approved budget are not authorized and will not be reimbursed. In light of these restrictions, you may choose either to travel by commercial airline at coach rates or less, by bus, by driving your private auto, or by a combination. (Please note that funding for rental cars is not allowed; SCEEE will not reimburse this expense. With any of these choices you may claim reimbursement up to the amount for the most direct routing, taking into the account the desirability of routing on interstate highways if you drive your private auto.

Reimbursement for direct route travel by commercial airline will thus be paid on your submission of an invoice to SCEEE following the invoicing instructions referenced above. In the view of the convenience of having a car at the research location, SCEEE strongly recommends that a private auto be used for travel when practical. Reimbursement for mileage when you drive your private auto is at the rate of 20¢ per mile within the routing restrictions mentioned above and will likewise be paid on submission of an invoice prepared according to the referenced instructions. These reimbursements cannot be extended to cover travel by your family if they accompany you.

During the ten week Summer Research period, you will be authorized to receive an expense allowance in lieu of a per diem payment. The rate of this allowance is $25 per day for a maximum of 70 days. To receive this allowance, you are required to invoice for it as described in the invoicing reference above.

These items above are the only reimbursable travel allowances authorized for the GSSS appointment. Please be advised that any additional travel expenses incurred during the appointment period will be your personal responsibility.

III. INSTRUCTIONS FOR INVOICING FOR COMPENSATION AND REIMBURSEMENT

Attached is a copy of the Invoice Format that you are required to use to obtain compensation or reimbursement from SCEEE. Note that all disbursements by SCEEE for compensation, travel, and/or other expenses are subject to audit approval, so you must submit receipts substantiating charges invoiced.

In addition, you must prepare and attached to each completed invoice a Brief Report of Effort.

A. PREPARATION OF BRIEF REPORT OF EFFORT

Whenever you submit an Invoice for reimbursement to SCEEE you must also include a brief report describing your activities for the invoice period. To meet this obligation, you must prepare, date, sign, and attach to your completed invoice a Brief Report of Effort describing the research accomplished on the appointment and explain any travel during the invoice period.

This report should include innovative techniques and designs or discoveries which may be disclosed as patents. Rights to any inventions or discoveries shall reside with SCEEE unless determined otherwise by the contracting agency.

The Brief report should never exceed one typewritten page and most often should be considerably shorter than one page.

The following is an example of such a report:

BRIEF REPORT OF EFFORT

Effort has been initiated on pole extraction methods. The modified ordinary least squares technique has been giving fair results. Work is presently being done on finding a better matrix inversion technique for the case when the coefficient matrix is ill-conditioned. Some problems have been encountered with conditioning when the data is filtered.

Travel invoice is for the trip to my research location.

_____ May 16, 1983

B. PREPARATION OF INVOICE FORMAT

Detailed instructions on properly completing your Invoice Format for reimbursement are provided below. Review them carefully.

(1) In the opening statement of the claim for remuneration on the invoice format, two dates are required. They are the date of your appointment letter from SCEEE (in the first blank) and the date you signed that letter accepting your appointment (in the second blank).

Other financial items required on the Invoice Format are for COMPENSATION, TRAVEL, EXPENSE ALLOWANCE. These are now explained individually with examples.

(2) COMPENSATION

(a) In the first blank to the right of COMPENSATION indicate the number of days you are claiming for compensation in this particular invoice.

(b) In the next blank enter your SCEEE Researcher daily appointment rate of $55.00 or $65.00 as noted in your appointment letter.

(c) Multiply the number of days times your appointment rate and enter the total dollar amount in the blank at the far right side. Note that the accumulated total number of days you claim on this appointment may not exceed the number authorized in your appointment letter. Some specific details on the compensation days must be provided in the next space.

(d) Under the heading Date, list the date of each of the days you are claiming for compensation, and opposite each date under the heading Place of Activity indicate where you worked on that date.

A sample entry of a correctly completed COMPENSATION item is shown below:

SAMPLE COMPENSATION ENTRY ON INVOICE

COMPENSATION: (10 days @ $65.00 per day)..... $ 650.00 (11)

Date (Specify exact dates)	Place of Activity
May 18-20, 1983 (inclusive)	AFAPL/POD High Power Lab
May 23-27, 1982 (inclusive)	WPAFB Computer Center
May 30, 31 1983	AFAPL/POD High Power Lab

(3) TRAVEL

(a) Under the heading Date indicate the date you departed on your trip and the date you arrived at your destination.

(b) Under the heading Departure/Arrival Time list the departure and arrival times for the corresponding days you listed under Date.

(c) List your destination under the heading Destination.

(d) Under the heading Mode, indicate your principal means of conveyance; i.e., commercial air, private auto, etc.

(e) Under the heading Amount, itemize these expenditures for travel reimbursement.

(f) Total these travel items and enter the total dollar amount to be reimbursed for travel in this particular submission on the line to the right of Total Travel Expense.

An example of a correctly completed TRAVEL entry is shown below.

TRAVEL EXAMPLE: TRAVEL TO RESEARCH LOCATION BY PRIVATE AUTO

TRAVEL: (Attach receipts for all Airline or Bus charges. Payment cannot be made without receipts attached to invoice.)

Date	Departure/Arrival Time	Destination	Mode	Amount
5/13-5/17/83	0630/1530	Wright-Patterson AFB, Ohio	Private Auto	$480.00

One-way trip from home in Eugene, Oregon to Wright-Patterson AFB, Ohio, (2400 mi x 20¢/mi= $480.00)
(mileage at start: 24162; at end: 26562)

Total Travel Expense ..... $ 480.00 (III)

Please note the following comments about the TRAVEL EXAMPLE:

i) Travel by your private auto in lieu of a commercial airline is authorized as a convenience to the traveler.

ii) Travel with use of a privately-owned vehicle will be reimbursed at the rate of 20¢ per mile provided mileage is listed with the start and end mileage on each separate use for all distances over 100 miles.

(4) EXPENSE ALLOWANCE

This item on the invoice will be used to claim the $25 per day for reimbursement of costs incurred at your assigned research location.

(a) In the first blank to the right of EXPENSE ALLOWANCE enter the number of days for which you are claiming reimbursement of the expense allowance for costs incurred at your assigned research location.

(b) Multiply this number by the daily allowance rate of $25.00 and enter this total dollar amount in the blank at the far right.

(c) Itemize the days for which you are claiming the Expense Allowance reimbursement. It can include weekend days and holidays as well as regular work days.

The following is a sample of a correctly completed EXPENSE ALLOWANCE item.

SAMPLE

EXPENSE ALLOWANCE: (14 days @ $25.00/day)..... $ 350.00 (IV)

Specific dates covered:
7/11/83 - 7/24/83 (inclusive)

(5) You may combine reimbursement requests for compensation, travel, and expense allowance in the same invoice. The total for all items invoiced should be indicated on the blank labeled "GRAND TOTAL FOR INVOICE" in the lower right hand side of line 5.

(6) IMPORTANT: Indicate in the space provided on each invoice the address to which you want the check mailed.

(7) You must sign and date your invoice in the lower right hand corner as "VENDOR" before it is submitted; you MUST also have your Summer Faculty Research Program (SFRP) Supervising Faculty Member countersign the invoice before it is mailed to SCEEE.

Invoices should be mailed to:

GSSS PROGRAM OFFICE
SCEEE Central Florida Facility
1101 Massachusetts Avenue
St. Cloud, Florida 32769

GRADUATE STUDENT SUMMER SUPPORT PROGRAM
INVOICE FORMAT

(Brief Report of Effort Attached)

1. I claim remuneration from SCEEE, Inc. via the terms and conditions of the agreement dated_____and accepted_____ as follows:

2. COMPENSATION: (_____days @ $_____ per day).....$_____(II)

Date (Specify exact dates)	Place of Activity

3. TRAVEL: (Attach receipts for all Airline or Bus charges. Payment cannot be made without receipts attached to invoice.)

Date	Departure/Arrival Time	Destination	Mode	Amount

Total Travel Expense ..... $_____(III)

4. EXPENSE ALLOWANCE: (_____days @ $25.00/day)..... $_____(IV)

Specific dates covered:

5. GRAND TOTAL FOR INVOICE (Sum of II, III, IV above)..... $_____(V)

6. Please send check to following address:

7. I certify that compensation invoice is not concurrent with compensation received from other Federal government projects, grants, contracts, or employment.

X_____
SFRP SUPERVISING FACULTY SIGNATURE

Location of Faculty_____

Telephone _____

Date _____

X_____
VENDOR SIGNATURE

Social Sec. No._____

Telephone_____

Date _____

GRADUATE STUDENT QUESTIONNAIRE

The attached 3 page Questionnaire was completed by the students at the end of their appointments. This was one of their specific obligations. Similar questionnaires were completed by the appropriate Air Force Laboratory contacts and by the students supervising professors. The detailed responses from these other sources are included in the 1983 Program Management Report on the Summer Faculty Research Program.

A compilation, unedited, of the Graduate Student responses is included following the Evaluation Questionnaire. In general, these responses were very favorable. However some troublesome situations still exist having to do with short term housing, initial start up financial arrangements and the Faculty - Student - Laboratory interaction.

1983 USAF/SCEEE GRADUATE STUDENT SUMMER SUPPORT PROGRAM
EVALUATION QUESTIONNAIRE
(TO BE COMPLETED BY GRADUATE STUDENT PARTICIPANT)

Name_____Title_____
Dept. (at home)_____Home Institution_____
Summer Supervising Professor_____
Research Colleague(s)_____
Laboratory Address of Colleague(s)_____
Brief Title of Research Topic_____

A. TECHNICAL ASPECTS

1. Was the offer of research assignment within your field of competency and/or interest? YES____NO____.

2. Was the work challenging? YES____NO____. If no, what would have make it so?_____
_____

3. Were your relations with your Supervising Professor and research colleague satisfactory from a technical point of view? YES____NO____. If no, why?_____
_____

4. Suggestions for improvement of relationship(s)._____
_____
_____

5. Considering the circumstances of a summer program, were you afforded adequate facilities and support? YES____NO____. If no, what did you need and why was it not provided?_____
_____

6. Considering the calendar "window" of ten weeks being limited by varying college and university schedules, please comment on the program length.
Did you accomplish: more than_____, less than_____, about what you expected_____?

7. Do you feel the Graduate Student appointment should continue to require affiliation with a Summer Research Faculty Member? YES____NO____.

8. Were you asked to present seminars on your work and/or your basic expertise? YES____NO____. Please list number, dates, approximate attendance, length of seminars, title of presentations (use reverse side if necessary.)

GRADUATE STUDENT QUESTIONNAIRE (Page 2 of 3)

9. Were you asked to participate in regular meetings in your laboratory? YES___NO___.
If yes, approximately how often?_____

10. Other comments concerning any "extra" activities._____
_____
_____

11. On a scale of A to D, how would you rate this program? (A high, D low)

Technically challenging	A	B	C	D
Future research opportunity	A	B	C	D
Professional association	A	B	C	D
Enhancement of my academic qualifications	A	B	C	D
Enhancement of my research qualifications	A	B	C	D
Overall value	A	B	C	D

B. ADMINISTRATIVE ASPECTS

1. How did you first hear of this program?_____ _____
_____

2. What aspect of the program was the most decisive in causing you to apply?_____
_____

3. How do you rate the stipend level? Meager___Adequate___Generous___.

4. Please give information on housing: Did you reside in VOQ___, apartment___,
other (specify)_____? Name and address of apartment complex and manager's name.
_____

5. Would you encourage or discourage expansion of the Student Program?_____
Why?_____

6. Considering the many-faceted aspects of administration of a program of this magnitude, how do you rate the overall conduct of this program?
Poor___Fair___Good___Excellent___. Please add any additional comments._____
_____
_____

GRADUATE STUDENT QUESTIONNAIRE (Page 3 of 3)

7. Please comment on what, in your opinion, are:

a. Strong points of the program:_____

_____

_____

b. Weak points of the program:_____

_____

_____

8. On balance, do you feel this has been a fruitful, worthwhile, constructive experience? YES____NO____.

9. Other remarks:_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU

TABULATION OF STUDENT QUESTIONNAIRE RESPONSES

In this section we have tabulated the 53 student responses to the Questionnaire. These are presented, mostly verbatim, with only minimal editing of format. The tabulation consists of two major divisions; those comments on the Technical Aspects of the program and those on the Administrative Aspects. There are ten categories under the Technical Aspects and nine under the Administrative compilation.

TABULATION OF QUESTIONNAIRE RESPONSES

A. TECHNICAL ASPECTS

1. Assignment in field of competency and/or interest? Yes: 50
No: 3

2. Work Challenging? Yes: 49
No: 4

3. Relations with Professor and Colleague satisfactory? Yes: 49
No: 4

If No, why?

My Air Force Supervisor, not my SFRP professor, treated me as an "independent contractor". He offered little supervision, or interest, except when I asked questions. Neither person gave me much information from which I could begin my own research work. So, I just had to wait for the professor to give me some work.

My Professor and I had very different topics. His knowledge is apparently state of the art, but I had virtually no knowledge of what he was doing.

4. Suggestions for improvement of working relationships

Tell the supervising professor he should give student some research objectives to work on.

I was more than satisfied with the arrangement and could offer no suggestions for improvement.

I feel I was able to express my ideas and they were considered.

The Air Force in-fighting for our services made the research air somewhat tense.

More input from the Graduate Student in planning the research format would have been helpful. Perhaps consider an interview prior to start of contract date. Enable communication between the two parties to begin earlier.

An Office closer to the research colleague would have been more convenient.

The relationship between supervisor and researcher was excellent because they provided all the necessary information to perform the work assignment.

No suggestions; my supervising Professor included me as a full partner in his efforts and responded very well to any of my suggestions.

My Air Force Colleague and Supervising Professor are both very easy to get along with. I don't think the relationship (friendship & professional) could be much better.

Arrange for all researchers to arrive at the lab at the same time in order to reduce start up time.

If possible, some preliminary work should be performed before arriving at AFHRL.

Everything went very well; I have no suggestions to make. SFRP was

from same college as Graduate Student.

I seek the opportunity to work and meet some people in my professional area. Therefore a student-industry team should be allowed for.

In my case everything went perfectly because I interacted with other members of the group.

Insist on the Supervisor being a Professor.

5. Were you afforded adequate facilities? Yes: 47
No: 6

6. What was your accomplishment in ten weeks? More than expected: 3
Less than expected: 22
About what expected: 28

7. Should Graduate Student appointment continue to require affiliation with a faculty member? Yes: 42
No: 11

8. Were you asked to present seminars? Yes: 15
No: 38

9. Were you asked to participate in meetings? Yes: 27
No: 26

10. Other comments on extra activities?

Not enough activities.

The SCEEE luncheon at AFWL was an excellent idea. Also, the tour around the Base for SCEEE Faculty and Graduate Students was great.

The banquet was very nice.

Had a very good working relationship with personnel. Enjoyed many extra activities such as a picnics, luncheons, etc.

I had no other extra activities. The amount of work I put into the literature review would have prevented participation in extra activities anyway.

Needed more interchange with research colleague on a one-to-one basis.

We were given the opportunity to make use of MWR facilities- which enhanced "free time" and were greatly appreciated.

Physical models should be in operation at the different bases so one can obtain a physical association with the work assignment.

I found some seminars given here to be informative. Meetings with other research participants were extremely well coordinated by AFWL personnel.

A trip was made to the WES facilities to discuss research efforts there in soil dynamics and to present a briefing on my research efforts. I was an extremely worthwhile trip for myself and the WES staff; it

being beneficial in the exchange of knowledge and discussion of research techniques and problems. I was encouraged when completed. I also had the beneficial opportunity to visit a soil dynamics facility at LANL.

I have met many interesting people working at AFWL this summer.

Our relationship with our supporting laboratory was excellent and I feel it greatly improved our final product.

People in the lab made me feel as if I were a part of the lab.

The ability to join the Officers Club was greatly appreciated.

The seminars were very enlightening; The staff briefings were of little value. Several classes were presented by faculty on linear models and multicollinearity. These "extra" activities were beneficial to the project.

I gained valuable experience in performing experiments on dog models: surgery, instrumentation, etc. Also, helped give stress tests to subjects involved in another study undertaken by a fellow SCEEE member. Good Experience! Learned a Lot!

11. How would you rate this program? High (A) ---------- Low (D)

Technically Challenging?	A: 33 B: 17 C: 1 D: 2
Future Research Opportunity?	A: 30 B: 11 C: 8 D: 4
Professional Association?	A: 33 B: 13 C: 6 D: 1
Enhancement of my academic qualifications?	A: 26 B: 17 C: 6 D: 2
Enhancement of my research qualifications?	A: 36 B: 13 C: 0 D: 4
Overall value?	A: 37 B: 11 C: 4 D: 1

B. ADMINISTRATIVE ASPECTS

1. How did you first hear about this program?

Chmn. Dept. of Engineering, Wright State University.
Through a research engineer and my boss at the University.
Through Professors at the University of Vermont
Through a Professor
A Faculty member showed me the announcements in 1982.

Through my sponsoring Professor; From Supervising Faculty Professor.
Professor of Physics Department at Alabama A&M University.
Brochure received by Advisor at "Home Institution".
Through the University's Research Notes; From Friends at School.
I was introduced to it by a former Graduate Researcher.

Through a member of my medical class who had participated in the program last year.
Through my Research Advisor's offer to participate.

1. How did you first hear about this program (continued):

Former faculty participant presented a seminar on his research.
A former Graduate Student Summer Researcher provided me with an application, and information.
National Association for Economic Opportunity (NAFEO) Washington, D.C. March 1981.
From my advisor who participated in the program as a faculty member in 1977.
IEEE Spectrum ad.

2. What was the main reson you applied for this program?

Challenging summer employment; The chance to do challenging research. Summer work; SFRP support. Gaining work and research experience in ElectricalEngineering.
The area of research, technical opportunity and the facility at AFHRL.
The fact that it was applied experience in my exact area of expertise.
The stipend level is much higher than what I normally get as a Graduate student. Enhancement of my research qualifications.
The idea of working in the area of aero-dynamics. The chance to obtain engineering experience. The possibility of working with facilities otherwise unavailable. Financial compensation opportunity.
Several factors including research topic, location of laboratory as well as high compensation. The opportunity for research oriented work during the summer with pay.
The opportunity to work, using my engineering background, over a summer break period; Chance to do research away from the University.
Opportunity to work in "real world" situation, to solve a particular problem; Experience in scientific programming, and income.
Opportunity to do summer work in areas more closely related to my field than can usually be found in "summer jobs"; Possibility of Thesis project.

The opportunity to continue research in my area of interest and make contact with other researchers doing similar work; Opportunity to participate in research presently being conducted by Air Force Personnel; Length and compensation.
Opportunity to work at Air Force facilities, summer work experience, pay scale; The opportunity to gain research experience in a work environment and to obtain first hand knowledge of the research facilities of Eglin AFB for posssible future employment.
Opportunity to make new professional/sponsorship contacts.
A chance to begin research in an area closely related to my future thesis research in a well equipped Lab. with financial reward; The possibility of a follow on program of research.

Possibility of combining biology, a previous degree, with civil engineering.

2. Main reason for applying (continued):

Possibility of combining biology, a previous degree, with civil engineering.

Experience gained by closely working with experts; Research experience opportunities with lasers outdoors; The excellent opportunity of perform research on such technically challenging subjects.

The chance to see and learn how professional research is done; The study involved things I was interested in and plus, I was able to get "hands on" experience in seeing how an experiment involving human subjects was conducted.

Opportunity to work at SAM.

3. How do you rate the stipend level?

Meager:	3
Adequate:	36
Generous:	14

4. Where did you reside?

Apartment:	25
VOQ:	8
Other:	20

5. Would you encourage or discourage expansion of student program?

Encourage:	52
Discourage:	0
No Opinion:	1

6. How do you rate the program administration overall?

Excellent:	27
Good:	22
Fair:	4
Poor:	0

7A. Comments on the strong points of the program?

Allows graduate students to gain actual experience in conducting and carrying out an experiment and research project. Also, great access to necessary facilities. The program places the student in a very stimulating environment where many valuable contacts can be made and a lot can be learned if there is good guidance and support. Excellent research areas, good support from our colleagues in the Laboratory, exposure to practical engineering research.

Top notch research topic and facilities, excellent co-workers; The chance to do interesting, challenging, summer research. Clear definitions and examples of what was expected and how to present or organize reports. The opportunity for students to be exposed to new ideas by working with experts in the field.

7A Comments on Strong Points (continued):

Good pay, challenging work, and good communications; Opportunity to do research in a well equipped Lab. Opportunity to work closely with a Professor. An introduction to military work. Opportunity to understand the Air Forces's technical needs and problems, opportunity to make new professional contacts.

It provides both Faculty and Graduate Students with the opportunity to gain research experience on current trends in their field. Excellent research facilities and equipment, professional association, cooperation of Air Force and government personnel. Ability to gain knowledge and expertise from sources not normally available to Graduate Student.

The research opportunity and the professional relationships I've developed - being responsible for my own project has been a greater challenge, but more rewarding as well. The program was well coordinated and we received full support from the persons in our office and the Air Force.

Provided a good research topic for my Master's thesis. I hope to study many of the recommendations on our final report. Give new experience.

Financial rewards; the program benefits from motivated students; opportunity to "take off" from the graduate school grind for three months; good support from colleagues on the Base. Ability to devote much time to research and many people knowledgeable in the subject were around to answer questions.

Opportunity for non-academic experience, able to put academic ideas into practice. Chance to gain research experience, relative freedom in doing research, good stipend levels, opportunity to see what is being done in research outside academic setting. On-hands experience in a specialized area together with faculty and other research specialists.

Opportunity to apply theory to "real" problem; contact with analysts at Gunter AFS; develop continuing relation AFLMC for future consultation and use of data. Experience, Future Research Opportunities. The opportunity to work at an engineering capacity. The research assignment has given me ideas for what subjects I need to be taking in my graduate study program that will be in my interest.

Work with many different computer systems, when allowed; expertise of personnel with in house systems.

Excellent research relationships and facilities.

Opportunities to develop interest in or to find out how much one dislikes - research.

The support which I received from Wright-Patterson Air Force Base Materials Laboratory was very good. I think that the civilian-military interaction is very good.

7A Comments on Strong Points (continued):

Students get real research experience in a professional environment and is able to associate with research arm of military - quite a different situation than the stereotypical picture of military life. It allows the student work experience in their field of interest.

Gives an opportunity to apply theory to real life situations.

Exposure to other organizations and operationg environments.

The research topics are current and challenging.

Highly competent and professional research colleagues - both civilian and military. Also, non-personal services orientation.

That there are a variety of places and facilities offering a graduate student a nice opportunity for research.

The administration of the program was exceptional - red tape kept to a minimum.

Gives hands on experience in working with engineers.

Excellent opportunity for grad-students. Good pay, develops good working relations, and creates potentials for continuing work.

The facilities available for performing research; potential contacts.

Ability to work with highly qualified, competent professionals in state-of-the-art research.

The opportunity to work with some of the outstanding scientists working with the Air Force and to get a salary competetive with the "real world".

Experience it provided, meeting different people outside of the University.

Observe military organization, participate in research, learn many new things in a short period of time.

I enjoyed the traveling to AFWL and being able to use the facilities (VAX 11-780, Technical Library) there on Base. Working at AFWL gave me a better feel for what type of solution the Air Force was interested in seeing.

Gaining experience in the field of electrical engineering and working with the current Air Force technology.

People were very receptive and helpful.

7B. Comments on the Weak Points of Program?

All things went well, but at times it was difficult to use the equipment because of availability or security clearance requirements.

The appointments need to be made sooner. I was still taking care of SCEEE paperwork during my finals week. Also, the program needs to be better advertised at the colleges.

I had to learn too many things. We really should have been offered VOQ. I wanted to meet people.

7B Comments on Weak Points (continued):

Housing! The housing arrangement should be guaranteed. I had to stay with a friend and his family for three weeks because there was no place on base to stay and the $25/day per diem isn't adequate for a motel and food. I finally got to share a room at the VAQ. Never did get into the VOQ like I was supposed to. Per diem rate should be the same for both Faculty and Students and should be raised.

Stipend level is to low. Shouldn't withhold last four weeks of salary and tell me who to acknowledge in my report. Both practices are "unprofessional".

The last two weeks of pay should be withheld pending the final report instead of four weeks pay.

Long period of time before the first pay check. Most graduate students cannot afford travel expenses, first and last month's rent and living expenses for two weeks out of savings. I had to get a loan for start-up costs.

Housing and travel support and cooperation of labs in getting us to the facility.

High set up costs getting to and starting at the research location, Air Force wasn't totally prepared for us, tedious documentation required.

One comes in the middle of project and attempts to understand the job. It is difficult, because questions arise and the original workers on the specific projects are not around.

The basic weak characteristic of this program is that, except in some special cases, the student does not know anything of the facility prior to the contract date nor anything of the people he is working with. Some type of pre-visit may be helpful. Other problems include getting settled for only ten weeks. I had definite difficulties in housing, banking, and general shopping in Dayton.

Lowry AFB/HRL contracts most of its research out, so there was virtually no opportunity to conduct any "hands-on" research.

There is more paper work involved than is necessary.

Visiting researchers need help with housing - Eglin AFB billeting office told me they couldn't help, so I committed to an apartment. When I arrived I was told I could've stayed on base, but it was too late to save ($1000) rent. I don't think I got much done. If student researchers are to have work assigned to them upon arrival, don't ask for a proposal. The work I did had nothing to do with any of my areas of interest.

Projects were not oriented toward the interests of the students and the delegated tasks were not research oriented.

Ten weeks are just too short to accomplish significant amounts of research. Hard to have a program of research that isn't vary narrow in scope.

The in-fighting between Air Force departments and the misinformation given to us about the availability of support.

7B. Comment on Weak Points (continued):

Lack of assistance from SCEEE or the Air Force in locating housing.

Work was more administrative oriented; needed more emphasis on research.

Lack of communication between SCEEE, the Air Force and the researchers.

Move money would be helpful, expecially when we must maintain two households for ten weeks.

Time is somewhat short, expecially for graduate students who may not be as familiar with research problem as the faculty member or USAF research contact.

It would be nice to be able to pursue the project part time during the school year.

Program length is very short.

The temporary housing availability near Wright-Patterson AFB.

There was no real support of the topic we chose. This put us back at the beginning and we eventually had to alter our topic.

I would have welcomed the opportunity for a longer research period.

Public relations were strengthened for further recruitment of minority students eligible for summer programs.

The lack of an advance payment to offset the high initial expense of locating at the research site.

Twelve weeks would be better than ten.

Time frame is really too short.

Lack of information prior to working of exactly what work experience could be gained.

Too little time, but I realize that can't be helped. Speaking for other students I have talked to, it would be the lack of adequate guidance from Summer Research Faculty members or Focal Points.

More time was needed in our case since our study involved human subjects. It would be advisable to let future members know that if human subjects are involved they need to get their protocols in early so that acceptance by the Human Use Committee can be made prior to their summer work. Also, more guidance needed from by Focal Points, as expressed by other SCEEE follows that I talked with, although not in my case.

Long delay before first paycheck, limits on quality of report due to ten week time constraint.

I was put to work "on my own" with little supervision. That is what I do at school. I could have enjoyed a better learning experience, I feel, if paired up with a professor.

No need for faculty sponsor.

Late date of notification of appointment to program - making it hard to compete with industry for the students.

8. Has this been a fruitful, worthwhile, constructive experience?
Yes: 49 No: 4

9. Other Remarks

I truly appreciate the opportunity you have given me. I can not thank you enough for allowing me to work with Dr. Faghri in his area of expertise. This will be of great help as I continue on with my school project and education.

Being a graduate student, an advancement in compensation would help greatly in making the move to the research site.

More technical books needed in the library and the computer system available should be updated to handle larger size jobs.

I really appreciate this opportunity to meet such fine engineering personnel at Eglin, AFB. I also appreciate the exposure to such state-of-the-art applied engineering research that I have received this summer. I highly recommend this program to anyone as both an education as well as a professional stimulant.

It is a great program and provides valuable experience for the students. Relationships with the Air Force personel were excellent and they supplied all the help and guidance needed to carry out the project.

The personnel at AFWL should have a better understanding of what the Summer Program is all about. They acted like Summer Faculty were just a waste of time and money.

I have learned a tremendous amount of academically and technically rewarding information. The program has definitely succeeded in getting me interested in Air Force Research. I plan to apply for a job at KAFB/AFWL and at other Air Force Research Centers. Please continue this program so others may benefit as I have from this program.

Ten weeks is too short a time to complete an intensive research project. I realize the limitations of a summer program but two extra weeks would provide for start up time and for time exclusively devoted to writing the final report. However, I throughly enjoyed my summer, the people I worked with, the project itself and the city of San Antonio. I look forward to a continued relationship with the Air Force and SCEEE.

I feel that this program has been an extemely worthwhile and quite enjoyable experience. I would highly recommend this program to other graduate students and I hope you will deem it fruitful enough on your behalf to expand the program so more graduate students will have similar opportunity in the future. Thank you!

For both the researcher and the government to get the most from a program of this kind there needs to be a follow on program or extension of the ten week period, depending on the problem.

I think SCEEE did a great job in handling all the paperwork concerning checks, and informing us on the structure of the final report. I appreciate your organization concerning these matters.

9. Other Remarks (continued):

However, I think with-holding four weeks pay is rather harsh, expecially on those who need themoney (not in my case, but maybe in others). I think two weeks pay with-holding if sufficient.

The DDAS (the system I was supposed to work on) was not functioning properly and it will have to be returned to the manufacturer. I was under the impression that the unit would be operating and I was to integrate it to another unit. Because the device never worked correctly, it was a frustrating summer.

I would recommend this program to other graduate students. However it has shortcomings. Large amount of cash required before first paycheck is received. No public transportation so you must have a reliable car or money to fix it on the road. Dayton area is not geared for short term housing, be prepared to pay high prices for sub-standard housing.

I thought the program was very educational for me and was run very well. I would like to see this program continued.

Thank you for the program; continue to maintain this high quality experience.

Challenging and interesting project. Opportunity to work with supervising professor. Opportunities are provided for further study in specified area.

Given the initial expenses of locating at the research site, an advance of one or two weeks stipend and expense allowance would greatly aid the student or faculty member during this transition period, thus making them more productive to the research effort.

Very pleased with the program!

I do not feel that enough thought or planning was given to the objectives and goals that we were to accomplish at the research location.

I really can't think of anything that needs to be done to improve the program. SCEEE's support was exceptional and I am very grateful that I was selected to participate in this very rewarding program.

Thanks for considering me for the program. I have enjoyed the summer working with the engineers and the experience I have gained will be beneficial as I complete my academic studies.

I look forward to returning to AFHRL to continue to work on this project as a faculty person next year.

The designated tasks requested by the research location (Eglin AFB) were more administrative in nature that research oriented. Eglin AFB was not a good location for Computer Science research since the personnel there are more interested in using existing technology rather than developing new technology. A location such as Langley Research Center or Los Alamos National Laboratory would have been more interesting if they were affiliated with the Air Force Summer Research Program.

9. Other Remarks (continued):

I feel fortunate to be a part of the program and find it rewarding. I feel that I could have accomplished more and have done a more efficient job if the Air Force would have been more prepared, i.e., having data ready upon my arrival, so that we could have started the analysis at the beginning of the ten week period. As far as SCEEE is concerned, I think all aspects are handled well on a professional level.

Should inform participants in the program that if they intend to do any experiments involving humans that it takes four to six weeks to get the protocol reviewed (and hopefully approved) by the Human Use Committee. Therefore, it would be wise to advise future participants to have their protocol written and submitted early so that adequate time can remain in which to carry out the experiment before the ten weeks are up.

Since the program often invo ves mini-grants with follow-up this grant, and since many faculty sponsors are at colleges and universities with out graduate programs, I feel that there is a need to extend the graduate student program to undergraduate juniors and seniors so that they can be a part of the follow-up mini-grant. There are many bright research oriented students who are lured away from graduate school by promises of large salaries, who might be encouraged to continue with their post-college education, by participating a program such as this. Thank-you for the opportunity.

I'm a little concerned about what is expected in the final report. It is very difficult to complete a research topic in just ten weeks and in many cases results will not reflect the difficulties encountered and the effort put forth. Personally this has been the most rewarding opportunity I have encountered as a young engineer. In particular the opportunity to work with and learn from personnel of the Flight Dynamics Lab is undescribable both from a personal and professional standpoint. Finally I wish to thank SCEEE for the opportunity to participate in the program.

I throughly enjoyed my research effort at AFWL, finding it a challenging and interesting experience. I would be interested in applying again for an appointment as a faculty member in the future. Some comments on the overall program follow:

(a) excellent opportunity to conduct research and make contacts with other researchers.

(b) gave a good perspective of Air Force interest and efforts in the particular area of research I am involved in.

(c) the trips were an important and beneficial part of the research effort and I would recommend they be a part of the program where possible.

(d) it would be very beneficial to the summer researchers and AFOSR if AFOSR were to offer some nominal support for 6-12 months after the summer appointment, to encourage the summer researchers in

9. Other Remarks (continued):

continuations of their research efforts. This would be for the students since the faculty have a mini-grant available to them. The support would be an incentive for research and would keep the summer researchers in contact with AFOSR.

(e) it would also be very beneficial to all summer researchers and AFOSR to have a follow up meeting the next summer with the researchers to present the work they have done since the 1st summer. This would also
maintain contact between the researchers and AFOSR and provide a meeting to evaluate and assess research needs in paticular areas, keeping AFOSR abreast of recent developments and in contact with the research community.

(f) concerning base specific requirements, such as identification cards, base passes and housing, it would be very useful if bases could provide a packet of information concerning the items that the researcher will need to obtain for access to the base and facilities prior to the researchers arrival at the research location. It would also be very helpful if some type of orders were provided as this was asked for many times at the base. Concerning housing, I was fortunate to get into VOQ housing, but this happened by chance. I was not made aware of the possibility of residence there until just before I left but was able to get in. It was quite convenient and inexpensive. I realize that the VOQ is for military personnel first but it would be advantageous to inform summer researchers of the possibility of staying there and to advise them as to how to go about attempting to secure quarters there. I found it a nice place to stay.

(g) overall, the summer research program was excellent and I would encourage others to apply and highly recommend the program.

If you are looking for short-term results the faculty program should be promoted. If you want long-term results the student (especially Ph.D.) program should be promoted. I was frustrated in that I had no opportunity to meet or work with people in my academic specialty. I took two hours off and visited one office of QA. They were extremely remote. A lot of student talents were wasted. One did a bibliography for ten weeks. The faculty member I worked with was very good to me but he was not used to having a daily assistant who was ignorant of his specialty. He even tried to teach me how to write his way; I got into his way, to his detriment. I felt the program was constructive for me, and could be made much better. I believe most of the fellow students I met were academically and personally mature enough to work directly with a base researcher. A possible administrative solution would be to have faculty sponsorship (personal responsibility), and academic responsibility by the government researcher. I personally feel faculty sponsorship may not be required. Program (Academic) responsibility to non-faculty frees the student of his University's attitudes and also allows the student to fully experience the situation. A more deliberate program of meeting

9. Other Remarks (continued):

base personnel in the student's academic area should be a part of the program. Something absolutely has to be done about student travel. My faculty member wanted all data and analysis at the University computer. This required several unpaid trips and many days of living off the goodwill of my friends. (I resented this). I urge you to allow the student more academic freedom, not less (e.g. requiring the student to have faculty interest).

Would have liked more base orientation.

APPENDIX I

1. Program Statistics
2. List of 1983 Participants
3. Participant Laboratory Assignments

1983 USAF/SCEEE GRADUATE STUDENT SUMMER SUPPORT PROGRAM

Conducted by
SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION, INC.

PROGRAM STATISTICS

1. Number of Air Force Installations (Laboratories/Centers): 18

2. Applications Received (First Choice as Follows): 94

APL	(W-PAFB)	- 5	HRL/TTD	(Lowry)	- 4
AMRL	(W-PAFB)	- 5	LMDC	(Maxwell)	- 4
AD	(Eglin)	- 9	LC	(W-PAFB)	- 2
AEDC	(Arnold)	- 3	LMC	(Gunter)	- 2
AL	(W-PAFB)	- 5	ML	(W-PAFB)	- 7
BRMC	(W-PAFB)	- 3	RPL	(Edwards)	- 3
ESC	(Tyndall)	- 9	RADC	(Griffiss)	- 5
FDL	(W-PAFB)	- 6	SAM	(Brooks)	- 7
HRL/FTD	(Williams)	- 4	WL	(Kirtland)	- 7
HRL/PRD	(Brooks)	- 5			

3. Number of Participants: 53

Number holding Masters Degree: 14
Number holding Bachelors Degree: 39

4. Average Age of Participants: 26 years

5. Distribution of Participants Location

APL	(W-PAFB)	- 2	HRL/TTD	(Lowry)	- 1
AMRL	(W-PAFB)	- 3	LMDC	(Maxwell)	- 1
AD	(Eglin)	- 5	LC	(W-PAFB)	- 1
AEDC	(Arnold)	- 2	LMC	(Gunter)	- 1
AL	(W-PAFB)	- 3	ML	(W-PAFB)	- 5
BRMC	(W-PAFB)	- 2	RPL	(Edwards)	- 1
ESC	(Tyndall)	- 5	RADC	(Griffiss)	- 4
FDL	(W-PAFB)	- 3	SAM	(Brooks)	- 5
HRL/PRD	(Brooks)	- 3	WL	(Kirtland)	- 6

PROGRAM STATISTICS - PAGE TWO

6. Disciplines Represented: 18

Bioengineering	- 1	Education	- 1
Biology	- 2	Engineering Physics	- 2
Wildlife Biology	- 1	Engineering Science	- 1
Business Administration	- 3	Human Factor Engineering	- 1
Chemical Engineering	- 2	Industrial Engineering	- 2
Chemistry	- 3	Mathematics	- 8
Civil Engineering	- 4	Mechanical Engineering	- 4
Computer Science	- 1	Physics	- 4
Electrical Engineering	- 9	Psychology	- 4

7. Number of Colleges/Universities Represented: 36

Alabama, University of (3)	New Mexico, University
Alabama A & M University	North Dakota State University
Arizona State University	Ohio State University
Auburn University (2)	Old Dominion University
Clarkson College	Oregon State University (2)
Clemson University	Pennsylvania State University
Colorado State University (2)	Rose-Hulman Institute of Technology
Cornell University	Rutgers University
Dayton, University of (5)	Sam Houston State University
Emory University	Texas A & M University
Florida, University of	Texas Lutheran College (2)
Florida Institute of Technology	Toledo, University of
Iowa State University	Utah State University
Kansas, University of (2)	Vanderbilt University (2)
Kansas State University (2)	Vermont, University of
Michigan, University of	VPI & SU
Mississippi State University	Wright State University (5)
Missouri, University of	Yale University

8. Number of States/US Territories Represented: 23

Alabama	New York
Arizona	North Carolina
Colorado	North Dakota
Connecticut	Ohio
Florida	Oregon
Georgia	Pennsylvania
Iowa	Tennessee
Kansas	Texas
Michigan	Utah
Mississippi	Vermont
Missouri	Virginia
New Jersey	

LIST OF GRADUATE STUDENTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
Robin Archer Vanderbilt University School of Medicine Nashville, TN 37232 (615) 322-2145	Degree: B.S. in Chemical Engineering 1982 Specialty: Biomedical Engineering Assigned: APL
Wade Auten Virginia Poly. Institute Chemical Engineering Departyment Blacksburg, VA 24061 (703) 961-6631	Degree: M.S., Chemical Engineering, 1983 Specialty: Surface Chemistry Assigned: ESC
Mark Blodgett Florida Institute of Technology Psychology Department Melbourne, FL 32901 (305) 723-3701	Degree: M.S., Clinical Psychology 1983 Specialty: Clinical Psychology Assigned: HRL/L
Daniel Boone Auburn University Psychology Department Auburn, AL 36930 (205) 826-4412	Degree: B.S., Psychology, 1983 Specialty: Adult Clinical Psychology Assigned: LMDC
Cynthia Bragg Rutgers University Education Department New Brunswick, NJ 08903 (201) 932-1766	Degree: M.R.E., Education 1975 Specialty: Social Foundations of Education Assigned: SAM
Bruce Breshears University of Missouri-Rolla Electrical Engineering Department Rolla, MO 65401 (314) 364-9918	Degree: B.S., Engineering Physics 1980 Specialty: Electrical Engineering Assigned: RADC
Robert Calvert Emory University Math. & Comp. Sci. Department Atlanta, GA 30322 (404) 329-7924	Degree: B.S., Mathematics 1983 Specialty: Mathematics & Computer Science Assigned: WL
Lynn Cashion Oregon State University Civil Engineering Department Corvallis, OR 97331 (503) 753-1908	Degree: BSCE, Civil Engineering 1983 Specialty: Environmental Engineering Assigned: AMRL

LIST OF GRADUATE STUDENTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
Stephen Cooley University of Dayton Engineering Management Department Dayton, OH 45469 (513) 229-2238	Degree: B.S., Civil Engineering, 1978 Specialty: Engineering Mgmt. Assigned: ML
Oscar Diaz University of Toledo Electrical Engineering Department Toledo, OH 43614 (419) 866-9127	Degree: B.S. in Electrical Engineering, 1982 Specialty: Statistical Stimulation of Semi-Conductor Devices Assigned: AL
Daniel Fetsko University of Dayton Mechanical Engineering Department Dayton, OH 45409 (513) 229-2185	Degree: B.S., Mechanical Engineering, 1983 Specialty: Mechanical Engineering Assigned: BRMC
James Flynn Old Dominion University Psychology Department Norfolk, VA 23508 (840) 440-4227	Degree: M.S., General/Experimental Psychology Specialty: Personnel Selection Assigned: HRL/B
Joanne Foley Clarkson College Electrical & Comp Engineering Potsdam, NY 13676 (315) 268-4431	Degree: B.S. Electrical Engineering, 1983 Specialty: Biomedical Engineering Assigned: SAM
Doug Garbarini Cornell University Civil & Environ. Engineering Ithica, NY 14853 (607) 256-2348	Degree: B.A., Mathematics, 1981 Specialty: Environmental Engineering Assigned: ESC
Kent Gaylor University of Kansas Electrical Engineering Department Lawrence, KS 66045 (913) 864-4615	Degree: B.S., Electrical Engineering, 1982 Specialty: Communication Systems Engineering Assigned: RADC
Frederick Gentner University of Michigan Stat. & Mngmt. Sci. Department Ann Arbor, MI 48103 (313) 763-1507	Degree: M.B.A., 1982 Specialty: Business Administration Assigned: LMC

LIST OF GRADUATE STUDENTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
Tim Haddock Arizona State University Mech. & Aero. Eng. Department Tempe, AZ 85287 (602) 965-9011	Degree: B.S., Physics, 1983 Specialty: Materials Science Assigned: ML
Catherine Hassett Colorado State University Psychology Department Ft. Collins, CO 80523 (303) 491-7201	Degree: B.A., Psychology, 1980 Specialty: Psychology Assigned: HRL/B
Daniel Hill Iowa State University Mech. Engineering Department Ames, Iowa 50010 (515) 294-1380	Degree: M.S., Mechanical Engineering, 1981 Specialty: Control Systems Assigned: AEDC
Susie Hobbs Alabama A&M University Physics Department Normal, AL 35762 (205) 859-7011	Degree: B.S., Mathematics Specialty: Adult Clinical Psychology Assigned: LMDC
John Kainer Sam Houston State University Physics Department Huntsville, TX 77341 (213) 294-1600	Degree: B.S., Physics, 1981 Specialty: Solid State Physics Assigned: SAM
Howard Koswara Rose Hulman Inst. of Tech. Civil Engineering Deptartment Corvallis, OR 97333 (812) 877-1511	Degree: M.S., Civil Engineering, 1983 Specialty: Structural Dynamics Assigned: ESC
Bradley Kramer Kansas State University Industrial Engineering Department Manhattan, KS 66506 (913) 532-5606	Degree: M.S., Industrial Engineering, 1981 Specialty: Operations Research Assigned: LC
Donald Love Pennsylvania State University Engineering, Sci. & Mech. Dept. State College, PA 16801 (814) 234-8462	Degree: B.S., Engineering Science, 1983 Specialty: Solid Mechanics Assigned: RPL

LIST OF GRADUATE STUDENTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
James Lyne Vanderbilt University School of Medicine Nashville, TN 37212 (615) 321-5032	Degree: M.S., Engineering Physics, 1982 Specialty: Medical Science Assigned: SAM
Charles MacArthur Universtiy of Dayton Mech. Engineering Department Dayton, OH 45469 (513) 229-3921	Degree: M.E., 1973 Specialty: Fluid Mechanics, Heat Transfer Assigned: APL
Michael Maglich University of Dayton Mech. Engineering Department Dayton, OH 45469 (513) 298-4783	Degree: B.S., Mechanical Engineering, 1982 Specialty: Computational Aerodynamics Assigned: FDL
Robert Marcus Wright State University Computer Science Department University, AL 35401 (205) 348-6363	Degree: B.S., Mathematics, 1980 Specialty: Computer Science Assigned: AD
Philip McLean University of Alabama Computer Science Department University, AL 35486 (201) 932-1766	Degree: B.S., Mathematics, 1976 Specialty: Computer Sciences Assigned: AD
John Newman University of New Mexico Chemistry Department Albuquerque, NM 87112 (505) 293-8664	Degree: B.S., Chemistry, 1982 Specialty: Physical Chemistry Assigned: WL
Benjamin Pashkoff Texas A&M University Ind. Engineering Department College Station, TX 77844 (713) 845-7942	Degree: B.S., Bioenginering, 1982 Specialty: Bioengineering Instrumentation Assigned: AMRL
Debra Picklesimer Wright State University Chemistry Department Dayton, OH 45435 (513) 873-2855	Degree: B.S., Chemistry, 1983 Specialty: Organic Chemistry Assigned: ML

LIST OF GRADUATE STUDENTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
Mark Pippin University of Dayton Physics Department Dayton, OH 45469 (513) 229-2311	Degree: B.S., Physics, 1983 Specialty: Condensed Matter Assigned: ML
Burton Price NC Central University Chemistry Department Durham, NC (919) 683-6462	Degree: B.S., Chemistry, 1979 Specialty: Biochemistry Assigned: ESC
Christine Rainey Wright State University Engineering Department Dayton, OH 45435 (513) 873-2403	Degree: B.S., Human Factors in Engineering, 1983 Specialty: Thermodynamics, Fluid Dynamics Assigned: APL
Steven Ramsier Clemson University Mathematical Sciences Department Clemson, SC 29631 (803) 654-2160	Degree: B.S., Mathematics, 1982 Specialty: Statistics Assigned: HRL/B
Christopher Rentola Oregon State University Elec. & Comp. Eng. Department Corvallis, OR 97333 (503) 758-5257	Degree: B.S., Electrical Engineering, 1979 Specialty: Computer Architecture Assigned: AL
Steven Roberts Utah State University Physics Department Logan, UT 84322 (801) 750-2857	Degree: B.S., Physics, 1981 Specialty: Electromagnetic Phenomena Assigned: WL
Debra Rotto Texas Lutheran College Biology Department Sequin, TX 75248 (512) 379-0198	Degree: B.S., Biology, 1983 Specialty: Cardiovascular Physiology Assigned: SAM
Diane Rotto Texas Lutheran College Biology Department Sequin, TX 75248 (512) 379-0198	Degree: B.S., Biology, 1983 Specialty: Cardiovascular Physiology Assigned: SAM

LIST OF 1983 GRADUATE STUDENT PARTICIPANTS(continued)

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
William Schoggen Mississippi State University Electrical Engineering Department Mississippi State, MS 39762 (601) 325-3912	Degree: M.S. Electrical Engineering, 1980 Specialty: Communications/Controls Assigned: AD
Norman Tew Auburn University Electrical Engineering Department Auburn, AL 36830 (205) 826-7477	Degree: B.E.E., Electrical Engineering, 1982 Specialty: Automatic Control Systems Assigned: AD
Russell Thomas Kansas State University Electrical Engineering Department Manhattan, KS 66502 (913) 532-5600	Degree: B.S., Electrical Engineering, 1983 Specialty: Network Modeling and Analysis Assigned: WL
Nancy Thibeault Wright State University Computer Science Department Dayton, OH 45435 (513) 873-2491	Degree: B.A., Mathematics, 1968 Specialty: Computer Science Assigned: AL
Brenda Todd Wright State University Mathematics Department Dayton, OH 45435 (513) 873-2785	Degree: B.S., Mathematics, 1979 Specialty: Applied Mathematics Assigned: FDL
Kevin Verfaille University of Vermont Electrical Engineering Department Burlington, VT 05401 (802) 658-3976	Degree: B.S., Mathematics & Biology, 1981 Specialty: Electrical Engineering Assigned: RADC
George Veyera Colorado State University Civil Engineering Department Ft. Collins, CO 80523 (303) 491-7825	Degree: M.S., Civil Engineering, 1980 Specialty: Geotechnical Civil Engineering Assigned: WL
Donald White Yale University Mathematics Department New Haven, CT 06520 (203) 785-9178	Degree: M.S., Mathematics, 1982 Specialty: Mathematics Assigned: FDL

LIST OF GRADUATE STUDENTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
Daniel Willeford Wright State University Computer Science Department Dayton, OH 45469 (513) 873-2491	Degree: B.S., Computer Engineering, 1982 Specialty: Dedicated Microprocessor System Design Assigned: WL
Scott Williams University of Alabama Computer Science Department University, AL 35486 (205) 348-6363	Degree: B.S., Electrical Engineering, 1981 Specialty: Computer Science Assigned: AD
Douglas Yovaish University of Florida Civil Engineering Department Gainesville, FL 32801 (904) 371-0603	Degree: B.S., Civil Engineering, 1983 Specialty: Geotechnical Engineering Assigned: ESC
Norman Zaenglein University of Toledo Industrial Engineering Department Toledo, OH 43606 (419) 537-2112	Degree: M.S., Industrial Engineering, 1980 Specialty: Systems Assigned: BRMC
Andrew Zimmerman N. Dakota State University Electrical Engineering Department Fargo, ND 58105 (701) 241-2630	Degree: B.S., Electrical Engineering, 1982 Specialty: Electrical Engineering Assigned: RADC

PARTICIPANT LABORATORY ASSIGNMENT

1983 USAF/SCEEE GRADUATE STUDENT SUMMER SUPPORT PROGRAM

AERO PROPULSION LABORATORY
(Wright-Patterson Air Force Base)
1. Mr. Charles MacArthur - University of Dayton
2. Ms. Christine Rainey - Wright State University

AEROSPACE MEDICAL RESEARCH LABORATORY
(Wright-Patterson Air Force Base)
1. Ms. Robin Archer - Vanderbilt University
2. Ms. Lynn Cashion - Oregon State University
3. Mr. Benjamin Pashfoff - Texas A&M University

ARMAMENT DIVISION
(Eglin Air Force Base)
1. Mr. Robert Marcus - University of Alabama
2. Mr. Philip McLean - University of Alabama
3. Mr. William Schoggen - Mississippi State University
4. Mr. Norman Tew - Auburn University
5. Mr. Scott Williams - University of Alabama

ARNOLD ENGINEERING DEVELOPMENT CENTER
(Arnold Air Force Station)
1. Mr. Daniel Hill - Iowa State University of Science & Tech.
2. Ms. Susie Hobbs - Alabama A&M University

AVIONICS LABORATORY
(Wright-Patterson Air Force Base)
1. Mr. Oscar Diaz - University of Toledo
2. Mr. Christoper Rentola - Oregon State University
3. Ms. Nancy Thibeault - Wright State University

BUSINESS RESEARCH MANAGEMENT CENTER
(Wright-Patterson Air Force Base)
1. Mr. Daniel Fetsko - University of Dayton
2. Mr. Norman Zaenglein - University of Toledo

ENGINEERING & SERVICES CENTER
(Tyndall Air Force Base)
1. Mr. Wade Auten - VPI & SU
2. Mr. Doug Garbarini - Cornell University
3. Mr. Howard Koswara - Rose-Hulman Institute of Technology
4. Mr. Burton Price - University of Kansas
5. Mr. Douglas Yovaish - University of Florida

FLIGHT DYNAMICS LABORATORY
(Wright-Patterson Air Force Base)
1. Mr. Michael Maglich - University of Dayton
2. Ms. Brenda Todd - Wright State University
3. Mr. Donald White - Yale Univerity

PARTICIPANT LABORATORY ASSIGNMENT (continued)

HUMAN RESOURCES LABORATORY/PERSONAL RESEARCH DIVISION
(Brooks Air Force Base)
1. Mr. James Flynn - Old Dominion University
2. Ms. Catherine Hassett - Colorado State University
3. Mr. Steve Ramsier - Clemson University

HUMAN RESOURCES LABORATORY/ TECHNICAL TRAINING DIVISION
(Lowry Air Force Base)
1. Mr. Mark Blodgett - Florida Institute of Technology

LEADERSHIP & MANAGEMENT DEVELOPMENT CENTER
(Maxwell Air Force Base)
1. Mr. Daniel Boone - Auburn University

LOGISTICS COMMAND
(Wright-Patterson Air Force Base)
1. Mr. Bradley Kramer - Kansas State University

LOGISTICS MANAGEMENT CENTER
(Gunter Air Force Base)
1. Mr. Frederick Gentner - University of Michigan

MATERIALS LABORATORY
(Wright-Patterson Air Force Base)
1. Mr. Stephen Cooley - University of Dayton
2. Mr. Tim Haddock - Arizona State University
3. Mr. John Kainer - Sam Houston University
4. Ms. Debra Picklesimer - Wright State University
5. Mr. Mark Pippin - University of Dayton

ROCKET PROPULSION LABORATORY
(Edwards Air Force Base)
1. Mr. Donald Love - Pennsylvania State University

ROME AIR DEVELOPMENT CENTER
(Griffiss Air Force Base)
1. Mr. Bruce Breshears - University of Missouri
2. Mr. Kent Gaylor - University of Kansas
3. Mr. Kevin Verfaille - University of Vermont
4. Mr. Andrew Zimmerman - North Dakota State University

SCHOOL OF AEROSPACE MEDICINE
(Brooks Air Force Base)
1. Ms. Cynthia Bragg - Rutgers University
2. Ms. Joanne Foley - Clarkson College
3. Mr. James Lyne - Vanderbilt University
4. Ms. Debra Rotto - Texas Lutheran College
5. Ms. Diane Rotto - Texas Lutheran College

WEAPONS LABORATORY
(Kirtland Air Force Base)

1. Mr. Robert Calvert, Jr. - Emory University
2. Mr. John Newman - University of New Mexico
3. Mr. Stephen Roberts - Utah State University
4. Mr. Russell Thomas - Kansas State University
5. Mr. George Veyera - Colorado State University
6. Mr. Daniel Willeford - Wright State University

APPENDIX II

1. Listing of Research Reports Submitted in the 1983 Graduate Student Summer Support Program

2. Abstracts of the 1983 Graduate Student's Research Reports

1. Listing of Research Reports Submitted in the 1983 Graduate Student Summer Support Program

RESEARCH REPORTS

1983 GRADUATE STUDENT SUMMER SUPPORT PROGRAM

Technical Report Number	Title	Graduate Researcher
1	The Pharmacokinetics of Dibromomethane and Metabolites	Robin S. Archer
2	Use of Colloidal Gas Aphrons (CGA'S) for Treating Hazardous Wastes	Wade L. Auten
3	Reinforcement Induces Stereotype of Sequential Behavior	Mark Blodgett
4	Evaluation of Organization Development Interventions: A Literature Review	Daniel E. Boone
5	Dilemmas of Combat Psychiatry: World War II and Vietnam	Cynthia B. Bragg
6	Reduction of Optical Effects of Atmospheric Turbulence with Retro-Reflective Arrays	Bruce E. Breshears
7	An Evaluation of Two Nuclear Weapons Effects Computer Programs	Robert O. Calvert, Jr.
8	Intergastric Administration of Dibromomethane to Rats	Lynn E. Cashion
9	A Dynamic Mini-Model for Space Technology Resource Allocation	Stephen C. Cooley
10	A GaAs Mesfet Model for Computer Calculations	Oscar G. Diaz
11	R&D Project Selection: An Annotative Bibliography	Daniel T. Fetsko
12	A Meta-Analysis of Multitrait-Multimethod Studies of Work Performance Ratings	James B. Flynn

Technical Report Number	Title	Graduate Researcher
13	Laser Densitometer Design	Joanne M. Foley
14	Partitioning Equilibria of Volatile Pollutants in Three Phase Systems	Doug Garbarini
15	Time Domain Simulation of Interception of FH/PN Signals by a Scanning Radiometer Receiver	Kent Gaylor
16	Testing the Representativeness of the Supply Data Bank	Frederick J. Gentner
17	Tem Morphology Study of Molecular Composites of Polymers	Tim Haddock
18	A Meta-Analysis of Multitrait-Multimethod Studies of Work Performance Ratings	Catherine E. Hassett
19	Investigation of Liquid Sloshing in Spin-Stabilized Satellites	Daniel E. Hill
20	An Evaluation of the Mathematical Process and Formulation for Case Mounted Displacement Sensors	Susie A. Hobbs
21	Infrared Spectroscopy of Neutron Transmutation Doped Silicon: Gallium	John J. Kainer
22	A Finite Element Analysis of Underground Shelter Subjected to Ground Shock Load	Howard Koswara
23	Toward The Development of a Cannibalization Policy via Markov Chain Computations	Bradley A. Kramer
24	Determination of Stress-Intensity Factor for Solid Propellant Specimens	Donald Love

Technical Report Number	Title	Graduate Researcher
25	Identification of Rapid Eye Movements by Computer During Discrete Tracking Tasks	J. Evans Lyne
26	Prediction of Free Stream Turbulence Effects on Boundary Layer Heat Transfer - An Evaluation of the Heat Transfer Code Stan5	Charles D. MacArthur
27	Numerical Analysis of Two Phase Flow on an Airfoil	Michael F. Maglich
28	Management Information Services	Robert G. Marcus
29	Management Information Services	Philip R. McLean
30	Rates of Relaxation of Highly Excited Vibrational Levels of HF and DF	John Kent Newman
31	Characteristics of the Somatosensory Magnetic Evoked Potential	Ben Pashkoff
32	Synthesis of Aryltrifluoromethylacetylenes	Debra K. Picklesimer
33	Transport and Electron Paramagnetic Resonance Studies of Infrared Detector Materials	Mark Pippin
34	Photochemical Reactions in a Small Indoor Smog Chamber	Burton D. Price
35	Axial Variation of Local Heat Flux Along the Condenser Section of a Double-Wall Artery High Capacity Heat Pipe	Christine L. Rainey
36	Analysis of Pilot Selection Data	Steven Ramsier

Technical Report Number	Title	Graduate Researcher
37	Real-Time Data Quality Assessment of Distributed Data Acquisition Systmes	Christopher T. W. Rentola
38	Finite Element Preliminaries in EMP Environments	Steven A. Roberts
39	Effects of Fluid Shifts and Hypovolemia in Individuals with Different Working Capacities While Resting at a Five Degree Declination	Debra K. Rotto
40	Effects of Fluid Shifts and Hypovolemia in Individuals with Different Working Capacities While Resting at a Five Degree Declination	Diane M. Rotto
41	Evaluation of Automatic Network Analyzer	William O. Schoggen
42	Parameter Estimation Via Kalman Filtering for Use in Bank-To-Turn Missile Autopilot Design	Norman E. Tew
43	Computer Network Characterization	Russell D. Thomas
44	Design and Creation of Data Base Files for Semiconductor Materials Characterization	Nancy E. Thibeault
45	Least Squares Method Reduction and Feedback Control Design For Linear Digital Systems	Brenda R. Todd
46	Image Filtering and Computer Recognition	Kevin J. Verfaille
47	Blast-Induced Liquefaction Mechanisms and Experience	George E. Veyera, Jr.
48	Direct Determination of Mass, Damping, and Stiffness Matrices	Donald L. White

Technical Report Number	Title	Graduate Researcher
49	Management Information Services	Scott A. Williams
50	The Digital Data Acquisition System: Some Additional Comments on its Operation	Daniel M. Willeford
51	Combined Blast and Fragment Loading on Reinforced Concrete	Douglas J. Yovaish
52	A Preliminary Investigation of the Utility of Linear Digital Filters for Analyzing Economic System Performance Data	Norman Zaenglein
53	An Evaluation of the Data Handling and Recording System	Andrew C. Zimmerman

2. Abstracts of the 1983 Graduate Student's Research Reports

THE PHARMACOKINETICS OF DIBROMOMETHANE AND METABOLITES

by

ROBIN S. ARCHER

ABSTRACT

The pharmacokinetics of dibromomethane (DBM) after both iv dosing and inhalation exposure was investigated. The time course of DBM blood concentration and of blood carboxyhemoglobin following iv dosing (13.1 and 65.5 mg/kg) and inhalation exposures (100, 200, 400, and 1000 ppm for 4 hr) are presented. Data from two low concentration inhalation exposures (10 and 25 ppm for 4 hr) are presented to assist in evaluating extrahepatic DBM metabolism. In addition, end experiment plasma bromides as well as volume of distribution of bromide for a 225 g rat are given. Suggestions for the application of these data and for further experimentation are offered.

USE OF COLLOIDAL GAS APHRONS (CGA'S) FOR TREATING HAZARDOUS WASTES

by
Donald L. Michelsen
Wade L. Auten

Abstract

Colloidal Gas Aphrons, a microdispersion of stable small air bubbles (15 to 50 mμ) in air, have proven to be effective in separation processes. The purpose of this laboratory study was to explore their effectiveness in treating hazardous wastes by 1) evaluating their flow characteristics through soil matrices (for removal or scouring of pollutants and for in-situ biodegradation); 2) quantifying their adhesion and retention in various saturated matrices (impoundments) for subsequent in-situ biodegradation; and 3) determining the feasibility of an extraction/flotation process for removing ortho dichlorobenzene (dissolved hazardous organics) from contaminated water using CGA's for flotation.

Extensive results on flow of CGA through a coarse golf course sand documented the importance of surfactant, type and concentration, and pretreatment on CGA flow characteristics.

The adhesion and retention of CGA's in a flooded impoundment were very promising. Water was displaced with 0.56 to 1.25 air/water volume ratio injected in the saturated sand and 75% retention of these bubbles one month later.

Finally, while testing was limited, CGA's provided encouraging phase separation (clarification) in an extraction/flotation process for removing soluble ortho dichlorobenzene from water using a good decane solvent (high partition coefficient).

REINFORCEMENT INDUCED STEREOTYPY OF SEQUENTIAL BEHAVIOR

by

Mark Blodgett and Arthur Gutman Ph.D.

ABSTRACT

The purpose of this report is to interface a major applied issue in Air Force technical training with basic research issues in the area of learning and Memory. The final product is a proposal to conduct four basic research experiments relating to the deleterious effects of positive reinforcement on incidental learning and transfer of learning on a sequential learning task. The long-range purpose of the proposed research is to create a more general program of research to investigate the more global conditions that produce and, more importantly, prevent these deleterious effects.

Evaluation of Organization Development Interventions: A Literature Review

by

Daniel E. Boone

Abstract

This literature review covers those necessary issues and elements that are essential for the implementation of an evaluation of an Organization Development (OD) intervention. An optimal evaluation takes into consideration each of the following steps: (1) Setting up goals and choosing criteria to measure them; (2) Choosing measurement instruments and the problems associated with measuring change; (3) Research design and statistical analysis. Each of these steps is discussed seperately, followed by a brief assessment of the current state of the art of OD research in light of these considerations. Recommendations are then made as to how OD evaluations can be improved in light of the discrepancies found.

DILEMMAS OF COMBAT PSYCHIATRY: WORLD WAR II AND VIETNAM

by

Willie A. Bragg
and
Cynthia B. Bragg

ABSTRACT

A review was conducted to investigate issues surrounding combat psychiatry. The focus of this investigation was to examine the development of combat psychiatry from the Civil War to Vietnam. Special attention was given to World War II and Vietnam conflict relative to incidence, diagnosis and treatment of psychiatric casualties. The results demonstrate the significant gains made in preventive psychiatry. Recommendations for further study are outlined.

REDUCTION OF OPTICAL EFFECTS OF ATMOSPHERIC TURBULENCE WITH RETRO-REFLECTIVE ARRAYS

by

Bruce E. Breshears

ABSTRACT

Wavefront correction of atmospheric perturbations is important for ground-based laser communication systems. A corner cube reflector array (retro-reflector array) was used as a pseudo-phase conjugator to reduce perturbations induced on a HeNe laser in a double pass arrangement through a 1000-foot path of atmospheric turbulence. Preliminary data analysed from this experiment indicates qualitatively that some real time wavefront correction was performed.

Beam spreading was reduced and a notable improvement in stability of intensity fluctuations were observed with a linear CCD array. Suggestions for further research in this area are offered.

AN EVALUATION OF TWO NUCLEAR WEAPONS EFFECTS COMPUTER PROGRAMS

by

John G. Eoll

Robert O. Calvert, Jr.

ABSTRACT

Work was performed on two FORTRAN programs used to model two separate nuclear weapons effects problems. The first code, the widely used HULL hydrodynamic code, was evaluated as to the possibility of including the effect of dust scattering in the radiation transport section of the code. It is our conclusion that considerable work needs to be done with HULL before the scattering effect can be included. Specific recommendations are described in detail.

The second code worked on was a family of FORTRAN programs used to model fallout problems. We combined the programs AFIT, BRAVO3, and SMEAR into a single interactive code named NCG capable of running on a PDP 11/24 minicomputer. Specific attention was paid to including a detailed wind field in the calculation of the distribution of fallout particles.

INTRAGASTRIC ADMINISTRATION OF DIBROMOMETHANE TO RATS

by

KENNETH J. WILLIAMSON AND LYNN E. CASHION

ABSTRACT

Partition coefficients for dibromomethane for saline, rat bile, corn oil, and mineral oil were determined by gas absorption. Dibromomethane was orally dosed to rats in saline at 10, 20, 50, and 100 mg/kg and the resulting time course for blood concentrations of the parent compound and carboxyhemoglobin were measured. The time traces were simulated using a physiological toxicokinetic model including partitioning to various body compartments, first-order absorption from the gut lumen, liver metabolism, kidney excretion, and exhalation. The model could not accurately simulate the experimental data with a single first-order absorption coefficient applied to all the dosages.

A DYNAMIC MINI-MODEL

FOR SPACE TECHNOLOGY RESOURCE ALLOCATION

by

Patrick J. Sweeney
Stephen C. Cooley

ABSTRACT

The report outlines a rationale and methodology that can be used to allocate resources in the Air Force Research and Developement Space Program. The results of allocations are shown both graphically and in tabular form. The report addresses mission priorities and work unit (research projects) selection and shows how each can affect the overall mission accomplishment. That work unit subjective probability of success estimates have traditionally been overly optimistic is also addressed and a potential solution is discussed. The dynamic model developed can easily be utilized to search out best overall solutions and for exercising "what if" opportunities. An extensive bibliography of resource allocation model evaluations is included.

A GaAs MESFET MODEL FOR COMPUTER CALCULATIONS

by

Oscar G. Diaz

ABSTRACT

Accurate models to simulate the behavior of GaAs MESFET's have become necessary to incorporate these devices in a readily available circuit analysis program. In this study a method for the extraction of the model parameters using the experimental data is discussed. Three different models were compared, two models which have been previously derived and a third model which was derived in this study using a modified version of one of the other two models. It is shown that the modified model gives more accurate results in predicting the behavior of a GaAs MESFET than the other two models. All three of the models discussed can be incorporated into the SPICE2 circuit simulation program.

R&D PROJECT SELECTION: AN ANNOTATIVE BIBLIOGRAPHY

by

DANIEL T. FETSKO

ABSTRACT

Many articles have been written over the years on R&D project selection. This subject has received a substantial amount of attention in the past and is continuing to do so. This article provides a list of related articles and a brief summary of each.

A META-ANALYSIS OF MULTITRAIT-MULTIMETHOD STUDIES OF WORK PERFORMANCE RATINGS

by

James B. Flynn

Catherine E. Hassett

ABSTRACT

The quality of performance ratings is an issue of concern to both practitioners and scientists of industrial-organizational psychology. The present study offers a statistical integration of multitrait-multimethod studies on work performance ratings. It evaluates the cumulative effects of moderator variables on the convergent validity, discriminant validity, and method bias reported by multitrait-multimethod analysis. The results indicate that convergent validity is obtained when the number of rating scale points is increased, ratings are obtained in private industry, the ratee sex is female, or a graphic format is used to obtain ratings. Discriminant validity is enhanced when scale reliabilities are increased, raters have maximum opportunity to observe ratee performance, performance dimensions are based on existing scales, ratees are affiliated with academia, or the object being rated is a videotape. Method bias is reduced when ratees are affiliated with academia, performance dimensions are behavioral in content, the object being rated is a videotape, rater training is provided, the focus of rater training is the accuracy of ratings, raters are provided the maximum opportunity to observe ratee performance, and performance dimensions are based on existing sales. These findings suggest a need for research to evaluate the effects of rater training and rater acceptance on the quality of performance ratings.

LASER DENSITOMETER DESIGN

by

Joanne M. Foley
and
Mark E. Lewittes

ABSTRACT

A design for an automated laser densitometer is presented. The design allows for the measurement of the optical density of samples with high attenuation factors. Such materials are used for or have the potential for use as laser protective eyewear.

The densitometer is designed to measure optical densities as high as 8±.1 OD. Both pulsed and continuous laser sources are incorporated in the densitometer. Wavelengths in the range 488 nm to 1064 nm are available. A microcomputer provides the automation of the laser densitometer, prompting the user through the measurement procedure, making the measurements, and ultimately performing the calculations to determine the optical density of the sample.

PARTITIONING EQUILIBRIA OF VOLATILE POLLUTANTS IN THREE PHASE SYSTEMS

by

Leonard W. Lion and Doug Garbarini

ABSTRACT

Volatile pollutants in unsaturated ground water systems are partitioned between the gaseous, aqueous, and solid phases. Equilibria between aqueous solution, the atmosphere, and a solid adsorbent are evaluated in this research. An equilibrium head space technique is employed to determine Henry's Law constants and activity coefficients for components of JP-4 Fuels and for trichloroethylene. Sorption equilibria for these same compounds are also determined on aluminum oxide (Al_2O_3) with and without humic acid coating materials, on humic acids in the absence of Al_2O_3, and on naturally occurring Air Force base soils.

Time Domain Simulation Of Interception of FH/PN Signals by a Scanning Radiometer Receiver

by

Kent Gaylor

Abstract

The question of how vulnerable frequency hopped pseudonoise (FH/PN) spread spectrum (SS) systems are to the interception of their signals by a scanning radiometer is addressed by using computer simulation. The development of a scarning radiometer module for the Interactive Communications System Simulation Model (ICSSM) is described. An approach to the simulation of scanning was developed and tested for the radiometer receiver. The performance of several spread spectrum systems are obtained using the simulation. The results of those simulations are presented. Suggestions for further research in this area are offered. The result of this effort is a simulation tool for the evaluation of the interceptibility of different FH/PN waveforms.

TESTING THE REPRESENTATIVENESS OF THE SUPPLY DATA BANK

by

Richard W. Andrews
and
Frederick J. Gentner

ABSTRACT

The objective of this project was to investigate the representativeness of the Air Force Supply Data Bank (SDB) with respect to the Air Force Standard Base Supply System (SBSS). As a working definition of representativeness, we require that a sample include at least one unit from each stratum. In addition, a sample should be balanced. That is, the sample mean and standard deviation should be close to the population mean and standard deviation on all test variables. By interviewing Air Force management, familiar with the SBSS, 78 supply test variables were subjectively selected. A statistic B, which measures closeness was used to compare alternative data banks.

The statistical methodology was accomplished by writing and executing two FORTRAN programs, BASEREP and BCOMP. BASEREP tests the representativeness of a SDB by random generating 100 alternative SDB's with the same coverage and comparing their values of B. BCOMP enables sensitivity analysis to be performed on the values of B.

Two SDB's are considered, one with 12 bases and one with 6 bases. Both of these have the same coverage. The SDB with 6 bases is better balanced for 11 of the 12 months tested. By using BCOMP the bases and the test variables that cause balancing problems are determined.

It is recommended that the 6 base SDB be augmented with one additional base so as to cover the entire Air Force, and that any data bank be tested monthly for representativeness.

TEM MORPHOLOGY STUDY OF MOLECULAR COMPOSITES OF POLYMERS

by

Tim Haddock and Dr. Stephen J. Krause

ABSTRACT

Transmission electron microscopy (TEM) is used to study 30% PBT / 70% ABPBI fibers to determine if a composite has been formed at the molecular level. It is concluded from dark field images and diffraction patterns that micron-sized aggregates rich in PBT crystallites form within an ABPBI rich matrix when fiber is spun or film is cast from solution above a critical concentration. However, when fiber and film was processed from solution below a critical concentration, the PBT is dispersed as crystallites no larger than 30 Å in size. Thus, the existence of a molecular-level composite has been confirmed by TEM.

A META-ANALYSIS OF MULTITRAIT-MULTIMETHOD STUDIES OF WORK PERFORMANCE RATINGS

by

James B. Flynn

Catherine E. Hassett

ABSTRACT

The quality of performance ratings is an issue of concern to both practitioners and scientists of industrial-organizational psychology. The present study offers a statistical integration of multitrait-multimethod studies on work performance ratings. It evaluates the cumulative effects of moderator variables on the convergent validity, discriminant validity, and method bias reported by multitrait-multimethod analysis. The results indicate that convergent validity is obtained when the number of rating scale points is increased, ratings are obtained in private industry, the ratee sex is female, or a graphic format is used to obtain ratings. Discriminant validity is enhanced when scale reliabilities are increased, raters have maximum opportunity to observe ratee performance, performance dimensions are based on existing scales, ratees are affiliated with academia, or the object being rated is a videotape. Method bias is reduced when ratees are affiliated with academia, performance dimensions are behavioral in content, the object being rated is a videotape, rater training is provided, the focus of rater training is the accuracy of ratings, raters are provided the maximum opportunity to observe ratee performance, and performance dimensions are based on existing sales. These findings suggest a need for research to evaluate the effects of rater training and rater acceptance on the quality of performance ratings.

INVESTIGATION OF LIQUID SLOSHING IN SPIN-STABILIZED SATELLITES

By

Joseph R. Baumgarten

and

Daniel E. Hill

ABSTRACT

Certain configurations of spin-stabilized spacecraft consistently develop a coning or nutating motion during the perigee burn. This motion consists of sinusoidal oscillations about the pitch and yaw axes at the same frequency, but with a 90° phase difference. The sloshing of liquid fuel stores is suspected as a source of these nutations. The moving liquid in its spherical containers has been modeled as an equivalent pendulum, pivoted with the main body of the payload, and moving relative to it with rotating constraint. The equations of motion of the spacecraft with a pendulum system have been derived. Numerical solution is accomplished on the digital computer. Comparison is made to flight test data of actual spacecraft.

AN EVALUATION OF THE MATHEMATICAL PROCESS AND FORMULATION FOR CASE MOUNTED DISPLACEMENT SENSORS

by

James Kirkpatrick

Susie A. Hobbs (Graduate Student)

ABSTRACT

A review of the data Analysis Principles of case mounted displacement sensors are validated relative to their algebraic significance and derivations from the standard equation of motion.

Some basic properties of fourier series and transform are discussed. We are primarily concerned with the recapture of f from f if additional information concerning f is known. The proof relies basically on Cesaro Summability, Planchereal Theorem, and the Lebesque Dominated Convergence Theorem. Meanwhile, we can relate the fourier transform to the prominent Paley-Weiner Theorem in the theory of entire functions, that is an entire function is analytic throughout the finite complex plane. This gives the assurances for symmetric inversions formulations for the recapture of f from f.

INFRARED SPECTROSCOPY OF NEUTRON TRANSMUTATION DOPED SILICON: GALLIUM

by

John J. Kainer

ABSTRACT

The results of an infrared spectroscopic study of neutron transmutation doped silicon: gallium as a function of annealing temperature are presented. Radiation induced divacancies are observed at 3030, ~890, and ~767 cm^{-1}. Single phonon lines are present at 415 and 483 cm^{-1} and absorption bands are observed at 532 and 550 cm^{-1}. A strong background absorption in the 600 and 1600 cm^{-1} region occurs after the 600°C anneal. This absorption covers the silicon lattice lines and is very similar to the absorption spectrum for the non-NTD reference sample.

A FINITE ELEMENT ANALYSIS OF UNDERGROUND SHELTER SUBJECTED TO GROUND SHOCK LOAD

BY

HOWARD KOSWARA

ABSTRACT

The possibility of using a standard ASTM box culvert as an underground shelter is studied. The structure is analyzed using a dynamic, finite element method and NONSAP computer code is used to perform the calculations. A finite element model is used including the structure with soil completely surrounding it. Proposed loading models for the structure are also described. Elastic material properties are used and it is indicated that nonlinear material properties should be used due to high stress in concrete and soil. Even though local yield may occur, it appears that the structure, buried 45 feet below the ground, should be structurally safe when submitted to a ground shock loading from a 500 lb explosive charge located 40 feet from the box culvert.

TOWARD THE DEVELOPMENT OF A CANNIBALIZATION POLICY VIA MARKOV CHAIN COMPUTATIONS

by

Bradley A. Kramer

ABSTRACT

The practice of aircraft cannibalization is investigated so that a cannibalization policy might be determined. Markov chains are used to describe the probabilities of an aircraft being in any given state of repair at any time. The Markov chain computations may be used to investigate cannibalization policy both for a stationary process and also for a dynamic process. A simple numeric example is presented to demonstrate this methodology. Suggestions for further research in this area and for extensions to the current model are included.

DETERMINATION OF STRESS-INTENSITY FACTOR FOR SOLID PROPELLANT SPECIMENS

by

Donald Love

ABSTRACT

This report [illegible] a two-dimensional investigation into the variation of Mode I stress-intensity factor with crack length for biaxial solid rocket propellant specimens [illegible] with both symmetrical and unsymmetrical cracks. The variation of normal stress along each sample's width was also investigated. All values were obtained numerically from a finite element analysis utilizing the finite element code, TEXGAP-3D, a linear elastic finite element program. Figures and tables included in the report detail the analysis and the results.

IDENTIFICATION OF RAPID EYE MOVEMENTS BY COMPUTER DURING DISCRETE TRACKING TASKS

by

John P. Giolma and J. Evans Lyne

The identification of rapid eye movements (saccades) and the extraction of performance parameters by digital computer is described. Algorithms written in Fortran are described that use signal noise estimates, main sequence relationships and the digitally derived eye velocity waveform to locate saccades of a half degree and larger. Recommendations are provided for future applications under other tracking conditions and for the improvement of the infrared eye movement recorder.

PREDICTION OF FREE STREAM TURBULENCE EFFECTS ON BOUNDARY LAYER HEAT TRANSFER - AN EVALUATION OF THE HEAT TRANSFER CODE STAN5

by

Charles D. MacArthur

ABSTRACT

The boundary layer heat transfer code STAN5 is compared to recently published measurements of laminar and turbulent heat transfer under the influence of 0.25 to 7% free stream turbulence. Five zero pressure gradient and four favorable pressure gradient flat plate flow cases are examined. The turbulence kinetic energy (one equation) method was used to model the turbulent viscosity in the transition and fully turbulent regions. For comparison, runs were were also made using the Prandtl mixing length model. Transition origin and length was predicted by the empirical methods of Abu-Ghannam and Shaw and Dhawan and Narasimha respectively. Results of the comparisons were mixed. Transition predictions were very sensitive to the input free stream turbulence (FST) level resulting in substantial errors at low FST levels but improving for higher levels. Laminar heat transfer was usually excellently predicted. The turbulence kinetic energy method generally under predicted the turbulent heat transfer by 5 to 30%. Recommendations for improvement of the code are given.

NUMERICAL ANALYSIS OF TWO PHASE FLOW ON AN AIRFOIL

by

Michael F. Maglich

ABSTRACT

The problem of rain effects on an airfoil is examined. The governing equations for the rain droplets are formulated and incorporated into an existing two-dimensional, time-dependent, compressible Navier-Stokes solver. The water equations are coupled to the already present air equations by means of a source term which appears in both the air and water momentum equations. This coupled system of equations is solved using the unsplit MacCormack finite difference explicit scheme.

A dry air, steady state solution is first obtained for a NACA 0012 airfoil at a chord Reynolds number of 170,000 and an angle of attack of 11.5°. The computed surface pressure distribution agrees favorably with experimental data.

A solution to the coupled system of equations is still in progress. A major problem area is formulation of the surface boundary condition for the water particles.

MANAGEMENT INFORMATION SERVICES

by

Robert G. Marcus
Philip R. McLean
Scott A. Williams

ABSTRACT

A survey of current technology in Management Information Service (MIS) systems is presented. The survey focuses on three aspects of MIS systems of particular interest to the information management personnel at Eglin Air Force Base, namely office automation, data base management systems, and computer graphics. The current practices and plans at Eglin Air Force Base are compared to the trends in state-of-the-art MIS systems.

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RATES OF RELAXATION OF HIGHLY

EXCITED VIBRATIONAL LEVELS OF HF AND DF

by

John Kent Newman

Relaxation rates of upper vibrational levels of HF and DF are determined using a double resonance technique with diode lasers as the probe. The exact wavelength of the diode lasers must be known in order to insure probing of the proper vibrational-rotational levels. The tunable wavelength characteristics of a number of infrared diode lasers were determined at various lasing currents and temperatures. The monochromator employed was calibrated using the higher orders of a HeNe laser and calibration curves constructed. Wavelength tunability ranges of up to 100 cm^{-1} demonstrated as temperatures from 16-55°K.

Characteristics of the Somatosensory Magnetic Evoked Potential

by

Ben Pashkoff

ABSTRACT

The work reported describes the preliminary experiments involved in working with the recently installed Super-cooled Quantum Interference Device (SQUID) magnetometer at the Aerospace Medical Research Laboratories at Wright Patterson Air Force Base. The magnetometer is a second order gradiometer configuration which allows for relatively convenient measurement of low level magnetic fields proximal to the end of the probe while deleting the effect of any other magnetic fields in the area. This has been shown to be convenient for use in measuring the magnetic fields of the heart and brain. Transient and steady state evoked potentials may also be measured which have been shown to be similar in character to electrical recordings. The instrumentation necessary and the preliminary measurements of somatosensory evoked potentials are described. Conjectures and suggestions for further work are also made.

SYNTHESIS OF
ARYLTRIFLUOROMETHYLACETYLENES

by

Debra K. Picklesimer

ABSTRACT

Certain aryltrifluoromethylacetylene systems are of interest as possible replacements for epoxy resins. Reaction schemes for their synthesis are outlined and discussed. The synthesis of a model compound, 3-(3,3,3-trifluoropropyne)-diphenyl ether, is presented. Finally, the synthesis of certain of the intermediates required for the systems are reported and discussed and recommendations for further work in this area are presented.

TRANSPORT AND ELECTRON PARAMAGNETIC RESONANCE STUDIES OF INFRARED DETECTOR MATERIALS

by

Mark Pippin

ABSTRACT

Through interaction with the Materials Laboratory, an experimental apparatus for Hall Effect and resistivity measurements has been established in the Physics Department at the University of Dayton. It operates over a temperature range of 4 to 400K. The system has been tested with silicon and gallium arsenide and compared to a comparable system at the Materials Laboratory. It has proved to be reliable for supplemental measurements for that laboratory. An electron paramagnetic resonance spectrometer has been used to examine similar gallium arsenide materials and comparisons made to earlier silicon work. Preliminary work indicates that with some dopants there are weak but as-yet unidentified signals at 77 and 300K. There remains the possibility of identification of the defects responsible.

PHOTOCHEMICAL REACTIONS

IN A SMALL INDOOR SMOG CHAMBER

BY

Stephen F. Lin and Burton D. Price

ABSTRACT

Photochemical reactions were studied in a small indoor smog chamber using long-path Fourier transform infrared spectroscopy. Three types of experiments were carried out to characterize the smog chamber: the irradiation of background air, ozone decay in the absence of light, and photooxidation reactions of the propene-NO_x-air system. The absorbance-time profiles of major products were determined in the background air system. The ozone decay rate was determined. The concentration-time profiles of reactants and major products were determined and important reaction mechanisms were mentioned for the propene-NO_x-air system.

AXIAL VARIATION OF LOCAL HEAT FLUX ALONG THE CONDENSER SECTION OF A DOUBLE-WALL ARTERY HIGH CAPACITY HEAT PIPE

by

Amir Faghri
Christine L. Rainey

ABSTRACT

A new technique was developed to experimentally measure local heat flux and heat transfer coefficient along the condenser section of a heat pipe. This design consists of installing circular fins along the condenser section of a double wall artery high capacity heat pipe. This method allows for overall heat flux as well as the local variation. In addition, a better cooling performance was achieved with this design compared to conventional cooling jackets. The trend in local heat flux and heat transfer coefficients are the same and show a high value at the end of the adiabatic section and decreases toward the end of the condenser section. The experimental result shows an overall energy balance. The general behavior of the individual fin agrees with the analytical result obtained from heat conduction analysis.

ANALYSIS OF PILOT SELECTION DATA

by

Steven Ramsler

ABSTRACT

Historical data on test performance scores and the individual characteristics of student pilots were analyzed to identify measures most highly associated with success in pilot training school. Groups of scores from psychomotor tests, from flight training lessons and from the Air Force qualifying examinations were studied separately as well as jointly for their relationship to training school attrition. A regression equation to predict the likelihood of success in training based on selected grades and characteristics of individuals was developed.

REAL-TIME DATA QUALITY ASSESSMENT OF DISTRIBUTED DATA ACQUISITION SYSTEMS

by

Sigurd L. Lillevik

Christopher T. W. Rentola

ABSTRACT

This report describes a 10-week research effort to study the data quality of the Avionics Laboratory's TSCF distributed data acquisition system. This facility generates data for validating Air Force models and for sensor evaluation. A second-order, alpha-beta tracker was designed to predict the value of a parameter one sample in advance. Thus, whenever the difference of the predicted and actual data exceed a threshold value, erroneous data are detected. To demonstrate this principle and to develop an off-line aid for detecting erroneous data, a software package called PDQA was written, debugged, and verified. This software package was used to evaluate raw data and obvious data excursions were correctly detected as erroneous data. These results indicate that the method will work very well in a real-time environment.

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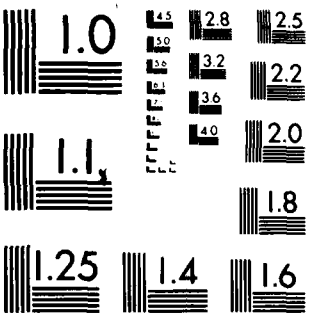

FINITE ELEMENT PRELIMINARIES IN EMP ENVIRONMENTS

by

Jack E. Chatelain
Steven A. Roberts

ABSTRACT

The use of the finite element method is investigated to evaluate what functional forms would satisfy boundary conditions and asymptotic wave forms. It is shown that vector spherical harmonics used in conjuction with Bessel functions or negative powers of r could be useful. The possibility of multi-pole moments both in the source and wavefield as solution to the problem is indicated. Suggestions for further research are offered.

EFFECTS OF FLUID SHIFTS AND HYPOVOLEMIA IN INDIVIDUALS WITH DIFFERENT WORKING CAPACITIES WHILE RESTING AT A FIVE DEGREE DECLINATION

by

Debra K. Rotto
Diane M. Rotto
William G. Squires

ABSTRACT

Data from actual space flight studies have demonstrated functional abnormalities and changes of the cardiovascular system immediately post-flight. Interest lies in what occurs to the body during exposure to zero gravity that could account for these post-flight alterations in cardiovascular functions. During zero gravity or head-down rest, the hydrostatic intra- and extravascular pressure gradients that are normally present in the upright position are abolished or minimized. This causes a headward shift of body fluids from the lower portions of the body cavity. This massive fluid shift induces adaptive changes in other body systems, such that reexposure to normal gravitational forces produces signs of of orthostatic intolerance. These adaptive changes include the following: inhibition of the renin-angiotensin and ADH systems, diuresis, decreased blood volume, weight loss associated with diuresis and decreased blood volume, inhibition of sympathetic activity due to decreased levels of circulating catecholamines and increased activity of the carotid sinus nerve, decreased stroke volume, no change (or slight increase) in arterial pressure, cardiac output, or the contractile state of the heart, compensatory bradycardia, increased right and left atrial filling pressures and central venous pressure, increased left ventricular end-diastolic volume and left ventricular ejection fraction, decreased leg volumes and increased forearm volumes. Preliminary studies were done on a dog and the expected changes in the cardiovascular parameters were found. Contractility of the heart increased, left ventricular pressure increased, left ventricular end-diastolic pressure increased, heart rate decreased, renal blood flow and carotid blood flow increased, and systemic arterial pressure increased after the dog was tilted five degrees head-down for one hour.

EVALUATION OF AUTOMATIC NETWORK ANALYZER

by

William O Schoggen

ABSTRACT

The increasing use of high bandwidth communication systems has produced a need to efficiently model a variety of high bandwidth switching systems. To meet the need, the Air Force Armament Laboratory's Guidance and Control Branch (AFATL/DLMM) constructed an automatic network analyzer with an accuracy enhancement program.

The evaluation of the Analyzer was separated into two tasks, examination of the error model and repeated testing. The results indicated the Analyzer produces repeatable measurements but accuracy must be improved. Recommendation and suggestions for further research in this area are offered.

PARAMETER ESTIMATION VIA KALMAN FILTERING FOR USE IN BANK-TO-TURN MISSILE AUTOPILOT DESIGN

by

Norman E. Tew

ABSTRACT

Modern air-to-air homing missile requirements are constantly being increased to incorporate engagement with the ever-increasing maneuverability of targets. Highly efficient missile airframes and advanced guidance laws based on modern control theory are keeping pace with these stringent requirements. However, it has been determined that the limiting factor in missile performance is the autopilot. Due to the high roll rates characteristic of the Bank-to-Turn (BTT) missile airframe and the multiple input-multiple output nature of a missile, BTT missile autopilots are much more amenable to treatment by modern control techniques. Due to the wide spectrum of operating conditions of an air-to-air missile, a method of autopilot control gain adaptation must be used for acceptable performance of the missile. In this report, the concept of parameter estimation is introduced and developed as a possible solution to the BTT autopilot design.

COMPUTER NETWORK CHARACTERIZATION

by

Russell D. Thomas

ABSTRACT

This paper discusses the necessary protocols to fully characterize a packet-switched network such as the ARPANET (Advanced Research Projects Agency computer network) or the DDN (Defense Data Network). The protocols discussed break messages into blocks for faster flow through the network, positively acknowledge received packets, detect errors (and prevent flooding of the network), and route messages along the paths of least delay.

DESIGN AND CREATION OF DATA BASE FILES FOR SEMICONDUCTOR MATERIALS CHARACTERIZATIONS

by

Nancy E. Thibeault

ABSTRACT

This Report presents a method for implementing the file creation portion of a Data Base Management System. The system was designed specifically to store data for the semiconductor materials characterization program, however, it is not limited to this particular application.

The system allows users to define files according to their needs, then enter and add data to the files. Fixed and variable length records, composed of standard and specially defined data types are used. As each file is defined, entries are made into a series of data structures and a record template is constructed. This template is then used to store data on the physical direct access storage device.

A sample file design is shown which takes into account the needs of the Electronics Research Branch. The data structures to implement the file designs are shown and discussed, the multilevel program is explained, and suggestions for further expansion are offered.

LEAST SQUARES MODEL REDUCTION AND FEEDBACK CONTROL DESIGN FOR LINEAR DIGITAL SYSTEMS

by

Brenda R. Todd and David F. Miller

ABSTRACT

The computer implementation of a time domain approach to model order reduction for discrete linear systems is presented. The basic technique relies upon a least squares minimization to determine the unknown coefficients of a reduced order z-domain transfer function. Numerical examples demonstrate the technique's effectiveness. Further analysis and experimentation extends the underlying theory to the problem of feedback controller design for linear digital systems.

Image Filtering and Computer Recognition

by

Kevin J. Verfaille

Abstract

Reconnaissance pictures may contain a great amount of distortion. This distortion can be reduced by two dimensional filtering, but which filter does the best job?

This paper deals with filtering distorted pictures, having known levels of blue and noise, with five selected linear filters and one non-linear filter. After filtering, the pictures are classified by the computer and compared on a pixel basis to the original, predistorted image. The results will demonstrate the filters restoration capability through computer recognition.

BLAST-INDUCED LIQUEFACTION MECHANISMS AND EXPERIENCE

by

George E. Veyera, Jr.

ABSTRACT

An examination of pertinent information concerning liquefaction produced by blast and earthquake-induced ground motions has been undertaken. The understanding of earthquake-induced liquefaction is fairly well understood and well documented. The understanding of blast-induced liquefaction is limited at best having advanced only slightly beyond its recognition. Many factors influence this phenomenon including those associated with the soil, pore fluid, local geology and explosive charge characteristics. The predominant action producing liquefaction is an induced shear failure leading to a plastic volume change of the soil skeleton. Based on field experience a number of empirical prediction relationships have been developed. There is evidence that liquefaction may be an important factor influencing crater development in saturated soils. Laboratory experience in blast-induced liquefaction simulation is still in a developmental stage. Research efforts need to be directed towards developing a better understanding of dynamic, compressional liquefaction. Systematic, controlled field and laboratory experiments are required. Recommendations are made in this area.

DIRECT DETERMINATION OF MASS, DAMPING, AND STIFFNESS MATRICES

by

Donald L. White

ABSTRACT

Methods for the direct determination of mass, damping and stiffness matrices from measured responses to known harmonic excitations are investigated. Descriptions of results of numerical experiments done to test the methods are given. Results indicate that the matrices are recovered well from a system of linear equations if the structure is excited at all stations. Modifications to allow excitation at fewer stations are considered, and limitations and restrictions on these modifications are indicated. Recommendations on the use of these methods are offered.

THE DIGITAL DATA ACQUISITION SYSTEM: SOME ADDITIONAL COMMENTS ON ITS OPERATION

by

Daniel M. Beford

ABSTRACT

The Digital Data Acquisition System (DDAS), is a recording device which monitors all 1553B multiplex bus messages and records those messages which the user has determined to be significant. My task was to interface the DDAS to a processor, in this case the Simulator Demonstrator Unit (SDU), so that recorded data could be retrieved, stored and examined. Although the final goal of integration of the DDAS to the SDU was never realized (due to hardware problems within the DDAS), many obscurities concerning the operation of the DDAS have been cleared up and it is hoped that this paper will be used in conjunction with the manufacturer's documentation to gain a thorough understanding of the device's operation.

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Scott A. Williams

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A survey of current technology in Management Information Service (MIS) systems is presented. The survey focuses on three aspects of MIS systems of particular interest to the information management personnel at Eglin Air Force Base, namely office automation, data base management systems, and computer graphics. The current practices and plans at Eglin Air Force Base are compared to the trends in state-of-the-art MIS systems.

COMBINED BLAST AND FRAGMENT LOADING ON REINFORCED CONCRETE

by

Dr. Chester E. Canada and Douglas J. Yovaish

ABSTRACT

A preliminary computational procedure is developed to predict the dynamic response of reinforced concrete to the combined blastwave and fragment loading arising from the near-by detonation of a metal-encased high explosive charge. For the physical models and scaled distances used here, the predicted shockwave profiles in concrete for cased and uncased charges are significantly different. The spatial gradient at the shockfront for a cased charge is relatively steeper yielding conditions more conducive for spalling.

If spalling occurs, less concrete is available to resist local shear failure; so, the probability of perforation is increased. This rationale appears to be consistent with recent experimental programs which show concrete spalling and perforation to be significantly greater for a cased charge than for an uncased charge.

A PRELIMINARY INVESTIGATION OF THE UTILITY OF LINEAR DIGITAL FILTERS FOR ANALYZING ECONOMIC SYSTEM PERFORMANCE DATA

by

Norman Zaenglein

ABSTRACT

The utility of linear digital filter (LDF) methods for analyzing performance data for economic systems was investigated. LDF methods typically used for analyzing physical systems were found to be not well suited for analyzing economic systems. Alternative methods for analyzing economic systems were identified. Data series from a number of economic systems of interest to the Air Force were identified and LDF models were fitted to each series and selected pairs of series. Analysis of the models fitted to the individual series indicated that the assumption of independent errors *was not* usually appropriate and that LDF methods could be used to account for such dependencies. Analysis of the simultaneous behavior of selected pairs of series indicated that feedback relationships could exist between certain pairs of series and that multivariate LDF models could be appropriate. The analysis of attempts to model certain pairs of series also indicated that a non-linear digital filter method could be needed.

An Evaluation of the Data Handling and Recording System

by

Andrew C Zimmerman

ABSTRACT

The results of an evaluation of the Data Handling and Recording System (DH/RS), a system for real-time target detection and classification, are presented. A functional overview of the system is given, followed by recommendations for the modification and expansion of both the hardware and software. The Hardware recommendations deal with specific sections of the DH/RS which could be expanded to improve performance in terms of speed and flexibility. The software recommendations are concerned with human interaction with the system and the portability and expansion of the software