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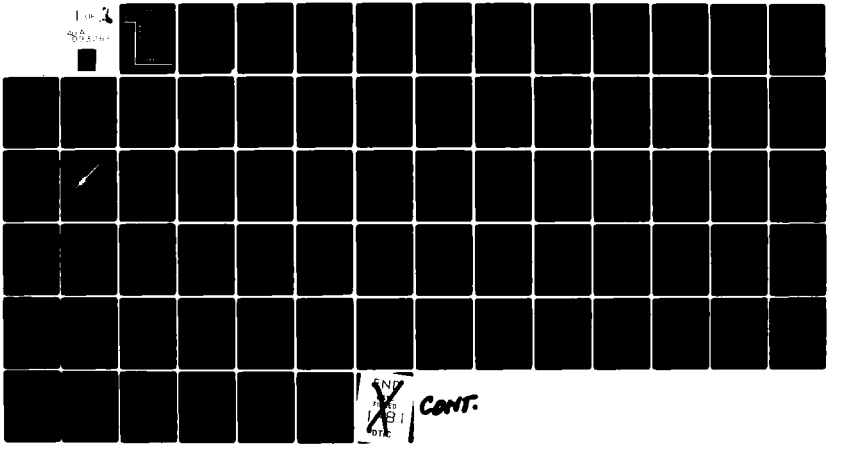

CONT.

AFHRL-TR-80-31

AIR FORCE HUMAN RESOURCES LABORATORY

NON-AIRCREW OFFICER POSITIONS: DETERMINATION OF GRADE REQUIREMENTS

By

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November 1980
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AIR FORCE SYSTEMS COMMAND
BROOKS AIR FORCE BASE, TEXAS 78235

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This interim report was submitted by the Manpower and Personnel Division, under project 7734, with HQ Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235. Dr. Joe T. Hazel was the Project Monitor for the Laboratory.

This report has been reviewed by the Office of Public Affairs (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

NANCY GUINN, Technical Director
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

For over 20 years the Air Force has needed a systematic method to establish officer grade requirements based on job content and responsibility. The major objectives of this study were (a) development and large-scale field-testing of a reliable and systematic method by which Air Force Management Engineering Teams (METs) could determine the appropriate grade levels (Lieutenant to Colonel) of non-aircrew officer positions and (b) application of this Officer Grade Requirement (OGR) technology to a job sample of sufficient size to estimate requirements for the non-aircrew force and various officer utilization fields.

To test the technology and make projections of grade requirements, 950 raters from 122 Air Force-wide METs collected and evaluated over 11,000 officer job descriptions. In addition, ratings were obtained on a

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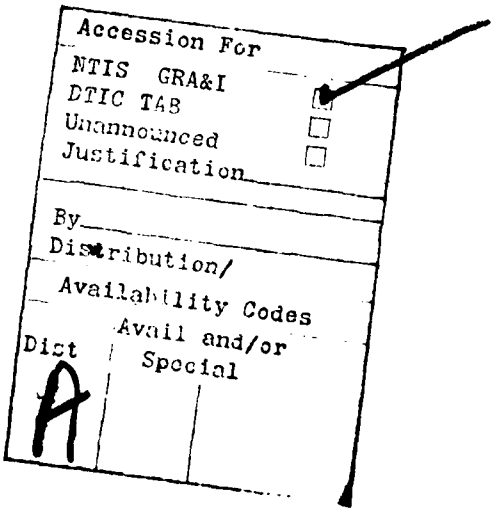
sample of jobs which had previously been evaluated by a HQ USAF Policy Board. A variety of analyses were conducted to determine the reliability and accuracy of the MET application and the stability of the data on the 11,000 jobs for making projections to the total non-aircrew force. An integral part of the analyses was the development of an integer-weighted eight-variable policy equation and a grade conversion table which represent the systematic method for METs to use in determining non-aircrew officer grade requirements.

Findings revealed that MET raters could accurately and consistently apply the technology, and there was considerable assurance of a stable base from which to make projections of grade requirements to the non-aircrew force. Comparison of these projected requirements with currently authorized grade levels revealed that the present non-airerew force had fewer authorized field grade positions than was indicated by the OGR technology. This difference was particularly striking at the major grade level where a substantial increase was indicated. Comparison of authorized versus OGR stated requirements also indicated that implementation of the OGR technology would produce significant changes in stated grade requirements for many officer utilization fields. In some fields there would be a general downgrading of jobs, while in others, there would be an upgrading of jobs. Recommendations regarding usage of certain findings from the study were provided.



SUMMARY

Objective

The purpose of this research was to develop a systematic method for establishing Air Force officer grade requirements based on job content and responsibility. Towards this objective, two major aspects of the study were undertaken: (a) the development and large-scale field-testing of a reliable and systematic method by which Air Force Management Engineering Teams (METs) could determine the appropriate grade levels (lieutenant to colonel) of non-aircrew officer positions and (b) the application of this technology to an officer job sample of sufficient size to estimate the grade requirements for the total non-aircrew officer force and various officer utilization fields.

Background

The basic technology used in this study has been under development and refinement during various periods over the past 15 years and represents one of the most comprehensive job evaluation systems in existence. The large-scale field test and projections in the present effort represent modifications and extensions of previous research studies.

Approach

To test the technology and make projections of non-aircrew grade requirements, 950 raters from 122 Air Force-wide METs collected and evaluated over 11,000 officer job descriptions under detailed instructions which assured the scientific and technical integrity of the data. In addition, ratings were obtained from these METs on a sample of jobs (1,725) which had previously been evaluated by a HQ USAF Policy Board. Various analyses were conducted to determine the reliability and accuracy of the MET application, and the stability of the data on the 11,000 jobs for making projections to the total non-aircrew force. An integral part of these analyses was the development of a policy equation and grade conversion table.

Specifics

The method developed to establish officer grade requirements (OGR) is similar to a yardstick, except instead of measuring feet or inches it measures the amount of job content and responsibility associated with officer positions. As the level of content and responsibility level of jobs change, so does the appropriate grade level for those jobs. The basic ingredient of this yardstick is an eight-variable equation applied to data collected by manpower and management engineering personnel. The first essential component involved in the application was a job description completed by officers using a standard form that provided a listing of duties and tasks performed and organizational information regarding the position. The descriptions were then evaluated by the officer's supervisor. Next, MET members evaluated each officer job description, and rated these descriptions in terms of five job factor benchmark scales. In brief, the eight-variable equation consisted of the five job evaluation factors (benchmark scales), two organization information variables, and the supervisor's judgment of the appropriate grade for the job.

Analyses revealed that MET raters could very accurately and efficiently apply the OGR technology. For a subsample (1,725) of officer positions, using MET ratings in the eight-variable policy equation, it was possible to estimate with considerable assurance the results that would be

obtained if METs were to apply the OGR technology to all Air Force non-aircrew officer positions (62,602). The sampling base (over 11,000 jobs) was sufficient to provide projections for the total non-aircrew force and 54 officer utilization fields.

Comparison of projected grade requirements with currently authorized unit detail listing (UDL) grade levels revealed that the total non-aircrew force has fewer authorized field-grade officer positions than are indicated by the OGR technology. While the results indicated there were more UDL colonel authorizations than estimated by OGR, there was an increase in the OGR estimates for lieutenant colonels. The lieutenant colonel increase more than balanced the colonel reductions. Further, the UDL versus OGR difference was particularly striking at the major grade level where OGR recommended a very substantial increase in grade requirements. At the combined captain/lieutenant grade level, OGR reflected a large reduction in grade requirements as compared to UDL authorizations.

The preceding problem (i.e., increase in majors and decrease in captains/lieutenants) should be considered from the viewpoint that the Air Force grade structure is essentially a closed system. With few exceptions (e.g., physicians), the Air Force does not hire captains directly from the civilian sector. For this reason, it may be necessary to identify a certain proportion of the lower-level OGR captain positions and declare them to be lieutenant positions on the UDL. Similarly, it may be necessary to declare a small proportion of the lower-level OGR major positions to be captain positions on the UDL. Such actions essentially reflect the recognition of a need to link career progression programs with job requirements in order to provide a reasonable officer grade structure.

In addition to comparisons at the aggregated force level, comparisons of UDL versus OGR stated requirements indicated that implementation of the OGR technology would produce significant changes in stated grade requirements for many specific officer utilization fields. In some instances there was a general downgrading of jobs in certain utilization fields; in others, there was general upgrading of jobs. These findings suggest that the OGR technology should be particularly useful with regard to actions taken by Air Force management to make grade adjustments within officer utilization fields.

Conclusions

In summary, the OGR research (a) provided a scientific technique for determining officer grade requirements based upon job content and responsibility levels, (b) demonstrated that METs are able to accurately and consistently apply the technology; (c) indicated a need for an increase in the stated requirements for non-aircrew field grade positions; and (d) suggested significant changes in the grade requirements structures for many officer utilization fields. If Air Force management decides to implement a system for determining grade requirements based on job content and responsibility, the OGR technology is recommended for consideration, in conjunction with other manpower and management procedures.

PREFACE

This report presents results of a study conducted under AFHRL work unit 77340208, Determination of Non-Aircrew Officer Grade Requirements: Conversion Table and Projections by METs. This work unit was established in response to Request for Personnel Research (RPR 75-21), Determination of Officer Grade Requirements Based on Job Content and Responsibility, initially submitted by HQ USAF/PRM and DPXX (The Air Force Management Engineering Agency subsequently assumed responsibility as requirements manager for AF/PRMRE). The research is a follow-on effort to RPR 74-20, titled "Development and Testing of an Officer Grade Evaluation Technology." The report describes the continuity between the initial Officer Grade Requirements (OGR) project and research results stemming from RPR 74-20 and RPR 75-21, with emphasis on the latter request.

This study does not constitute authority to change existing Air Force officer grades, and its publication does not infer approval to implement report procedures as USAF policy. Such actions or objectives are a function of HQ USAF. Further, the report does not attempt to tie into or address provisions of the Defense Officer Personnel Management Act (DOPMA), nor does it claim compatibility with same. While the report does briefly mention grade authorizations and career planning objectives, it neither fully addresses or encompasses the entire problem of grade distributions to support orderly career progression plans nor recognizes external limitations on Air Force grade structure. Although the philosophy and methodology of the report are assumed to be valid, accurate and unbiased, the report should be viewed from the prospective that considerable efforts over the years have allowed USAF to determine, establish, and defend Air Force grade requirements, albeit multi-faceted approaches were utilized.

Due to the scope of this research effort, it is not possible to mention all scientific, military and support personnel who contributed to the OGR studies. However, accomplishment of the requirements for RPR 75-21 involved the following individuals (titles/organizations as of April 1978).

AFMEA: Capt Robert T. Walker, Air Force Management Engineering Agency, AFMEA/AFHRL Liaison Officer.

AFHRL: Lt Col William H. Pope, Chief, Occupation and Manpower Research Division.
Dr. Raymond E. Christal, Technical Director, Occupation and Manpower Research Division, General Director of OGR research.
Dr. Joe T. Hazel, Chief, Career Development and Job Evaluation Branch, Project Monitor.
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Mrs. Helen Widner, Mrs. Marie Courtney, Mrs. Sharon Hights, and Mrs. Patsy Cheatham, Typing Support.
Lts Manuel Garcia, Jr., and Michael J. Letica, Job descriptions and MET data reviewers.

Particular appreciation is expressed to Dr. Raymond E. Christal for his assistance with OGR project, both with regard to directing the technical aspects as well as developing the original methodology. With the author's permission, sections from two reports describing the research were used extensively (Christal, 1965; Christal, 1975) in order to provide readers with a complete account of the OGR program.

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I. INTRODUCTION

The purpose of this research was to develop a systematic and reliable method for establishing Air Force officer grade requirements based on job content and responsibility. This study investigated a job evaluation technology developed for the non-aircrew officer force, which, with certain operational adaptations, could be applied by the Air Force personnel and manpower management communities.

The present study consisted of two major research objectives. The first was the development and large-scale field-testing of a reliable and systematic method by which Management Engineering Teams (METs) could determine the appropriate grade levels of non-aircrew officer positions (excludes line pilots, navigators, physicians, and dentists). The second objective was to apply the technology to an officer job sample of sufficient size to estimate the grade requirements for the total non-aircrew officer force and various officer utilization fields.

The basic technology used in the study has been under development and refinement at various periods for over 15 years, and represents one of the most comprehensive and carefully researched job evaluation systems in existence. The large-scale field test and projections for the present effort represent modification and extension of methods developed during the 1963-1966 time period, with an application of the methodology by Management Engineering Teams (METs) during 1974. Complete documentation of the entire stream of officer job evaluation research is available in the form of technical reports listed in the Reference and in the Bibliography sections. Key references in this series are the following: Brokaw and Giorgia, 1966; Christal, 1965, 1975; Hazel, 1965; Hazel, Christal, and Hoggatt, 1966; and Stacy, Matthews, and Hazel, 1975. A companion report (Finstuen, Matthews, & Pope, 1980) to the present study provides supplemental detailed information regarding the current effort. With the author's permission, various sections from two reports (Christal, 1965; Christal, 1975) were paraphrased extensively (see Sections III & VI) to provide a complete account of the research program.

The major research efforts in chronological sequence of accomplishments are as follows: (a) Officer Grade Requirements (OGR) Project, 1963—1965, (b) Development of Benchmark Scales, 1966, (c) Test Application of OGR Technology by METs, 1974, and (d) Field-Test and Projections of Non-Aircrew Officer Grade Requirements, 1976. The 1976 effort is of primary emphasis in this report.

II. BACKGROUND

There was a time in the military services when the determination of grade requirements was basically a function of the size of the unit commanded. However, technological changes have created many new jobs which cannot be graded on such a basis, so the rules for assigning a grade level to a particular job or position have become less clear.

From 1963 to 1965, a project was undertaken to determine the appropriate distribution of Air Force officer grade based on job requirements. This Officer Grade Requirements (OGR) study provided a set of job evaluation factors for defining the meaning of grade and a basis for evaluating positions in terms of grade requirements. Subsequently (1966), a factor benchmark scaling procedure was developed for application to individual officer positions. Since this research formed the background for the present endeavor, it is next described in some detail.

III. OFFICER GRADE REQUIREMENTS RESEARCH: 1963–1965

The OGR Project was conducted in three phases. Essential steps and findings for each of these phases were as follows.

Phase I: Policy Board Grade Ratings for Jobs in Criterion Sample

Development of an objective and systematic method for grade determination required an unbiased and stable statement of appropriate grades for a sample of officer jobs. Grade levels assigned to this criterion job sample by a HQ USAF Policy Board could then be used to construct a grade "yardstick" or job evaluation system (Phase II), which in turn was applied to the remaining Air Force officer jobs (Phase III). Because of its criticality to the entire project, the first phase merits particular attention.

Six steps were involved in the first phase of the OGR project: (a) collection of descriptions for approximately 80,000 officer jobs, (b) selection of an adequate "criterion" sample of descriptions representing all levels and types of Air Force officer jobs, (c) selection of a USAF Policy Board, (d) obtaining grade ratings for jobs in the criterion sample from Policy Board members, (e) analysis of the Policy Board's ratings to determine that they were reliable, reasonable, and unbiased, and (f) acceptance or rejection of the ratings as a basis for establishing Air Force policy concerning grade determination.

The first major step of the project was to collect accurate and detailed information describing the work performed by Air Force officers in grades lieutenant through colonel. Forms and instructions were developed, and job descriptions were obtained by commands from all officers except generals, student officers, patients, air attaches, officers in the medical-professional and dental utilization fields, and selected officers in the operations career area. Descriptions were received from 79,750 officers.

The incumbents were asked to provide a job title, a verbal description of the location of their particular job in the Air Force organizational structure, and a detailed description of duties and tasks performed. In addition, certain background and assignment information was obtained (i.e., duty AFSC, present grade, Unit Manning Document (UMD) grade authorized, organizational level of job, and level of job within the organization). The incumbent's supervisor was then asked to review the completed description and provide a judgment concerning the appropriate grade level for the job.

For the second step, job descriptions were sorted into UMD (subsequently called Unit Detail Listing (UDL)) authorized grade-by-AFSC categories, and a representative criterion sample of 3,575 cases was selected. The selection procedures offered assurance that descriptions respresenting all levels and types of Air Force officer jobs were included.

For step three, a Policy Board which included representatives from 12 major commands was selected by HQ USAF. The board was composed of 22 colonels, selected on the basis of their overseas and zone of interior experience in particular career areas. For any of the 3,575 jobs in the criterion sample, there was at least one member who could serve as an expert consultant to the rest of the board.

To obtain grade ratings (step four) on the criterion job sample, the Policy Board was convened by HQ USAF for 5 days during February 1964. During this period, board members determined the appropriate grade level for each of the 3,575 jobs. Measures taken to assure that ratings were reliable, valid, and unbiased were as follows:

1. Board members were instructed by the HQ USAF Director of Manpower and Organization regarding the importance of their mission, to be as impartial and objective as possible, and to avoid any tendency to exaggerate grade requirements.

2. Board members were asked first to rate the appropriate grade level for a job and then to indicate on a 3-point scale their level of confidence in such ratings. They were given access to any information needed to make accurate judgments. This included consultation with other members; obtaining organizational, command, or installation information about a job; and calling special air staff consultants or the supervisor of the incumbent of the job being rated. However, members were advised that their ratings were to be independent and were to reflect the unbiased judgment of the rater alone. The board members were not allowed to have knowledge of the current UMD grade authorized for the job being rated nor of the grade stated by the incumbent's supervisor. They were not informed of the grade held by the incumbent in the job nor that of the incumbent's supervisor, nor were grade ratings assigned by other board members available to the rater.

3. Grade ratings for each job were obtained independently from five separate board members since research indicated that the average of five independent ratings provided stable estimates.

4. Each job was rated in a context of other jobs since research on context effects indicated that more accurate ratings of job level are obtained when a job is considered with other jobs of varying content and level.

5. Board members were required to rate grade requirements using a 10-point rating scale which recognized three levels of experience requirements within each grade from lieutenant through colonel, and one level for general (Table 1). This scale was based on findings that ratings are more stable when judges made the finest discriminations of which they are capable, and the assumption that experienced officers can distinguish jobs requiring high, moderate, or low levels of experience or time in grade.

Analysis of the Policy Board rating data (step 5) was a critical part of the OGR project since these ratings formed the basis for establishing grade requirements. A series of analyses was accomplished to determine if the grade ratings were stable, that there was high agreement among board members concerning the appropriate grade requirements for particular jobs, that the raters had confidence in their ratings, and that the raters were not biased for or against jobs in various Air Force Specialty Codes (AFSCs) or commands. The principal results from these analyses were as follows:

1. The reliability coefficient (.92) of the mean grade ratings given by the Policy Board indicated there was high agreement among Board members concerning grade requirements for jobs in the criterion sample. Another statistic (standard error of estimate =.79) indicated that, if judgments of a large number of similar boards were obtained, 95 percent of the mean grade ratings would be within

Table 1. **Criterion Board Rating Scale**

Grade		Code
General		16
Colonel	— Senior	15
Colonel	— Middle	14
Colonel	— Junior	13
Lt Colonel	— Senior	12
Lt Colonel	— Middle	11
Lt Colonel	— Junior	10
Major	— Senior	9
Major	— Middle	8
Major	— Junior	7
Captain	— Senior	6
Captain	— Middle	5
Captain	— Junior	4
Lieutenant	— Senior	3
Lieutenant	— Middle	2
Lieutenant	— Junior	1

plus or minus one-half grade level of the mean grade ratings computed from the Policy Board data (± 1.55 on the 16-point scale).

2. Based on a 3-point rating scale (1 = little or no confidence, 2 = some confidence, and 3 = feel confident rating is about right), Board members expressed confidence in their ratings of job requirements. Examination of the mean confidence levels expressed by members in their ratings of 3,575 jobs revealed that for 2,387 of the jobs, at least four of the five raters expressed the highest level of confidence in their judgments. Only 59 of the 3,575 jobs had a mean confidence rating of less than 2.00 on the 3-point scale.

3. Analyses designed to identify raters showing a bias for or against jobs in various command or occupational groupings revealed that individual Board members did not exhibit a bias towards jobs in particular commands or AFSCs. For 15 command/AFSC categories, "bias" values were computed by taking the difference between the average of ratings assigned by a rater (on the 16-point scale) to jobs in a particular category from an average of ratings assigned by all raters to jobs in that category. Since three points on the 16-point scale represents one grade level, a value of 3.0 would indicate that a board member rated jobs in a given category approximately one grade higher than did other board members. Similarly, a value of -3.0 would indicate judgments averaging approximately one grade lower than those of other members. The largest reported value was only 1.7, and most of the values were less than 1.0. The largest values tended to be associated with judges who rated all categories somewhat high or low, and these judges did not show a bias toward jobs in particular categories.

4. Additional analyses indicated that Board members agreed that many jobs were inappropriately graded and that each job was considered on its own merits. Comparison of UMD vs. Policy Board grade

revealed no systematic tendency on the part of raters to confirm current UMD grade authorizations or to inflate their ratings of grade requirements. Many jobs were downgraded as much as one or two full grade levels. Others were upgraded. Also, the reliability analysis indicated there was strong agreement among board members as to which particular jobs should be upgraded or downgraded.

Step 6, acceptance or rejection of the Board ratings as a basis for establishing Air Force policy concerning grade determination, was contingent on the outcomes from the preceding steps. As shown in the findings, the Board ratings appeared highly defensible. Since these ratings were acceptable as standards for grade determination, the second phase of the project was initiated.

Phase II. Development of an Officer Grade Requirements Policy Equation

The second phase of the OGR project involved the development of a mathematical equation to express the Policy Board in terms of weighted measures of job characteristics. To be acceptable, it was necessary for this equation to assign the same grade to a job as the Policy Board. Its effectiveness was gauged by the extent to which it predicted the grades assigned by the board to the 3,575 jobs in the criterion sample. Four steps were involved in this phase of the study: (a) hypothesizing job requirement factors considered by Policy Board members in making their ratings; (b) evaluation of the criterion jobs in terms of these factors; (c) development of a policy equation which weights the job requirements factors into a composite to predict the criterion board's grade ratings; and (d) evaluation of this policy equation.

One of the most challenging parts of the OGR study was the identification of factors considered by the Policy Board in making their grade ratings. The high agreement among board members concerning appropriate grade requirements for jobs in the criterion sample indicated they considered similar factors in making their decisions. The four classes of variables hypothesized and used to predict Policy Board ratings were as follows:

Job requirement factors. These were demands on the job which were considered to have a bearing on grade determination (e.g., such factors as the complexity, variety, and level of activities which must be managed by the job incumbent; the possible impact of decisions made by the incumbent on Air Force mission; the types of planning activity required of the incumbent; and the types of knowledges and experiences the incumbent should possess).

Organizational structure factors. It was hypothesized that the location of the job in the Air Force organizational structure would have a bearing on grade requirements.

Coincidental predictors. It was hypothesized that certain non-relevant factors, such as the number of words in the job description or the verbal facility of the description writer, might have influenced judges in their rating of a job.

Command or specialty affiliation. Data concerning some of the factors considered were obtainable from job descriptions (e.g., organizational level of job). However, previous research and interviews with Policy Board members suggested certain job evaluation factors, such as planning or type of judgments required by the job incumbent would also have relevance for grade determination. These factors could be measured only through use of rating scales, and a procedure had to be established for obtaining such ratings. The 3,575 job descriptions were sorted into 143 booklets, each containing 25 job descriptions. Each booklet was sent to five or more majors or lieutenant colonels in the field, who were selected at random throughout the Air Force. Over 700 officers participated in this phase of the study. Each officer rated each job on 10 job evaluation factors and on the 16-point

scale which was used by the Policy Board in making their grade determinations. Mean rating scores for each of the 10 job evaluation factors and for the grade rating were computed for each job. These scores were utilized, along with other variables, in deriving the final policy equation.

In the development of an equation which accurately predicted grade ratings made by the Policy Board, approximately 200 predictor variables and 350 regression problems were considered. The final equation contained nine predictors:

1. Five job evaluation factors (Management, Planning, Special Training and Work Experience, Judgment and Decision Making, Communication Skills).

2. Two job organizational level variables (Level of Organization in Which Job Occurs and Level of Job within Organization).

3. Mean grade rating by field judges. The mean of the grade ratings for each job obtained from five field judges on the 16-point scale.

4. Supervisor's judgment of appropriate grade. A statement by the supervisor of the job, taken from the job description, concerning the appropriate grade level. Although collected as a scaled variable (7 =General, 2 =Lieutenant), this predictor was used in the equation as six categorically-coded variables to increase prediction efficiency.

Since the job evaluation factors underwent subsequent modification (i.e., development of benchmark scales) and the policy equation was further refined in the later application by METs, supplemental description of the nine predictor variables is deferred until later in the report. However, certain points regarding the predictive efficiency and rationale of the predictor variables included in the equation warrant attention presently.

Although the Policy Board ratings were predicted very well using the five job evaluation factors in combination with the two organization variables (correlation =.84), it would be difficult to prove that these particular variables were the ones considered by the Policy Board in making their grade judgments. Since these seven variables have high "face validity" for grade, and they accurately predicted the Policy Board's decisions, it was assumed that they are primary determiners of grade requirements. While the mean grade rating from five field judges had the highest relation with the criterion for a single variable (r =.89), one should recognize that in making their ratings these judges also considered information measured by the job evaluation factors, such as the management and organizational levels of jobs, along with their requirements for planning, decision making, special work experience, and communication skills. In fact, the five job evaluation factors in combination with the two organizational variables correlated .92 with the grade ratings obtained from all field judges. Even so, grade ratings obtained from field judges made a unique contribution in predicting the Policy Board ratings. This was believed to be due to a large number of special factors associated with specific jobs which were considered by the Policy Board and by the field judges in arriving at grade requirements. Since any one of these factors might apply to only one or two jobs, it would be uneconomical to develop scales for applying them to all jobs.

The supervisor's judgments concerning grade made a very small unique contribution to the system. However, this contribution was believed due to an occasional job requirement factor considered by the supervisor and the Policy Board but not considered by the field judges.

When the policy equation was applied to jobs in the 3,575 case criterion sample, it was demonstrated to be highly accurate. As shown in Table 2, the policy equation pinpointed 82 percent of the jobs in this sample within one-third grade level of the ratings assigned by the board on the 16-

point scale and within two-thirds grade level for 96.7 percent of the jobs. The correlation coefficient between grades allocated by the policy equation and grade ratings provided by the Policy Board was .92.

Table 2. Accuracy in Prediction of Policy Board Job Ratings

Degree of Accuracy	Cumulative N	Cumulative %
Exactly on	1292	36.1
Within 1/3 grade	2931	82.0
Within 2/3 grade	3457	96.7
Within 1 grade	3557	99.5
Within 1-1/3 grade	3572	99.9
Within 1-2/3 grade	3575	100.0

As stated before, the nine variables in the final equation were selected after examining about 200 potential predictors. To evaluate the possibility that this process involved a capitalization on chance relationships, the criterion-predictor data were randomly divided into two job subsamples, A and B. Least squares weights for the nine final predictors were developed in sample A and cross-applied to sample B. Similiarly, weights were developed in sample B and cross-applied to sample A. The resulting shrinkages in multiple correlations (*R*s) averaged less than one point in the third decimal place.

In summary, the data indicated that the policy equation was stable and that it did an excellent job of assigning grades judged appropriate by the Policy Board. Errors were few in number and small in magnitude. In view of these findings, the OGR project moved to the next phase.

Phase III: Application of the Policy Equation to 10,000 Case Sample and Projection of Results

After the policy equation had been developed and demonstrated to assign the same grades to jobs as did the Policy Board, Phase III was undertaken. This phase involved application of the equation to determine the appropriate grade levels for a sufficiently large number of jobs to serve as a base for estimating the appropriate distribution of grades in various specialties and specialty groupings. Ten thousand jobs were selected for inclusion in this base sample. Of these, 1,750 were selected from the original 3,575 criterion job sample so the policy equation could be revalidated. The remaining 8,250 jobs were new jobs selected from the 79,750 population file to provide adequate representation of every AFSC-by-UMD grade category. Descriptions for the 10,000 jobs were randomly sorted into 400 booklets, each containing 25 job descriptions. Each booklet was rated by not fewer than five majors and lieutenant colonels, who were selected at random throughout the Air Force. About 2,000 rating officers participated in this phase of the project. Each officer rated each job in the booklet on the job evaluation factors and the same 16-point grade scale as used by the Policy Board in making its grade determination.

Mean score values on the job evaluation factors and field grade ratings were combined by the policy equation with organizational variables and supervisory ratings to determine the appropriate grade level for each of the 10,000 jobs. The grades assigned by the policy equation to the 1,750 criterion jobs were compared with the grades assigned to these same jobs by the policy equation using ratings collected from field judges in the development sample. These two sets of grade requirements correlated .93 and had approximately equal means and standard deviations. Thus, the policy equation was shown to have high stability across time and judges.

At this stage of the OGR project, appropriate grade requirements had been determined for 11,825 officer jobs. From this large sample of job descriptions, which had been collected and rated, it was possible to make projections as to how the grade structure of the Air Force might change if the policy equation was universally applied to determine appropriate grades for jobs. Essentially, this sample was used as a base to determine the appropriate distribution of grades for various specialties and specialty groupings.

Results of the OGR project projections indicated that changes in grade allocations would have to be made in many officer utilization fields to bring statements of grade requirements into line with job demands. In some utilization fields, grade requirements appeared to be overstated; in others they were understated. In every utilization field, some jobs were overclassified while others were underclassified by grade level. Overall, the OGR project indicated that the Air Force was somewhat undergraded at the colonel level in 1964, and considerably undergraded at the major level.

Regarding subsequent application of findings, the OGR results had an impact on allocations of grades to officer positions, although they were not implemented across-the-board. A number of aircrew lieutenant colonel positions were downgraded to major and some major positions in other areas (e.g., communications-electronics) were upgraded to lieutenant colonel. For several years after the study, OGR results were used to evaluate requests for upgrading from the field. The OGR project also was instrumental in convincing the Department of Defense of the need for supporting an Air Force request for temporary grade relief.

IV. DEVELOPMENT OF BENCHMARK SCALES

While the OGR project produced appropriate distributions of grades for various officer utilization fields and for the total force, it did not provide a grade evaluation procedure which could be applied to individual officer positions. Previous research on context effects indicated that the most accurate ratings of job level are obtained when a job is considered with other jobs of varying content and level. When a job is rated with high level jobs, it tends to be underestimated; when it is rated with low level jobs, it tends to be overestimated. In the OGR study, context effects were controlled by making sure that when job or job factor ratings were collected, the rater's judgments were always executed on a carefully selected set of jobs.

In order to develop a system for evaluating individual officer positions, it first was necessary to construct job-factor scales with carefully anchored rating levels. That is, the rating scales had to provide raters with an appropriate context within which to nest their judgments. In the case of the OGR factors, a decision was made to develop scales using generally recognized job titles as benchmarks for level definitions. The efficiency of the scales could then be tested through application to a sample of jobs from the original OGR study.

For a comprehensive review of benchmark scale development, the Brokaw and Giorgia (1966) study should be examined. The following paragraph summarizes the major accomplishments and findings from the report:

> A set of job requirement factor scales based upon a benchmark scale presenting job titles to identify successive levels of requirement were derived. These scales were applied to 1000 Air Force officer position descriptions collected and previously applied in the Officer Grade Requirements study. Comparison of rating distributions based upon adjective scales and the benchmark scales revealed lower mean values, larger standard deviations, and superior zero-order validity of the ratings based on the benchmark scales. The predictive efficiency of optimal composites of the benchmark scales for both full sets of factors and the subset chosen for application in the Officer Grade Requirements study was equivalent to that of the adjective scales. A set of integer weights for use in field application of the equation was derived without significant loss of validity. (Brokaw & Giorgia, 1966, p. 10)

To show adequate information for present purposes, an abbreviated version of a factor benchmark scale is presented in Figure 1. As explained subsequently, the factor benchmark scales were updated during the 1974 MET OGR application. In addition, further explanation and examples of the benchmark scales are provided for the 1976 test and projection research effort.

FACTOR 1: FORMAL EDUCATION: The amount of formal education required by the job. Consider the education obtained in high school, college, university, or professional school.

LEVEL 9

Chief, Computer Techniques Div, Hq Air Weather Service
Industrial Engineer, Hq Air Base Wg
Chief, Re-entry Vehicle Div, Strategic Missile Evaluation Sq

LEVEL 8

Nuclear Research Officer, Research Technology Div, AF Flight Dynamics Lab
Chief, Military Affairs & Asst Staff Judge Advocate, Air Base Gp
Chief Physiological Chemistry Dept, USAF School of Aerospace Medicine

•
•
•

LEVEL 2

Chief Transportation Traffic Management, Transportation Sq
Group Supply Officer, Aeromedical Evacuation Gp
Base Fuels Officer, Fighter Wg

LEVEL 1

Automotive Maintenance Officer, Transportation Sq
Food Service Officer, Combat Support Gp
Clothing Sales Officer, Combat Support Gp

Figure 1. **Abbreviated Example of a Benchmark Scale.**

V. OFFICER GRADE REQUIREMENTS RESEARCH, 1966–1974

On completion of the benchmark scale research, a grade evaluation technology had been developed and partially tested and could be applied to individual officer positions. For a fully operational technology, one further step needed was the construction of an equi-percentile conversion table. While the predicted composite score generated by the benchmark scale equation could be used to order jobs from high to low merited grade, a conversion table was needed to convert predicted composite score values into specific grade levels. The conversion table was needed to insure that the technology would assign the same distribution of grades to a set of positions as would have been allocated to those positions by the 1964 Policy Board.

Since the Air Force did not elect to operationally implement the OGR technology, the conversion table was not developed. The reasons why the OGR technology was not implemented are unknown. Regardless of reasons, since the technology was not implemented, further officer grade requirements research was held in abeyance. This condition held until 1974.

VI. 1974 MANAGEMENT ENGINEERING TEAM STUDY

During 1974, a request (RPR 74-20) was received from HQ USAF for the development and testing of a system by which METs could evaluate grade requirements for individual officer positions, based on job content and responsibility. Essentially, this research involved the development of a technology by which METs could apply job evaluation factors to determine appropriate grade requirements for non-aircrew positions and used the previously described yardstick (OGR policy equation) and benchmark scaling procedure for individual officer positions. To tie the proposed system to the Board policy, MET members provided ratings on a subset of positions from the 3,575 criterion sample. Using ratings obtained on benchmark factor scales and simplified integer weights, grade composite scores could be correlated with the original Policy Board grade ratings. An additional sample of current jobs and MET ratings could be used to indicate whether the procedure yielded a distribution of grade requirements different from UDL specified requirements.

The initial effort in the 1974 MET study involved updating the 10 benchmark scales (e.g., changes in job titles to reflect organizational or equipment changes). Instructions and forms were developed, and two job subsamples were specified. The first sample consisted of 485 positions from the benchmark study previously rated by the 1964 policy board and deemed to still exist in the Air Force job inventory. The second sample consisted of 1,687 current positions selected to be representative of the existing Air Force population of non-aircrew jobs. Eighty-nine METs participated in the data collection phase (a total of 665 MET members). Each MET was asked to collect a specified subset of current descriptions and to rate these descriptions and another subset of reproduced descriptions from the 485-position sample. Ratings for each position were obtained on the 10 updated benchmark scales and the 16-point grade rating scale (Table 1).

The first set of data analyses was designed to evaluate whether information collected by METs produced a grade composite having a high correlation with the Policy Board. Analyses conducted on the 485-position sample involved weighting together the MET grade and five benchmark scale ratings, together with supervisory grade ratings and organizational level variables. The second set of analyses involved applying the equation to the 1,687-position sample and comparing OGR equation grades to present job incumbent grades and UDL authorized grades. Additional analyses of the job

sets also were conducted to determine the level of interrater agreement on ratings. These analyses indicated MET raters could reliably rate both old and new job descriptions and provided very stable estimates of grade requirements.

Analyses of the 485-job sample indicated that METs could accurately implement the 1964 board's grade "policy" (validity of grade evaluation composite =.90). Analyses of the 1,687-position sample indicated that if the system were implemented, it would reflect fewer colonel and lieutenant colonel positions and more major positions than currently authorized (UDL). These projections were considered extremely tenuous however due to the small base sample (1,687) and the weak conversion table based on only 485 jobs.

Recommendations stemming from the 1974 MET study were as follows:

1. If Air Force management wished to implement a system for evaluating grade requirements, the previously described technology was recommended for consideration.

2. Before the technology became operational, it would be necessary for METs to evaluate another larger set of jobs (≈1,000) from the original criterion sample in order to develop a stable conversion table for translating composite scores into grade decisions.

3. If the Air Force wished to determine the total distribution of non-aircrew grade requirements, evaluations on approximately 10,000 additional officer positions by METs would be needed. Projections from this base could be used to detemine grade requirements for each non-aircrew officer utilization field.

VII. 1976 MET OGR PROJECT

During October 1975, research was started on a request (RPR 75-21), titled Determination of Officer Grade Requirements Based on Job Content and Responsibility. The major purpose of the research was to extend development of the OGR technology for MET determination of appropriate distribution of grade authorizations for non-aircrew officer career fields. Specific objectives were as follows:

1. To develop a stable grade conversion table suitable for operational usage. The conversion table, which is an integral part of the technology, was not fully developed in previous research.

2. To apply the OGR technology to an adequate sample of officer positions as necessary to project estimates of grade requirements for various utilization fields and the total non-aircrew officer force.

3. To make comparisons of projected OGR and current UDL requirements and examine the impact of implementing the OGR technology on the current non-aircrew officer grade structure.

Design of the 1976 MET OGR Project

The 1976 MET OGR project was based on the previously described research which had provided a grade yardstick (integer weighted OGR equation), factor benchmark scales for evaluating individual positions, and certain modifications made during the 1974 MET study. Basically, the technology assigned a grade level to a position which is the same as would have been assigned to a job

of equivalent content and responsibility by the Board which established policy in 1964. The primary definers of grade in the OGR equation which had been identified up to this point in the stream of research were as follows:

1. *Management:* The level of executive and managerial skills required in the job. Consider the complexity, variety, and level of the activities which are directed, organized, coordinated, controlled, commanded, or evaluated.

2. *Planning:* The extent to which planning is required by the job. Consider the scope and significance of work for which planning is done. The longer the time span for which planning is done, the higher the rating should be.

3. *Special Training Work Experience:* The extent to which the job requires knowledges and skills which must be acquired through special training courses or on-the-job experience. Disregard general courses given by Squadron Officer School, Air Command and Staff College, or Air War College.

4. *Judgment and Decision Making:* The importance and independence of judgments and decisions required by the job. Consider the nature, variety, and possible impact of decisions. The less well defined the guidance for decisions, the higher should be the rating; while the more specific and detailed the guidance, the lower should be the rating.

5. *Communication Skills:* The extent to which the job requires skill in oral and written communication. Consider the complexity and variety of information communicated, as well as the level of the individuals and agencies involved.

6. *Level of Organization in Which Job Occurs.*

7. *Level of Job Within Organization.*

In addition, ratings of appropriate grade from supervisors and MET members had been weighted into the equation to take into account special factors occurring in some jobs which were not reflected in the seven preceding primary grade definers. As previously implied, the possibility of excluding one or both of these variables was considered. For the present project, a critical re-examination of the MET mean grade rating predictor variable was considered necessary in order to evaluate its potential impact on an operationally implemented technology.

In the present application, it was necessary to obtain factor ratings from MET members on an adequate subset of positions from the original 3,575 criterion job sample. Composite scores resulting from application of the OGR equation could then be compared with grades assigned by the Policy Board, in order to confirm that the grade yardstick was applied in a consistent, reliable, and valid manner by MET raters. This subset of "criterion jobs" could also be used in the construction of an equi-percentile conversion table to determine the cutting points (for composite scores) separating adjacent grade levels so as to yield the same distribution of grades to a job sample as would have been allocated by the Policy Board. Essentially, the grade composite plus the conversion table form the system for evaluating the appropriate grade level of each non-aircrew officer position. A highly valid composite offers assurance that the right jobs are assigned into each grade category; while the conversion table assures that the correct number of jobs are assigned to each grade category.

In addition, a large sample ($\simeq$1,000) of current jobs was collected and rated in order to evaluate the level of agreement among MET members and to serve as a basis for projection of requirements to

the total non-aircrew force and various officer utilization fields. If there was high agreement among raters (i.e., high reliability), considerable confidence could be placed in composite scores derived from MET raters and used as a basis for projection to the total non-aircrew force.

After development of a stable conversion table and projections of requirements, various comparisons were possible to evaluate the impact of implementing the technology. The OGR projected grade requirements could be compared to Air Force Manpower and Organization (M & O) Unit Detail Listings (UDL) authorized grade requirements both with regard to the total non-aircrew force grade structure as well as specific officer utilization fields or special duty AFSC (DAFSC) groupings. These utilization field comparisons could be used to indicate areas or AFSC groupings where adjustments in grade requiements should be considered. In addition, OGR projected requirements could also be compared to current on-board grade distributions (i.e., from Uniform Officer Records (UOR)). These comparisons (OGR vs. present UOR grade distribution) were considered desirable in the event of possible differences between UDL authorized and on-board grade structures. For all comparisons, the main precaution to recognize in determining the "fineness" or level of comparison (e.g., two-character AFSC or utilization field or four-character DAFSC) was the adequacy of the job sampling base used for projections.

There were seven major steps involved in the grade determination process for the 1976 OGR project. These were (a) reproduction/collection of job descriptions, (b) identification of METs and MET raters, (c) obtaining job factor and grade ratings, (d) development of policy equation (regression) weights, (e) determination of grade composite scores, (f) development of a stable conversion table, and (g) conversion of composite scores to grade equivalents. These steps are next described. After the last step in the process, projections of grade requirements to the non-aircrew force were accomplished.

Job Samples and Data Collection

As indicated, the present project required two samples of job descriptions. The first sample consisted of 1,725 job descriptions for non-aircrew positions from the 1964 criterion jobs (3,575) which were screened and judged to represent positions still in the Air Force inventory. The second sample consisted of approximately 11,000 current jobs identified for collection by METs from job incumbents. For the 1,725 descriptions, copies were reproduced for subsequent use by METs. For the 11,000 jobs, sampling specifications by METs were established, with current positions stratified across DAFSC and grades (lieutenant through colonel) in order to assure that descriptions collected were representative of the non-aircrew force. The sample of current job descriptions collected contained one or more jobs from each of five UDL grades by 54 utilization field (2-character AFSC) categories. Larger numbers of descriptions were collected for more populated categories. Sample specifications for current position descriptions were based on a December 1975 UDL non-aircrew utilization field-by-grade population (62,602 positions) provided by HQ USAF Manpower and Organization (M & O).

There were 122 METs participating in the collection of job descriptions and factor ratings from January to March 1976. These METs were from 22 major commands, were located both overseas and the zone of interior, and involved 950 manpower and management engineering raters (officers, airmen, and civilians). Packages of material were prepared and distributed to each MET, including instructions, grade by DAFSC job sample specifications, reproduced copies of current position description forms, benchmark factor scales, and rating forms. Each of the 122 METs was asked to collect position descriptions for a specified subset of the current or new job sample (i.e., from about 15 or 20 to 500 descriptions depending on base/organization size). An example of an officer position description form is given in Appendix A. Job incumbents were asked to complete the position description form according to instructions, then forward it to their supervisor who provided a

judgment of appropriate grade for the job. There were 100 larger METs (i.e., seven or more raters available) which were asked to furnish ratings for the subset of reproduced descriptions provided by AFHRL from the criterion job sample. Two copies of this set were reproduced and divided so that each description could be rated by two different MET organizations.

After collection and processing of position descriptions, MET raters were asked to independently rate specified subsets of job descriptions (both criterion sample and current jobs) according to prescribed directions. Each rater was instructed to rate jobs using the 10 job evaluation factor benchmark scales and 16-point grade code scale. The five benchmark scales entering into the OGR policy equation are shown in Appendix B (i.e., factors 2, 5, 7, 8, and 9). Job rating forms, with job numbers pre-listed by MET project officers, were provided for raters to enter their job factor and grade code ratings. Job descriptions were arranged into folders so that page 4 background information was not visible with each folder containing approximately 25 descriptions.

Factor and grade ratings were obtained from an average of 13.61 raters for the 1,725-job sample. An average of 6.95 MET raters provided such data for the 11,321 current position sample (i.e., composed of 9,634 jobs for the 1976 cycle and 1,687 from 1974 cycle). In summary, data were available for a total of 13,046 non-aircrew officer position descriptions (11,321 + 1,725) for the present study.

MET Application of OGR Technology to Criterion Job Sample

After receipt and screening of data (job description and ratings) from the 122 METs, analyses were accomplished concerned with a critical re-examination of the OGR policy equation, determination of optimal integer weights for each predictor variable, evaluation of the validity or predictive efficiency of the policy equation, and development of a stable conversion table. These analyses and findings, based on data for the 1,725 job sample, were as follows.

During the 1974 MET OGR study, a nine-variable simplified integer weighted policy equation was designed to evaluate whether information collected by METs produced a grade composite score having a high correlation with the 1964 Policy Board. This equation was developed on a 485 job sample and involved weighting the grade and benchmark factor scale ratings provided by METs, together with supervisory grade ratings and data concerning the organizational level for each position. This simplified equation had a composite score validity of .90 for the 485 job set, which was identical to that obtained for 1,000 jobs in the 1966 Benchmark study, and only slightly lower than the validity coefficient of .92 obtained in the 1964 study. When this equation was applied to the 1,725 job sample in the present investigation, it yielded a composite score validity of .91.

Although the nine-variable policy equation yielded high validity coefficients when applied on four occasions, the question remained open regarding the inclusion of the MET mean grade rating variable in an equation for operational implementation. In the present study projections were based on the assumption that MET raters would apply the OGR technology in the future in the same manner as applied in the present job samples. Any tendency for raters to give high or low grade estimates on the 16-point scale did not create a problem in determining grades for the 11,000-case sample since the conversion table automatically adjusted for any rating biases. However if the OGR technology became operational, METs would receive continuous feedback concerning the OGR-specified grade for each position evaluated. Consequently, this could modify the raters' frame of reference such that they would tend to bring their grade ratings into alignment with anticipated equation results. In order to protect against this possibility, the decision was made to eliminate MET

grade ratings from an operational version of the policy equation, provided there was little if any loss in validity or predictive efficiency. The supervisors' judgment of grade variable was retained in the equation since supervisors would not be involved in the continuous feedback process as were MET raters.

An eight-variable policy equation with optimal integer regression weights was developed as shown in Table 3. As described subsequently this optimally weighted equation had a high level of predictive efficiency and was the final version used for making projections to the non-aircrew force. The equation consisted of the five MET rated job evaluation factors, two level of organization variables, and the supervisor's judgment of appropriate grade. Although supervisor's judgment was taken from the job description as a linear variable, it was used in the equation with adjustments to composite score weighted for each grade as shown in Table 3.

Table 3. **Final Version of OGR Integer Weighted Policy Equation**

Grade Definer Variables	Weights
Job Factors (MET Mean Ratings)	
2. Special Training and Work Experience	1
5. Communication Skills	1
7. Judgment and Decision Making	1
8. Planning	1
9. Management	3
Organization Level Variables	
Level of Organization in Which Job Occurs	1
Level of Job Within Organization	1
Supervisor's Judgment of Appropriate Grade (+ or —)	

Grade	Adjustment to Composite Score
Lt	-12
Capt	-9
Major	-5
Lt Col	+5
Col	+12

Table 4 presents validity coefficients for each of the final equation variables and the correlation of final grade composite scores with the 1964 Policy Board grade ratings. The eight-variable composite validity, as shown, is essentially identical with the validity obtained in the previous application of a nine-variable equation (Stacy et al., 1975). There was practically no loss in accuracy or predictive efficiency from exclusion of the MET mean grade rating variable. Consequently, the optimal integer weighted policy equation (Table 3) was the version adopted for use in this project (see Finstuen et al., 1980, for details).

Table 4. **Validities of Variables Included in the MET-Applied Integer Weight Grade Equation**
(N = 1,725 Jobs)

Variables	Validity
Factor 2 Special Training and Work Experience	.65
Factor 5 Communication Skills	.72
Factor 7 Judgment and Decision Making	.74
Factor 8 Planning	.78
Factor 9 Management	.79
Level of Organization in Which Job Occurs	.50
Level of Job within Organization	.47
Supervisor Judgment of Appropriate Grade	.78
Final Grade Evaluation Composite (R = .896)	

A grade conversion table based on 1,725 jobs was constructed in order to convert composite scores to a 16-point experience level scale and a 5-point grade scale (Table 5). This research conversion table was necessary to determine cutting points separating adjacent grade levels so as to yield the same distribution of grades to a job sample as would have been allocated by the 1964 Policy Board. When applied to the grade equation composites, this conversion table also adjusts for restriction in range due to regression effects. Essentially, the validity of .90 assured that the OGR equation assigned jobs in the correct order of merited grade and the conversion table assured that the right number of jobs was assigned to each grade level.

Table 5. **Grade Conversion Table**

Weighted Composite Cumulative Score	Converts to Experience Level	Converts to Grade
79.6 and above[a]	15 Sr Col	
73.5 to 79.5	14 Mid Col	Colonel
67.4 to 73.4	13 Jr Col	
61.4 to 67.3	12 Sr Lt Col	
55.5 to 61.3	11 Mid Lt Col	Lt Colonel
49.6 to 55.4	10 Jr Lt Col	
43.7 to 49.5	9 Sr Maj	
37.7 to 43.6	8 Mid Maj	Major
31.7 to 37.6	7 Jr Maj	
25.6 to 31.6	6 Sr Capt	
19.4 to 25.5	5 Mid Capt	Captain
13.0 to 19.3	4 Jr Capt	
12.9 and below[b]	3 Lt	Lieutenant

[a] Although supervisory grade ratings at the general level (> 16) are allowable, the conversion table does not recognize grade requirements above colonel.

[b] At the present time, the system is not designed to distinguish between lieutenant positions (levels 3, 2, and 1).

The basic concept involved in the construction of the equi-percentile conversion table was to use average (mean) grade ratings values (Table 1) of the 1,725 jobs assigned by the Policy Board to establish interval cutoff points in the array of job composite scores ranked from highest to lowest score values. Essentially the procedure assures that equal percentages or the same number of jobs (i.e., job composite scores from application of the OGR equation) are assigned the same experience level (16-point experience level scale) or grade level (5-point grade scale) as given by Policy Board ratings for these jobs. For example (Table 5), if seven jobs were rated by the Policy Board as upper level colonel positions (14.5 and above), then a corresponding number of jobs would be designated as upper level colonel according to their job composite scores (i.e., the composite score for the seventh lowest job would be used as the interval cutoff score between upper and mid-level colonel jobs). Similar logic and procedure were used to determine cutoff points (experience level, grade, and job composite scores) for the remaining 1,725 jobs.

After determining the preceding intervals, and making the minor adjustments described subsequently, the equi-percentile conversion procedure was then applied to the 11,000 case job sample. This technology was used in order to apply a standard unit or system measurement to the job sample. With regard to this procedure, the point should be noted that this conversion process does not limit the number of jobs within experience or grade levels. Rather, the procedure permits individual jobs to change grade levels according to changes in their job content and responsibility. Consequently, if some specified set of jobs were evaluated at two different time periods, the procedures could result in essentially the same grade distribution or a different grade distribution, dependent on shifts or changes in content or responsibility of the jobs.

In the construction of the conversion table based on 1,725 jobs, a modification to prior equi-percentile conversion table development procedures was necessary to account for the smaller job sample size. In the initial OGR project, using the criterion job sample (3,575), a 16-point conversion table was developed which resulted in cutoff intervals between experience levels which were relatively equal (Hazel et al., 1966). In the present study, the intervals between cutoff points were slightly irregular. Minor adjustments were made by fitting a quadratic regression equation to the interscore intervals and then changing cutoff points slightly in the research conversion table composite scores. (See Finstuen et al., 1980, for details). Within the range of composite scores shown in Table 5, the maximum adjustment at any interval was + 1.2 points. These minor changes in cutoff points were assumed to better reflect a conversion table based on a larger job sample.

After application of the grade conversion table to the composite scores, Figure 2 was constructed to display the relationship between grades assigned by the optimal Policy Equation and those assigned by the 1964 Policy Board to the 1,725 jobs. As shown in Table 5, three points on the experience level scale encompasses one grade level, except for lieutenants. For those positions in the squares with a diagonal line drawn, there was exact agreement between the equation and board-assigned grades. Positions plotted one square off the diagonal are those for which the equation and board agreed within 1/3 grade level. Positions plotted two squares off the diagonal were in agreement within 2/3 grade level. For the 1,725 jobs, 94% (1614) of the jobs were in perfect agreement or within 2/3 grade level. Of the remaining jobs, only 2% (35 jobs) were in disagreement more than one grade level. In brief, the MET raters were able to accurately implement the 1964 criterion board policy using the optimal integer weighted equation.

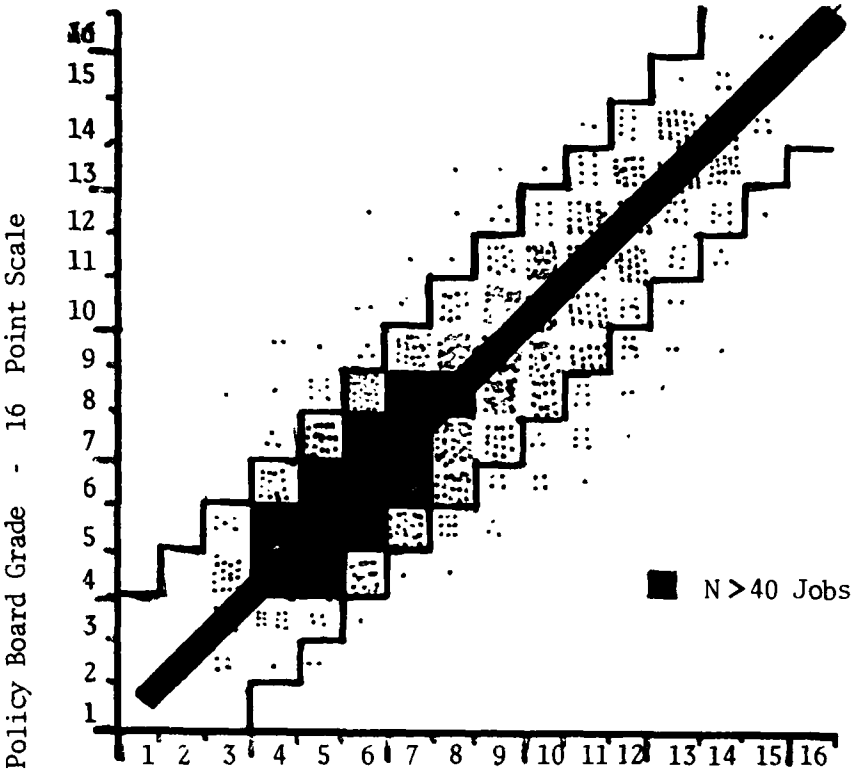

Figure 2. **Comparison of grades assigned to 1,725 jobs by Air Force Policy Board and the MET applied OGR Policy Equation.**

In addition to the validity coefficient (.90) between equation composite scores and board grade ratings, the relationship between converted composite scores and board ratings was also determined (r =.89). The conversion process with minor adjustments had only a negligible effect on the validity of the policy equation. In addition, there was a high relationship between the MET mean grade ratings and the converted policy equation scores (r =.91).

MET Rater Agreement on 11,000 Case Job Sample

Another critical question regarding MET application of the technology was the stability of the values used for projections to the total non-aircrew force. For this purpose, the level of agreement among MET raters for the present job sample (over 11,000 descriptions) was examined. Interrater reliability coefficients were computed for the five job evaluation factors and the final grade evaluation composite scores, based on an average of 6.95 ratings for each job. Reliability coefficients for the factors and grade composite extrapolated to an average of 6.95 ratings (k) per job are given in

Table 6. The reliability of the overall grade composite was .97, indicating a high level of agreement among MET raters concerning content and responsibility of jobs and stable values (i.e., mean composite scores of MET raters) used for projections. Essentially the obtained stability estimates suggest that if the 11,000 current job sample was evaluated by another group of MET raters, the probability is quite high they would be able to apply the technology and produce similar results in terms of mean composite scores.

Table 6. **Reliability Coefficients of MET Raters for Present Job Sample**

Variable		R_{kk}[a]
Factor 2	Special Training and Work Experience	.85
Factor 5	Communication Skills	.85
Factor 7	Judgment and Decision Making	.84
Factor 8	Planning	.87
Factor 9	Management	.87
Grade Composite Scores		.97

[a] R_{kk} based on average (k) of 6.95 ratings per job.

Reliability coefficients were also determined and compared for the type rater groups for the present job sample (591 enlisted, 184 civilian, 175 officer raters). Interrater reliabilities of composite scores were computed separately for each rater group based on jobs with two or more ratings. Reliability coefficients (i.e., stability estimates) derived by the Spearman-Brown prophecy formula for an average of seven raters (k) per job for the three groups are given in Table 7.

Table 7. **Reliability Coefficients for Three Groups of MET Raters**

Rater Group	R_{11}	k	R_{kk}[a]
Enlisted	.79	4.59	.96
Civilians	.83	3.38	.97
Officers	.85	2.41	.98

[a] R_{kk} based on average (k) of seven ratings per job

If the technology were operationally implemented by METs, it is estimated that the validity of the eight-variable policy equation would be approximately .91 as reported previously for the 1,725 job sample. However by accepting certain tenable assumptions (i.e., statistical relation of validity and reliability), validity in an operationally implemented system may be further enhanced by making maximum use of officer raters. As shown in Table 7, the ratings provided by civilian MET members were slightly more reliable than those provided by enlisted members, and the officer ratings were more reliable than those provided by either enlisted or civilian raters.

Projections from 11,000 Job Sample to Determine Non-Aircrew Grade Requirements

Based on preceding findings, it was possible to estimate with considerable accuracy the results that would be obtained if METs were to apply the OGR technology to all Air Force non-aircrew positions. After close examination of the present job sample, there were 11,192 jobs identified with complete information on all necessary data elements (i.e., prescribed DAFSC, OGR converted grade, and UDL grade of job) needed for projections. This sampling base was large enough to provide stable projections for the total non-aircrew force, large groupings of specialties, (i.e., career areas) and various officer utilization fields (i.e., 2-character AFSC levels).

The non-aircrew population to which the 11,192 case sample was projected consisted of 62,602 UDL authorized officer positions identified by HQ USAF/M&O as of December 1975. The method for projecting to this population of officer positions involved the determination of "population weights" and projections from sample values to population values. The essential feature of the projection procedure for a hypothetical specialty (AFSC) are illustrated in Table 8.

The basic sampling units for OGR projections were the DAFSC-by-grade (UDL) categories. As a first step for projection purposes, an associated "population weight" was determined for each job in the 11,192 case sample. For example if a certain specialty (DAFSC) population contained 125 positions at a certain M&O UDL grade (e.g., major), and if there were 25 jobs in this UDL grade-by-DAFSC category in the OGR sample, then each of the 25 jobs in the sample receives a population weight of five (125/25 = 5, see Table 8). Thus each of the jobs in this category of the sample would represent five jobs in the population.

To determine the appropriate distribution of grade for a particular specialty, the next step was to construct a two-way table in which rows represent OGR prescribed grades and columns represent currently authorized UDL grades of jobs (page 4 of job description). The following step involved the multiplication of population weights times sample frequencies in each OGR/UDL grade cell. These resulting values are then entered into a population distribution table for a specialty (Table 8). By combining population distributions for specialties, projection tables can be constructed for various occupational groupings (e.g., career areas) or the total non-aircrew force.

Projection Results — Total Non-Aircrew Force

Tables 9 and 10 present and compare estimates of grade requirements for the total non-aircrew force which were accomplished by sampling 17 percent of 62,602 positions. Table 9 is a two-way distribution of OGR (rows) versus UDL (columns) grade requirements. Table 10 presents the OGR job sample used for projections, HQ USAF M&O UDL values, OGR projected grade requirements, differences between M&O UDL and OGR requirements, and on-board grade distributions (December 1975 and June 1976 Uniform Officer Record assigned strength figures). For reasons associated with development of the conversion table discussed subsequently, data for captains and lieutenants have been combined. Additionally, the tables do not include data for general officers, students, patients, air attaches, line pilots and navigators and officers in the professional medical/dental specialties.

As shown in Table 9, of the 4,739 UDL authorized colonel positions, only 3,726 were correctly graded according to job content and responsibility as evaluated by the OGR equation. This means that approximately 21 percent (1013 jobs) were overclassified. However Table 9 reveals that 528 UDL lieutenant colonel positions, 18 UDL major positions, and four captain/lieutenant positions

Table 8. **Illustration of Sample to Population Projections Within a Specialty**

Computation of Population Weights

UDL Grade	(A) Sample n	(B) M&O Population N	(B/A) Population ($\frac{N}{n}$ = W) Weight
Col	12	48	4
Lt Col	20	100	5
Maj	25	125	5
Capt	45	270	6
Lt	10	70	7
Total	112	613	

Population Weights (W) Times Sample Distribution (S)
UDL Grades

	Lieutenant		Captain		Major		Lt. Colonel		Colonel		
OGR	S	(W)	S	(W)	S	(W)	S	(W)	S	(W)	Total
Col							1	(5)	10	(4)	11
Lt Col					3	(5)	17	(5)	2	(4)	22
Maj			12	(6)	21	(5)	2	(5)			35
Capt	5	(7)	30	(6)	1	(5)					36
Lt	5	(7)	3	(6)							8
Total	10		45		25		20		12		112

Population Distributions
UDL Grades

OGR	Lt	Capt	Major	Lt Col	Col	Total
Col				5	40	45
Lt Col			15	85	8	108
Maj		72	105	10		187
Capt	35	180	5			220
Lt	35	18				53
Total	70	270	125	100	48	613

Table 9. **Projected Total Non-Aircrew Force: UDL vs. OGR Requirements**

OGR Grade	Capt/Lt	Major	Lt Col	Colonel	Totals
			UDL Grade		
Colonel	4	18	528	3,726	4,276
Lt Colonel	361	2,049	7,626	964	11,000
Major	7,968	9,140	2,065	31	19,204
Capt/Lt	25,428	2,537	139	18	28,122
Total	33,761	13,744	10,358	4,739	62,602

Table 10. **Comparison of Grade Requirement for Total Non-Aircrew Force**

							UOR Present Grade			
		M&O UDL		OGR			Dec 75		June 76	
Grade	Sample Size	N	%	N	%	Difference	N	%	N	%
Col	858	4,739	7.57	4,276	6.83	- 463	4,306	6.52	4,329	6.82
Lt Col	1,961	10,358	16.55	11,000	17.57	+ 642	10,153	15.38	10,332	16.27
Maj	2,687	13,744	21.95	19,204	30.68	+5460	14,307	21.67	14,027	22.09
Capt/Lt	5,686	33,761	53.93	28,122	44.92	-5639	37,248	56.42	34,823	54.83
Total	11,192	62,602		62,602			66,014		63,511	

would be more appropriately graded at the colonel level yielding a net balance of 463 more UDL colonel authorizations than the requirements determined by the OGR equation (Table 10). Thus, these results indicate that the Air Force UDL stated requirements for colonel positions is approximately 10 percent too high. However, as of December 1975 (Table 10), there were approximately 4,306 colonels in the active duty force (UOR), which was 433 less than called for by the UDL at that time but 30 more than OGR requirements.

The preceding results suggest that grade requirements based on job content and responsibility levels would accommodate nearly all of the on-board colonels. Additionally, the OGR versus on-board comparisons suggest an alternative usage of the OGR technology. Composite scores derived for positions could be used for more finite differentiation in the assignment process at all grade levels. For example, OGR grade composite scores could be used to identify higher-level lieutenant colonel positions which could serve as training positions for colonel selectees.

Reference to Table 10 also reveals that the OGR recommendation for lieutenant colonel grades is higher than the UDL statement for such grades, and more than balances the colonel reduction. The combination of requirements for colonel and lieutenant colonels was 15,097 as defined by UDL and 15,276 for OGR. Either of these requirements would accommodate the number of colonels and lieutenant colonels on active duty as of December 1975 or June 1976 (14,459 and 14,061, respectively).

As shown in Table 10, the OGR equation indicates a requirement for 5,460 more majors and 5,639 fewer captains/lieutenants than called for by the UDL. While the OGR stated requirements for major positions may be correct in terms of the content and responsibilities associated with these positions, it may not be possible for the Air Force to produce this many majors from the stated captain/lieutenant base. Although separate breakouts are not provided for captains and lieutenants, the policy equation reflected a requirement for considerably more captains than lieutenants, which would be even more unreasonable to implement.

The problem is generated by the fact that the 1964 policy board recognized very few non-aircrew positions as being appropriately filled by lieutenants; yet the Air Force is a closed system, and with few exceptions (e.g., physicians) does not hire captains directly from the civilian sector. For this reason, it may be necessary to identify a certain proportion of the lower-level OGR captain positions and declare them to be lieutenant positions on the UDL. Similarly, it may be necessary to declare a small proportion of the lower-level OGR major positions to be captain positions on the UDL. Such actions in no way suggest that the requirements stated by the 1964 policy board for such positions are incorrect; rather, it is a recognition of the need to link career progression programs with job requirements in order to provide reasonable promotion points. Since the OGR equation yields a continuous distribution of composite scores reflecting the responsibility level of positions, there is flexibility in defining cutting points for different grade levels. Consequently, development of a conversion table to provide an appropriate distribution of grades at the lower levels, as specified by Air Force Management, is recommended. The development of such a conversion table however would also require a concurrent examination of its impact on grade requirements in various officer utilization fields.

Projection Results — Six Career Area Groupings

Tables 11 to 16 present comparisons of UDL versus OGR grade requirements and on-board strength figures (December 1975 and June 1976 UOR) for six career area or specialty groupings. These groups correspond approximately with certain career areas outlined in AFR 36-1 (1977). The data on these tables permit the comparison of UDL, OGR, and on-board grade requirements and detection of certain general trends or differences which are not observable from the total non-aircrew force distribution. While these groupings reflect the impact of applying the OGR technology at a broader level of occupational groupings, any observable trends should be considered further with regard to specific specialties or utilization fields described later in the report. The values in Tables 11 to 16 are averaged across AFSCs and do not reflect the wide variations that may appear within specialties.

Table 11. **Commander/Director Area**

AFSCs: 0016, 0026, 0036, 0046, 0056, 0066, 0076, 0086, and 0096

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	303	2,080	67.55	1,869	60.70	-211	1,980	64.02	1,968	61.87
Lt Col	92	998	32.41	1,134	36.83	+136	867	28.03	964	30.30
Maj	1	1	.03	74	2.40	+73	225	7.27	222	6.98
Capt/Lt	—	—	—	2	.06	+2	21	.68	27	.85
Total	396	3,079		3,079			3,093		3,181	

Table 12. **Air Operations Area**

AFSCs: 14XX, 16XX, 17XX, 18XX, 20XX, 21XX, and 22XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	82	294	2.19	332	2.47	+38	295	1.99	300	2.07
Lt Col	519	2,458	18.27	2,570	19.10	+112	3,180	21.40	3,192	21.97
Maj	754	3,567	26.51	4,825	35.87	+1258	4,128	27.78	3,920	26.98
Capt/Lt	1,223	7,134	53.03	5,726	42.56	-1408	7,257	48.84	7,115	48.98
Total	2,578	13,453		13,453			14,860		14,527	

Table 13. **Scientific and Engineering Areas**

AFSCs: 25XX, 26XX, 27XX, 28XX, 29XX, 30XX, 51XX, 55XX, and 57XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade *Dec 75* N	*Dec 75* %	*June 76* N	*June 76* %
Col	153	918	5.54	927	5.60	+9	756	4.40	772	4.59
Lt Col	441	2,507	15.14	2,765	16.70	+258	2,286	13.32	2,351	13.97
Maj	721	3,837	23.18	5,966	36.04	+2129	3,677	21.42	3,721	22.12
Capt/Lt	1,535	9,294	56.14	6,898	41.66	-2396	10,446	60.86	9,980	59.32
Total	2,850	16,556		16,556			17,165		16,824	

Table 14. **Logistics and Materiel/Comptroller Areas**

AFSCs: 31XX, 40XX, 46XX, 60XX, 62XX, 63XX, 64XX, 65XX, 66XX, 67XX, and 69XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	140	565	5.18	520	4.76	-45	470	4.11	475	4.76
Lt Col	408	1,989	18.22	2,016	18.47	+27	1,525	13.34	1,529	15.32
Maj	544	2,807	25.72	3,693	33.84	+886	2,480	21.69	2,419	24.24
Capt/Lt	907	5,553	50.88	4,685	42.93	-868	6,957	60.86	5,557	55.68
Total	1,999	10,914		10,914			11,432		9,980	

Table 15. **Administrative and Support Areas**

AFSCs: 02XX, 05XX, 23XX, 70XX, 73XX, 74XX, 75XX, 79XX, 80XX, 81XX, and 87XX

Grade	Sample Size	M&O UDL		OGR		Difference	LOR Present Grade			
							Dec 75		June 76	
		N	%	N	%		N	%	N	%
Col	96	539	5.20	392	3.78	-147	453	4.16	459	4.28
Lt Col	323	1,648	15.90	1,674	16.15	+26	1,359	12.47	1,372	12.79
Maj	419	2,321	22.40	3,089	29.81	+768	2,447	21.54	2,382	22.21
Capt/Lt	1,004	5,855	56.50	5,208	50.26	-647	6,738	61.83	6,511	60.71
Total	1,842	10,363		10,363			10,897		10,724	

Table 16. **Medical and Professional Areas**

AFSCs: 88XX, 89XX, 90XX, 91XX, 92XX, 97XX, and 99XX

Grade	Sample Size	M&O UDL		OGR		Difference	LOR Present Grade			
							Dec 75		June 76	
		N	%	N	%		N	%	N	%
Col	84	343	4.17	234	2.84	-109	352	4.11	351	4.29
Lt Col	178	757	9.19	841	10.21	+84	936	10.93	924	11.17
Maj	248	1,210	14.69	1,558	18.92	+348	1,150	16.93	1,363	16.47
Capt/Lt	1,017	5,925	71.95	5,602	68.03	-323	5,829	68.04	5,633	68.07
Total	1,527	8,235		8,235			8,567		8,275	

Table 17 provides a summary of the percentage of changes by grades for the six areas and supplements Tables 11 through 16. The percentage of change values were derived by dividing the differences between M&O UDL and OGR requirements by the M&O UDL values (e.g., Table 11, Commander/Director area, Colonel difference = -211/2080 which yields a UDL loss of -10.14% in Table 17).

As can be seen in Table 17, if OGR recommendations were implemented, one area (Air Operations) would have an increase in colonel authorizations, whereas four areas (Commander/Director, Logistics/Materiel, Administrative, and Medical/Professional) would lose some UDL colonel authorizations. While the Commander/Director AFSCs would lose the largest in actual numbers (-211), they would not lose the most on a percentage basis (e.g., Medical/Professional =32%, actual loss =-109). The Scientific/Engineering area would receive a small (approximately 1%) increase in colonel authorizations. For three areas (Air Operations, Scientific/Engineering, and Logistics/Materiel), OGR requirements were larger than on-board (December 1975 present grade) strength figures (Tables 12, 13, and 14). For three other areas (Commander/Director, Administrative/Support and Medical/Professional), on-board strength figures were larger than OGR requirements (Tables 11, 15, and 16).

Table 17. **Percentage of Change by Grades for Six Career Areas**

Career Area	Capt/Lt	Major	Lt Col	Colonel
		Percent of UDL Change[a]		
Commander/Director	b.	b.	+ 13.63	-10.14
Air Operations	-19.74	+ 35.27	+ 4.56	+ 12.93
Scientific and Engineering	-25.78	+ 55.49	+ 10.29	+ 0.98
Logistics and Materiel/ Comptroller	-15.63	+ 31.56	+ 1.36	- 7.96
Administrative and Support	-11.05	+ 33.09	+ 1.58	-27.27
Medical and Professional	- 5.45	+ 28.76	+ 11.10	-31.78

[a]Percent change (gain or loss) in authorized M&O UDL requirements.
[b]*Omitted since these grades not authorized according to* AFR 30-1 and only one case for M&O UDL

For lieutenant colonel changes, there would be an increase in the number of UDL authorizations for all six areas. The percentage of increase for lieutenant colonels is particularly noticeable for the Commander/Director, Scientific/Engineering, and Medical/Professional areas. Number-wise, the first three areas listed in Table 17 would have substantial increases (i.e., 136, 112, 258 cases, respectively, in Tables 11, 12, and 13 for lieutenant colonel). For the last three areas listed, the actual number of cases were smaller (i.e., 27, 26, and 84, respectively, for Tables 14, 15, and 16). Comparing on-board strength figures (December 1975 present grade) to OGR requirements revealed that two areas (Air Operations and Medical/Professional) had on-board values larger than OGR values (Tables 12 and 16). For the four other areas (Tables 11, 13, 14, and 15), OGR requirements were larger.

For changes at the major grade level, the percentages of increase for major authorizations would be quite large for all five of the areas (i.e., Commaner/Director area excluded since this grade is not included in AFR 30-1 grade spread). Number-wise these increases were particularly striking for the Air Operations (+ 1,258) and Scientific/Engineering (+ 2,129) areas and quite substantial for the Logistics/Materiel, Administrative and Medical/Professional areas (i.e., 886, 768, and 348 for Tables 14, 15, and 16, respectively). With regard to on-board (December 1975 present grade) versus OGR requirements, for all five areas OGR values were larger (Tables 12 to 16). Number-wise, the Scientific/Engineering and Logistics/Materiel areas reflected the largest difference (i.e., 2,289 and 1,273, respectively).

At the combined captain/lieutenant grade level, there was a decrease in the percentage of UDL authorizations for each of the five areas. The Scientific/Engineering area reflected the largest decrease, representing a difference of 2,396 cases. The Air Operations and Logistics/Materiel areas also reveal a substantial decrease, representing 1,408 and 868 cases, respectively. With regard to on-board versus OGR requirements, for all five areas, on-board strength figures were larger than OGR requirements. This difference was particularly noticeable in four of the areas (i.e., differences ranging from 1,530 to 3,548 cases).

Projection Results — 54 Utilization Fields

Since one requirement for RPR 75-21 was to project estimates of grade requirements for non-aircrew officer utilization fields, projections and comparisons for 54 utilization fields (2-character AFSCs) are provided in Appendix C. The values in the 54 tables (Appendix C) reflected wide

variations between and within specialties and permitted detection of specific utilization field differences which were not observable in the preceding series of comparisons (Tables 9 to 17). The 54 tables were accomplished by sampling 17% (over 11,000 jobs) of the 62,602-job population of non-aircrew positions. Each table consists of the OGR job samples used for projections, HQ USAF M&O UDL population values, OGR projected grade requirements, differences between M&O UDL and OGR requirements, and present on-board distributions (December 1975 and June 1976 Uniform Officer Record strength figures). The percentages for each grade level of the totals for the *four columns* (M&O UDL, OGR, and present grade), are also recorded.

In the interpretation of these projections, particular attention should be directed to the sample sizes used as a basis for making OGR estimates of grade requirements. Projections of grade requirements for the total non-aircrew force are very stable, and the six groupings of career areas also have adequate and representative job samples. Many of the 54 tables of officer utilization fields are based on adequate AFSC-by-grade job samples to place considerable confidence in the stability of projected grade estimates. For example, in the 40XX (Aircraft Maintenance/Avionics) field, the M&O UDL value was 2,984 with a job sample of 605 across grades colonel through captain/ lieutenant. However in some of the utilization field-by-grade cells, the number of jobs sampled may not have been sufficient to assure representativeness and stability of projected requirements. Projections made on insufficient sampling could result in either an understatement or overstatement of grade requirements. For example, in 0046, Director of Logistics, only six of 100 lieutenant colonel jobs were sampled.

In evaluating the adequacy (or representativeness) of sample sizes, both the actual utilization-by-grade cell frequencies and percentages (i.e., sample percent of M&O UDL values) should be considered, with primary emphasis given to the actual cell frequencies. As an overall guideline, projections from cell frequencies less than 8 to 10 cases should be treated cautiously. However, a more systematic procedure was developed, based on sample cell frequencies and the ratio of these samples to M&O UDL values (i.e., percentages). An explanation of this procedure is provided in Appendix C. Each utilization field-by-grade cell without desired sample size (according to this procedure) has been identified with an asterisk. Further, if the OGR technology were operationally applied to determine grade requirements within a particular utilization field, an adequate or even 100% sampling of jobs in certain specialties (e.g., those with smaller populations) is recommended.

The most striking feature of the tables in Appendix C is the widespread variation in grade requirements for 53 of the 54 officer utilization fields. Comparison of the M&O UDL versus OGR stated grade requirements (see difference column) indicated that implementation of the OGR technology would produce significant changes in stated grade requirements based on job content and *responsibility for all specialties. In some instances there was a general downgrading of jobs; in other* instances, there was a general upgrading of jobs. There were also many varied adjustments or combinations of changes between these two general trends. For information regarding changes or comparisons within any specific utilization field, the reader should examine the tables in Appendix C which are arranged in numerical AFSC sequence (0016 to 99XX). Some examples are provided subsequently, however, to illustrate the interpretation of the tables and to point out that the gross (or grouped) values in Tables 11 through 16 which were averaged across certain AFSCs do not necessarily reveal the wide variations which may appear within grade levels for a particular specialty. Essentially, the findings from the tables in Appendix C (with appropriate cautions) would be useful with regard to actions or recommendations taken by Air Force management to make grade adjustments within officer utilization fields.

As an example, *in the Commander/Director area* (Table 11), there was a downgrading of 211 UDL colonel authorizations. As shown in Appendix C, OGR calls for an increase of 27 colonel authorizations in the Organization Commander (0026) specialty. For the remaining specialties in the Commander/Director area, the percentage of UDL colonel authorization decreases varied from approximately 7% (0066, Air Commander, — 15/209 = 7.18%) to 35% (0056, Comptroller, — 37/107 = 34.58%).

With regard to M&O UDL versus OGR difference at the lieutenant colonel grade level (Appendix C), there were 35 utilization fields where OGR requirements were greater than UDL authorizations, 17 fields with OGR requirements less than UDL authorizations, and 2 fields where UDL and OGR requirements were the same. Of the 17 fields where OGR application would represent a decrease in UDL authorizations for lieutenant colonel, the losses were distributed across *utilization fields in all of the six career categories* (*i.e., two fields in Commander/Director, two in* Air Operations, three in S&E, three in Logistics/Materiel, four in Administrative, and three in Medical/Professional). However, within categories where there were fields with decreases, there were other fields with increases (e.g., 64XX, Supply Management versus 66XX, Logistics Plans, see Table 14 and Appendix C).

Examination of Appendix C reveals that the Medical/Professional area has a number of problems which are not detectable in Table 16. Four utilization fields selected as examples are Judge Advocate (88XX), Chaplain (89XX), Health Services Administrator (90XX), and Nurse (97XX).

The Judge Advocate field (88XX) OGR requirements exceeded UDL authorizations for the major, lieutenant colonel, and colonel grade levels. For these grade levels, the on-board strength figures (both December 1975 and June 1976 UOR) were less than the UDL authorizations (Appendix C). Even if the OGR grade requirements for major were reduced by making adjustments to the conversion table (Table 5) as previously described, difficulty would still be encountered in filling major through colonel requirements in the 88XX utilization field unless the retention of junior officers is improved.

The December 1975 (also June 1976) UOR indicated that about 42% of the Chaplain (89XX) utilization field was graded as lieutenant colonels or colonels (Appendix C). The UDL called for about 23% in these grades, and the OGR reduced this value to approximately 17%. In terms of OGR requirements, the Chaplain field is overgraded at the upper levels. However, it should be recognized that there may be grounds for supporting the present grade structure on bases other than the OGR definition of grade.

The Health Services Administrator (90XX) field has a rather unique feature. The UDL calls for about the same number of majors as lieutenant colonels. The OGR also calls for about the same number of majors and lieutenant colonels (214 vs. 210), and for lieutenant colonels, this is about twice the number on-board (106). This suggests that the grade structure in this utilization field merits investigation of the nearly equal requirements at these two grade levels.

For the Nurse (97XX) field, the OGR requirements call for a down-grading of field grade nurse positions compared to those authorized by the UDL. Additionally, the on-board population (UOR) is considerably overgraded for either set of requirements. As in other utilization fields however (e.g., Chaplain), there may be other reasons for supporting the nurse grade structure on bases other than the OGR definition of grade requirements.

VIII. SUMMARY AND CONCLUSIONS

This study had two major purposes. The first objective was the development and large-scale field-testing of a reliable and systematic method by which METs could determine the appropriate grade levels (lieutenant to colonel) of non-aircrew officer positions (excludes line pilots, navigators, physicians and dentists). The second objective was to apply the technology to an officer job sample of sufficient size to estimate the grade requirements for the total non-aircrew officer force and various officer utilization fields, if the technology was implemented operationally.

The basic technology used in this study has been under development and refinement at various periods for 15 years, and represents one of the most comprehensive and carefully researched job evaluation systems in existence. The large-scale field test and projections for the present effort represent modification and extension of this research.

To test the technology and make projections of non-aircrew grade requirements, independent evaluation teams from 122 Air Force-wide METs (950 qualified raters) collected and evaluated over 11,000 officer job descriptions under detailed instructions which guaranteed the scientific and technical integrity of the data. In addition, ratings were obtained from these teams on a sample of jobs (1,725) which had previously been evaluated by a HQ USAF Policy Board. A variety of analyses were conducted to determine the reliability and accuracy of the MET application (i.e., ratings), and the stability of the data on the 11,000 jobs for making projections to the total non-aircrew force. An integral part of the analyses was the development of an integer-weighted eight-variable policy equation and a grade conversion table, which represent the systematic method for *METs to use in determining non-aircrew officer grade requirements.*

The method developed to establish officer grade requirements is like a yardstick, except, instead of measuring feet or inches, it measures the amount of job content and responsibility associated with officer positions. As the level of content and responsibility changes, so does the appropriate grade level for a job. Basic ingredients of this yardstick consist of eight variables in an equation applied to data collected by and from manpower and management engineering personnel. The essential components and steps involved in the application are: first, job descriptions are completed by officers using a standard form that provides a listing of duties and tasks performed and organizational information regarding the position. The descriptions are then evaluated by the officer's supervisor. Next, MET judges evaluate each officer job description and rate these descriptions in terms of five job factor benchmark scales. These job factors, together with the other variables, are as follows.

Job Factors:

1. Special Training and Work Experience
2. Communication Skills
3. Judgment and Decision Making
4. Planning
5. Management

Organizational Information:

6. Level of Organization in Which Job Occurs
7. Level of Job Within Organization

Supervisory Appraisal:

8. Supervisor's Judgment of Appropriate Grade for Job.

Using the preceding information about a particular position in the eight-variable equation, a numerical score (predicted composite score) can be computed to place a job at an appropriate level of job content and responsibility compared to other Air Force officer jobs. A conversion table is then used to translate the composite score to the appropriate grade level, lieutenant through colonel. Essentially, the OGR equation assigns jobs in the correct order of merited grade, and the conversion table assigns the right number of jobs to each grade level, based on job content and responsibility.

In obtaining data, the benchmark factors used by METs consisted of a 9-point scale (9 =high to 1 = low), with each point defined in terms of appropriate job title representing that level. These benchmark scales permit raters to "nest" their judgments according to the amount of the factors required in individual officer jobs. The organization level variables and supervisor's judgment of appropriate grade are extracted from the incumbent's job description. From five to seven MET members provided benchmark factor ratings on each position description evaluated.

Analyses revealed that MET raters could very accurately and efficiently apply the OGR technology. For a subsample (1,725) of officer positions, using MET ratings in the eight-variable policy equation, it was possible to estimate with considerable assurance the results which would be obtained if METs were to apply the OGR technology to all Air Force non-aircrew officer positions (62,602). The sampling base (over 11,000 jobs) was sufficient to provide projections for the total non-aircrew force and various officer utilization fields.

Comparison of OGR projected grade requirements with currently authorized (M&O UDL) grade levels revealed that the total non-aircrew force has fewer authorized field-grade officer positions than indicated by the OGR technology. While results indicated fewer OGR colonel requirements than UDL authorizations, there was an increase in the OGR requirements for lieutenant colonels. The lieutenant colonel increase more than balanced the colonel reductions (i.e., decrease of 163 colonels and increase of 642 lieutenant colonels). Further, the UDL versus OGR difference was particularly striking at the major grade level, where OGR recommended a very substantial increase in grade requirements. Conversely, at the combined captain/lieutenant grade level, OGR reflected a very large reduction in grade requirements as compared to UDL authorizations.

Comparisons of on-board, UDL and OGR requirements revealed that there were 4,306 colonels in the active duty force (December 1975 — UOR) which was 433 less than called for by the UDL but 30 more than OGR. These results suggest that grade requirements based on job content and responsibility levels would accommodate nearly all of the on-board colonels.

Comparisons of OGR versus on-board (UOR) also suggest a possible additional usage of the OGR technology. Composite scores derived for positions could be used for improved differentiation in the assignment process at all grade levels. For example, OGR grade composite scores could be used to identify higher-level lieutenant colonel positions for colonel selectees.

As noted, OGR indicated a large requirement for more majors and fewer captains/lieutenants than called for by the UDL. While OGR —stated requirements for major positions may be correct in terms of the content and responsibilities associated with these positions, it may not be possible for the Air Force to produce this many majors from the stated captain/lieutenant base. Although separate breakouts are not provided for captains and lieutenants, the policy equation reflected a requirement for considerably more captains than lieutenants, which would be even more unreasonable to implement.

The preceding problem is generated by the fact that the Air Force Policy Board recognized very few non-aircrew positions as being appropriately filled by lieutenants; yet the Air Force is a closed system, and with few exceptions (e.g., physicians) does not hire captains directly from the civilian

sector. For this reason, it may be necessary to identify a certain proportion of the lower-level OGR captain positions and declare them to be lieutenant positions on the UDL. Similarly, it may be necessary to declare a small proportion of the lower-level OGR major positions to be captain positions on the UDL. Such actions essentially reflect the recognition of the need to link career progression programs with job requirements in order to provide reasonable promotion points. Since the OGR equation yields a continuous distribution of composite scores reflecting the responsibility level of positions, there is flexibility in defining cutting points for different grade levels. Consequently, development of a conversion table to provide an appropriate distribution of grades at the lower levels, as specified by Air Force management, appears desirable. The development of such a conversion table, however, would require a concurrent examination of its impact on grade requirements in various officer utilization fields.

Comparisons of UDL versus OGR stated requirements indicated that implementation of the OGR technology would produce significant changes in stated grade requirements for many officer utilization fields. In some instances there was a general downgrading of jobs; in other instances there was general upgrading of jobs. These findings suggest that the OGR technology may be particularly useful with regard to actions taken by Air Force Management to make grade adjustments within officer utilization fields.

For the present study, the question may arise whether a new criterion board should have been established to express grade policy as of 1976. There are several reasons for using the 1964 Policy Board's statement of grade requirements for the criterion job sample (1,725 jobs) rather than attempting to obtain another policy statement. The initial OGR project was one of the largest and most carefully executed job evalution studies ever accomplished, in or out of the military service. Numerous analyses were conducted before the Policy Board judgments were accepted as a criterion, and results demonstrated that board member ratings were reliable, reasonable, and unbiased. Each step in the project was fully documented, and all data or analyses involved in the effort are still available for inspection. Similar findings for the initial policy board would appear difficult to reproduce in today's environment.

Additionally, while new types of officer positions have been introduced since 1964, there is reason to believe that the "grade definers" in the equation developed are as valid for today's jobs as jobs existing previously. During the original study, tests were conducted which revealed that grade had a universal meaning and that the same factors and weights were applicable to all classes or types of jobs. Therefore, the same equation should be valid for any new types of jobs. Finally, attaching grade requirements to a constant standard (i.e., the same equation and policy board) would tend to prevent any unjustified "grade creep" over time. Assuming objective application of the benchmark scales, any increases in stated grade requirements would be associated with actual increase in job content and responsibility levels.

IX. RECOMMENDATIONS

If Air Force management wishes to implement a system for determining non-aircrew officer grade requirements in terms of job content and responsibility, the OGR technology is recommended for consideration. However, this recommendation is made with emphasis on the need to link career progression programs with job requirements in order to provide reasonable promotion points. The present study did not attempt to resolve an officer grade structure to support orderly career progression in various specialties, although certain suggestions regarding adjustments to a conversion table are given below. An optimal final officer grade determination system would likely represent some compromise between the OGR technology and certain modifications to support orderly career progression as well as allow for some shifts in requirements between career fields. Additionally, some changes in the present technology for

operational application should be considered, as in multi-point position classification involving similar jobs in different locations or organizations. For example, some changes in the procedure used to obtain job descriptions for officer positions may be necessary.

The difference between OGR and UDL grade requirements was particularly striking at the major grade level where OGR indicated a substantial increase in requirements. While the OGR stated requirements for major positions seem defensible in terms of content and responsibility, it may not be possible for the Air Force to produce this many majors from the stated captain/lieutenant base. Therefore, it may be necessary to identify a certain proportion of the lower-level OGR major positions to be captains on the UDL, and some lower-level captain positions as UDL lieutenant positions. Such an interpretation recognizes the need to link career progression with job requirements. Since the OGR equation yields a continuous distribution of composite scores reflecting different levels of responsibility for officer positions, it provides certain flexibility in defining cutting points for different grade levels. Consequently, development of a conversion table to provide an appropriate distribution of grades at the lower levels is recommended, as specified by Air Force management. The development of an adjusted conversion table, however, would also require a concurrent examination of its impact on various officer utilization fields.

The OGR projections to the non-aircrew force indicated significant changes in grade requirements for many officer utilization fields. In some fields there would be a general upgrading of jobs and in others a general downgrading of jobs. The OGR technology should be particularly useful with regard to recommendations or actions by Air Force management to make grade adjustments within utilization fields. Projections in the present study could be used as "checks and balances" in the examination of grade structure adjustments made in various officer utilization fields, based on reasons or justification other than the OGR definition of grade requirements.

The findings suggested that grade requirements based on job content and responsibility could accommodate nearly all on-board (UOR) colonels.

Comparisons of OGR versus on-board (UOR) requirements also suggested a possible additional usage of the technology. Composite scores derived for positions could be used for improved differentiation (of positions) in the assignment process for all grade levels. For example, OGR grade composite scores could be used to identify higher level lieutenant colonel positions which can service as training positions for colonel selectees.

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APPENDIX A: JOB DESCRIPTION FORM FOR 1976 MET OGR PROJECT

AIR FORCE OFFICER POSITION DESCRIPTION

INSTRUCTIONS

This survey is directed by Hq USAF to identify and describe the work performed by officers in the Air Force. The Air Force needs precise information about the duties, tasks, and requirements of officer jobs in order to maintain the classification structure, to make appropriate grade allocations, to define incumbent qualifications, and to guide other manpower and personnel actions. Participation in this survey gives you an opportunity to provide accurate information about your job in support of improved Air Force management.

You are requested to complete the survey according to the following instructions:

1. ASSIGNMENT INFORMATION (Page 4): Fill in the required data or check the one box in each block that applies to you.

2. JOB DESCRIPTION (Pages 2 and 3): On these pages provide typewritten* information which accurately and comprehensively describes your job.

   a. In the JOB NAME OR TITLE block, record a name or title which is descriptive of your job.

   b. In the JOB CONTEXT block, locate your job within the organizational structure.

      Examples: (1) THIS JOB IS IN THE HEAVY EQUIPMENT BRANCH DIRECTLY UNDER THE BASE MOTOR POOL COMMANDER, WHO REPORTS TO THE M & S GROUP COMMANDER.

      (2) THIS JOB IS IN THE TARGETS SECTION OF THE OPERATIONS PLANNING BRANCH OF WING HQ.

   c. In the blocks under DUTIES AND TASKS, list statements that describe your job. Consider significant work activities such as those involved in commanding, planning, organizing, directing, monitoring, coordinating, reviewing, inspecting, evaluating, supervising, and operating. Use as many blocks as you consider necessary. The statements you provide should clearly define your job.

      Example: Duty A. DIRECTING MATERIEL CONTROL FUNCTIONS
      TASKS (1) ASSIGN PRIORITIES TO REQUISITIONS
      (2) COORDINATE REQUIREMENTS FOR MOBILITY DEPLOYMENT
      (3) MONITOR SUPPLY BUDGET
      (4) PROCESS REQUESTS FOR LOCAL MANUFACTURE OF ITEMS
      (5) REQUISITION TIME CHANGE ITEMS

      First, list all the major duties you perform, then go back and list the appropriate tasks under each duty. Describe your normal job. Omit temporary variations in your work which are not part of your regular assignment. Ignore additional duties unless they constitute a significant part of your job.

   d. In the JOB REQUIREMENTS block, enter additional statements that describe any unusual requirements of your job for the factors below.

      COMMUNICATION SKILLS — INTERPERSONAL SKILLS — WORKING CONDITIONS — FORMAL EDUCATION — ORIGINALITY, INGENUITY, & CREATIVENESS — SPECIAL TRAINING & WORK EXPERIENCE — JUDGMENT & DECISION MAKING — MANAGEMENT — PLANNING — RISK

      Examples: (1) WORKING CONDITIONS: JOB REQUIRES APPROXIMATELY 120 DAYS TDY ANNUALLY.

      (2) SPECIAL TRAINING & WORK EXPERIENCE: JOB REQUIRES A 30-DAY AF COURSE IN SPECIAL WEAPONS DELIVERY.

   e. In the JOB SUMMARY Block, write a three-or four-sentence summary description of your job.

   f. After you have completed pages 2, 3, and 4, [illegible] the [illegible] form to your supervisor.

NOTE: Supervisor will review all entries, check a box to indicate his judgment of the most appropriate grade level for this job, sign the form, and return to your Management Engineering Organization.

*If typing service is not available, information should be clearly printed by hand.

POSITION DESCRIPTION
JOB NAME OR TITLE
JOB CONTEXT
DUTIES AND TASKS
DUTY A: Tasks
DUTY B: Tasks
DUTY C: Tasks
DUTY D: Tasks

DUTY E

Tasks

DUTY F:

Tasks

DUTY G:

Tasks

DUTY H:

Tasks

JOB REQUIREMENTS

JOB SUMMARY

JOB DESCRIPTION NUMBER TO BE ASSIGNED BY MET

LAST NAME | FIRST NAME | MI

ORGANIZATION (44) | BASE OR INSTALLATION (45-54)

SOCIAL SECURITY ACCOUNT NUMBER
Number (2, 10-19) Suffix (20-21)

YOUR PRIMARY AFSC
Prefix (22) Number (23-26) Suffix (27)

MAJOR AIR COMMAND (44)
- AAC A
- USAFA B
- ADC C
- USAFE D
- AFAFC E
- ALC F
- AFSC H
- ARPC I
- ATC J
- AU K
- USAFSO L
- AFRES M
- Hq USAF N
- AFDAA O
- Hq Comd P
- MAC Q
- PACAF R
- SAC S
- TAC T
- USAFSS U
- AFCS Y
- Other Z

Specify

UDL AUTHORIZED GRADE FOR YOUR POSITION (28)
- Col 6
- L/C 5
- Maj 4
- Capt 3
- Lt 2
- W/O 0

YOUR PRESENT GRADE (29)
- Col 6
- L/C 5
- Maj 4
- Capt 3
- 1/Lt 2
- 2/Lt 1
- W/O 0

GRADE OF YOUR IMMEDIATE SUPERVISOR (30)
- Civ A
- Gen 7
- Col 6
- L/C 5
- Maj 4
- Capt 3
- 1/Lt 2
- 2/Lt 1

YOUR DUTY AFSC
Prefix (31) Number (32-35) Suffix (36)

TOTAL MONTHS IN YOUR DUTY AFSC (37-39)

TOTAL MONTHS ACTIVE FEDERAL MILITARY SERVICE (40-42)

SEX (check one)
M 1 F 2 (43)

LEVEL OF YOUR ORGANIZATION (check one) (45)
- DOD, Hq USAF 9
- Hq Maj Air Comd 8
- Numbered AF (or Equiv) 7
- Air Division (or Equiv) 6
- Wing (or Equiv) 5
- Group (or Equiv) 4
- Squadron (or Equiv) 3
- Detachment (or Equiv) 2

LEVEL OF YOUR JOB WITHIN YOUR ORGANIZATION (check one) (46)
- Command Element 7
- Directorate, Dept, Office (or Equiv) 6
- Division (or Equiv) 5
- Branch (or Equiv) 4
- Section (or Equiv) 3
- Unit (or Equiv) 2

HIGHEST LEVEL OF YOUR EDUCATION (check only one) (47)
- Doctoral Degree 9
- Master's Degree 8
- Some Post Grad Work 7
- Bachelor's Degree 6
- 3 Years College 5
- 2 Years College 4
- 1 Year College 3
- High School Grad 2
- Non High School Grad 1

YOUR MAJOR FIELD OF STUDY (check only one) (48)
- Other (Specify) 9
- Military Science 8
- Social Science 7
- Medical, Legal 6
- Business, Management 5
- Engineering 4
- Arts, Humanities 3
- Physical Science 2
- Education 1

SUPERVISOR'S JUDGMENT OF MOST APPROPRIATE GRADE FOR THIS JOB (49)
- Gen 7
- Col 6
- L/C 5
- Maj 4
- Capt 3
- Lt 2

COMPLETED BY:
Signature | Duty Phone | Date

REVIEWED BY — SUPERVISOR CHECK ONE
Signature of Immediate Supervisor | DAFSC | Date

★ 1975 G P O 1702 M 874 549 153

AF OFFICER POSITION DESCRIPTION

APPENDIX B: FIVE JOB EVALUATION FACTOR BENCHMARK SCALES IN POLICY EQUATION

FACTOR 2: SPECIAL TRAINING AND WORK EXPERIENCE: The extent to which the job requires knowledges and skills which must be acquired through special training courses or on-the-job experience. Disregard general courses given by Squadron Officer School, Command and Staff College, or War College.

LEVEL 9

Chief, Contract Pricing Branch, Hq USAF
Chief, Military Justice Division, Air Div
Space Vehicle Research Officer, Hq AF Special Weapons Center

LEVEL 8

Director, Reconnaissance & Electronic Warfare Operations, Major Air Command
Minuteman Trajectory Engineer, Aerospace Reconnaissance Technical Wg
Chief, Missile/Nuclear Safety Division, Technical Training Center

LEVEL 7

Missile Combat Crew Commander, Strategic Missile Sq
Chief, Target Intelligence Branch, Strategic Reconnaissance Wg
Chief, Maintenance Operations Div, Aerospace Test Gp

LEVEL 6

Chief, Consolidated Base Personnel Office, Bomb Wg
Flying Safety Officer, Hq Tactical Fighter Wg
Reconnaissance Aircraft Commander, Strategic Reconnaissance Sq

LEVEL 5

Co-pilot B-52, Bomb Sq
Pilot, Military Airlift Sq
Radar Evaluation Officer, Hq Major Air Command (Overseas)

LEVEL 4

Chief, Audio-Visual Center, Numbered Air Force
Electronic Warfare Officer B-52, Bomb Sq
Education-Training Officer, Major Air Command

LEVEL 3

Crypto Operations Officer, Communications Gp (Overseas)
Avionics Officer, Consolidated Aircraft Maintenance Sq
Flight Line Maintenance Officer, Organizational Maintenance Sq

LEVEL 2

Photographic Equipment Maintenance Officer, Avionics Maintenance Sq
Chief, Pay & Travel Branch, Combat Support Gp
Photographic Officer, Technical Reconnaissance Sq

LEVEL 1

Base Housing Officer, Combat Support Gp
Special Service Officer, Fighter Gp
Transportation Officer, Instrumentation Sq

FACTOR 5: COMMUNICATION SKILLS: The extent to which the job requires skill in oral and written communication. Consider the complexity and variety of information communicated as well as the level of the individuals and agencies involved.

LEVEL 9

Director of Information, Hq Major Air Command
Political Military Affairs Officer, Hq USAF
Secretary of the Air Staff, Hq USAF

LEVEL 8

Chief of Logistics Division, Hq Numbered Air Force
Astronautical Engineer, Hq Space & Missile Systems Org
OSI District Commander, Hq District OSI

LEVEL 7

Base Civil Engineer, Air Base Gp
Human Performance Engineer, Electronic Systems Div
Comptroller, Air Base Wg

LEVEL 6

Aviation Physiologist, Inspector General Gp
Chemical Engineer, AF Aero Propulsion Lab
Administrative Officer, Electronics Installation Gp

LEVEL 5

Officer Selection Officer, Det, USAF Recruiting Gp
Deputy Commander, Strategic Missile Sq
Chief, Sensors Section, AF Special Weapons Center

LEVEL 4

Construction Engineer, Civil Engineering Sq (Overseas)
Squadron Operations Officer, Combat Crew Training Sq
Accounting & Finance Officer, Fighter Gp

LEVEL 3

Commercial Transportation Officer, Materiel Sq
Avionics Officer, Aircraft Control & Warning Wg
Missile Maintenance Control Officer, Strategic Missile Sq

LEVEL 2

Fighter Interceptor Pilot, Fighter Intercetor Sq
Strategic Missile Complex Maintenance Officer, Strategic Missile Sq
Electronic Warfare Officer, Tactical Reconnaissance Sq

LEVEL 1

Co-pilot, Air Refueling Sq
Navigator, Bomb Sq
Helicopter Pilot, Aerospace Rescue & Recovery Sq

FACTOR 7: JUDGMENT AND DECISION MAKING: The importance and independence of judgments and decisions required by the job. Consider the nature, variety, and possible impact of decisions. The less well defined the guidance for decisions, the higher should be the rating; while the more specific and detailed the guidance, the lower should be the rating.

LEVEL 9

Chief, Budget Div, Hq Major Air Command
Staff Legal Officer, Military Affairs, Hq USAF
Chief, Weapon System Testing Div, Space & Missile Systems Org

LEVEL 8

Deputy Commander, Combat Support Gp
Missile Maintenance Inspector, IG, Hq Major Air Command
DCS/Comptroller, Hq Numbered Air Force (Overseas)

LEVEL 7

Logistics Officer, Space & Missile Systems Org
Experimental Flight Test Officer, Hq Aeronautical Systems Division
Chief of Personnel, Combat Support Gp

LEVEL 6

Commander, Organizational Maintenance Sq
Missile Safety Officer, Strategic Missile Wg
Missile Combat Crew Commander (ICBM), Strategic Missile Sq

LEVEL 5

Maintenance Officer, Strategic Missile Wg
Base Operations Officer, Combat Support Gp
Aircraft Commander KC-135, Air Refueling Sq

LEVEL 4

Munitions Maintenance Supervisor, Munitions Maintenance Sq
OIC, Maintenance Analysis Branch, Communications Area
Fighter Interceptor Pilot, Fighter Interceptor Sq

LEVEL 3

Reconnaissance Pilot, Tactical Reconnaissance Sq
Pilot, Transport, Military Airlift Sq
Special Services Officer, Services Sq

LEVEL 2

Traffic Management Officer, Transportation Sq
Fuels Officer, Air Base Gp
Helicopter Pilot, Combat Support Gp

LEVEL 1

Recreation Services Officer, Combat Support Gp
Pharmacy Officer, USAF Dispensary
Photographic Officer, Reconnaissance Technical Wg

FACTOR 8: PLANNING: The extent to which planning is required by the job. Consider the scope and significance of work for which planning is done. The longer the time span for which planning is done, the higher the rating should be.

LEVEL 9

Deputy Chief, Plans Division, Hq Major Air Command
Asst Director of War Plans, Hq Major Air Command
Director, Joint Operations Task Force, NORAD

LEVEL 8

Chief, R & D Contracts Div, Air Force Special Weapons Center
Management Engineering Officer, Air Materiel Area
Wing Logistics Officer, Air Refueling Wg

LEVEL 7

Maintenance Control Officer, Bomb Wg
Deputy Commander, Combat Support Gp
Budget Officer, Air Base Gp

LEVEL 6

Operations Officer, Fighter Interceptor Sq
Hospital Administrator, USAF Hospital
Chief, Data Services Division, Combat Support Gp

LEVEL 5

Chief, Career Control Branch, Air Base Gp
Traffic Management Officer, Transportation Sq
Procurement Officer, Combat Support Gp

LEVEL 4

Missile Combat Crew Commander, Strategic Missile Sq
Wing Administration Officer, Military Airlift Wg
Weapons Officer, Tactical Fighter Wg

LEVEL 3

Electronic Warfare Officer, Bomb Sq
Medical Administrative Officer, USAF Dispensary
Reconnaissance Pilot, Tactical Recon Sq

LEVEL 2

Fighter Interceptor Pilot, Fighter Interceptor Sq
Registrar, Medical Center
Security Police Officer, Security Police Sq

LEVEL 1

Flight Nurse, Aeromedical Evacuation Sq (Overseas)
Weather Forecaster, Weather Det
Optometrist, Medical Center

FACTOR 9: MANAGEMENT: The level of executive, and managerial skills required in the job. Consider the complexity, variety, and level of the activities which are directed, organized, coordinated, controlled, commanded, or evaluated.

LEVEL 9

Director of Budget, Hq Major Air Command
Commander, Combat Support Gp (Overseas)
Wing Commander, Tactical Control Wg (Overseas)

LEVEL 8

Wing Commander, Aerospace Rescue & Recovery Wg
Chief of Operations, Strategic Missile Sq
Deputy Commander, Air Base Gp

LEVEL 7

Maintenance Supervisor, Avionics Maintenance Sq
Squadron Operations Officer, Combat Crew Training Sq
Base Accounting & Finance Officer, Flying Training Wg

LEVEL 6

Chief, Consolidated Base Personnel Office, Combat Support Gp
Base Procurement Officer, Pilot Training Wg
Helicopter Squadron Operations Officer, Flying Training Sq

LEVEL 5

Traffic Management Officer, Transportation Sq
Base Communications Maintenance Officer, Communications Sq (Overseas)
Missile Combat Crew Commander, Strategic Missile Sq

LEVEL 4

Chief, Utilities Operations Division, Civil Engineering Sq
Chief, Photo Evaluation Branch, Photographic Sq
Base Fuels Officer, Supply Sq

LEVEL 3

Primary Pilot Training Instructor, Pilot Training Sq
Space Surveillance Officer, Aerospace Support Sq
Air Traffic Controller, Communication Sq

LEVEL 2

Administrative Officer, Air Base Sq
Data Services Officer, Combat Support Gp
Tactical Fighter Pilot, Tactical Fighter Sq

LEVEL 1

Clinical Psychologist, USAF Hospital
Psychiatric Social Worker, USAF Hospital
Helicopter Pilot Single Rotor, Air Base Sq

APPENDIX C: PROJECTIONS — COMPARISONS FOR 54 UTILIZATION FIELDS (2-CHARACTER AFSC)

TITLE: DIRECTOR OF PERSONNEL MANAGEMENT
AFSC: 0016

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	24	170	59.44	127	44.41	-43	142	50.53	144	51.25
Lt Col	17	116	40.56	152	53.15	+36	113	40.21	108	38.43
Maj	—	—	—	7	2.45	+7	26	9.25	26	9.25
Capt/Lt	—	—	—	—	—	—	—	—	3	1.07
Total	41	286		286			281		281	

TITLE: ORGANIZATION COMMANDER
AFSC: 0026

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	54	294	62.03	321	67.72	+27	294	62.16	297	59.64
Lt Col	10	180*	37.97	117	24.68	-63	149	31.50	171	34.34
Maj	—	—	—	36	7.59	+36	29	6.13	27	5.42
Capt/Lt	—	—	—	—	—	—	1	.21	3	.60
Total	64	474		474			473		498	

TITLE: DIRECTOR OF OPERATIONS
AFSC: 0036

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	102	644	87.38	555	75.31	-89	639	81.61	613	77.50
Lt Col	8	93*	12.62	182	24.69	+89	137	17.50	168	21.24
Maj	—	—	—	—	—	—	7	.89	9	1.14
Capt/Lt	—	—	—	—	—	—	—	—	1	.13
Total	110	737		737			783		791	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: DIRECTOR OF LOGISTICS
AFSC: 0046

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	37	261	72.30	233	64.54	-28	285	71.25	259	70.19
Lt Col	6	100*	27.70	128	35.46	+28	90	22.50	84	22.76
Maj	—	—	—	—	—	—	24	6.00	25	6.78
Capt/Lt	—	—	—	—	—	—	1	.25	1	.27
Total	43	361		361			400		369	

TITLE: COMPTROLLER
AFSC: 0056

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	17	107	45.73	70	29.91	-37	81	36.00	77	34.38
Lt Col	17	127	54.27	164	70.09	+37	87	38.67	94	41.96
Maj	—	—	—	—	—	—	53	23.56	51	22.77
Capt/Lt	—	—	—	—	—	—	4	1.78	2	.89
Total	34	234		234			225		224	

TITLE: AIR COMMANDER*
AFSC: 0066

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	27	209*	95.43	194	88.58	-15	199	91.28	201	94.37
Lt Col	3	10*	4.57	25	11.42	+15	19	8.72	12	5.63
Maj	—	—	—	—	—	—	—	—	—	—
Capt/Lt	—	—	—	—	—	—	—	—	—	—
Total	30	219		219			218		213	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: PLANNING AND PROGRAMMING OFFICER
AFSC: 0076

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	30	300	47.32	276	43.53	-24	275	44.50	276	42.33
Lt Col	28	333*	52.52	345	54.42	+12	245	39.64	278	42.64
Maj	1	1	.16	12	1.89	+11	84	13.59	82	12.58
Capt/Lt	—	—	—	1	.16	+1	14	2.27	16	2.45
Total	59	634		634			618		652	

TITLE: MISSILE COMMANDER
AFSC: 0086

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	7	15*	93.75	15	93.75	—	13	92.86	16	88.89
Lt Col	1	1	6.25	1	6.25	—	1	7.14	2	11.11
Maj	—	—	—	—	—	—	—	—	—	—
Capt/Lt	—	—	—	—	—	—	—	—	—	—
Total	8	16		16			14		18	

TITLE: DIRECTOR OF RESOURCE MANAGEMENT*
AFSC: 0096

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	5	80*	67.80	80	67.80	—	52	64.20	85	62.96
Lt Col	2	38*	32.20	19	16.10	-19	26	32.10	47	34.81
Maj	—	—	—	19	16.10	+19	2	2.47	2	1.48
Capt/Lt	—	—	—	—	—	—	1	1.23	1	.74
Total	7	118		118			81		135	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: INTERNATIONAL POLITICO—MILITARY AFFAIRS
AFSC: 02XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	3	43*	36.44	14	11.86	-29	39	28.68	39	26.53
Lt Col	9	45*	38.14	64	54.24	+19	45	33.09	52	35.37
Maj	11	30	25.42	37	31.36	+7	38	27.94	39	26.53
Capt/Lt	—	—	—	3	2.54	+3	14	10.29	17	11.56
Total	23	118		118			136		147	

TITLE: DISASTER PREPAREDNESS
AFSC: 05XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	—	—	—	1	.90	+1	—	—	—	—
Lt Col	4	5	4.50	7	6.31	+2	9	7.76	4	3.51
Maj	7	24*	21.62	45	40.54	+21	18	15.52	19	16.67
Capt/Lt	22	82	73.87	58	52.25	-26	89	76.72	91	79.82
Total	33	111		111			116		114	

TITLE: AIR OPERATIONS OFFICER PILOT
AFSC: 14XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	30	174	3.62	176	3.66	+2	179	3.31	193	3.60
Lt Col	313	1,556	32.38	1,626	33.84	+70	1,894	35.06	1,856	34.67
Maj	317	1,577	32.82	2,047	42.60	+470	1,821	33.71	1,717	32.07
Capt/Lt	272	1,498	31.18	956	19.90	-542	1,508	27.92	1,588	29.66
Total	932	4,805		4,805			5,402		5,354	

**See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.*

TITLE: AIR TRAFFIC CONTROL OPERATIONS
AFSC: 16XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	11	16*	2.58	24	3.87	+8	14	2.13	15	2.35
Lt Col	5	44*	7.10	51	8.23	+7	63	9.59	64	10.03
Maj	20	98	15.81	160	25.81	+62	118	17.96	116	18.18
Capt/Lt	64	462	74.52	385	62.10	-77	462	70.32	443	69.44
Total	100	620		620			657		638	

TITLE: WEAPONS DIRECTOR/CONTROLLER
AFSC: 17XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	8	16*	1.12	27	1.89	+11	15	1.02	15	1.08
Lt Col	19	120	8.38	125	8.73	+5	116	7.90	119	8.54
Maj	52	254	17.74	347	24.23	+93	281	19.13	262	18.81
Capt/Lt	134	1,042	72.77	933	65.15	-109	1,057	71.95	997	71.57
Total	213	1,432		1,432			1,469		1,393	

TITLE: MISSILE OPERATIONS
AFSC: 18XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	16	32	.89	52	1.45	+20	29	.71	28	.74
Lt Col	47	209	5.83	172	4.80	-37	114	2.89	112	2.94
Maj	150	634	17.68	791	22.06	+157	372	9.43	384	10.09
Capt/Lt	512	2,710	75.59	2,570	71.69	-140	3,428	86.94	3,280	86.23
Total	725	3,585		3,585			3,943		3,804	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: SPACE SYSTEMS
AFSC: 20XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	7	15*	3.36	13	2.91	-2	16	3.41	16	3.72
Lt Col	16	50	11.19	47	10.51	-3	35	7.46	40	9.30
Maj	23	100	22.37	77	17.23	-23	90	19.19	85	19.77
Capt/Lt	51	282	63.09	310	69.35	+28	328	69.94	289	67.21
Total	97	447		447			469		430	

TITLE: SPECIAL OPERATIONS*
AFSC: 21XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	1	2*	6.67	—	—	-2	1	2.78	1	3.85
Lt Col	3	9*	30.00	9	30.00	—	8	22.22	8	30.77
Maj	2	12*	40.00	19	63.33	+7	14	38.89	9	34.62
Capt/Lt	1	7*	23.33	2	6.67	-5	13	36.11	8	30.77
Total	7	30		30			36		26	

TITLE: AIR OPERATIONS OFFCER, NAVIGATOR OBSERVER
AFSC: 22XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	9	39*	1.53	41	1.61	+2	41	1.42	32	1.11
Lt Col	116	472	18.58	542	21.33	+70	950	32.94	993	34.46
Maj	190	893	35.14	1,386	54.55	+493	1,432	49.65	1,347	46.74
Capt/Lt	189	1,137	44.75	572	22.51	-565	461	15.98	510	17.70
Total	504	2,541		2,541			2,884		2,882	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: AUDIO-VISUAL, OPTICAL INSTRUMENTATION, TELEVISION, MOTION PICTURE PRODUCTION
AFSC: 23XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	4	6*	5.45	5	4.55	-1	6	5.41	4	3.92
Lt Col	9	16*	14.55	19	17.27	+3	16	14.41	16	15.69
Maj	11	22	20.00	35	31.82	+13	12	10.81	9	8.82
Capt/Lt	28	66	60.00	51	46.36	+15	77	69.37	73	71.57
Total	52	110		110			111		102	

TITLE: WEATHER
AFSC: 25XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	10	52*	3.78	37	2.69	-15	54	3.57	56	3.83
Lt Col	27	138	10.04	145	10.55	+7	154	10.17	150	10.27
Maj	50	300	21.83	264	19.21	-36	285	18.82	317	21.70
Capt/Lt	154	884	64.34	928	67.54	+44	1,021	67.44	938	64.20
Total	241	1,374		1,374			1,514		1,461	

TITLE: SCIENTIFIC
AFSC: 26XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	2	12*	1.07	6	.53	6	6	.51	8	.68
Lt Col	16	102	9.09	141	12.57	+39	98	8.28	105	8.88
Maj	56	273	24.33	504	44.92	+231	257	21.71	265	22.40
Capt/Lt	136	735	65.51	471	41.98	264	824	69.51	805	68.05
Total	210	1,122		1,122			1,184		1,183	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: RESEARCH AND DEVELOPMENT DIRECTOR
AFSC: 27XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	TOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	41	244	48.70	244	48.70	—	205	40.59	212	42.23
Lt Col	43	257	51.30	221	44.11	-36	232	45.94	236	47.01
Maj	—	—	—	36	7.19	+36	64	12.67	51	10.16
Capt/Lt	—	—	—	—	—	—	4	.79	3	.60
Total	84	501		501			505		502	

TITLE: DEVELOPMENT ENGINEER
AFSC: 28XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	TOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	7	48*	1.03	96	2.07	+48	42	.90	43	.94
Lt Col	135	607	13.07	765	16.47	+158	653	13.98	654	14.32
Maj	198	1,158	24.92	2,179	46.90	+1,021	1,052	22.53	1,001	21.91
Capt/Lt	488	2,833	60.98	1,606	34.57	-1,227	2,923	62.59	2,870	62.83
Total	828	4,646		4,646			4,670		4,568	

TITLE: SYSTEM PROGRAM MANAGEMENT
AFSC: 29XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	TOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	28	174	11.70	204	13.72	+30	161	11.06	160	10.21
Lt Col	59	411	27.64	460	30.93	+49	372	25.55	408	26.04
Maj	56	371	24.95	666	44.79	+295	393	26.99	426	27.19
Capt/Lt	51	531	35.71	157	10.56	-374	530	36.40	573	36.57
Total	194	1,487		1,487			1,456		1,567	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: COMMUNICATIONS — ELECTRONICS
AFSC: 30XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	25	174	5.33	156	4.78	-18	135	3.73	134	3.91
Lt Col	67	461	14.13	476	14.59	+15	305	8.43	305	8.89
Maj	193	836	25.63	1,093	33.51	+257	820	22.66	856	24.96
Capt/Lt	293	1,791	54.90	1,537	47.12	+254	2,359	65.18	2,135	62.24
Total	578	3,262		3,262			3,619		3,430	

TITLE: MISSILE MAINTENANCE
AFSC: 31XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	13	25	4.91	21	4.13	-4	26	4.74	22	4.30
Lt Col	13	79	15.52	81	15.91	+2	53	9.67	56	10.94
Maj	23	119	23.38	115	22.59	-4	110	20.07	105	20.51
Capt/Lt	70	286	56.19	292	57.37	+6	359	65.51	329	64.26
Total	119	509		509			548		512	

TITLE: AIRCRAFT MAINTENANCE/AVIONICS
AFSC: 40XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	
Col	43	204	6.84	194	6.50	-10	196	6.03	AFSC
Lt Col	146	601	20.14	654	21.92	+53	535	16.47	collapsed
Maj	153	783	26.24	927	31.07	+144	672	20.69	combined
Capt/Lt	263	1,396	46.78	1,209	40.52	-187	1,845	56.80	with 46XX
Total	605	2,984		2,984			3,248		

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: AEROSPACE MUNITIONS
AFSC: 46XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	UOR Present Grade Dec 75 %	
Col	6	14*	1.72	20	2.46	+6	13	1.58	AFSC
Lt Col	21	123	15.13	131	16.11	+8	94	11.45	collapsed
Maj	35	192	23.62	272	33.46	+80	138	16.81	combined
Capt/Lt	69	484	59.53	390	47.97	-94	576	70.16	with 40XX
Total	131	813		813			821		

TITLE: COMPUTER SYSTEMS TECHNOLOGY
AFSC: 51XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	UOR Present Grade Dec 75 %	UOR Present Grade June 76 N	UOR Present Grade June 76 %
Col	9	71*	3.31	32	1.49	-39	48	2.22	54	2.52
Lt Col	32	230	10.73	303	14.14	+73	192	8.90	209	9.73
Maj	90	491	22.91	644	30.05	+153	401	18.58	429	19.98
Capt/Lt	211	1,351	63.04	1,164	54.32	-187	1,517	70.30	1,455	67.77
Total	342	2,143		2,143			2,158		2,147	

TITLE: CIVIL ENGINEERING
AFSC: 55XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	UOR Present Grade Dec 75 %	UOR Present Grade June 76 N	UOR Present Grade June 76 %
Col	28	138	7.11	152	7.83	+14	101	5.12	101	5.26
Lt Col	59	283	14.57	238	12.26	-45	266	13.50	273	14.21
Maj	69	384	19.77	544	28.01	+160	381	19.33	354	18.43
Capt/Lt	188	1,137	58.55	1,008	51.91	-129	1,223	62.05	1,193	62.10
Total	344	1,942		1,942			1,971		1,921	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: CARTOGRAPHY*
AFSC: 57XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	3	5*	6.17	2	2.47	-3	4	4.55	4	8.89
Lt Col	3	19*	23.46	16	19.75	-3	14	15.91	11	24.44
Maj	9	25*	30.86	35	43.21	+10	24	27.27	22	48.89
Capt/Lt	14	32	39.51	28	34.57	-4	46	52.27	8	17.78
Total	29	81		81			88		45	

TITLE: TRANSPORTATION
AFSC: 60XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	13	44	4.69	30	3.19	-14	32	3.09	36	8.22
Lt Col	26	174	18.53	162	17.25	-12	148	14.30	143	32.65
Maj	48	208	22.15	227	24.17	+19	225	21.74	194	44.29
Capt/Lt	76	513	54.63	520	55.38	+7	630	60.87	65	14.84
Total	163	939		939			1,035		438	

TITLE: SUPPLY/FOOD SERVICE
AFSC: 62XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	4	11*	3.19	8	2.32	-3	6	1.67	10	2.87
Lt Col	18	83	24.06	46	13.33	-37	59	16.39	59	16.95
Maj	13	63	18.26	110	31.88	+47	79	21.94	74	21.26
Capt/Lt	32	188	54.49	181	52.46	-7	216	60.00	205	58.91
Total	67	345		345			360		348	

*See explanation attached to this Appendix (I) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: FUELS MANAGEMENT*
AFSC: 63XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	2	4*	2.60	4	2.60	—	3	1.70	3	1.76
Lt Col	6	20*	12.99	21	13.64	+1	15	8.52	17	10.00
Maj	8	39*	25.32	24	15.58	-15	32	18.18	30	17.65
Capt/Lt	20	91	59.09	105	68.18	+14	126	71.59	120	70.59
Total	36	154		154			176		170	

TITLE: SUPPLY MANAGEMENT
AFSC: 64XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	18	64	4.30	47	3.16	-17	53	3.49	54	3.66
Lt Col	63	267	17.93	225	15.11	-42	129	8.49	139	9.42
Maj	69	412	27.67	397	26.66	-15	386	25.39	380	25.75
Capt/Lt	134	746	50.10	820	55.07	+74	952	62.63	903	61.18
Total	284	1,489		1,489			1,520		1,476	

TITLE: PROCUREMENT MANAGEMENT
AFSC: 65XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	21	120	8.36	125	8.70	+5	85	5.83	89	6.19
Lt Col	46	282	19.64	291	20.26	+9	213	14.60	212	14.74
Maj	60	336	23.40	565	39.35	+229	324	22.21	330	22.95
Capt/Lt	103	698	48.61	455	31.69	-243	837	57.37	807	56.12
Total	230	1,436		1,436			1,459		1,438	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: LOGISTICS PLANS AND PROGRAMS
AFSC: 66XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	8	38*	4.92	38	4.92	—	29	3.70	25	3.14
Lt Col	36	182	23.58	203	26.30	+21	135	17.24	136	17.09
Maj	50	257	33.29	382	49.48	+125	245	31.29	263	33.04
Capt/Lt	36	295	38.21	149	19.30	-146	374	47.77	372	46.73
Total	130	772		772			783		796	

TITLE: FINANCIAL
AFSC: 67XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	9	36*	2.90	34	2.74	-2	22	1.77	20	1.64
Lt Col	26	154	12.40	167	13.45	+13	123	9.91	125	10.25
Maj	65	326	26.25	584	47.02	+258	223	17.97	254	20.84
Capt/Lt	85	726	58.45	457	36.80	-269	873	70.35	820	67.27
Total	185	1,242		1,242			1,241		1,219	

TITLE: MANAGEMENT ANALYSIS
AFSC: 69XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	3	7*	3.03	—	—	-7	5	2.07	6	3.13
Lt Col	7	23*	9.96	35	15.15	+12	21	8.71	17	8.85
Maj	20	73	31.60	89	38.53	+16	46	19.09	35	18.23
Capt/Lt	19	128	55.41	107	46.32	-21	169	70.12	134	69.79
Total	49	231		231			241		192	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: EXECUTIVE SUPPORT/ADMINISTRATIVE MANAGEMENT
AFSC: 70XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	11	85*	3.34	51	2.01	-34	74	2.76	78	2.95
Lt Col	65	294	11.57	282	11.09	-12	296	11.02	299	11.30
Maj	83	449	17.66	540	21.24	+91	477	17.77	510	19.27
Capt/Lt	302	1,714	67.43	1,669	65.66	-45	1,838	68.45	1,759	66.48
Total	461	2,542		2,542			2,685		2,646	

TITLE: PERSONNEL, SPECIAL SERVICES, SOCIAL ACTIONS
AFSC: 73XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	10	57*	2.46	30	1.29	-27	44	1.77	42	1.72
Lt Col	84	386	16.65	330	14.23	-56	282	11.38	280	11.45
Maj	106	574	24.75	709	30.57	+135	578	23.32	583	23.84
Capt/Lt	242	1,302	56.14	1,250	53.90	-52	1,575	63.53	1,540	62.99
Total	442	2,319		2,319			2,479		2,445	

TITLE: MANPOWER MANAGEMENT
AFSC: 74XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade: Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	10	36	5.97	38	6.30	+2	30	5.24	31	5.49
Lt Col	25	144	23.88	162	26.87	+18	80	13.99	84	14.87
Maj	22	152	25.21	297	49.25	+145	136	23.78	133	23.54
Capt/Lt	42	271	44.94	106	17.58	-165	326	56.99	317	56.11
Total	99	603		603			572		565	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for *these cells is advised due to sample size.*

TITLE: EDUCATION AND TRAINING
AFSC: 75XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	15	80	12.50	69	10.78	-11	68	10.13	66	9.84
Lt Col	38	181	28.28	166	25.94	-15	179	26.68	189	28.17
Maj	35	194	30.31	239	37.34	+45	211	31.45	196	29.21
Capt/Lt	32	185	28.91	166	25.94	-19	213	31.74	220	32.79
Total	120	640		640			671		671	

TITLE: INFORMATION
AFSC: 79XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	9	47*	8.36	26	4.63	-21	34	5.76	32	5.51
Lt Col	15	107	19.04	123	21.89	+16	75	12.71	77	13.25
Maj	24	178	31.67	189	33.63	+11	145	24.58	147	25.30
Capt/Lt	32	230	40.93	224	39.86	-6	336	56.95	325	55.94
Total	80	562		562			590		581	

TITLE: INTELLIGENCE
AFSC: 80XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	23	155	6.51	133	5.59	-22	130	5.15	138	5.63
Lt Col	46	339	14.24	366	15.38	+27	299	11.84	290	11.82
Maj	89	514	21.60	788	33.11	+274	555	21.98	561	22.87
Capt/Lt	197	1,372	57.65	1,093	45.92	-279	1,541	61.03	1,464	59.68
Total	355	2,380		2,380			2,525		2,453	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: SECURITY POLICE
AFSC: 81XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	11	32	3.36	25	2.63	-7	27	2.76	28	2.89
Lt Col	27	130	13.67	156	16.40	+26	75	7.67	78	8.06
Maj	28	176	18.51	195	20.50	+19	169	17.28	177	18.29
Capt/Lt	89	613	64.46	575	60.46	-38	707	72.29	685	70.76
Total	155	951		951			978		968	

TITLE: BAND
AFSC: 87XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	—	—	—	1	2.94	+1	1	2.94	1	3.13
Lt Col	1	4*	11.76	1	2.94	-3	3	8.82	3	9.38
Maj	3	9*	26.47	19	55.88	+10	8	23.53	8	25.00
Capt/Lt	18	21	61.76	13	38.24	-8	22	64.71	20	62.50
Total	22	34		34			34		32	

TITLE: JUDGE ADVOCATE
AFSC: 88XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	18	116	10.02	127	10.97	+11	88	7.03	85	7.36
Lt Col	51	243	20.98	330	28.50	+87	150	11.98	153	13.25
Maj	51	272	23.49	468	40.41	+196	137	10.94	141	12.21
Capt/Lt	101	527	45.51	233	20.12	-294	877	70.05	776	67.19
Total	221	1,158		1,158			1,252		1,155	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: CHAPLAIN
AFSC: 89XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	21	86	10.01	41	4.77	-45	129	14.68	126	14.82
Lt Col	29	115	13.39	101	11.76	-14	234	26.62	228	26.82
Maj	39	158	18.39	297	34.58	+139	253	28.78	238	28.00
Capt/Lt	85	500	58.21	420	48.89	-80	263	29.92	258	30.35
Total	174	859		859			879		850	

TITLE: HEALTH SERVICES ADMINISTRATOR
AFSC: 90XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	18	79	7.72	35	3.42	-44	44	4.37	45	4.42
Lt Col	38	207	20.23	210	20.53	+3	106	10.52	104	10.23
Maj	30	205	20.04	214	20.92	+9	185	18.35	190	18.68
Capt/Lt	88	532	52.00	564	55.13	+32	673	66.77	678	66.67
Total	174	1,023		1,023			1,008		1,017	

TITLE: BIOMEDICAL SCIENCES
AFSC: 91XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	9	13*	1.91	11	1.61	-2	17	2.34	19	2.68
Lt Col	10	52*	7.62	70	10.26	+18	78	10.76	83	11.71
Maj	22	115	16.86	146	21.41	+31	100	13.79	97	13.68
Capt/Lt	88	502	73.61	455	66.72	-47	530	73.10	510	71.93
Total	129	682		682			725		709	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

TITLE: DIETICIAN, OCCUPATIONAL THERAPIST, PHYSICAL THERAPIST, PHARMACIST, OPTOMETRIST, BIOMEDICAL SPECIALIST
AFSC: 92XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	—	—	—	—	—	—	8	1.42	8	1.56
Lt Col	6	12*	2.16	8	1.44	-4	36	6.37	39	7.62
Maj	13	45	8.09	56	10.07	+11	62	10.97	61	11.91
Capt/Lt	88	499	89.75	492	88.49	-7	459	81.24	404	78.91
Total	107	556		556			565		512	

TITLE: NURSE
AFSC: 97XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	9	25*	0.68	6	0.16	-19	43	1.12	46	1.23
Lt Col	33	91	2.49	60	1.64	-31	269	7.02	258	6.91
Maj	82	333	9.11	303	8.29	-30	658	17.17	583	15.60
Capt/Lt	545	3,208	87.72	3,288	89.91	+80	2,863	74.69	2,849	76.26
Total	669	3,657		3,657			3,833		3,736	

TITLE: VETERINARY
AFSC: 99XX

Grade	Sample Size	M&O UDL N	M&O UDL %	OGR N	OGR %	Difference	UOR Present Grade Dec 75 N	Dec 75 %	June 76 N	June 76 %
Col	9	24*	7.95	14	4.64	+10	23	7.54	26	8.78
Lt Col	11	40	13.25	66	21.85	+26	63	20.66	59	19.93
Maj	11	84*	27.81	73	24.17	-11	55	18.03	53	17.91
Capt/Lt	22	154	50.99	149	49.34	-5	164	53.77	158	53.38
Total	53	302		302			305		296	

*See explanation attached to this Appendix (C) regarding desirable sample size chart. Caution in the interpretation of results for these cells is advised due to sample size.

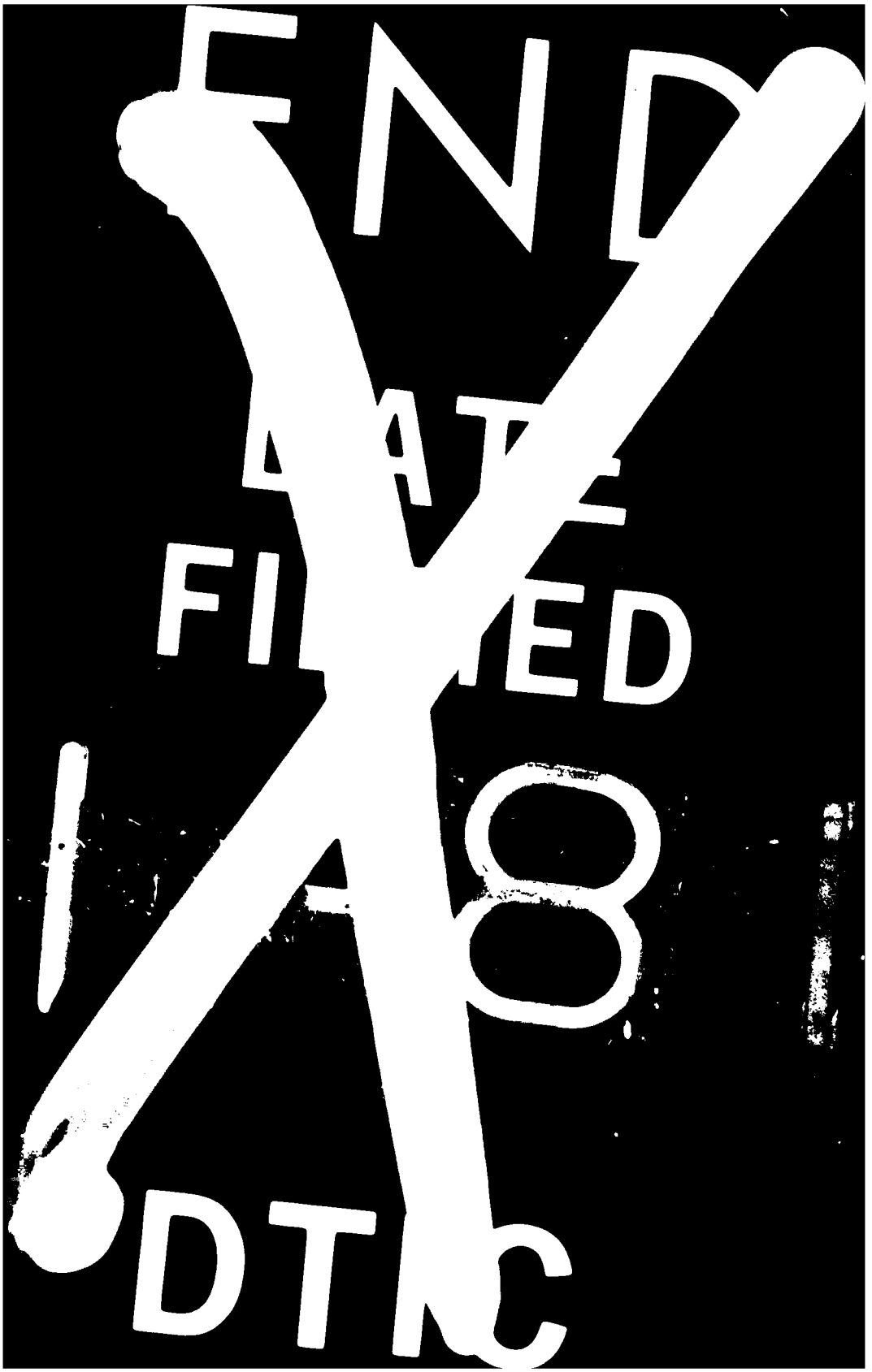
DESIRABLE SAMPLE SIZE CHART

			Sample Size					
			Very Small		Small		Medium	Large
			A	B	A	B		
IF	M&O UDL Population (N)	IS	N = 1—10	N = 11—25	N = 26—38	N = 39—59	N = 51—70	N = 71 to 130 & more
THEN	Desirable Sample Size (n)	IS	n = 1 for N = 1	n = 10	n = 10	n = 11	n = 12	n = 13 or 10%
RESULTING IN A PERCENT SAMPLE		OF	100%	91%—40%	38%—26%	28%—22%	21%—17%	18%—10%

Overall, the sample percent of the entire study across all grades and utilization fields was 17.88 percent, based on a 11,192 job sample of the 62,602 non-aircrew M&O UDL population. The more fractionated the tables become, the less likely will it be that particular sample will represent 17 percent of the population. For large samples such as utilization field 51XX, Computer Systems Technology, a sample of 211 Captains and Lieutenants should be representative even if 211 jobs do not constitute 17 percent of the 1351 M&O UDL jobs. On the other hand, for utilization field 21XX, Special Operations, the grade of Colonel, a sample of one constitutes 50 percent of the two jobs in the UDL, but would not be as good for a projection base as if both UDL M&O jobs had been used.

If a sample is less than that indicated by the desirable sample size chart, an asterisk (*) appears after that grade by utilization field cell. If most cells within a utilization field have been identified as weak for porjection, the entire table has been so marked in the title of that utilization field.

For example: the utilization field 0006, Air Commander, has 10 M&O UDL Lt Colonels listed — then the desired sample size would be 10, one sample for every population job. The sample contains only three Lt Colonel jobs, rather than 10, and the listing is subsequently marked with an (*) asterisk.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AD-A093 283 AIR FORCE HUMAN RESOURCES LAB BROOKS AFB TX F/G 6/9
NON-AIRCREW OFFICER POSITIONS: DETERMINATION OF GRADE REQUIREME--ETC(U)
NOV 80 J T HAZEL, K FINSTUEN
UNCLASSIFIED AFHRL-TR-80-31 NL

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SUPPLEMENTARY

INFORMATION

DEPARTMENT OF THE AIR FORCE
AIR FORCE HUMAN RESOURCES LABORATORY (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235

Errata

REPLY TO ATTN OF: TSR

16 JAN 1981

SUBJECT: Removal of Export Control Statement

AD-A093 283

TO: Defense Technical Information Center
Attn: DTIC/DDA (Mrs Crumbacker)
Cameron Station
Alexandria VA 22314

1. Please remove the Export Control Statement which erroneously appears on the Notice Page of the reports listed [redacted]. This statement is intended for application to Statement B reports only.

2. Please direct any questions to AFHRL/TSR, AUTOVON 240-3877.

FOR THE COMMANDER

Wendell L Anderson

WENDELL L. ANDERSON, Lt Col, USAF
Chief, Technical Services Division

1 Atch
List of Reports

Cy to: AFHRL/TSE