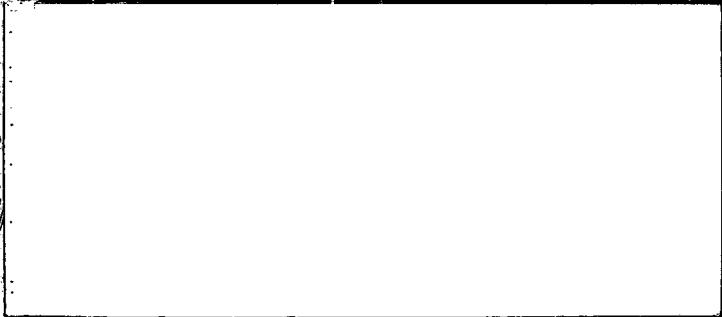


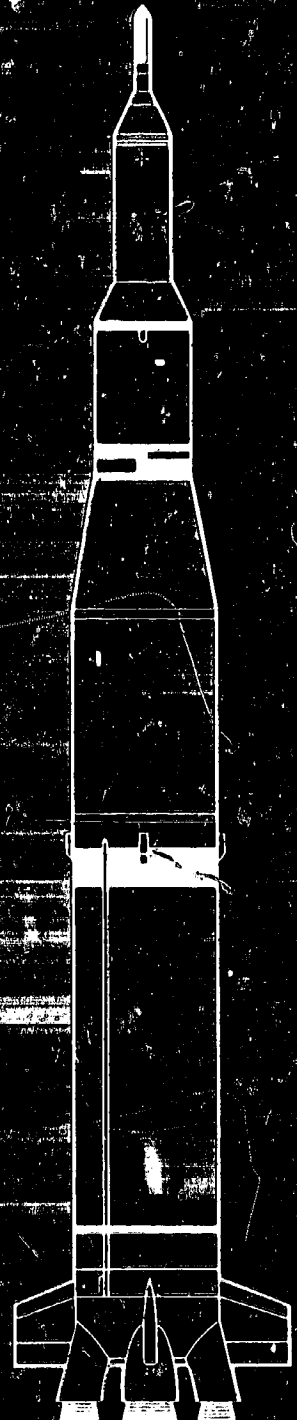


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THE PROFESSIONAL AND TECHNICAL
QUALIFICATIONS OF APOLLO PROJECT MANAGERS

by

JOHN PHILLIP CICERO

A.B., University of Rochester, 1966

ABSTRACT OF THESIS

Submitted in partial fulfillment of the requirements for
the degree of Master of Business Administration in the
Graduate School of Syracuse University, August, 1969.

APPROVED _____

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CHAPTER I

PROBLEM DELINEATION AND RESEARCH DESIGN

Introduction

"Every age develops an organizational form appropriate to its genius."¹ Today's genius has formulated and implemented the large-scale endeavor as its representative in the history of management. History will refer to the large-scale endeavor as matrix management, configuration management, phase management, data management, or, perhaps, project management. The author chooses the latter term, project management, to define the total concept of the large-scale endeavor which may include elements of matrix, configuration, phase, data, and other systems approaches to management. Whatever framework one chooses, however, the term "traditional management" is noticeably absent. The traditional management concepts represent the genius of a prior age and the large-scale endeavor, project management, does not operate within the simplified scheme of its enterprises.

¹Warren G. Bennis, "Post-Bureaucratic Leadership," Transaction: Social Science and Modern Society, July/August, 1969, p. 44.

Take, for example, such traditional principles as "well defined areas of authority and responsibility," "unity of command," "one man, one boss," "unity of direction," "one objective, one plan," "compensation commensurate with contribution," "centralized operations," the "Scalar" unbroken line of command, "a place for everything and everyone, and everything and everyone in its place," or "stability of tenure, no unnecessary turnover." Such principles might work well for the static organization, but more is needed for the dynamism required in a successful large-scale endeavor.²

Project management, as a departure from the traditional management concepts, is sometimes considered the antithesis of "the pyramidal, centralized, functionally specialized, impersonal mechanism known as bureaucracy."³ The project or programmatic organization is perceived as being designed around factors of "flexibility," "maneuverability," and an accepted level of "instability."⁴

A comparison of the project viewpoint with the functional-traditional viewpoint brings at least seven distinguishing project characteristics to the foreground: (1)

²James E. Webb, Space Age Management: The Large Scale Approach, New York: McGraw-Hill Book Company, c. 1969, p. 136

³Bennis, "Post-Bureaucratic Leadership," see note 1.

⁴Webb, Space Age Management, see note 2, p. 8

the line functions are placed in a support position in the project organization creating a web of authority and responsibility among diverse organizational participants; (2) prime emphasis is placed on horizontal and diagonal work flow with important business conducted as the legitimacy of the task requires; (3) important business is not conducted through a pyramiding structure of superiors and subordinates, but through peer-to-peer, manager-to-technical expert, associate-to-associate, etc., relationships; (4) the project objective may be multilateral; (5) the project manager manages across functional and organizational lines to accomplish a common interorganizational objective; (6) responsibility and authority may not be commensurate since many of the project manager's support personnel may be responsible to other managers for pay, performance reports, promotions, etc.; and (7) the project organization is finite in duration.⁵

Since the project organization displays characteristics which are not typical of the traditional organization, the project managers responsible for the management of large-scale endeavors are in unique management positions. In fact, it has been suggested that the "traditional" executive could not function in the project environment.

⁵David I. Cleland and William R. King, Systems Analysis and Project Management, New York: McGraw-Hill Book Company, c. 1968, p. 153.

The executive trained only in traditional principles, able to operate only in accord with them and uncomfortable in their absence, would be of little use and could expect to gain little satisfaction in a large complex endeavor.⁶

The project manager must display a talent appropriate to the flexibility of the project organization. He must have a high tolerance for ambiguity.

In the large-scale endeavor the man himself must also be unusual; he must be knowledgeable in sound management doctrine and practice, but able to do a job without an exact definition of what it is or how it should be done; a man who can work effectively when lines of command criss-cross and move in several directions rather than straight up and down; one who can adjust to, and be himself, several bosses at the same time; one who can work effectively in an unstable environment and can live with uncertainty and a high degree of personal insecurity; one willing to work for less of a monetary reward than he could insist on elsewhere; one who can blend public and private interests in organized participation to the benefit of both.⁷

The project manager has generated a positional charisma that has elicited increasing attention among organization theorists. One result of that attention has been an evolving interest

⁶Webb, Space Age Management, see note 2.

⁷Webb, Space Age Management, see note 2, pp. 136-137.

in "project manager" as a professional career objective in the same sense as "engineer" or "professor." This study explores the professional and technical qualifications associated with a project manager career

"Today's need is, I believe, increased emphasis on research that will provide greater knowledge and deeper understanding of what successful administrative leaders in large endeavors really do, why they do it, and what effect it has."⁸ A study of "project manager" as a professional career is, in part, an answer to what successful administrative leaders in large-scale endeavors do. The underlying assumption is that the project manager plays a critical role in determining the success or failure of any large-scale endeavor. An examination of the project manager's career and the attempt to define the technical and professional qualifications for the position, of necessity, must focus on what the project manager does.

The significance of this study is enhanced by its focus on a select group of Apollo project managers. The Apollo Program is clearly recognizable as a large-scale endeavor a project organization. Apollo project managers represent, what might be termed, one of the first generations of career project managers. This group, therefore, seems the most

⁸Webb, Space Age Management, see note 2, p. 3

appropriate choice in terms of identifying the professional qualifications of the office of the project manager.

The Objective of This Research

The objective of this research is to formulate and examine some specific criteria which can be identified with "project manager" as a professional career. To meet this objective, the demographic characteristics of a select group of Apollo project managers will be compiled and evaluated. The evaluation will identify any career patterns capable of standing as technical and/or professional qualifications for a project manager. For example, an examination of the education of the sample may show certain degree levels and/or fields of concentration as predominant. Any such predominant patterns may be interpreted as a qualification or desirable characteristic for a project manager. Drawing the demographic profiles of a sample of Apollo project managers is a direct and objective method of analyzing the group characteristics.

To insure that the demographic analysis focuses on those positive and relevant characteristics, a brief survey of the literature will attempt to point out what the perceived role of the project manager is. Although this perceived role may be substantiated, modified, or discredited by the analysis of a specific group of project managers, the

literature does provide some preliminary insights and a viable framework for comparison.⁹ The demographic analysis in this study offers a research dimension capable of placing prior perceptions and conceptualizations of the project manager in perspective.

It should be noted that the basic concern of this study is the formal aspects of the position of project manager. The informal qualifications for the position either in terms of personality or management style are strictly peripheral considerations which attempt to draw attention to the possibilities of future research.

Limitations of This Study

As suggested, this study does not deal with the personality traits or management style of the project manager. This is not, however, to underestimate their importance; the personality of the project manager is a critical variable in determining how he perceives his environment and how he copes with his diverse responsibilities. A limitation of this study, therefore, is its scope; it considers primarily the formal technical and/or professional qualifications of the project manager.

⁹Chapter II, "The Perceived Role of the Project Manager," focuses on the literature.

Possible Contributions

A significant contribution of this study would be to draw the realms of theory and practice into closer focus. If the study verifies the perception of the project manager as presented in the literature, an important step is made in solidifying theory as applicable to the "real world" situation. On the other hand, if the study fails to show any consistency with the literature, the necessity of further research to seek out some consistent pattern would be enhanced.

A more basic contribution is the drawing of the demographic profiles of a sample of Apollo project managers and relating these profiles to the professional status of the project manager. Although the Apollo Program represents one of man's most complex undertakings, relatively little research has been done on the management team that made the Apollo mission a reality.

Methodology

The Sample

The sample for this study is a select group of Apollo project managers within the National Aeronautics and Space Administration (NASA). The population includes all of the project managers directly concerned with some hardware component used in the Apollo Program. All managers involved

with the stages of the Saturn V, the engines, the instrument unit, ground support equipment, and the space vehicles (i.e., the command module) make up the total population. The population size is thirty-five.¹⁰ The population is concentrated at two NASA field center locations, George C Marshall Space Flight Center, Huntsville, Alabama and Manned Spacecraft Center, Houston, Texas.

The total universe of project managers would include other NASA personnel (i.e., managers of unmanned projects at Goddard Space Center), personnel in other Government agencies and departments (i.e., Department of Defense), and a host of industrial personnel both within and outside of aerospace research and development.

The sample used includes fifteen Apollo project managers. The sample size, $n=15$, represents 42.9 per cent of the population. Selection of the sample was based on availability and completeness of information and represents the diverse Apollo task areas (i.e., stages, engines).

The sample represents both the task areas and field center locations of the total population. In this context

¹⁰ Although there is not a formal listing of Apollo project managers, individuals associated with particular hardware systems, within specific salary ranges, and responsible for specific task objectives have been identified by the Syracuse University/NASA research team and labeled Apollo project managers.

and considering the relative size of the sample (42.9 per cent) random selection has three possible disadvantages: (1) the probability of selecting managers concentrated in fewer task areas might be increased; (2) both field center locations might not be represented; and (3) after selection it might be found that data from NASA Personnel is not available

Sources of Empirical Data

Two sources of data will be utilized, the Personnel Management Information System (PMIS) and the Executive Assignment System (EAS). The PMIS is a computerized filing system which consolidates basic data on all NASA employees.¹¹ All information is coded and retrieved from a central data bank located at NASA Headquarters in Washington, D. C. A computer print out on the sample considered was made available to the author. Code sheets and a master key were supplied for interpreting the data provided.¹² The PMIS is updated quarterly. The following information was retrieved from the PMIS.

¹¹U.S., NASA, Headquarters, Personnel Management Information System - (PMIS): Data Processing Manual, January, 1967.

¹²Appendix A includes: (1) PMIS detailed description; (2) code sheets; (3) computer print out and master key. All names have been deleted from the print out to maintain the confidence of the managers involved.

1. Education.
 - a. Educational level.
 - b. Fields of concentration
 - c. Year graduated.
2. Present Employment.
 - a. Location.
 - b. Salary - Government Service Rating (GS) including grade, step, and dollar equivalent.
3. Government Service Information.
 - a. Age.
 - b. Length of Federal Service.
 - c. Length of NASA Service.

The EAS is a questionnaire filing system that contains detailed information on NASA employees with a GS status of fifteen or above. All of the managers considered are GS-15 and over. The section of the EAS relevant to this study is the Executive Inventory Record.¹³ The NASA personnel files were made available for the author's personal inspection. A questionnaire corresponding to the Executive Inventory Record was made up and relevant data pertaining to this study was

¹³U.S., Civil Service Commission, Bureau of Executive Manpower, Executive Assignment System, 1967.

manually copied onto the questionnaire.¹⁴ The following information was obtained from the Executive Inventory Record.

1. Education.

- a. Educational level.*¹⁵
- b. Fields of concentration.*
- c. Honors.
- d. Educational attainment after entering
Federal Service.
- e. Year graduated.*
- f. Institutions attended.

2. Present Employment.

- a. Location.*
- b. Length of time in present position.
- c. Salary.*
- d. Job description.

3. Past Employment.

- a. Location.
- b. Employing organizations.
- c. Job description.

¹⁴Appendix B includes: (1) a blank copy of the Executive Inventory Record; and (2) a blank copy of the questionnaire used to transfer the data.

¹⁵Items marked with an asterisk (*) indicate duplication of data available from PMIS.

4. Government Service Information.

- a. Age.*
- b. State of residence at time of first
Federal appointment.
- c. Length of Federal Service.*
- d. Salary at time of first Federal appointment.
- e. Reason for entering Federal Service.
- f. Number of times left Federal Service.
- g. Number of times changed jobs in last
five years.

5. Miscellaneous Characteristics.

- a. Areas of job interest outside of present
position.
- b. Attitude toward geographic relocation.
- c. Attitude toward job change.
- d. Member of professional group or society.
- e. Publications.
- f. Civic activities.
- g. Honors (non-scholastic).
- h. Management experience.
- i. Superior skill levels.
- j. Size of organizations (groups) managed.
- k. Working relations in other occupational
areas.

Meeting the Objective

The presentation and evaluation of the Apollo project managers' demographic characteristics as evidenced by the PMIS and the EAS should provide an adequate framework for identifying any consistent patterns pointing to technical and/or professional qualifications. The data offers not only a profile of the manager's present position, but substantial information concerning past experience and overall management orientation.

Previous Studies

A study of particular relevance to this research was conducted by the Bureau of Executive Manpower. The study, conducted in 1968, used the PMIS as its basic data source for the purpose of determining some significant characteristics of the Federal career executive. The study covered some 22,000 Federal executives. The Apollo project managers considered here represent only a minute percentage of the Federal executives studied and were in no way stratified from the total group considered. The study serves as a useful base of comparison for matching some of the characteristics of the Apollo project manager with those of other Federal executives.¹⁶

¹⁶U.S., U.S. Civil Service Commission, Bureau of Executive Manpower, Characteristics of the Federal Executive, February, 1968. Appendix C includes a copy of the entire study.

Organization of the Study

"The Perceived Role of the Project Manager," Chapter II, is a survey of the current literature on project management. This chapter establishes some preliminary insights into what the technical and/or professional qualifications of the project manager are. Although the focus of the literature is not "project manager" as a career, significant aspects of what the project manager's job is perceived to be are discussed. The purpose of this chapter is to delineate what that perceived role is.

"Demographic Characteristics," Chapter III, succinctly presents the demographic characteristics of the sample of Apollo project managers through the compilation of the PMIS and EAS data collected. The characteristics are not interpreted by the author in this chapter.

"Analysis of Demographic Characteristics: Indications of Technical and/or Professional Qualifications," Chapter IV, integrates the data presented in Chapter III into identifiable career patterns. The technical and/or professional qualifications of the Apollo project managers as evidenced by the data are delineated in this chapter.

"Summary and Conclusions," Chapter V, integrates the analysis of Chapter IV with the preliminary insights gained by the review of the literature in Chapter II. The

implications of this research and the possibilities for future research are discussed in the concluding pages.

CHAPTER II

THE PERCEIVED ROLE OF THE PROJECT MANAGER

Management and Technology: An Expanding Environment

A discussion of the project manager must transcend a consideration of the individual and look, at least briefly, at the project manager's interaction with his project team. In the words of one management theorist:

Conventional organizational theory has focused almost exclusively on the individual as the main building block of the organization and has tended to ignore the problems of groups or teams and their development. . . . However, the complexity of the environment and the goal structure of the enterprise create a situation in which it is no longer possible to comprehend or conduct the operation of the enterprise without some form of teamwork and team building.¹

The project manager is, in many respects, dependent upon his project team in order to accomplish the task objectives of the project. This dependence implies that in order to effectively draw on the resources of the project team, the

¹Douglas McGregor, The Professional Manager, New York: McGraw-Hill Book Company, c. 1967, p. 181.

project manager has to have the ability to "resolve conflicts" among team members, the ability to "build alliances and reciprocity," and the overall ability to "maintain the integrity of the project team."² In a real sense, the project manager is:

. . . the man in between management and the technologist - the one man in the organization who must be at home in the front office . . . and at home in the laboratory. . . . In his own right he does what neither the front-office executive nor the scientist can do: accomplish the aims of his corporate management, while serving as a perpetual buffer so that the engineers and scientists can meet the technological objectives . . .³

Acting as the buffer between management and technology, the project manager's sphere of influence extends even beyond the project team and he becomes involved in a "web of interrelationships" as the organizational matrix expands.⁴ The question, therefore, becomes, what type of individual is needed to fulfill the project manager position? What special

²David I. Cleland, "Understanding Project Management," Notes & Quotes, p. 7, 1967, reprinted from Manage, Vol. 19, No. 9, 1967.

³Paul O. Gaddis, "The Project Manager," Harvard Business Review, May-June, 1959, pp. 93-94.

⁴John F. Mee, "Matrix Management," Business Horizons, Summer, 1964, pp. 70-72.

qualifications should he have? What type of special problems should he be willing and able to handle?⁵ Viewed in the context of the project team and the organizational environment extending beyond the project team, a determination of the qualifications of the project manager includes a wide range of technical and management skills and abilities.

The Function of the Project Manager: Some
Differentiating Characteristics

One author's interpretation of the prime function of the project manager is as follows:

A project manager is responsible for planning, motivating, and controlling activities essential for the engineering and manufacturing functions involved in producing an end item.⁶

A preliminary examination of this definition does not appear to distinguish the function of the project manager from that of the traditional manager. The distinction arises in terms of how the project manager achieves his objectives.

⁵Gaddis, "The Project Manager," see note 3, p. 94.

⁶John F. Mee, "Project Management," Business Horizons, Fall, 1963, p. 53.

In a sense project management is compatible with the traditional and functional approach to management, yet it has provided a way of thinking about management of highly technical and costly products whose development and acquisition spread across several large autonomous organizations. The project manager crosses functional lines to bring together the management activities required to accomplish project objectives. The project manager has certain characteristics that differentiate him from the traditional manager.⁷

In this context, seven areas can be delineated where the project manager can be differentiated from the functional manager: (1) the project manager must accomplish objectives through organizations and agencies outside of his direct control; (2) since the project manager cuts across organizational lines, his authority conflicts with that of functional managers; (3) the project manager must determine the type of support his project needs and when it will be needed; (4) his task is finite in duration; (5) he must employ management techniques which enable him to successfully oversee a high proportion of professionals; (6) he must act as coordinator for all project activities; and (7) he must operate without direct line authority over the organizations involved in the physical (production) aspects of the task.⁸

⁷David I. Cleland, "Why Project Management," Business Horizons, Winter, 1964, p. 82.

⁸Cleland, "Why Project Management," see note 7.

Identifiable Technical and Professional Qualifications

Once the office of the project manager is established as something apart from a traditional management position, certain technical and professional qualifications can be delineated.

One qualification for the project manager revolves around his leadership function.

It is, of course, essential that the project manager have superior leadership ability. He must have administrative experience in engineering and manufacturing. And he must be skilled in planning, budgeting, scheduling, and other control techniques. A weak project manager cannot be made strong and effective by creating additional controls or a top-heavy project organization structure.⁹

Beyond the concept of leadership, the project manager needs certain kinds of experience in diverse areas. One author cites four areas of prime importance.

- (1) His career must have been molded in the advanced-technology environment.
- (2) He must have a working knowledge of many fields of science, the fundamental kind of knowledge which he can augment when necessary to delve into the intricacies of a specific technology.

⁹C. J. Middleton, "How To Set Up A Project Organization," Harvard Business Review, March-April, 1967, p. 78.

- (3) He must have a good understanding of general management problems - especially marketing, control, contract work, purchasing, law, and personnel administration. The concept of profitability should be familiar to him.
- (4) He must have a strong, continuous, active interest in teaching, training, and developing his supervisors.¹⁰

Beyond these, the project manager must be able to communicate with scientific and technical personnel, he must keep project activities and personnel focused on the immediate task through leadership, persuasion, or coercion, if necessary.¹¹

From this brief survey of the literature, the following technical and professional qualifications can be summarized.

1. The project manager may be able to successfully draw on the resources of the project team.
2. He may be able to resolve conflicts.
3. He may have the ability to build alliances and reciprocity.
4. He may be able to maintain the integrity of the project team.
5. He may be able to act as the buffer between management and technology.

¹⁰Gaddis, "The Project Manager," see note 3, p. 95.

¹¹John M. Stewart, "Making Project Management Work," Business Horizons, Fall, 1965, p. 67 and Gaddis, "The Project Manager," see note 3, pp. 94-96.

6. He may have the management ability to plan a project.
7. He may have the management ability to coordinate a project.
8. He may be able to motivate project participants.
9. He may have the ability to cross functional lines and effectively accomplish project objectives without direct authority over all participants.
10. He may be able to effectively supervise professional personnel.
11. He may be an effective leader.
12. He may have experience in diverse managerial and technical areas.
13. He may have a working knowledge in many scientific areas.
14. He may have a good understanding of general management problems and techniques.
15. He may be able to "communicate" his position to his supervisors.

In light of these characteristics, one author viewed the project manager career in the following perspective:

For those men with the mental and personal endowment for the project kind of work - the men of factual creativity, the applied scientists, the practicing technologists - there is no element of professional degradation in this work. On the contrary, this type of professional find the project pace challenging and exhilarating . . . and far preferable to the apparent aimlessness of the pure research environment.¹²

¹²Gaddis, "The Project Manager," see note 3, p. 97.

CHAPTER III

DEMOGRAPHIC CHARACTERISTICS

Education

Education Level

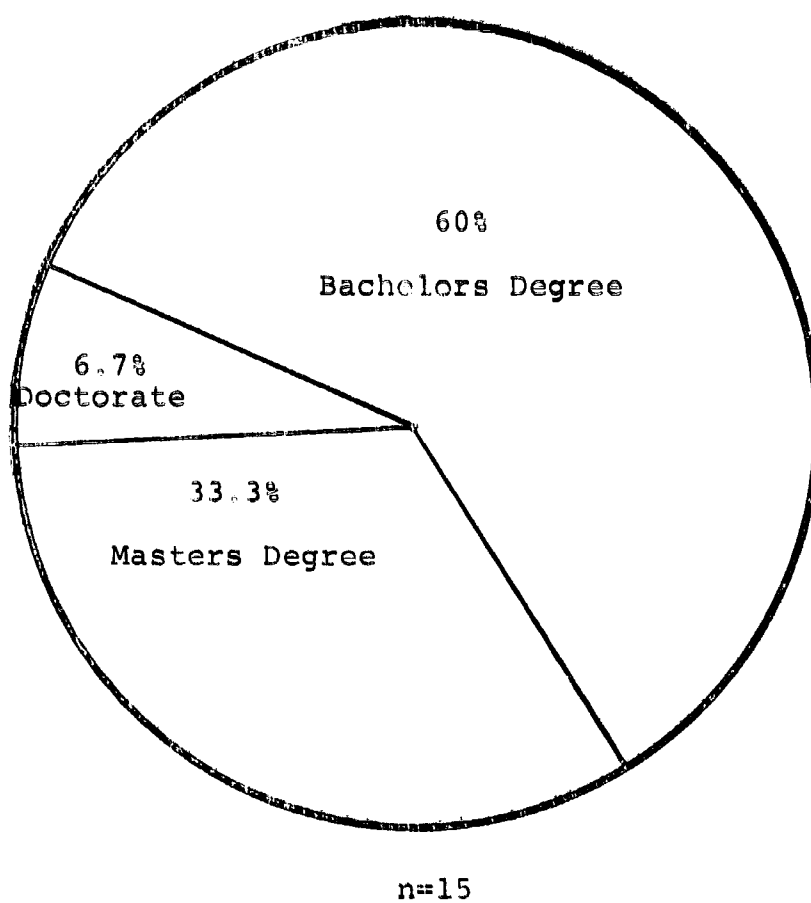
In the sample considered, 60 per cent attained a Bachelors degree, 33.3 per cent a Masters degree, and 6.7 per cent a Doctorate (see Figure 1).¹

Fields of Concentration

In the sample considered, 86.7 per cent have a Bachelors degree in Engineering, 6.7 per cent in Physics, and 6.7 per cent in Math. At the Masters level, 60 per cent have a degree in Engineering and 40 per cent in Business Administration. At the Doctorate level, the degree (100 per cent) is in Engineering (see Figure 2).²

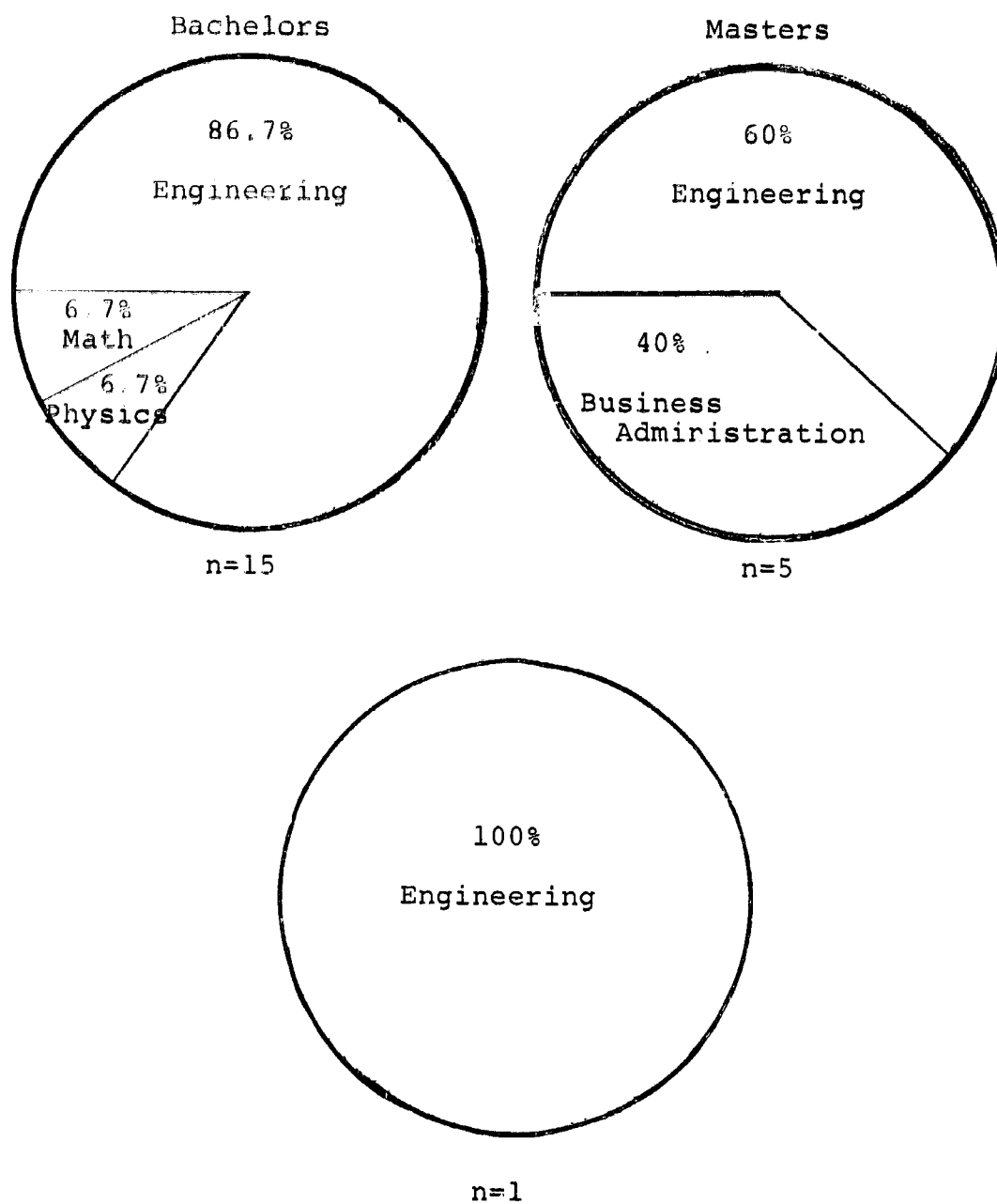
¹All data pertaining to education is complete for the entire sample considered. For all percentages $n=15$ unless specified otherwise.

²At the Bachelors level $n=15$; at the Masters level $n=5$; at the Doctorate level $n=1$.



EDUCATIONAL LEVEL

FIGURE 1



FIELDS OF CONCENTRATION

FIGURE 2

Across degree levels, 93.3 per cent have degrees in Engineering (one participant with a non-Engineering Bachelors has a Masters in Engineering). The total Engineering concentration includes Mechanical, Electrical, Aeronautical, and Chemical Engineers.

Educational Attainment After Entering Federal Service

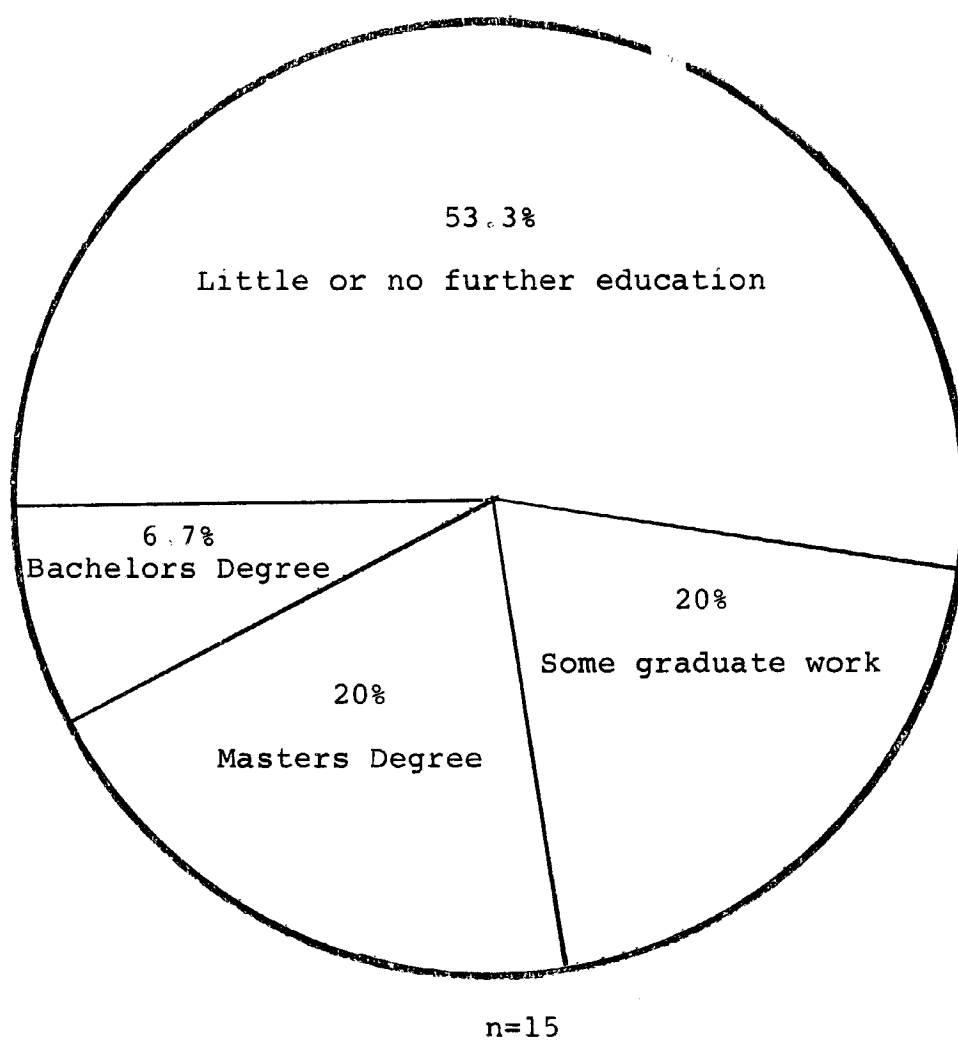
In the sample considered, 20 per cent received a Masters degree, 6.7 per cent a Bachelors degree, 20 per cent attended one year of graduate school, and 53.3 per cent did not appreciably further their education after entering Federal Service (see Figure 3).

Honors

In the sample considered, 20 per cent received a Bachelors degree with honors.

Year Graduated

In the sample considered, year graduated ranged from 1932 to 1957 at the Bachelors-level, from 1936 to 1963 at the Masters level, and the Doctorate was received in 1956 (see Table 1).



EDUCATIONAL ATTAINMENT AFTER ENTERING GOVERNMENT SERVICE

FIGURE 3

TABLE 1

YEAR GRADUATED

Bachelors Degree

Year	Number of Managers
1932	1
1941	1
1942	3
1947	1
1948	1
1949	1
1950	1
1951	1
1952	1
1953	1
1954	2
1957	1
	<u>15</u>

Masters Degree

Year	Number of Managers
1936	1
1955	2
1961	1
1963	1
	<u>5</u>

Doctorate

Year	Number of Managers
1956	1

Institutions Attended

In the sample considered, twenty institutions are represented for all degree levels combined (see Table 2).

Present Employment

Location

In the sample considered, 60 per cent are located at Marshall Space Flight Center, Huntsville, Alabama and 40 per cent at Manned Spacecraft Center, Houston, Texas.³

Length of Time in Present Position

In the sample considered, 53.4 per cent have been in their present positions from two to four years, 33.3 per cent from five to seven years, and 13.3 per cent from eight to ten years (see Figure 4).

Salary

In the sample considered, 93.3 per cent are on the Government Service (GS) Pay Scale ranging from GS-15/4 (\$22,000) to GS-15/6 (\$26,500) and 6.7 per cent are on the NASA Excepted Scale (AD) at \$27,500 (see Figure 5).

³All data pertaining to present employment is complete for the entire sample considered. For all percentages n=15 unless otherwise specified.

TABLE 2

INSTITUTIONS ATTENDED

Bachelors Degree

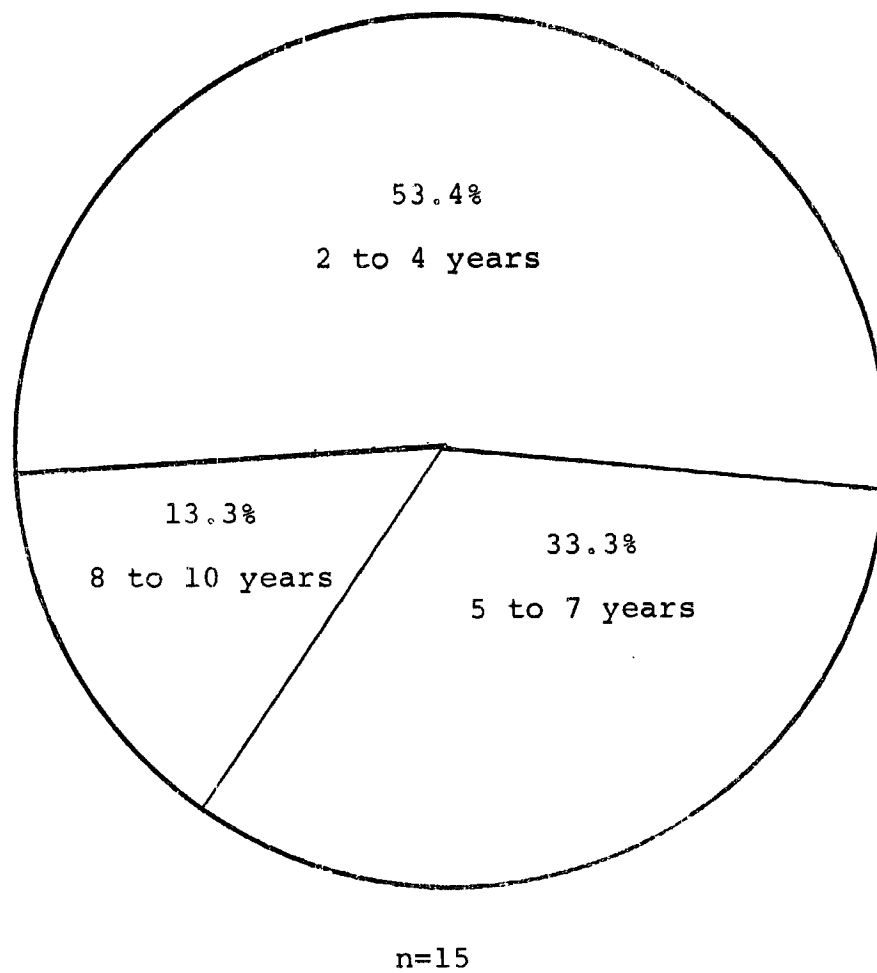
1. Agricultural and Mechanical College of Texas - College Station, Texas
2. Auburn University - Auburn, Alabama
3. City College of New York - New York, New York
4. Duke University - Durham, North Carolina
5. Georgia Institute of Technology - Atlanta, Georgia
6. Institute of Technology at Stuttgart - Germany
7. Miami University - Oxford, Ohio
8. Milwaukee School of Engineering - Milwaukee, Wisconsin
9. Mississippi State University - University, Mississippi
10. Missouri School of Mines and Metallurgy - Rolla, Missouri
11. Purdue University - Lafayette, Indiana
12. University of Arkansas - Fayetteville, Arkansas
13. University of Tennessee - Knoxville, Tennessee
14. University of Texas - Austin, Texas
15. West Virginia University - Morgantown, West Virginia

Masters Degree

1. Institute of Technology at Munich - Germany
2. Massachusetts Institute of Technology - Cambridge, Massachusetts
3. USAF Institute of Technology
4. University of Wisconsin - Madison, Wisconsin
5. Xavier University - Cincinnati, Ohio

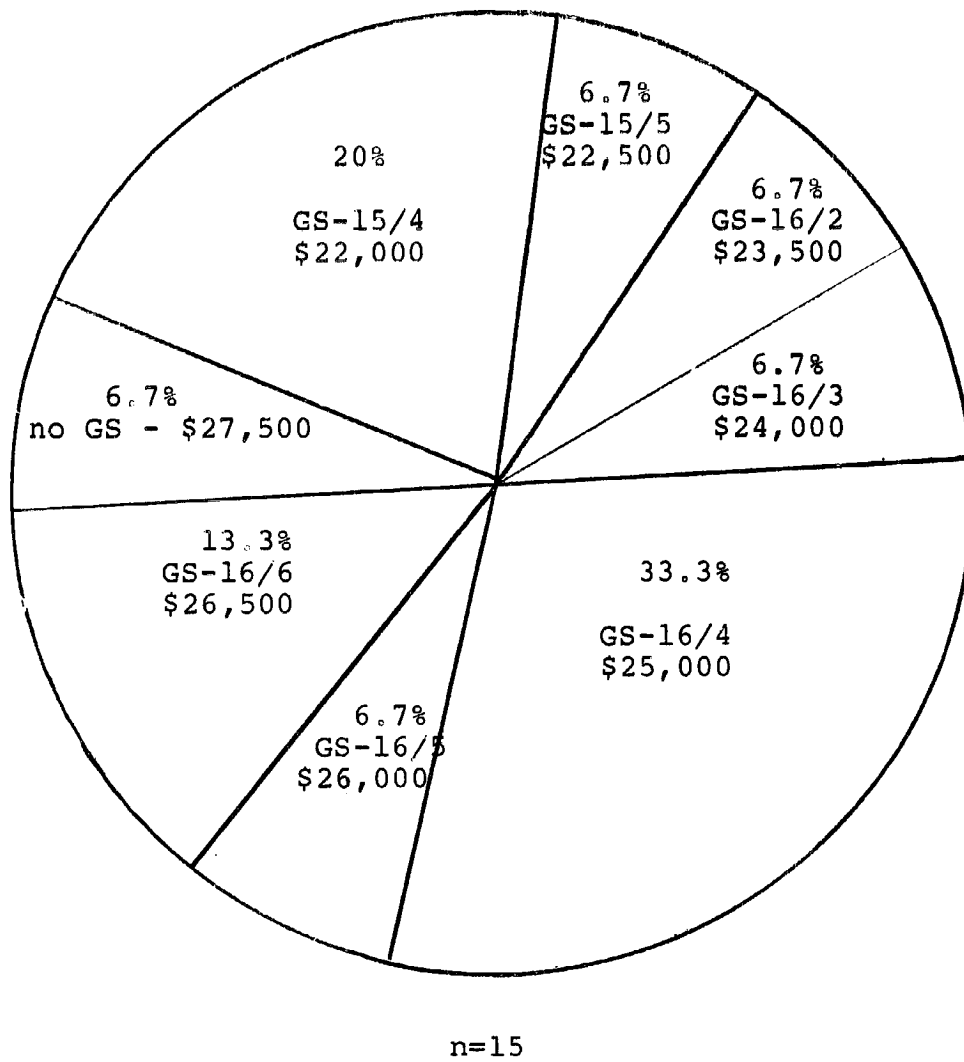
Doctorate

1. University of Wisconsin - Madison, Wisconsin



LENGTH OF TIME IN PRESENT POSITION

FIGURE 4



PRESENT SALARY IN FEDERAL SERVICE

FIGURE 5

Past Employment

Location

In the sample considered, location of past employment is concentrated in the South and West United States with the states of Alabama, California, and Texas predominating (see Table 3).⁴

Employing Organizations

In the sample considered, prior employing organizations may be divided into four categories: (1) prior NASA employment; (2) prior Federal Service Employment outside of the NASA; (3) industrial employment; and (4) other. The first category includes 93.3 per cent of the sample, the second 60 per cent, the third 60 per cent, and the fourth 33.3 per cent (see Table 3 and Figure 6).⁵

Government Service Information

Age

In the sample considered, 40 per cent are from thirty-five to thirty-nine, 20 per cent from forty to forty-four,

⁴Data pertaining to location of past employment was not available on 6.7 per cent of the sample considered. For all percentages n=15 unless otherwise specified.

⁵For each category of prior employing organizations n=15.

TABLE 3

LOCATION/EMPLOYING ORGANIZATION

Prior NASA Employment

Manned Spacecraft Center - Texas
- Missouri (at contractor's plant)
Marshall Space Flight Center - Alabama
- California (at contractor's
plant)
Kennedy Space Center - Florida
Headquarters - Washington, D.C.

Prior Federal Service Outside of the NASA

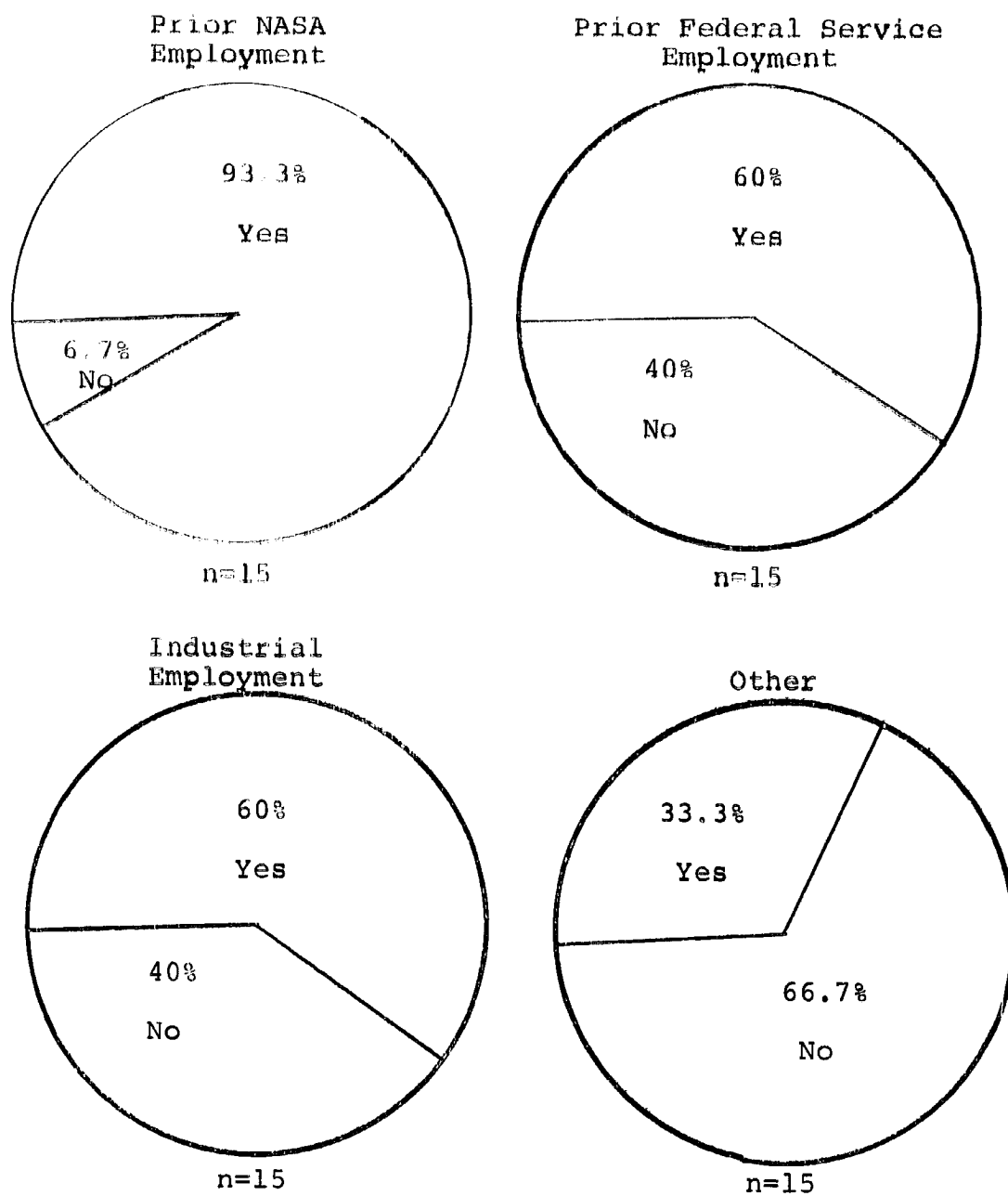
Army Ballistic Missile Agency - Alabama
 - Michigan
 - Texas
 - California
 Army - Red River Arsenal - Texas
 Navy - Bureau of Weapons - California
 Navy - Bureau of Ordinance - Virginia
 Tennessee Valley Authority - Tennessee

Industrial Employment

North American Aviation - California
- Alabama
- Missouri
General Electric - Massachusetts
- Ohio
Sperry Rand - Minnesota
General Dynamics - California
Martin-Marietta Corp. - Maryland
- Florida
Fairchild Corp. - Tennessee
Curtis H. Stout, Inc. - Mississippi
Chrysler - Alabama
Combustion Engineering Corp. - Tennessee

Other Employment

Georgia Power Company - Georgia
Mississippi Power and Light Company - Mississippi
University of Wisconsin - Wisconsin
Missouri School of Mines - Missouri
Self-employed - Georgia



PRIOR EMPLOYING ORGANIZATIONS

FIGURE 6

26.7 per cent from forty-five to forty-nine, and 13.3 per cent from fifty-five to fifty-nine (see Figure 7).⁶

State of Residence at Time of First Federal Employment

In the sample considered, 33.3 per cent resided in Alabama at time of first Federal appointment, 26.7 per cent in Texas, 13.3 per cent in California, and 6.7 per cent in each of the three states of Tennessee, Arkansas, and Indiana.⁷

Length of Federal Service

In the sample considered, 33.3 per cent have been in Federal Service from six to nine years, 20 per cent from ten to fourteen years, 13.3 per cent from fifteen to nineteen years, 20 per cent from twenty to twenty-four years, and 13.3 per cent from twenty-five to twenty-nine years (see Figure 8).

Salary at Time of First Federal Appointment

In the sample considered, 6.7 per cent were GS-2

⁶Where data is incomplete pertaining to government service information it will be so specified. For all percentages n=15 unless otherwise specified.

⁷Data pertaining to state of residence at time of first Federal employment was not available on 6.7 per cent of the sample considered.

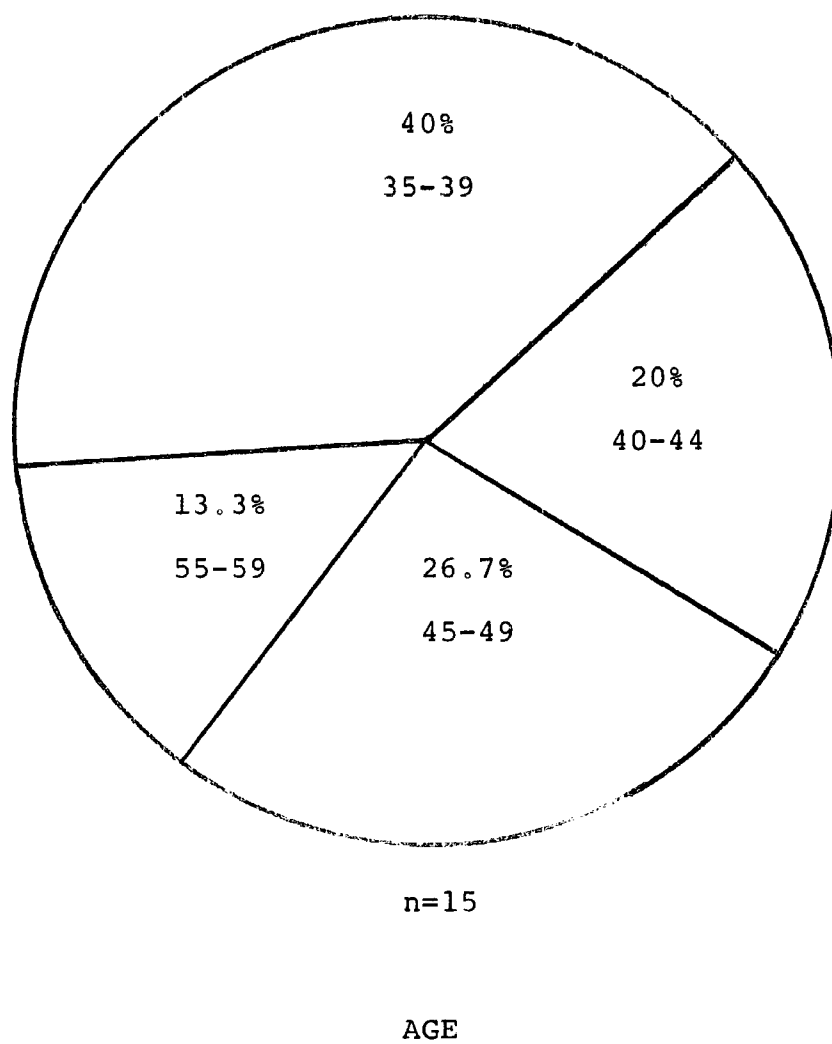
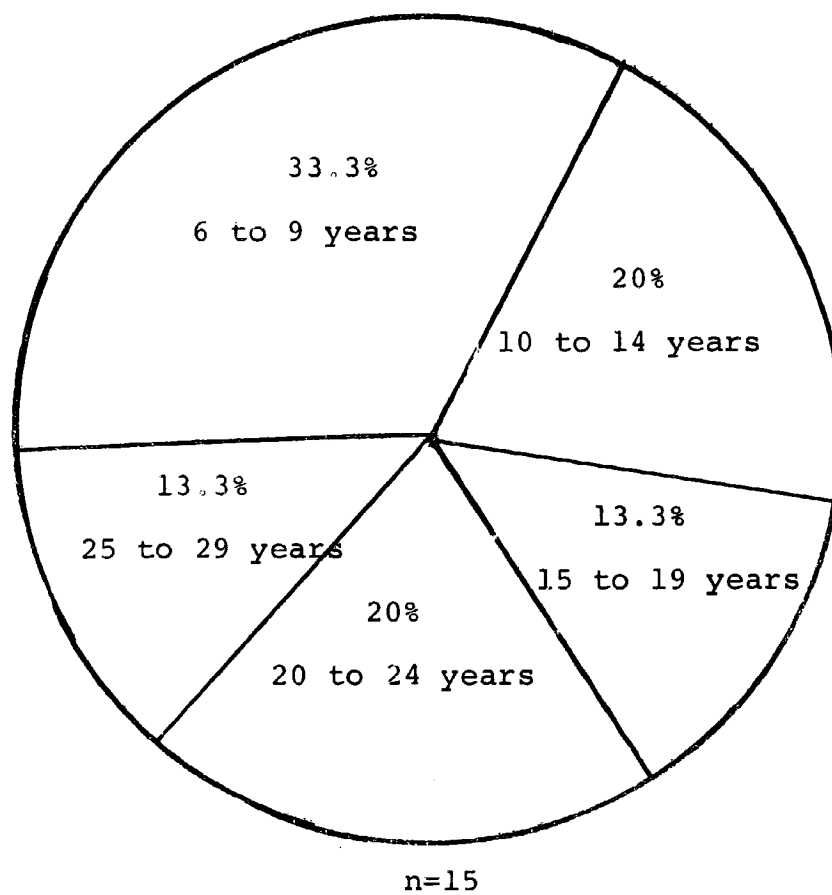


FIGURE 7



LENGTH OF FEDERAL SERVICE

FIGURE 8

(\$5,000) at time of first Federal appointment, 13.3 per cent GS-5 (\$6,000), 13.3 per cent GS-7 (\$7,000), 13.3 per cent GS-9 (\$8,000), 6.7 per cent GS-11 (\$10,000), 6.7 per cent GS-12 (\$12,000), 20 per cent GS-13 (\$14,000), 13.3 per cent GS-14 (\$17,000), and 6.7 per cent at GS-16 (\$20,000) (see Figure 9).⁸

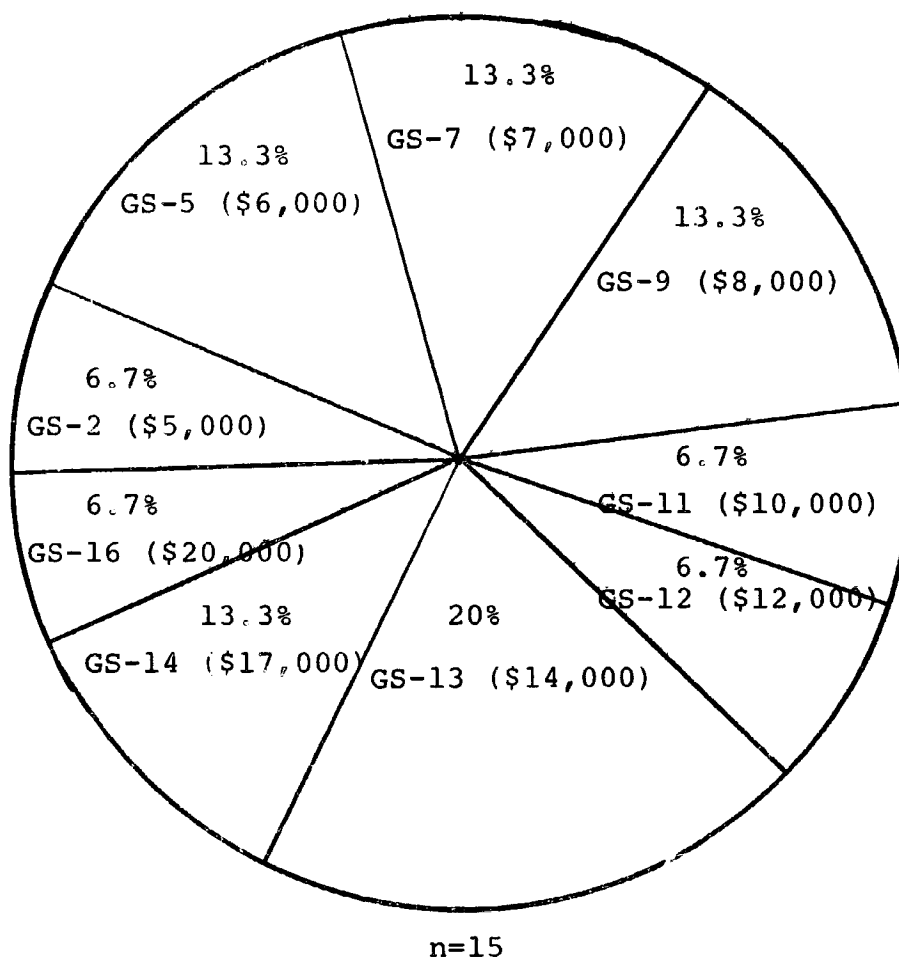
Reason For Entering Federal Service

In the sample considered, 53.3 per cent entered Federal Service because they were offered an interesting, challenging assignment, 20 per cent because Federal Service offered the best opportunity for pursuing their chosen occupational fields, 20 per cent because the idea of working where the important decisions of the day were made appealed to them, and 6.7 per cent because Federal Service was the best offer in terms of location, pay, advancements, and benefits.

Number of Times Left Federal Service

In the sample considered, 6.7 per cent left Federal Service for a period of time to pursue other employment and 93.3 per cent have never left Federal Service employment after entering

⁸At the time of first Federal employment the entire sample was on the GS Pay Scale.



STARTING SALARY IN FEDERAL SERVICE

FIGURE 9

Number of Times Changed Jobs in Last Five Years

In the sample considered, 60 per cent have not changed jobs in the last five years, 26.7 per cent have changed jobs once, and 13.3 per cent have changed jobs twice in the last five years.

Miscellaneous Characteristics

Areas of Job Interest Outside of Present Position

In the sample considered, only 33.3 per cent expressed any interest in areas outside of aerospace research and development management.⁹ Interest was expressed in aircraft flight test and undersea research.

Attitude Toward Geographic Relocation

In the sample considered, 40 per cent would prefer not to relocate, 60 per cent would consider relocation depending upon the job.

Attitude Toward Job Change

In the sample considered, 40 per cent prefer no change and 60 per cent would consider a change in position depending upon the job.

⁹ Data pertaining to areas of job interest outside of present position was not available on 6.7 per cent of the sample considered.

Member of Professional Group or Society

In the sample considered, 53.3 per cent are members of a professional group or society. The most predominant group was the American Institute of Aeronautics and Astronautics.¹⁰

Publications

In the sample considered, 86.7 per cent have published at least one article in a professional journal.¹¹

Civic Activities

In the sample considered, 26.7 per cent participated in community activities or organizations.¹²

Honors (Non-Scholastic)

In the sample considered, 60 per cent received some honor or reward for superior work performance while in the NASA. These ranged from letters of commendation to the nomination for a Presidential citation.¹³

¹⁰Data on membership in a professional group or society was not available on 6.7 per cent of the sample considered.

¹¹Data pertaining to publications was not available for 6.7 per cent of the sample considered.

¹²Data pertaining to civic activities was not available for 6.7 per cent of the sample considered.

¹³Data pertaining to non-scholastic honors was not available for 6.7 per cent of the sample considered.

Management Experience

In the sample considered, 73.3 per cent have successfully managed a research program; 6.7 per cent have dealt extensively with foreign representatives; 86.7 per cent have dealt extensively with representatives of industry or other non-governmental organizations; 60 per cent have established a new program or organization; and 60 per cent have managed a geographically dispersed organization.¹⁴

Superior Skill Levels

In the sample considered, 20 per cent felt an above average ability to speak before large groups; 53.3 per cent the ability to handle impromptu question-and-answer sessions; 46.9 per cent the ability to recruit staff and evaluate people; 33.3 per cent the ability to prepare materials in a non-institutional style; and 53.3 per cent the ability to negotiate with groups or individuals essentially opposed to your viewpoint.¹⁵

¹⁴Data pertaining to management experience was not available for 6.7 per cent of the sample considered. For each category (i.e., have successfully managed a research program) n=15.

¹⁵Data pertaining to superior skill levels was not available for 6.7 per cent of the sample considered. For each category (i.e., ability to speak before large groups) n=15.

Size of Organizations (Groups) Managed

In the sample considered, 33.3 per cent have managed groups of twenty to forty-nine employees, 40 per cent from fifty to one hundred ninety-nine, 6.7 per cent from two hundred to five hundred, and 13.3 per cent more than five hundred.¹⁶

Working Relationships in Other Occupational Areas

In the sample considered, 53.3 per cent had close working relations with trades personnel; 93.3 per cent with scientists or engineers; 13.3 per cent with physicians; 60 per cent with lawyers; 6.7 per cent with educators; and 13.3 per cent with other professionals.¹⁷

¹⁶Data pertaining to size of organizations managed was not available for 6.7 per cent of the sample considered.

¹⁷Data pertaining to working relationships in other occupational areas was not available on 6.7 per cent of the sample considered. For each category (i.e., trades personnel) n=15.

CHAPTER IV

ANALYSIS OF DEMOGRAPHIC CHARACTERISTICS: INDICATIONS
OF TECHNICAL AND/OR PROFESSIONAL QUALIFICATIONS

Education

Education Level

In the sample considered, the minimum education level is a Bachelors degree. Education beyond a Bachelors is evidenced by only 33.3 per cent of the sample. Therefore, a Bachelors degree will be designated as a professional qualification for the project manager. It is significant to note that 85 per cent of the Federal career executives in all areas have attained a Bachelors degree.¹

Fields of Concentration

In the sample considered, 93.3 per cent have a degree in Engineering at some degree level. All of the managers, however, have a degree in a technical or scientific field. Therefore, a technical degree, preferably in Engineering, will be designated as a professional qualification for the

¹U.S. Civil Service Commission, Bureau of Executive Manpower, Characteristics of the Federal Executive, see note 16, Chapter I, p. 7.

project manager. It is significant to note that only 13.3 per cent have any formal education in Business Administration.

Year Graduated

Although year graduated cannot stand as a professional qualification, it serves as an indicator of experience required before attaining the position of project manager. Breakdown of the data per man showed that at least ten years elapsed between time of graduation and first appointment as a project manager (in the majority of cases, the time lapse was fifteen years or longer).²

Institutions Attended

Although institutions attended cannot stand as a professional qualification, it is significant to note the number of technical schools represented.

Educational Profile

The position of project manager requires a minimum of a Bachelors degree in a scientific or technical field preferably Engineering). The position of project manager is not open immediately after graduation.

²The breakdown per man is not included in its detail in order to maintain the confidence of the individuals involved.

Present Employment

Length of Time in Present Position

Although length of time in present position cannot stand as a professional qualification, it does imply a characteristic of the position. The project manager is usually not mobile during the life of his particular project. The duration of a project may be as long as ten years (as evidenced by 13.3 per cent of the sample) and the project manager is obligated to remain with his project from phase-in to phase-out. It is, however, significant to note that a high degree of mobility is not characteristic of the Federal career executive.³

Salary

Although salary cannot stand as a professional qualification, it does imply a characteristic of the position. All of the project managers have attained a super-grade on the GS Scale. Specific GS ratings imply certain levels of executive responsibility as outlined by Civil Service Regulations. A GS-16, for example, might serve as

³U.S. Civil Service Commission, Bureau of Executive Manpower, Characteristics of the Federal Executive, see note 16, Chapter I, p. 11.

the head of a program of unusual difficulty, diverse responsibilities, and of national significance.⁴

Job Description

In addition to the data presented in Chapter III, job descriptions covering 93.3 per cent of the sample were available. Following is one example.⁵

This position demands coordination and direction of a centralized effort to bring to focus all hardware work performed in the Center and by other agencies and industry in support of the Center. This includes responsibility for the development and production of all hardware of this type assigned to the Center. The project manager plans, defines, and monitors the progress, interrelation, and coordination of the development and production of this type of hardware for advanced space vehicles. The manager represents this effort to the Center, other NASA Centers, other agencies, industry, and scientific and technological groups concerned. The position demands technical experience, mature judgment, management ability, personal presentations, and a wide range of technical and managerial skills such as planning, coordinating, and exercising self-discipline. One must have the ability to establish and maintain an effective leadership role to assure effective implementation of the program.

⁴For a complete description of all GS ratings, see: U.S., Civil Service Commission, Federal Personnel Manual, Chapter 21.

⁵Appendix D includes the complete listing of available job descriptions.

Seven characteristics of the project manager may be drawn from this example: (1) technical experience; (2) management ability; (3) mature judgment; (4) ability to speak before groups (personal presentations); (5) ability to exercise self-discipline; (6) ability to maintain an effective leadership role; and (7) other technical and management skills such as planning, coordinating, communicating, and directing. While each of these characteristics may be vitally important, it may prove difficult to pinpoint exactly what is meant by the ability to exercise self-discipline or the ability to maintain an effective leadership role, for example. Therefore, only the factors of technical experience and management ability will be designated as professional qualifications of the project manager.

Present Employment Profile

The position of project manager requires the willingness to see a project to completion, the willingness to accept diverse responsibilities, technical experience, and management ability. There are indications that management ability may include such factors as the ability to exercise mature judgment and self-discipline, the ability to speak before groups, the ability to maintain an effective leadership role, and the ability to plan, coordinate, communicate, and direct the efforts of a project.

Past Employment

Employing Organizations

Although employing organizations cannot stand as a professional qualification, the type of prior employment is significant in terms of the development of the project manager's technical competence and/or experience. The vast majority of prior employment is in a technical field. This is consistent with the Engineering background and is further evidence of the critical import of establishing technical competence through experience.

Job Descriptions

In addition to the data presented in Chapter III, job descriptions for prior employment covering 93.3 per cent of the sample were available.⁶ Following is one example.

This position demanded service as a research and development engineer for the hardware. Performance of continual surveillance of the above hardware's development, production, and flight programs to insure engineering integrity was required. Served as a principle government contact for solution of problems involving engineering, performance and schedules.

⁶Appendix D includes a partial listing of available job descriptions.

From this example, technical expertise and/or experience will be designated a professional qualification of the project manager.

Past Employment Profile

The position of project manager requires prior employment in a technological area to insure experience in handling technical problems.

Government Service Information

Age

Although age cannot stand as a professional qualification, it is significant to note that no manager reached his present position before age thirty-five. It is also significant to note that only 1 per cent of the Federal career executives in all areas reached a super-grade position before age thirty-five.⁷

Reason for Entering Federal Service

Although reason for entering Federal Service cannot stand as a professional qualification, it may imply a characteristic of the project manager. In the sample considered

⁷ U.S. Civil Service Commission, Bureau of Executive Manpower, Characteristics of the Federal Executive, see note 16, Chapter I, p. 2.

over half (53.3 per cent) of the managers entered Federal Service because they were offered an interesting, challenging assignment. Only 6.7 per cent entered for monetary reasons. This may imply that the project manager is motivated by challenge.

Number of Times Changed Jobs in Last Five Years

Although number of times changed jobs in last five years cannot stand as a professional qualification, the fact that 60 per cent of the sample have not changed in last five years, reinforces the notion that the project manager is obligated to remain with his project through completion.

Government Service Profile

The position of project manager is not usually attainable before age thirty five (in Government Service) and the project manager must be willing to see his project to completion. There are indications that the project manager is motivated by challenge rather than by monetary consideration.

Miscellaneous Characteristics

Member of Professional Group or Society

Although membership in a professional group or society cannot stand as a professional qualification, it is significant

to note that over half (53.3 per cent) are members of some professional group or society.

Publications

In the sample considered, 86.7 per cent have published at least one article in a professional journal. Some publication, therefore, may be interpreted as a professional qualification in terms of demonstrating an understanding a technical area.

Honors (non-scholastic)

In the sample considered, 60 per cent received some honor or reward for superior work performance. High achievement, therefore, appears to be a characteristic of the project manager, if not a professional qualification.

Management Experience

In the sample considered, the successful management of a research program (prior to the project manager position) and the ability to deal with industrial representative (contracting agents) stand out as professional qualifications for the project manager. The ability to establish a new program and manage a geographically dispersed organization stand out as desirable characteristics for the project manager.

Skill Levels

In the sample considered the ability to speak before groups (including handling of impromptu question-and-answer sessions), the ability to recruit staff and evaluate people, and the ability to negotiate with groups or individuals with diverse viewpoints on particular problems stand out as professional qualifications.

Size of Organizations (Groups) Managed

In the sample considered, prior management of a group of, at least, twenty persons stands out as a professional qualification.

Working Relationships in Other Occupational Areas

Working relationships with trades personnel, other engineers and scientists, and with lawyers stands out as a professional qualification.

Profile-Miscellaneous Characteristics

The position of project manager requires: (1) the demonstration of an understanding of a technical area, perhaps, through publication in a professional journal; (2) experience in managing a research program and dealing with industrial representatives; (3) the ability to speak before

groups; (4) the ability to recruit staff and evaluate people; (5) the ability to negotiate with individuals or groups with different viewpoints on a particular problem; (6) experience in managing a group of twenty individuals or more; and (7) prior contact with other engineers or similar professional groups. Some desirable characteristics are:

(1) membership in a professional group or society; (2) demonstrated superior achievement in prior positions; (3) the ability to establish a new program and manage a widely dispersed geographically organization; and (4) a range of past experience in dealing with diverse groups.

CHAPTER V

SUMMARY AND CONCLUSIONS

The Apollo Project Manager

An analysis of the technical and professional qualifications of the Apollo project manager as evidenced by the demographic profiles drawn in Chapter III and Chapter IV designates the following characteristics as predominant project manager career specifications or prerequisites.

1. A Bachelors degree.
2. A field of concentration in a technical or scientific area, preferably Engineering.
3. A willingness to see a project to completion.
4. A willingness to accept diverse responsibilities.
5. Demonstrated technical experience.
6. Management ability.
7. Prior employment in a technological area.
8. Experience in managing a research program.
9. Experience in dealing with industrial representatives (contractors).

10. The ability to speak before groups.
11. The ability to recruit staff.
12. The ability to evaluate people (performance ratings).
13. The ability to negotiate with groups having a different point of view than your own.
14. Experience in a supervisory position; managing a group of individuals.
15. Prior contact with diverse professional groups.

Beyond a delineation of necessary characteristics, a number of highly desirable characteristics can be identified.

1. Ability to exercise mature judgment.
2. Self-discipline.
3. Ability to maintain an effective leadership role.
4. Challenge as a primary motivator.
5. A publication in a professional journal.
6. The ability to establish a new program.
7. The ability to manage a geographically dispersed organization.

The Civil Service Parameter

In the final analysis of the Apollo project manager, the fact that the NASA is a Government Agency cannot be

overlooked. As a Government Agency, many of the personnel policies in the NASA are directly affected by the Civil Service Commission. As a result, some of the characteristics displayed by the Apollo project manager may be reflections of Civil Service policy rather than strictly qualifications for the position of project manager. One example is the age of the Apollo project manager; no individual reached a project manager position before age thirty-five. However, further investigation reveals that throughout the Federal Service only 1 per cent of the executives reached a GS-15 rating before age thirty-five. This would indicate that age is not entirely a characteristic of the position, but a characteristic of the Civil Service. Another example is that no Apollo project manager reached his present position without some prior Federal Service experience. Again, this does not appear characteristic of the position, but a Civil Service constraint. Therefore, the analysis in Chapter IV and the summary of twenty-two characteristics at the beginning of this chapter have attempted to isolate those characteristics which may be reflections of Civil Service policy and present only those characteristics which might be more generalizable to other groups of project managers outside of Government Service.

Some Additional Insights

Although the primary objective of this research is to concentrate on those characteristics of the project manager that can be objectively defined in terms of his formal role, the professional qualifications delineated at the beginning of this chapter include a number of personality traits. To more clearly establish the importance of their inclusion some insights gained from interviews with a number of Apollo project managers are cited in this section.¹

Two personality characteristics cited that are of particular importance are challenge as a primary motivator and the ability to maintain an effective leadership role. One Apollo project manager, when asked why he chose project management as his career objective, placed motivation and leadership in the following context.

I wanted experience in project management simply for my own career. I don't expect success to bring a promotion. We're talking motivation here. What type of motivation attracts people who come into project management? . . . I think basically that a project manager

¹The interview data is not a part of the research design for this study. Data was collected by the Syracuse University/NASA research team. The author was not present at all of the interviews. Information is taken from transcripts distributed among team members. The data will not be footnoted nor will the names of the individuals interviewed be disclosed.

is a keen individualist. He might be likened to the psychological makeup of an artist. He gains his own rewards from his own efforts; he equates his own success in terms of how good he feels when he drives home at night and is satisfied with that. You have to be kind of an individualist, particularly in the government where there is a lot of bureaucracy, where there are a lot of people who like to write their directives and like to impose their will in a regimented way. You've got to be a maverick, in fact, I've been called "maverick" many times. To protect your project from those influences which, in your judgment, are sub-optimal, you must be a strong leader.

Interviews with a number of the Apollo project managers, while, perhaps, not as articulately or strongly stated, indicate that job satisfaction through challenge and effective leadership are essential attributes of the successful project manager.

The professional qualifications of the project manager rely, to a large extent, on his technical abilities both in terms of education and experience. However, even here, personality plays a very definite role. The Apollo project managers indicated that a balance between their technical and managerial functions must be maintained. To maintain this balance the project manager must be able to effectively use his project team; he must be able to "work with and through people" to accomplish project objectives. The team concept was described by one Apollo project manager in the following context.

A good project manager has to surround himself with experts. He doesn't need to be an expert in finance, an expert in contracting, etc. He does, however, need a working knowledge of these things. For example, when an engineer starts talking to him about longitudinal oscillations, he has to know what the man is talking about. The prime thing that a project manager needs is the ability to listen and comprehend what his people are telling him.

This concept of the project team reinforces the notions of the project manager's ability to exercise self-discipline and mature judgment and the necessity of his exposure to diverse professional groups. A fundamental quality of the Apollo project manager is the ability to assimilate knowledge from several sources, evaluate the recommendations, and make decisions based on this wide range of information.²

Two final characteristics particularly relevant to project manager as a career are his willingness to accept diverse responsibilities and his willingness to see his project to completion. Both of these characteristics incorporate elements of risk. The acceptance of diverse responsibilities places the success or failure of a particular task on the shoulders of the project manager. As one Apollo project

²For further discussion of this concept see: David L. Wilemon and John P. Cicero, "The Apollo Project Manager: Anomalies and Ambiguities," unpublished working paper, Syracuse, New York: Syracuse University, June, 1969, pp. 2-6.

manager put it: "If my hardware didn't work and it failed in lift-off, it would be a catastrophic occurrence. I would completely expect to be replaced. Put it that way." The willingness to see a project to final completion, especially in the case of projects of long duration, involves the risk of professional obsolescence. In effect, the state of the art bypasses the project manager who is unable to devote full time to the technical aspects of the project. One project manager stated the implications of professional obsolescence this way: "I'm an obsolete engineer, I'm an untrained manager, and I'm too old to go back to school."³

The Literature

A review of the fifteen project manager qualifications at the end of Chapter II (pp. 22-23) shows a pattern consistent with the findings of this study. However, those characteristics delineated in this study tend to be more specific in terms of the kind of technical and management experience required. Moreover, a more precise focus on formal educational training and length of time required to reach the project manager position are achieved by this research.

A significant difference in focus, however, exists

³Wilemon and Cicero, "Anomolies and Ambiguities," see note 2, pp. 6-8.

between this study and the construct in the literature. The literature stresses the "role" of the project manager in terms of his interrelationships among the diverse groups within and associated with the total project environment. In this sense, the personality and management style of the project manager captures the emphasis in the literature. This study attempts to evaluate project manager as a career and more directly emphasizes the more formal qualifications for the position and the career patterns of those individuals reaching project manager positions. This study, therefore, complements current research and suggests that those perceptions of the project manager as described in the literature are, on the basis of this research, consistent with the career qualifications of a select group of Apollo project managers.

Peripheral Findings

Although the focus of this study is on project manager as a career objective, the nature of the demographic data gives some preliminary insights into the mobility of the Apollo project managers, their attitudes toward location or job change, and some indication of their Federal Service careers in terms of promotions, length of Federal Service, and number of times left Federal Service. These findings are briefly discussed in this section.

Mobility

If all locational data presented in Chapter III (state of residence at time of first Federal appointment, present location, and locations of prior employing organizations) is broken down and examined per manager, geographic mobility does not stand out as a characteristic of the Apollo project manager. If the total career spectrums of each manager are examined, the majority of the managers have made only two to four moves across organizations. If this is compared to the Federal executive in other areas, the data is consistent; 70 per cent of the Federal executives have not made an interagency move since reaching a grade level of GS-13.⁴

The lack of mobility among Federal executives has generated two NASA related studies in an attempt to determine why the NASA is a mobile inhibitive organization. A sampling of all NASA employees to determine what employee attitudes and decisions on relocation were, concluded that: (1) certain NASA personnel policies and practices tend to inhibit mobility; and (2) current patterns and levels of employee mobility within the NASA can be improved. In the first instance, it was suggested that promotion policies and practices tend

⁴U.S. Civil Service Commission, Bureau of Executive Manpower, Characteristics of the Federal Executive, see note 16, Chapter I, p. 11.

to favor executives who remain at a single NASA location and that promotions are used more often as rewards for staying rather than inducements for moving to another NASA location. To improve the level of mobility it was suggested that a positive attitude toward mobility should be incorporated in recruitment, promotion, and development policies and practices.⁵

A second study, dealing in part with mobility within the NASA, cites four reasons for a lack of employee mobility: (1) personnel who desire to move laterally within the organization may do so, if they can find a position; (2) moving expenses are paid only if the move is deemed "to benefit the Government;" (3) promotions are generally confined within organization lines; promotions are rarely made laterally; and (4) official encouragement or incentive is rare.⁶

This lack of mobility within the NASA, including the Apollo project managers, has two peripheral implications in terms of the project managers' professional qualifications. First, the project manager's willingness to see his project

⁵Thomas G. Kobus, Robert F. Nerney, Sherry P. Siracuse, and Rayburn A. Metcalf, A Study of Employee Mobility in the National Aeronautics and Space Administration, U.S., NASA, Personnel Division, June, 1967, pp. 9-10.

⁶John M. Eggleston, "Executive Selection and Development in a Large Government Agency," unpublished graduate paper, M.I.T., 1966, p. 37.

to completion (especially in terms of a ten-year project) may, in some degree, be affected by the status quo of the organization itself; executives do not move laterally as a general rule. A second factor not directly considered in this study, is that the image of project manager in terms of the dynamic executive immersed in a "web of interrelationships" seems inconsistent with non-mobility. The very tentative conclusion from the sparse evidence presented here is that the lack of mobility on the part of the Apollo project managers is a factor of the NASA environment as a Government Agency constrained by the Civil Service. It would not be anticipated that the same patterns of mobility would be displayed in an industrial setting.

Attitude Toward Location or Job Change

Examination of the data in Chapter III indicates that 60 per cent prefer no change in either job or location. While this is overtly consistent with the managers' lack of mobility, the reasons for their attitude may produce a more ambiguous situation. For example, they may prefer not to change location or job because promotional possibilities are greater if they do not move or they may prefer to change because they are satisfied in their present position. This study does not attempt to answer the question.

Federal Service Careers

Promotions - It is interesting to note that in the sample considered the average yearly salary increase over the duration of their Federal Service careers is \$960 per year. The average salary increases range from \$610 to \$1,400 per year. If cost of living moves at approximately 3 to 4 per cent per year, on a \$20,000 base (this approximates the present salaries of the project managers), a cost of living increase would be from \$600 to \$800 per year. In this light, an average increase of \$960 per year is only slightly above cost of living increases.⁷ This relatively slow promotion rate seems inconsistent with the position of project manager when his necessary qualifications and diverse task responsibilities are considered. Again, the tentative conclusion may be that the Apollo project manager is affected by the NASA as a Government Agency. This type of pattern might not be anticipated for the industrial project manager.

Length of Federal Service. - Data from Chapter III shows that the project managers considered have been in Federal Service from six to twenty-nine years.

⁷ This brief overview of promotional data is based on the computation of linear salary maturity curves for each manager for the duration of his Federal Service career. The detailed computations are not included as a part of this study.

Number of Times Left Federal Service - Only 6.7 per cent of the sample left Federal Service for any period of time (and returned)

Future Research

This study points to three significant possibilities for future research: (1) a comparative study involving a sample of industrial project managers; (2) a study focusing on the personality traits and management styles of project managers; and (3) a study of project manager mobility. A comparative study of industrial project managers could help stabilize the professional qualifications of the project manager delineated in this research. Moreover, such a study would be invaluable in terms of separating those characteristics of the Apollo project manager due to Government Service influence from those characteristics that apply to a more general population of project managers.

A study focusing on the personality traits and management styles of the project manager would add a new dimension to the concept of project manager as a career. A clearer perception of how the project manager operationally copes with the programmatic environment would be an invaluable addition to present theory surrounding project management.

The third area, the mobility of the project manager,

would give still further insights into the total career patterns of the project manager. A succinct determination of exactly what career path the project manager follows would supplement any study looking to his professional qualifications and/or his personality traits and management style. If the total research suggested in the three areas mentioned here is accomplished, project manager could clearly emerge as a career objective in its own right. If this study has not satisfactorily answered any questions concerning the project manager career, it is hoped that it, at least, has raised enough questions to encourage further investigations.

APPENDIX A

THE PERSONNEL MANAGEMENT INFORMATION SYSTEM (PMIS)

Description

The first section of this appendix includes a general description of the PMIS and a flow chart of the system. Pages 1-1 and 1-2 of the PMIS Data Processing Manual are reproduced.¹

Code Sheets

The second section of this appendix includes a complete listing of items stored in the PMIS and the definition and coding of PMIS data elements. Appendix B and Appendix C of the PMIS Data Processing Manual are reproduced.² A further breakdown of coding procedures appears in later appendices of the manual. These appendices are not reproduced here because they would not significantly add to the reader's general understanding of the PMIS as employed in this research.

¹NASA, Headquarters, PMIS Data Processing Manual, see note 11, Chapter I, pp. 1-1-1-2.

²NASA, Headquarters, PMIS Data Processing Manual, see note 11, Chapter I, pp. C-1-C-8 and B-1.

Computer Print Out and Master Key

The third section of this appendix includes the computer print out used in this study (all names have been deleted) and a copy of the master key used to interpret the data (the original master key is a plastic overlay sheet).

APPENDIX A

Section 1

Description

SECTION 1: PERSONNEL MANAGEMENT INFORMATION SYSTEM DESCRIPTION

100 BASIC CONCEPT

1. The Personnel Management Information System provides an integrated NASA-wide data bank containing essential personnel data on all in-house employees. The data are extracted from the existing Headquarters and field center personnel systems and submitted on a quarterly basis.
2. Figure 1-1 is a flow chart of the system showing:
 - a. Personnel data originate at the field centers and are sent to Headquarters either on magnetic tape or punched cards. These data are edited prior to submission to Headquarters in accordance with prescribed edit criteria.
 - b. Input data are again checked for accuracy at Headquarters. Errors are rejected and the remaining data are consolidated into a NASA-wide data bank.
 - c. Errors detected during checks at Headquarters are identified and returned to the originating center. A record of each error is retained until the correction is received through the normal PMIS reporting channels.
 - d. When error correction is complete for each cycle, the NASA-wide data bank is analyzed and used to generate recurring standard output reports. It will also be used to extract data for special one-time requirements or studies.

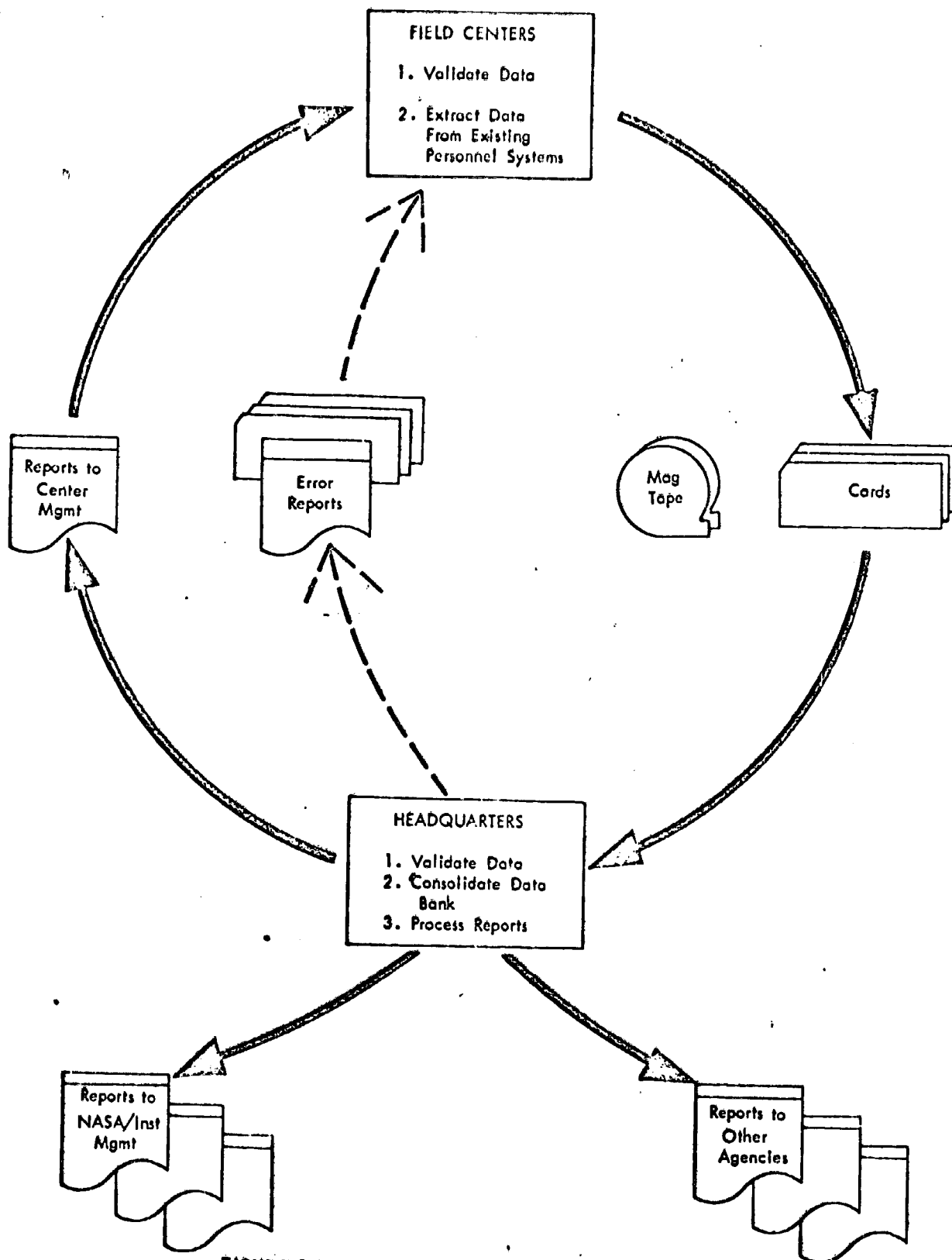


FIGURE 1-1: PERSONNEL MANAGEMENT INFORMATION SYSTEM

APPENDIX A

Section 2

Code Sheets

APPENDIX B

PMIS DATA ELEMENTS

Item	Title	Card Number						Column
		1	2	3	4	Z	9	
1	Reporting Installation	X	X	X	X	X	X	2, 3
2	Social Security Number	X	X	X	X		X	4-12
3	Nature of Employment (FT, PT, WAE, etc.)							
4	Tenure/Position Code	X						22, 23
5	NASA Service Computation Date	X						24, 25
6	Date of Birth	X						30-33
7	Sex Code	X						34-37
8	Bachelor Degree Field	X						38
9	Bachelor Degree Date	X						39-41
10	Highest Degree Level	X						42, 43
11	Highest Degree Field	X						44
12	Highest Degree Date	X						45-47
13	Date of Current Grade	X						48, 49
14	Physical Handicap Code	X						50-53
15	Parent Installation Code		X	X				54, 55
15a	Organizational Element Code	X						45, 46
16	Duty Station Code	X						57-62
17	Pay Plan		X	X				63-71
18	CSC Series Code		X	X				22, 23
19	Grade and Step		X	X				24-28
20	Current Salary		X	X				29-32
21	NASA Classification Code		X	X				33-37
22	Advanced/Saved Pay Category		X	X				38-43
23	Personnel Action Code			X				44
24	Vacancy							13-15
25	Minority Code	X						
26	Federal Service Computation Date	X						56
								26-29

DEFINITION AND CODING OF PMIS DATA ELEMENTS

1. REPORTING INSTALLATION. Use two digit installation identification code specified in the NASA Agency-wide Coding Structure (FMM). These are:

- 10 - Headquarters
- 11 - Western Support Office
- 21 - Ames Research Center
- 22 - Lewis Research Center
- 23 - Langley Research Center
- 24 - Flight Research Center
- 25 - Electronics Research Center
- 42 - Space Nuclear Propulsion Office/Cleveland
- 44 - Space Nuclear Propulsion Office/Nevada
- 45 - Space Nuclear Propulsion Office/Germantown, Md.
- 51 - Goddard Space Flight Center
- 53 - Wallops Station
- 55 - NASA Pasadena Office - JPL
- 62 - George C. Marshall Space Flight Center
- 72 - Manned Spacecraft Center
- 76 - John F. Kennedy Space Center

2. SOCIAL SECURITY NUMBER

- a. The unique nine digit number assigned to an individual by the Social Security Administration for identification.
- b. A dummy Social Security number will be assigned to any employee who does not have one. This dummy number will be recorded in a manner which will permit replacement by the valid SS# when it is obtained. A block of dummy numbers will be assigned for this purpose. Dummy numbers will be formatted as follows:

<u>Three Zeros</u>		<u>Four Digit Identifier</u>
000	- XX -	XXXX

NASA Installation Code

Ref: FPM 296-31 Book V Table III Item 4

Note: All personnel must have either a valid or a dummy Social Security number.

3. NATURE OF EMPLOYMENT. A code which designates the basis of employment. This will be expressed as a two position alpha code. Valid codes:

FT - Full Time
PT - Part Time

WA - When Actually Employed
WC - Without Compensation

Appendix C

4. TENURE/POSITION CODE. This is a two character code to indicate (a) the tenure of the individual (to be used to identify permanent vs temporary personnel for reporting purposes)¹ and (b) information about the type of position.
 - a. (Tenure) (Ref: FPM Chapter 351)
 - 1 - Career
 - 2 - Career Conditional
 - 3 - Temporary
 - b. (Type of Position)
 - 1 - Co-op
 - 2 - YOC
 - 3 - Summer (Temporary employment between June 1 and September 30)
 - 4 - TAPER
 - 5 - Other Temporary
 - 6 - Permanent
5. NASA Service Computation Date (NSCD). A four digit coded date reflecting month and year in the format MMY~~Y~~. This is a constructive date which provides a basis for computation of an individual's service with NASA. In most cases the NSCD will be the same date the individual entered on duty at the installation.
 - a. October 1958 (10/58) is earliest possible NASA Service Computation Date.
 - b. For Pay Plan EC enter 0000.
 - c. Adjustments to NSCD for extended leave without pay, etc., should be on same basis as adjustments are made to the Federal Service Computation Date.
 - d. Service as a detailee from another agency or military department should be excluded.
6. DATE OF BIRTH. A four digit coded date reflecting month and year of birth in the format MMY~~Y~~.
7. SEX CODE. A one character code describing the sex of the individual.

M - Male F - Female
8. BACHELOR DEGREE FIELD. A three character code to identify the major field of study for the baccalaureate level degree. A copy of the complete code is set forth in Appendix D.
 - a. If more than one baccalaureate degree is held, designate the degree in the major field of study most closely related to the current occupation.
 - b. If the individual has no baccalaureate degree, enter 000.
 - c. Included earned degrees only - excluded all honorary degrees.

¹For output reports generated at Headquarters, TAPERS (Code 34) will be counted as permanents.

Appendix C

9. BACHELOR DEGREE DATE. The year in which the Bachelor's Degree was awarded expressed in two digits (last two digits of year (Ex: 1966 = "66")).
- a. If more than one baccalaureate degree is held, enter date of award of the degree in the major field of study most closely related to the current occupation.
 - b. Include earned degrees only--exclude all honorary degrees.
 - c. If no degree is held, enter ø ø.
10. DEGREE LEVEL (HIGHEST DEGREE). A one digit code indicating the degree level of highest earned degree (exclude honorary).
- ø - No Degree
- 1 - Bachelor -
 - a. All four year Bachelors Degrees.
 - b. All cooperative plan Bachelors Degrees.
 - 2 - Master -
 - a. All Masters Degrees requiring five or more years of college work.
 - b. All first professional degrees requiring five years or more of college work. (Some Bachelor Degrees will fall in this level).
 - 3 - Doctorate -
 - a. Ph.D.
 - b. M.D.
 - c. D.D.S.
 - d. D.V.M.
 - e. All other "doctor" level degrees.
11. HIGHEST DEGREE FIELD. A three character code to identify the major field of study for the highest level of earned degree. A copy of the complete code is set forth in appendix D. This is the same code used to identify field of baccalaureate level degree.
- a. If the baccalaureate degree is the highest level of degree held, this will be the same code as the Bachelor Degree Field (Item 8).
 - b. If more than one degree is held at the highest level for an individual, designate the degree in the major field of study most closely related to the current occupation.
 - c. If no degree is held, enter ø ø ø.
 - d. Include earned degrees only - exclude all honorary degrees.

Appendix C

12. HIGHEST DEGREE DATE. The year in which the highest academic degree was awarded expressed in two digits (last two digits of year).
- a. If more than one degree is held at the highest level, enter date of award of the degree in the major field of study most closely related to current occupation.
 - b. Include earned degrees only - exclude all honorary degrees.
 - c. If no degree is held, enter Ø Ø.
13. EFFECTIVE DATE OF CURRENT GRADE. A four digit coded date in the format MMY (month, year). This is the date which establishes total continuous service in present grade, whether the service was with NASA or other Federal agency. For AD, EC, EX, ST and WM pay plans, indicate the date the individual entered the current pay level.
14. PHYSICAL HANDICAP CODE. A two digit code found on the SF 78 ("Certificate of Medical Examination") which is keyed to general description of physical handicaps. (FPM Suppl. 296-31 Chart S1-7C)
15. PARENT INSTALLATION. The installation against whose complement (ceiling) the individual is charged. The two digit installation identification code is specified in Item 1, page C-1.
- 15a. ORGANIZATIONAL ELEMENT CODE. This is the internal organization code peculiar to each parent installation and used in the Position Complement Report. This code is to be left justified in a six (6) position field.
16. DUTY STATION CODE. The nine digit GSA Location Code. See Appendix F for current valid duty locations. (GSA Publication "Geographical Location Codes", latest edition.)
17. PAY PLAN. A two position alpha code which describes the pay plan which applies to the individual. Pay plans currently in use in NASA are (FPM 296-31, Book V, Table III, Item 16):
- a. AD - NASA "Excepted" (PL 85-568)
 - b. EC - Experts and Consultants (Per Diem Empl.)
 - c. EX - Executive Pay Act
 - d. GS - General Schedule Empl.
 - e. WB - Wage Board)
 - f. WL - Wage Leaders) Blue Collar
 - g. WS - Wage Supervisors) Per Hour Emp.

h. ST - Scientific and Technical (PL 313 type)

i. WM - Maritime Pay Schedule

YOC are to be classified either as GS or WB.

18. CSC SERIES CODE. A numeric code, expanded to four digits by high order zeros as required, left justified in a five place field. The fifth (right-most) position of the field will be left blank except when the CSC series is a five digit number or a sub-break is specified (as in 1301.1), in which case, the sub-break will be placed in that fifth space. (CSC Standard Classification Codes). For Pay Plan AD, EC, EX and ST enter 0 0 0 0 0 (do not have CSC Series Code).

Examples:

CSC Code 080 - enter as 0 0 8 0 0

CSC Code 1301.1 - enter as 1 3 0 1 1

CSC Code 26120 - enter as 2 6 1 2 0

a. See Appendix I for CSC codes being used within NASA

b. See Appendix H for NASA codes related to CSC codes

19. GRADE AND STEP. A four digit code which identifies pay level for all scheduled compensation rates, affecting both blue collar and white collar employees. Enter Grade and Step as follows:

a. 2 digits for grade (include high order zeros)

b. 2 digits for step (include high order zeros)

Example:

Grade 9, step 2 enter as 0 9 0 2

c. For AD, EX, EC, ST and WM enter 0 0 0 0 for grade and step.

d. For those YOC in Pay Plan WB who are not assigned a specific grade and step enter 0 0 0 0 for grade and step.

20. CURRENT SALARY. The scheduled or assigned:

a. Annual salary expressed in whole dollars when referenced to GS, ST, EX and AD employees. (See pay plan).

b. Per diem rate in dollars and cents when referring to EC employees.

Appendix C

- c. Hourly rate in dollars and cents when referring to WB, WL, WS employees.

Examples:

Annual salary \$17,055 enter as 1 7 0 5 5

Per diem \$25.00 enter as 0 2 5 0 0

Hourly rate \$5.25 enter as 0 0 5 2 5

- d. For Nature of Employment WC and Pay Plan WM, enter 0 0 0 0 0.
- e. All type of salaries are right justified.
- f. Enter high order zeros.

21. NASA SERIES CODE (REFERRED TO AS "NASA CLASS CODE"). A number, five digits in length, left justified. A supervisory code "S" is placed in position six when applicable, otherwise leave blank. The number identifies NASA position classifications, and is used within NASA in addition to the CSC Series Code. (Authority: NASA Personnel Division, (Code BPC).)

Example:

NASA Code 100 enter as 1 0 0 0 0 b

NASA Code 70101 enter as 7 0 1 0 1 b

NASA Code 70101S enter as 7 0 1 0 1 S

- a. Additional positions are sometimes used as an optional installation level break. Do not report the installation level portion of such codes.
- b. The codes 69500, 79500, or 99500 shall be used to designate experts and consultants and are reserved for this use only.
- c. See Appendix G for codes in use with related CSC codes.

22. ADVANCED/SAVED PAY CATEGORIES

- a. Advanced Pay Category - Special pay level for certain individuals in hard to fill positions.
- b. Saved Pay - The pay rate retained by an employee if he is demoted because of administrative actions.

ADVANCED/SAVED PAY CATEGORY CODES

N = Normal Pay

A = Advanced Pay - Under Section 504 of Federal Salary Reform Act of 1962, as amended.

B = Advanced Pay - Under Section 801 of Classification Act of 1949, as amended.

S = Saved Pay

23. PERSONNEL ACTION CODE. Submit a card 3 for each of the following CSC Personnel Action Codes (FPM 296-31, Table I):

a. Accessions and returns from nonpay status exceeding 30 calendar days.

100	121	150	181
101	122	151	214
108	123	160	280
110	130	161	290
112	131	170	291
113	132	171	292
115	140	172	
120	141	173	

b. Separations and Placements in nonpay status exceeding 30 calendar days.

300	316	327	350
301	317	328	351
302	320	329	352
310	321	330	355
311	322	331	365
312	323	332	371
313	324	340	460
314	325	345	470
315	326	346	472

c. Position Changes.

700	712	} Only reassignments between NASA Parent Installations. To be reported by both gaining and losing installations.
701	713	
702	715	
710	720	
711	721	

Appendix C

d. Change actions not covered above.

790	896
820	897
892	987 (Code 987 is designated to cover changes in
893	NASA Classification Code when such changes
	are not recorded in any of the above action
	codes (a through d).)

24. VACANCIES. Identify those authorized unencumbered permanent GS positions to be filled. Submit in document form, a summary count of vacancies by:

Installation Code
NASA Code Block (200, 300, etc.)
Grade/Step

25. MINORITY GROUP CODE. A one digit numerical code identifying the minority group identification of an individual. Data is to be provided on the basis of individual self-designation by means of a survey to be accomplished in privacy by every person in the agency. Civil Service Commission regulations prescribe positive controls on how this information may be obtained, retained and utilized. NASA policy and establishment of responsibility in this regard is set forth in NPD 3713.5. Minority group designations and codes to be used are:

	<u>Code</u>
American Indian	1
Negro	2
Oriental	3
Spanish American	4
None of these	5
No response or unknown.	0

26. FEDERAL SERVICE COMPUTATION DATE. A four digit coded date in the format MMY (month, year). This is the date which provides the basis for computation of total Federal service (months and years only) as reflected in Item y of Standard Form 50.

a. For Pay Plan EC enter 0000.

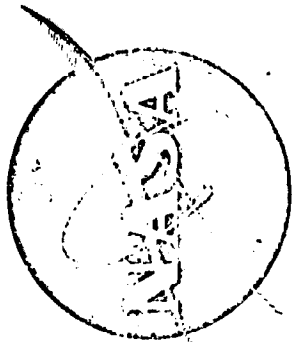
b. When FSCD has not yet been determined enter 0000.

APPENDIX A

Section 3

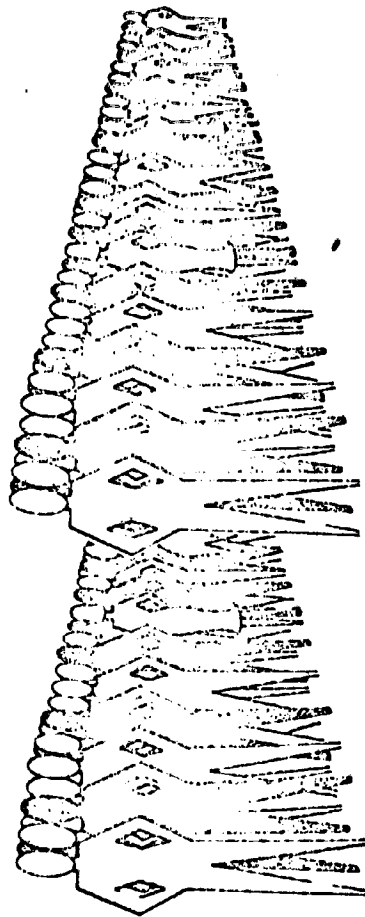
Print Out

Master Key



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PERSONNEL MANAGEMENT INFORMATION SYSTEM - (PMIS)



REPORT: SPECIAL PMIS EXTRACT

FOR SYRACUSE UNIVERSITY RESEARCH
ON PROJECT AND SUBSYSTEM MANAGERS

PERSONNEL DIVISION (BPA)
NASA HEADQUARTERS
WASHINGTON, D.C.; 20546

phone area code 202; 962-6481

AS OF: March 20, 1969

NOTE

This is a special FMIS extract of data on a selected population designated by Dr. David Wilemon. It is intended for use in a research project, regarding project and subsystem managers, which is being conducted by Syracuse University under NASA auspices.

Please refer suggestions or questions regarding this material to:

Manpower Analysis and Plans Branch (BPA)
Personnel Division
NASA Headquarters
Washington, D. C. 20546

Phone: Area Code 202, 962-6481

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6243907514072501 GS0861 14041864162NFT16076005641018MC08481C08480564002950530011730089
6244530096372501 GS0861 14031807662NFT16056110620631MC08532C08560966001950560011730089
6246440269072501 GS0861 14092146662NFT16124707600122MC08491C08491257002950730011730089
624672437927701CSGS1301 16042511862NFT16044710611021MC08501C08500962002960400011730089
624872238777701CSGS1301 16042511862NFT16065507601225MC05521C05520562002960300011730089
7250632284170840 GS1301114021751172NFT16035606630732MC08601C08600667002EC911 423280201
6256220553077010 GS1301 16022359662NFT16075409610220MA01412004611267002950700011730089
7257905973377010SAD000000C002770072NFT16124210580719MC08421C08421161001PA111 423280201
7246070055872510 GS086115042175772 N F T 16064201640813 MC14421C14420267002PE511 4232 802 01
7239030750372501SGS086116042511872NFT16016301631229MC05533C05560805001 PF 111 4232 802 01

APPENDIX B

THE EXECUTIVE INVENTORY RECORD

This appendix has two sections. Section one includes a blank copy of the Executive Inventory Record.¹ Section two includes a blank copy of the questionnaire designed by the author for the purpose of manually copying the relevant data from the record.

¹U. S. Civil Service Commission, Bureau of Executive Manpower, Executive Assignment System, see note 13, Chapter I.

APPENDIX B

Section 1

Executive Inventory Record

UNITED STATES CIVIL SERVICE COMMISSION
BUREAU OF EXECUTIVE MANPOWER
WASHINGTON, D.C. 20415

(cc 1-6) No 154766

EXECUTIVE INVENTORY RECORD

0	CSC USE—		
1	DATE OF RECORD		

PART I.—IDENTIFICATION (To be completed by the Personnel Office)

1. Name (last name first) (cc 13-36)		Put number in box 1—Mr, 2—Mrs, 3—Miss (cc 39)		2a. Home address—number and street (cc 40-53)	
2b. Home address—city (cc 9-24)		c. State or country (cc 25-39)		d. ZIP Code (cc 40-41)	
3. Social Security Number (cc 45-53)		4. Place of birth (State) (cc 54-63)		5. Birth date (cc 64-71)	
6. U.S. Citizen? (Put number in box) 1—Yes 2—No (cc 72)		7. Service Computation Date (Leave) (cc 73-78)		8. Submitting Office No. (cc 9-13)	
9a. Duty station—city (cc 14-23)		b. State or country (cc 30-44)		c. Duty station location code (cc 45-53)	
10. Agency Code (cc 54-57)		11. Pay system (Put number in box) 1—GS 2—AEC 3—NASA excepted 4—P.L. 313 5—PFS 6—TVA 7—VA (DM&S) 8—Other (cc 58)		12. Present GS series, if any (cc 59-62)	
13. Annual salary (Round salary to nearest \$1,000, and enter first two digits in box.) (cc 63-64)		14. Status of present position (Put number in box) 1—Competitive 2—Excepted, Schedule A 3—Excepted, Schedule B 4—Excepted, Schedule C 5—Other (cc 65)		15. Personal career status (Put number in box) 1—Career or Career-Conditional, Competitive Service 2—Career or Career-Conditional, Other Fed. Pers. System 3—Other (cc 66)	
16. Present grade (Put numbers in box) 01—GS 14 or below 02—GS 15 03—GS 15 equivalent 04—GS 16 05—GS 16 equivalent 06—GS 17 07—GS 17 equivalent 08—GS 18 09—GS 18 equivalent 10—Executive level (cc 67-69)		11. Special authority not reportable as GS-equivalent (cc 67-69)		17. CSC Certificate No. (cc 69-73)	
18. Veteran Preference (Put number in box) 1—None 2—5-Point 3—10-Point Disability 4—10-Point Compensable 5—10-Point Other (cc 74)					

PART II.—WORK EXPERIENCE (To be completed by executive)

The information provided below will be retained in the record and furnished to prospective employers in exactly the form in which you furnish it.

In describing your work experience, account for at least the last 15 years (if some blocks of experience during that period were at a low level of responsibility, you may summarize them briefly). You need not include positions held more than 15 years ago, unless you believe that these jobs contribute information about your abilities not apparent from your more recent employment. BEGIN WITH YOUR MOST RECENT POSITION. DESCRIBE ALL YOUR REGULAR FULL-TIME EMPLOYMENT FIRST; THEN, IF YOU HAVE HAD SIGNIFICANT PART-TIME EMPLOYMENT, SPECIAL ASSIGNMENTS, OR DETAILS, DESCRIBE THESE. In describing each position or assignment, indicate:

- (1) The dates during which the position was held.
- (2) Grade, rank, or salary at the beginning and the end of the position. If the position was in the General Schedule of the Federal service, enter the grade after "GS." If it was in another formal ranked system, enter the system and the rank (e.g., FSO-5, AF-06) in the space on the second line. Otherwise give annual salary to the nearest \$1,000. (Salary may be omitted for self-employment, for part-time work, or for special assignments.) Enter GS-grade, or rank, or salary, but not all three.
- (3) Whether the position was regular full-time or special, according to the categories provided.
- (4) The employing organization (abbreviate if necessary). If self-employed, so indicate. For Federal employment enter which executive department or independent agency (for Army, Navy, or AF, enter these, not DoD).
- (5) Major organizational subdivision, if any (e.g., service, office, bureau,

administration; or division or subsidiary of a company). (Abbreviate if necessary.)

- (6) State (or country) where principally employed (abbreviate if necessary).
- (7) The name, title, and (if known) current address—home or office—and phone number—including Area Code, if known—of your immediate superior in the position. (If you have had multiple superiors in any position, list the one you believe would have the best knowledge of your capabilities; or you may list more than one superior, if you prefer.)
- (8) The organizational or working title of the position (abbreviate if necessary).
- (9) The basic nature, responsibilities, and duties of the position, along with the most important knowledges required and their extent and nature (e.g., broad general knowledge of accounting procedures, or detailed expert knowledge of plant pathology); and the most important skills and abilities required (e.g., ability to negotiate with groups opposed to your viewpoint, or ability to organize large masses of numerical data into meaningful relationships).

USE ONLY THE SPACE PROVIDED FOR EACH POSITION

Then, in the block numbered 10, below the narrative section, describe each position in terms of the codes on the attached code sheets. This information may be used in searching the inventory for people with appropriate experience background for a particular position and should therefore be as representative as possible of the true nature of the position being described.

If, after you have finished describing each block of experience, you feel that some occupational or functional areas in which you are competent have not been represented in the coded information for any position, use the space at the top of page 6 for entering the supplementary information.

Name (last name first—enter as in PART I, Item 1)				Social Security Number			
---	--	--	--	------------------------	--	--	--

A	1. Dates (Month/Year)	2. Grade, Rank, or Salary	3. Position is: (Put number in box.)		
1	(cc 9-12)	(cc 13-16)	Start (cc 17-22)	Present (cc 23-28)	1—Full-time 2—Part-time (approximately hours/week on the average) 3—Special assignment or detail (cc 29) 4—Special consultant to a company, foreign country, or other organization ☐
9	FROM	TO	GS-	GS-	
	P R E S		\$,000	\$,000	
4. Employing organization (cc 30-52)					
5. Major organizational subdivision (cc 53-75)					
CSC Use (cc 76-79)					
6. Location of employment					
7. Name and title, and current address and phone (if known), of immediate superior					
2					
8. Title of your position (cc 9-53)					
0					
9a. Basic nature, responsibilities, and duties; b. Knowledge, skills, and abilities required.					

2	10. Occupational codes (When entering 2 or 3 separate codes, enter the second code in block B and the third in block C. The two shaded spaces under "Sub-codes" are for Medical Officers and Attorneys only.)					(cc 53-56) Job Function	(57-58) Org. Type	(59-60) Act. Area		
1	(cc 9-16)	Sub-codes	(cc 17-24)	Sub-codes	(cc 29-36)	Sub-codes	D.	E.	F.	G.
	A.		B.		C.					

B	1. Dates (Month/Year)	2. Grade, Rank, or Salary	3. Position was: (Put number in box.)		
2	(cc 9-12)	(cc 13-16)	Start (cc 17-22)	Final (cc 23-28)	1—Full-time 2—Part-time (approximately hours/week on the average) 3—Special assignment or detail 4—Special consultant to a company, foreign country, or other organization (cc 29) ☐
2	FROM	TO	GS-	GS-	
			\$,000	\$,000	
4. Employing organization (cc 30-52)					
5. Major organizational subdivision (cc 53-75)					
CSC Use (cc 76-79)					
6. Location of employment					
7. Name and title, and current address and phone (if known), of immediate superior					
2					
8. Title of your position (cc 9-53)					
3					
9a. Basic nature, responsibilities, and duties; b. Knowledge, skills, and abilities required.					

2	10. Occupational codes (When entering 2 or 3 separate codes, enter the second code in block B and the third in block C. The two shaded spaces under "Sub-codes" are for Medical Officers and Attorneys only.)					(cc 53-56) Job Function	(57-58) Org. Type	(59-60) Act. Area		
4	(cc 9-16)	Sub-codes	(cc 17-24)	Sub-codes	(cc 29-36)	Sub-codes	D.	E.	F.	G.
	A.		B.		C.					

C	1. Dates (Month/Year)		2. Grade, Rank, or Salary		3. Position was: (Put number in box.)											
2	(cc 9-12)	(cc 13-16)	Start (cc 17-22)	Final (cc 23-28)	1—Full-time 2—Part-time (approximately hours/week on the average) 3—Special assignment or detail (cc 29) 4—Special consultant to a company, foreign country, or other organization ☐											
5	FROM	TO	GS—	GS—												
			\$,000	\$,000												
4. Employing organization (cc 30-52)					5. Major organizational subdivision (cc 53-75)											
CSC Use (cc 76-79)		6. Location of employment		7. Name and title, and current address and phone (if known), of immediate superior												
8. Title of your position (cc 9-53)																
9a. Basic nature, responsibilities, and duties; b. Knowledges, skills, and abilities required.																
2	10. Occupational codes (When entering 2 or 3 separate codes, enter the second code in block B and the third in block C. The two shaded spaces under "Sub-codes" are for Medical Officers and Attorneys only.)										(cc 53-56) Job Function	(57-58) Org. Type	(59-60) Act. Area			
7	(cc 9-16)		Sub-codes		(cc 17-24)		Sub-codes		(cc 29-36)		Sub-codes		D.	E.	F.	G.
	A.				B.				C.							
D	1. Dates (Month/Year)		2. Grade, Rank, or Salary		3. Position was: (Put number in box.)											
2	(cc 9-12)	(cc 13-16)	Start (cc 17-22)	Final (cc 23-28)	1—Full-time 2—Part-time (approximately hours/week on the average) 3—Special assignment or detail 4—Special consultant to a company, foreign country, or other organization (cc 29) ☐											
8	FROM	TO	GS—	GS—												
			\$,000	\$,000												
4. Employing organization (cc 30-52)					5. Major organizational subdivision (cc 53-75)											
CSC Use (cc 76-79)		6. Location of employment		7. Name and title, and current address and phone (if known), of immediate superior												
8. Title of your position (cc 9-53)																
9a. Basic nature, responsibilities, and duties; b. Knowledges, skills, and abilities required.																
3	10. Occupational codes (When entering 2 or 3 separate codes, enter the second code in block B and the third in block C. The two shaded spaces under "Sub-codes" are for Medical Officers and Attorneys only.)										(cc 53-56) Job Function	(57-58) Org. Type	(59-60) Act. Area			
0	(cc 9-16)		Sub-codes		(cc 17-24)		Sub-codes		(cc 29-36)		Sub-codes		D.	E.	F.	G.
	A.				B.				C.							

E		1. Dates (Month/Year)		2. Grade, Rank, or Salary		3. Position was: (Put number in box.)													
3		(cc 9-12)		(cc 13-16)		Start (cc 17-22)		Final (cc 23-28)		1—Full-time									
1		FROM		TO		GS-		GS-		2—Part-time (approximately hours/week on the average)									
										3—Special assignment or detail (cc 29)									
						\$,000		\$,000		4—Special consultant to a company, foreign country, or other organization ☐									
4. Employing organization (cc 30-52)										5. Major organizational subdivision (cc 53-75)									
CSC Use (cc 76-79)		6. Location of employment				7. Name and title, and current address and phone (if known), of immediate superior													
3		8. Title of your position (cc 9-53)																	
2																			
9a. Basic nature, responsibilities, and duties; b. Knowledge, skills, and abilities required.																			
3												(cc 53-56)		(57-58)		59-60			
10. Occupational codes (When entering 2 or 3 separate codes, enter the second code in block B and the third in block C. The two shaded spaces under "Sub-codes" are for Medical Officers and Attorneys only.)												Job Function		Org. Type		Act. Area			
3												D.		E.		F.		G.	
A.		(cc 9-16)		Sub-codes		B.		(cc 17-24)		Sub-codes		C.		(cc 29-36)		Sub-codes			
F		1. Dates (Month/Year)		2. Grade, Rank, or Salary		3. Position was: (Put number in box.)													
3		(cc 9-12)		(cc 13-16)		(cc 17-22)		(cc 23-28)		1—Full-time									
4		FROM		TO		GS-		GS-		2—Part-time (approximately hours/week on the average)									
										3—Special assignment or detail									
						\$,000		\$,000		4—Special consultant to a company, foreign country, or other organization (cc 29) ☐									
4. Employing organization (cc 30-52)										5. Major organizational subdivision (cc 53-75)									
CSC Use (cc 76-79)		6. Location of employment				7. Name and title, and current address and phone (if known), of immediate superior													
3		8. Title of your position (cc 9-53)																	
5																			
9a. Basic nature, responsibilities, and duties; b. Knowledge, skills, and abilities required.																			
3												(cc 53-56)		(57-58)		59-60			
10. Occupational codes (When entering 2 or 3 separate codes, enter the second code in block B and the third in block C. The two shaded spaces under "Sub-codes" are for Medical Officers and Attorneys only.)												Job Function		Org. Type		Act. Area			
6												D.		E.		F.		G.	
A.		(cc 9-16)		Sub-codes		B.		(cc 17-24)		Sub-codes		C.		(cc 29-36)		Sub-codes			

G	1. Dates (Month/Year)		2. Grade, Rank, or Salary		3. Position was: (Put number in box.)																																																																									
3	(cc 9-12)		(cc 13-16)		Start (cc 17-22)		Final (cc 23-28)		1—Full-time 2—Part-time (approximately hours/week on the average) 3—Special assignment or detail (cc 29) 4—Special consultant to a company, foreign country, or other organization ☐																																																																					
7	FROM		TO		GS—		GS—																																																																							
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4. Employing organization (cc 30-52)					5. Major organizational subdivision (cc 53-75)																																																																									
CSC Use (cc 76-79)					6. Location of employment					7. Name and title, and current address and phone (if known), of immediate superior																																																																				
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="4">(cc 9-16)</td> <td colspan="4">Sub-codes</td> <td colspan="4">(cc 17-24)</td> <td colspan="4">Sub-codes</td> <td colspan="4">(cc 29-36)</td> <td colspan="4">Sub-codes</td> <td colspan="2">(cc 53-56) Job Function</td> <td colspan="2">(57-58) Org. Type</td> <td colspan="2">(59-60) Act. Area</td> </tr> <tr> <td colspan="4">A.</td> <td colspan="4"></td> <td colspan="4">B.</td> <td colspan="4"></td> <td colspan="4">C.</td> <td colspan="4"></td> <td colspan="2">D.</td> <td colspan="2">E.</td> <td colspan="2">F.</td> <td colspan="2">G.</td> </tr> </table>																	(cc 9-16)				Sub-codes				(cc 17-24)				Sub-codes				(cc 29-36)				Sub-codes				(cc 53-56) Job Function		(57-58) Org. Type		(59-60) Act. Area		A.								B.								C.								D.		E.		F.		G.	
(cc 9-16)				Sub-codes				(cc 17-24)				Sub-codes				(cc 29-36)				Sub-codes				(cc 53-56) Job Function		(57-58) Org. Type		(59-60) Act. Area																																																		
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H	1. Dates (Month/Year)		2. Grade, Rank, or Salary		3. Position was: (Put number in box.)																																																																									
4	(cc 9-12)		(cc 13-16)		Start (cc 17-22)		Final (cc 23-28)		1—Full-time 2—Part-time (approximately hours/week on the average) 3—Special assignment or detail 4—Special consultant to a company, foreign country, or other organization (cc 29)																																																																					
0	FROM		TO		GS—		GS—																																																																							
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A.								B.								C.								D.		E.		F.		G.																																																

If there are additional positions you wish to describe, continuation sheets can be obtained from your Personnel Office.

0 Use blocks A through D below to enter any additional Occupational Codes representing areas of competence not covered in the positions described above.

4

(cc 9-16)		Sub-codes		(cc 17-24)		Sub-codes		(cc 25-32)		Sub-codes		(cc 33-40)		Sub-codes	
A.				B.				C.				D.			

Use blocks E through H below to enter any Job Function Codes describing types of responsibility or roles which you would be interested in and which you have not been able to represent in the positions described above.

E.		cc 41 42	F.		cc 43 44	G.		cc 45 46	H.		cc 47 48
----	--	----------------	----	--	----------------	----	--	----------------	----	--	----------------

PART III.—EDUCATION (To be completed by executive)

1. Education (Put in box the number of the single highest level attained. Consider multiple degrees at any level as the same as a single degree at that level. Multiple degrees are shown in item 3, below.)

- | | |
|--|---|
| 01—Did not graduate from high school | 06—Have Bachelor's or equivalent degree (include LL.B. with no prior college) |
| 02—Have high school diploma or official equivalent | 07—Have some graduate work |
| 03—Completed high school and an additional non-college course (e.g., business school, trade apprenticeship, registered nurses' training) | 08—Have Master's degree or law degree (with prior college) |
| 04—Took some college-level courses | 09—Have doctoral-level graduate work beyond the Master's |
| 05—Have an AA degree or equivalent of at least 2 years of college-level work | 10—Have an earned Doctorate |

(cc 49-50)

(cc 51-52)

2. Of how many college scholastic honor societies have you been a member? (Example: If your answer is two, enter "02"; if none, enter "00".)

3. For college graduates only, list below all earned degrees received at the Bachelor level or above. Enter certificate or diploma from foreign universities in item 4 below. Enter only one degree on a line. For each degree enter:

- | | |
|---|--|
| (a) Degree (e.g., BA, Ph D) | (d) Whether degree granted with honors (use following code): |
| (b) Year granted (last 2 digits) | 1—No honors |
| (c) Coded Major or Majors (count as Majors any area in which you had a course load approximating a Major. List no more than two Majors per degree. See code sheets for codes) | 2—Cum Laude or equivalent |
| | 3—Magna or Summa Cum Laude or equivalent |
| | 4—Graduate degree with distinction |
| | (e) Institution granting degree (abbreviate where necessary) |

Card 0 5 0 6 0 7 0 8 0 9	(cc 9-14) (a) Type Degree	CSC USE cc 15	(cc 17-18) (b) Year	(cc 21-24) (c) Majors	(cc 25) (d) Honors	(cc 29-47) (e) Name of Institution
			19			
			19			
			19			
			19			
			19			
			19			

4. If you have had significant education for which a degree at the bachelor level or above was not awarded, list it below. For each such block of education enter:

- | | |
|--|---|
| (a) Level (use following code): | (d) Number of academic years, to the nearest year (consider 30 semester hours or 45 quarter hours as about one academic year) |
| 1—Non-college | (e) Degree, diploma, or certificate, if any (abbreviate where necessary) |
| 2—Undergraduate college | (f) Name of institution attended (abbreviate where necessary) |
| 3—Graduate college or professional school | |
| (b) Year last attended (last two digits only) | |
| (c) Coded Majors or areas of concentration (enter no more than two Majors per block of education. See code sheets for codes) | |

Card 1 0 1 1 2 1 3 1 4	(cc 9) (a) Level	(cc 13-14) (b) Year last At.	(cc 17-20) (c) Majors	(cc 21) (d) No. Ac. Years	(cc 25-36) (e) Degree or Certificate	(cc 37-55) (f) Name of Institution
		19				
		19				
		19				
		19				
		19				
		19				

PART IV.—PROFESSIONAL ACTIVITIES, HONORS, AND SPECIAL QUALIFICATIONS (To be completed by executive)

1. Enter a "1" in the box for each of the following which currently applies to you. Indicate the jurisdictions involved (usually a State). (Omit those that do not apply.)			
Jurisdictions		Jurisdictions	
Member of Bar.....	cc 9	Licensed to Practice Medicine.....	cc 12
Admitted to practice before major courts.....	10	Other Professional License or Certification.....	14
Certified Public Accountant.....	11	(Specify below)	
Registered Professional Engineer.....	12		

2. List major professional groups or societies of which you are a member. (Indicate any in which you are a fellow or from which you hold a diploma.)

3. How many times in the past 10 years have you been elected or appointed to an office in a professional society? (Example: If two times, enter "02"; if none, enter "00"). (cc 16-17)

4. How many times in the past 10 years have you been elected or appointed to an office in civic or other groups not related to your work? (Example: If two times, enter "02"; if none, enter "00"). (cc 18-19)

5(a) How many patents do you hold? (Example: If two, enter "02"; if none, enter "00"). (cc 20-21)

(b) Year of most recent patent (omit if none) 19 22-23

6(a) How many books have you had published? (Example: If one, enter "01"; if none, enter "00"). (cc 24-25)

(b) Year of most recent book (omit if none) 19 26-27

7(a) How many pamphlets, articles, and papers in your field have you had published? (Include single chapters in books. Put number in box.)

1—None 2—One or two 3—Three to ten 4—Eleven to twenty 5—More than twenty

(b) Year of most recent pamphlet, article, or paper (omit if none) 19 28-30

8(a) Of how many published books or monographs have you been a principal editor? (Example: If three, enter "03"; if none, enter "00"). (cc 31-32)

(b) Year of most recent such publication (omit if none) 19 33-34

9. In the last 10 years have you served as editor or associate editor of a professional journal? (Put number in box.) 1—No 2—Yes (cc 35)

10. Have you ever been employed outside of the U.S. for a period of several months or more? (Put number in boxes.) 1—No 2—Yes (a) In a civilian capacity? (cc 36)

(b) In a military capacity? (cc 37)

11. Have you ever operated your own business or firm for a period of a year or longer? (Put number in box.) 1—No 2—Yes (cc 38)

12. Which, if any, of these activities have you done successfully? (Enter a "1" in the box for each that applies; omit those that do not apply.)

Managed a research or development program.....	cc 39	Dealt extensively with representatives of foreign countries.....	cc 41
Dealt extensively with the legislative branch of the Federal government.....	40	Dealt extensively with representatives of industry or other non-governmental organizations.....	45
Managed a grant-in-aid program.....	41	Established a new program or organization.....	46
Dealt extensively with State and local authorities.....	42	Managed a geographically dispersed organization.....	47
Managed a regulatory function.....	43		

13. In which of these areas, if any, do you feel you have ability or skill well above that of the typical person in your general type and level of work? (For each area that applies, enter a "1". Omission implies probable good ability but not an outstanding skill.)

Ability to speak before large groups.....	cc 48	Ability to prepare written materials in a non-institutional style.....	cc 51
Ability to handle impromptu question-and-answer sessions.....	49	Ability to negotiate with groups or individuals essentially opposed to your viewpoint.....	52
Ability to recruit staff and evaluate people.....	50		

14. During the last 5 years have you had faculty status in a college or university? (Put number in box.)

1—No 2—Yes, at the undergraduate level only 3—Yes, at the graduate level only 4—Yes, at both graduate and undergraduate levels (cc 53)

15. For each of these activities in which you engaged on a part-time basis during the last 5 years, enter a "1" in the box. (Omit those which do not apply. Consider such activities in both colleges and other institutions giving college-level instruction.)

Teach an undergraduate college course.....	cc 54	Supervise the work of a candidate for a research doctorate.....	cc 55
Teach a graduate-level college course.....	55	Serve as guest lecturer in an undergraduate or graduate college course.....	57

16. In how many executive departments or independent agencies have you been regularly employed in a civilian capacity at a level of responsibility equivalent to GS-13 or above? (Do not count jobs in different major subdivisions of one department. Example: If five, enter "05." If none, enter "00.")	cc 9-10										
17. In how many executive departments or independent agencies have you been regularly employed in a civilian capacity during your entire Federal service? (Do not count jobs in different major subdivisions of one department. Example: If five, enter "05." If none, enter "00.")	cc 11-12										
18. In the last 10 years, how many awards have you received from organizations in which you have been employed? (Include such awards as those recognizing meritorious service and those for significant suggestions. Example: If 2, enter "02." If none, enter "00.")	cc 13-14										
19. In the last 15 years, how many awards have you received from organizations other than those in which you have been employed? (E.g., civic or professional groups, government-wide awards, honorary degrees. Example: If 2, enter "02." If none, enter "00.")	cc 15-16										
20. List significant honors, commendations, and awards you have received. (Include such awards as those recognizing meritorious service or achievement. Also give college honors. Give approximate year in which award was made.)											
21. In how many significant training programs (held under Government or other auspices) have you participated as a speaker, discussion leader, or lecturer during the last 2 years? (Put number in box.)											
1—None 2—One or two 3—Three to five 4—Six to ten 5—More than ten.											
22. List major training courses or programs to which you have been sent and the year (approximate) in which you attended.											
CSC Use cc 18											
23. In approximate terms, what is the largest number of employees you have had under your direct or indirect supervision in any position you have held? (Put number in box.)											
1—None 2—One to eight 3—Nine to nineteen 4—Twenty to forty-nine 5—Fifty to one hundred ninety-nine 6—Two hundred to five hundred 7—More than five hundred											
24. In any position you have held, have you had close working associations (in any capacity) with individuals in any of the following occupational areas? (Enter "1" in the box for each that applies. (Omit those that are not applicable.)											
Trades personnel	cc 20	Physicians	cc 22	Educators	cc 24						
Scientists or engineers	cc 21	Lawyers	cc 23	Professionals other than those listed	cc 25						
25. Below are listed a number of foreign areas or countries. Mark ALL the countries in which you have special knowledge, either of the country (area) as a whole, or of some aspect of the country (area) related to your own field. Use the following code: 1—Expert knowledge 2—Very good knowledge, but not expert. (Omit if less than very good knowledge.)											
Britain	cc 26	USSR	cc 33	Near Eastern country(s)	cc 39	Other Central or South American country(s)	cc 46				
France	cc 27	China (Mainland and/or Nationalist)	cc 34	North African country(s)	cc 40	Other country or area (Specify below)	cc 47				
Italy	cc 28	Japan	cc 35	Other African country(s)	cc 41		cc 48				
Germany	cc 29	Southeast Asian country(s)	cc 36	Cuba	cc 42						
Scandinavian country(s)	cc 30	Pakistan	cc 37	Mexico	cc 43						
Poland	cc 31	India	cc 38	Brazil	cc 44						
Yugoslavia	cc 32			Panama	cc 45						
26. Describe your facility in each of the languages listed, using the code below. Enter the number that reflects your highest level of skill. (Make no entry for a language in which you have little or no skill.)											
Speaking Ability				Speak Read				Speak Read			
1—Meets routine travel or courtesy needs.				cc cc				cc cc			
2—Meets limited social and office demands.											
3—To engage quite freely in conversation and discussion.											
4—Nearly as fluent as a well-educated native.											
Reading Ability											
1—To get the gist of newspaper articles and similar material.											
2—To read newspaper and similar material easily (or technical writing in my field).											
3—To understand readily more difficult written material.											
4—To read all sorts of material nearly as well as a well-educated native											
French	cc 49	cc 50	Arabic	cc 67	cc 68						
Italian	cc 51	cc 52	Japanese	cc 69	cc 70						
Portuguese	cc 53	cc 54	Chinese language(s)	cc 71	cc 72						
Spanish	cc 55	cc 56	Southeast Asian language(s)	cc 73	cc 74						
German	cc 57	cc 58	African language(s)	cc 75	cc 76						
Russian	cc 59	cc 60	Other (Specify)	cc 77	cc 78						
Polish	cc 61	cc 62	Other (Specify)	cc 79	cc 80						
Greek	cc 63	cc 64									
Hebrew	cc 65	cc 66									

PART V.—REFERENCES AND ADDITIONAL COMMENTS (To be completed by executive)

1. In addition to the superiors named in PART II, list three persons who have a good knowledge of your abilities.

Name, and Position or Title	Address, including ZIP Code (if known)	Telephone (if known)	
		Area Code	

2. Use this space to make any additional comments, or to describe any qualifications you feel have not been covered adequately above. (For example, describe unusually significant contributions, achievements, or accomplishments. List significant publications. Executives in medical occupations should list post-graduate training not shown elsewhere. Brief assignments as delegates to meetings and the like which are not shown in Part II should be described here. Include outside activities which may demonstrate work-relevant skills, abilities, or experience.)

PART VI.—PERSONAL PREFERENCES AND OTHER INFORMATION RELEVANT TO ASSIGNMENT (To be completed by executive)

This part is designed to give you an opportunity to express your own preferences in respect to referral for assignment. Accordingly, if you prefer not to answer questions 1 through 6, you may omit them. This section, as well as other parts of the form, will be updated annually—or you may submit changes at any time if your circumstances change.

1. How do you feel about changing job, work role, or field? (Put number in box.)
 1—Would very much prefer not to change at this time. 3—Would welcome the opportunity.
 2—Would consider changing depending on the job. (cc 9)
2. List those departments or independent agencies, if any, besides your present one in which you are particularly interested. (No more than three.)
 CSC Use (cc 22)
 (10-13)
 (14-17)
 (18-21)
3. Describe any occupational, program, or functional areas besides your present ones, in which you would be particularly interested in working.
4. How do you feel at present about changing geographic location? (Put number in box.)
 1—Would be very reluctant. 2—Would consider changing depending on the job. 3—Would welcome a change (cc 22)
5. Do you have any disability which you would like to have considered in referring you for assignment? What limitations would you like to have observed?
6. Are there any disabilities among members of your family which you would like to have considered in referring you for assignment? What limitations would you like to have observed?

PART VII.—GENERAL INFORMATION (To be completed by executive)

The material in this part will be used ONLY IN MAKING STATISTICAL ANALYSES OF CAREER PATTERNS OF FEDERAL EXECUTIVES AS A GROUP to provide information for planning such programs as recruitment and career development. It will NOT be sent to agencies filling vacancies.

1. In which one of the following types of organization did you begin your working career? (Do not count summer jobs or jobs held temporarily to permit further school attendance. Put number of best answer in box.)
 01—Business or industry 07—Executive branch of the Federal government
 02—Professional (e.g., law firm, medical practice) 08—Legislative branch of the Federal government
 03—College or university 09—Judicial branch of the Federal government
 04—Public school system 10—Non-profit (e.g., foundation, labor union, charity)
 05—State government 11—Other
 06—Local government (cc 23-24)
2. What State was your legal or voting residence at the time of your first appointment to a full-time Federal position? (Abbreviate) (If foreign country, enter "OUTSIDE US")
 State (cc 25-34) (cc 35-36)
 CSC Use
3. In what year and at what GS grade or approximate equivalent did you first enter the Federal civilian service, executive branch?
 (First permanent-type position. Example for grade: If entry was CAF-5, P-1, or GS-05, enter "05.")
 Year—19 GS Grade— (cc 37-38, 39-40)
4. What is the highest educational level you had attained at the time you first entered the Federal civilian service—executive branch? (First permanent-type position. Consider multiple degrees at any level as the same as a single degree at that level. Put numbers of answer in box.)
 01—Had not graduated from high school 06—Had Bachelor's or equivalent degree (include LL.B. with no prior college)
 02—Had high school diploma or official equivalent 07—Had some graduate work
 03—Had completed high school and additional non-college course (e.g., business school, trade apprenticeship, registered nurses' training) 08—Had Master's degree or law degree (with prior college)
 04—Had taken some college-level courses 09—Had doctoral-level graduate work beyond the Master's
 05—Had an AA degree or equivalent of at least 2 years of college-level work 10—Had an earned Doctorate (cc 41-42)
5. Why did you enter the Federal service? (Put in the box the number of the single statement which BEST describes your reason.)
 1—Someone in my family worked for the Government and I followed in his footsteps. 6—I felt I could be useful in an emergency situation or in accomplishing a specific mission.
 2—The idea of working where the important decisions of the day were made appealed to me. 7—I wanted to obtain expertise in Federal procedures for use after leaving Government.
 3—It was the best offer I had in terms of location, pay, advancement, and benefits. 8—It offered the best opportunity for pursuing my chosen occupational field.
 4—I was offered an interesting, challenging assignment. 9—Other.
 5—I was motivated toward public service. (cc 43)

1 6. What were your intentions as to a Federal career when you first entered the Government? (Put in the box the number of the statement which BEST describes what your intentions were.)

1—I expected to stay a year or so and then obtain, or return to, a position outside the Government. 4—I expected to stay a few years to pick up expertise in Federal procedures that would be useful after I left.

2—I expected to stay a year or so and then obtain further education. 5—I expected to make a career of Federal service.

3—I expected to stay only for the duration of an emergency or the completion of a mission. 6—I had no definite intentions one way or another.

(cc 9) ☐

7. How did you enter the Federal civilian service (first permanent-type position)? (Put number in box.)

1—Through the Junior Management Assistant or Management Intern Examination (cc 10) ☐

2—Through the Junior Professional Assistant or Federal Service Entrance Examination

3—Through the Federal Administrative and Management Examination (FAME)

4—Through some other competitive examination (includes filing an application to be rated)

5—Other

8. How many years have you worked for the Federal Government, to the nearest year? (Exclude military service. Example: If your answer is 8 years, enter "08"; if less than 6 months, enter "00.") (cc 11-12) ☐

9. How many years have you worked in your present department or independent agency, to the nearest year? (If your agency service included an extended period of active military service, exclude this from your answer. Example: If your answer is 5 years, enter "05"; if less than 6 months, enter "00.") (cc 13-14) ☐

10. Approximately how many years of active military service have you had? (Example: If about 5 years, enter "05"; if less than 6 months, enter "00.") (cc 15-16) ☐

11. Military reserve status. (Put number of correct answer in box.) (cc 17) ☐

1—None 2—Standby 3—Ready 4—Retired

12. How many times have you left Federal civilian employment to accept employment with another employer? (Do not count military service as an interruption. Example: If twice, enter "02"; if never, enter "00.") (cc 18-19) ☐

13. In the Federal civilian service, approximately how many years, to the nearest year, have you spent in each of the following grades or equivalents? (If no experience at a grade, leave blank; enter "0" for less than 1 year; and "9" for 9 or more years; for 1 to 8 years, enter actual number.)

(cc 20)	(cc 21)	(cc 22)	(cc 23)	(cc 24)	(cc 25)	(cc 26)	(cc 27)
GS-11 ☐	GS-12 ☐	GS-13 ☐	GS-14 ☐	GS-15 ☐	GS-16 ☐	GS-17 ☐	GS-18 ☐

14. How many times have you changed jobs in the last 5 years? (Do not consider reclassification or organizational reorganization as a change in job unless there was a major shift in duties or responsibilities. Put number in box.) (cc 28) ☐

0—Never 1—Once 2—Twice 3—Three or more times

15. Listed below are some areas in which formal training might be provided for executives. (Enter "1" for each type of training you would be interested in receiving.)

	cc		cc
Government policy and operations.....	☐ 29	Military strategy and tactics.....	☐ 38
Public administration.....	☐ 30	A particular foreign country or area.....	☐ 39
Personnel administration.....	☐ 31	Foreign language.....	☐ 40
Budgeting and fiscal management.....	☐ 32	Public speaking.....	☐ 41
Contracting and procurement.....	☐ 33	Writing.....	☐ 42
Use of data processing systems.....	☐ 34	Supervision.....	☐ 43
Political, economic, and social problems.....	☐ 35	Advanced or refresher training in my professional or technical field.....	☐ 44
Labor relations and the labor movement.....	☐ 36	Other (specify):.....	☐ 45
International relations and organizations.....	☐ 37		

QUESTIONS 16 (a) THROUGH (d) ARE TO BE ANSWERED ONLY BY THOSE NOW IN GS-16 OR ABOVE (OR EQUIVALENT).

16. At the time you were first appointed to a supergrade position (or equivalent) in your present department or independent agency:

(a) for how long consecutively had you worked in that agency immediately before your appointment? (Do not consider military service as a break in service, but exclude time spent in military service. If you were not working in the agency when appointed, leave blank; if you had been working in the agency but for less than 6 months, enter "00"; if you had worked in the agency for 6 months or more, enter the number of years, to the nearest year. Example: If about 3 years, enter "03.") (cc 46-47) ☐

(b) for how long consecutively had you been in the Federal service? (Do not consider military service as a break in service, but exclude time spent in military service. If you were not working in the Federal service when appointed, leave blank; if you had been working in the Federal service but for less than 6 months, enter "00"; if you had worked in the Federal service for 6 months or more, enter the number of years, to the nearest year. Example: If about 3 years, enter "03.") (cc 48-49) ☐

(c) where were you employed? (Put number in box.)

1—In my present agency in the same bureau (office, service, etc.) that my new position was in.

2—In my present agency in a different bureau (office, service, etc.).

3—In another Federal agency.

4—Outside the Federal service.

(cc 50) ☐

(d) how old were you (to the nearest year)? (cc 51-52) ☐

SIGNATURE (All executives: Please sign in ink)

DATE

APPENDIX B

Section 2

Questionnaire

INDEX - Coordinated with Executive Inventory Record
United States Civil Service Commission
Bureau of Executive Manpower
Washington, D. C. 20415
(Standard Form 161, April 1967, FPM Chapter 305)

PART 1. - Identification

1. Name _____
3. Social Security Number _____
4. State of Birth _____
5. Date of Birth _____
6. U.S. Citizen _____
11. Pay System _____ (code 1-8)
13. Annual Salary _____ (to nearest \$1,000)
14. Status of Present Position _____ (code 1-5)
15. Personal Career Status _____ (code 1-3)
16. Present Grade _____ (code 1-11)

PART 2. - Work Experience

1. Dates from _____ to _____
2. Grade, Rank, or Salary Start Present
3. Position _____ (Code 1-4)

4 Other Significant Education

Level	Year Last Attended	Majors	No. Ac. Years	Degree/ Certificate	Institution

PART 4. - Professional Activities, Honors, and
Special Qualifications

1. Member of Bar C.P.A. Reg. Engineer M.D. Other
2. Professional Groups or Societies
3. Past ten yrs. - elected or appointed to an office -
no. times _____
4. Past ten yrs. - elected or appointed to an office
in civic or other group not related to work -
no. of times _____
5. How many patents do you hold _____ Yr. most recent _____
6. How many books have you published _____ Yr. most recent _____
7. How many pamphlets, articles, and papers in your field have
you published _____
Code 1-5) _____ Yr. most recent _____
8. How many published books or monographs have you been
principal editor _____
Yr. most recent _____

- 9 Editor or associate editor of professional journal past
ten yrs. Yes No
10. Employed outside U.S. for several months or more
Yes No Civ. Mil.
11. Operated own business for year or more Yes No
12. Activities Success (Code 1-9)
13. Skill level above average for person in your field
(Code 1-5)
14. Faculty status during last five years (Code 1-4)
23. Largest no. of employees under direct or indirect
supervision (Code 1-7)
24. Close working relationships with people in occupational
areas (Code 1-6)

PART 5. - References and Additional Comments

2. Additional comments describing qualifications not adequately
described above

PART 6. - Personal Preferences and Other Information
Relevant to Assignment

1. Feeling about changing job, work role, field (Code 1-3)

3. Occupational, program, functional areas besides present one you would be interested in working in

4. How do you feel about changing geographic location

(Code 1-3)

PART 7. - General Information

1. In which of the following types of organization did you begin your working career

(Code 1-11)

2. State of residence at time of first full-time Fed. employment

3. What year/GS grade at time of first appointment

4. Educational level at time of first appointment

(Code 1-10)

5. Why did you enter Fed. Service

(Code 1-9)

6. Intentions in terms of Fed. career when first entered

(Code 1-6)

7. How did you enter Fed. service

8. How many years have you worked for Fed. Govt.

(Code--)

9. How many years in present department or agency

(Code--)

12. How many times have you left Fed. employment _____ (Code --)

13. How many years spent in following grades or equivalents

GS 11 GS 12 GS 13 GS 14 GS 15 GS 16 GS 17 GS 18

14. How many times have you changed jobs in last 5 yrs.

_____ (Code 0-3)

16a-d (GS 16 or above)

a - (Code ---) _____

b - (Code ---) _____

c - (Code 1-4) _____

d - age _____

APPENDIX C

CHARACTERISTICS OF THE FEDERAL EXECUTIVE

This appendix includes a study done by the Bureau of Executive Manpower. This study evaluates information from the PMIS on a sample of 22,000 Federal executives. The study provides a useful comparison to the data collected on the Apollo project managers and will be referred to where relevant to the main objectives of this research.¹

¹U.S. Civil Service Commission, Bureau of Executive Manpower, Characteristics of the Federal Executive, see note 16, Chapter I, pp. 1-15.

*Characteristics
of the
Federal Executive*

FEBRUARY 1968



**BUREAU OF EXECUTIVE MANPOWER
U.S. CIVIL SERVICE COMMISSION**

INTRODUCTION

PURPOSE

This report represents some significant characteristics of the present Federal career executive staff.

SOURCE OF INFORMATION

The facts presented were obtained from the comprehensive background information furnished by the men and women included in the newly established Executive Inventory--the computerized talent bank of the Executive Assignment System.

A PRELIMINARY ANALYSIS

The figures presented in this report are based on a preliminary analysis of the information received prior to September 15, 1967 from 22,000 executives representing 86% of the Present Inventory of approximately 26,000 individuals.

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Composition of the Inventory.....	1
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Sex.....	4
Occupational Distribution.....	5
Age Distribution by Occupation.....	6
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Educational Attainment After Entering Government Service...	8
Entrance Grade of Federal Executives.....	9
Reasons for Entering Government.....	10
Mobility	
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Attitudes Toward Changing Geographical Location..	12
Areas in which Executives Desire Training.....	13
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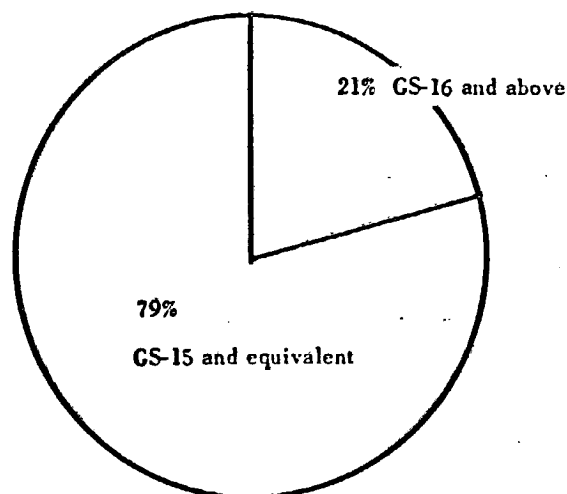
EXECUTIVE INVENTORY COVERAGE

The Executive Inventory includes the approximately 26,000 executive branch administrators, managers, scientists, physicians, and others serving in grades GS-15 through GS-18 and equivalent levels. About 79% are grade 15 or equivalent and the remaining 21% are grades GS-16, 17, 18 or equivalent.

The Executive Inventory does not include executives in the legislative and judicial branches, executives in the foreign service and foreign service reserve, hearing examiners, and others.

The thirteen largest agencies--VA, NASA, DOD, Army, Navy, AF, HEW, Treasury, Commerce, Agriculture, Transportation, Interior, and AEC account for 80% of the Inventory.

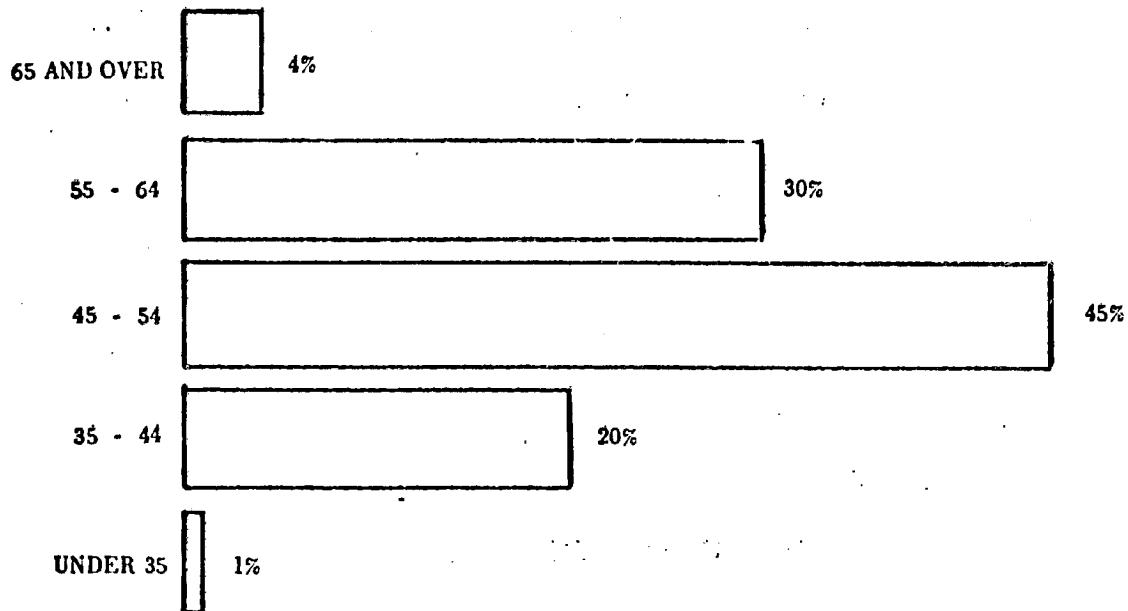
COMPOSITION OF THE INVENTORY



- ① Two thirds of the executives, GS-16 and above and equivalent, work in the Washington area.
- ① Over half of the executives in grade GS-15 and equivalent are located outside the Washington area.

BASIC CHARACTERISTICS

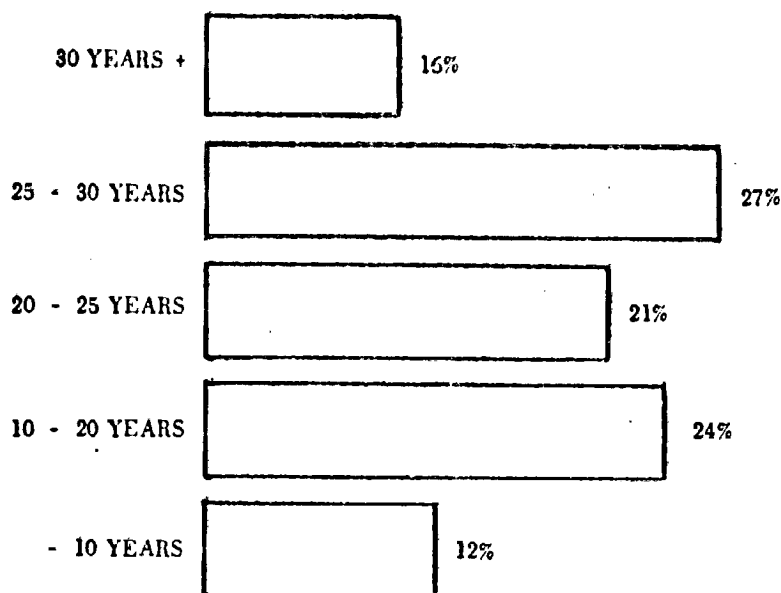
AGE



One third of the executives in the Inventory have reached the age of 55, and 4% are over 65. Fewer than 25% are under 45 years of age.

- Approximately 23% of the GS-15's and below and almost 18% of the GS-16's and above are under 45 years of age.
- About a third of each grade level group is age 55 or older, the age group in which optional retirement is possible.
- About 4% of each grade level are within 5 years of compulsory retirement age.

LENGTH OF SERVICE



Almost two-thirds of the executives have more than 20 years of Federal service.

When age and length of service are considered together, more than 11% of those in the Inventory are eligible for immediate retirement:

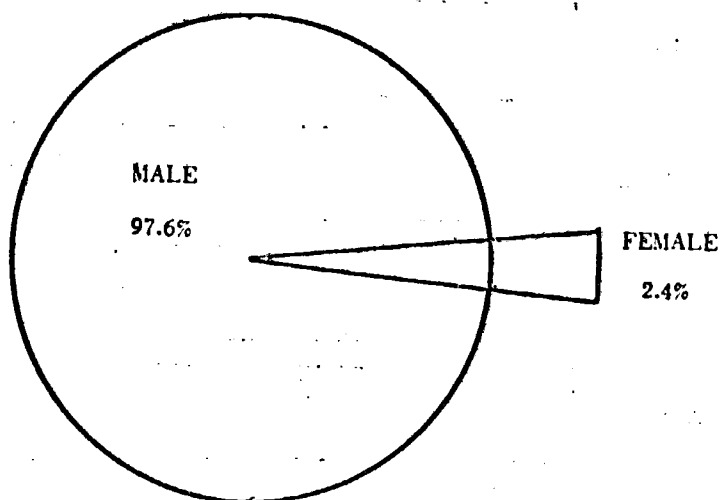
- 11% of the GS-15's
- 15% of the GS-16's and above.

Within 5 years, about a third of the present executives will be eligible for retirement or will have retired.

Age clusters vary widely between agencies. In comparing two large agencies, for example, we find that:

- One has only 13% of its present executives under age 45, and 53% over age 55.
- The other has only 10% in the over 55 group, and 45% under age 45.

SEX



The Inventory contains the record of 535 women serving at GS-15 and above.

- Over one third of the women are medical officers.
- Women represent approximately 6% of the social scientists in the Inventory (5% of the economists).
- About 5% of the top educators, doctors, and statisticians and mathematicians are women.
- Less than 1% of the top executives in accounting, engineering, and contracting are women.

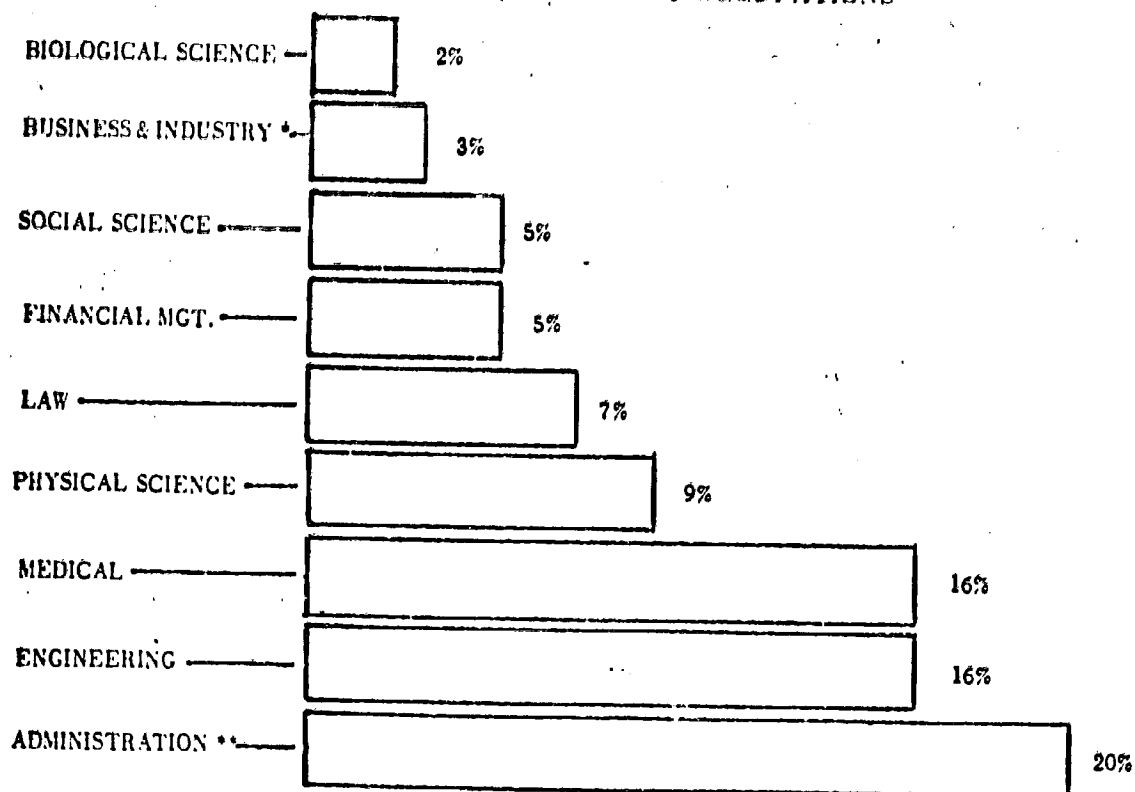
About 21% of the men and 39% of the women have entered Federal service in the last 15 years.

About 3% of the men and 7% of the women have 5 years or less of Federal service.

OCCUPATIONAL DISTRIBUTION

The diversity of Federal activities is reflected in the occupational distribution of the executives in the Inventory. There is a marked concentration of executives in nine broad fields which account for nearly 85% of the Inventory.

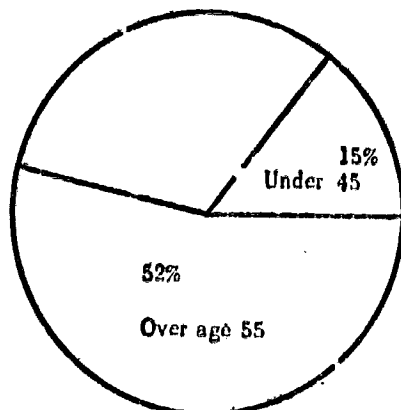
NINE LARGEST OCCUPATIONS



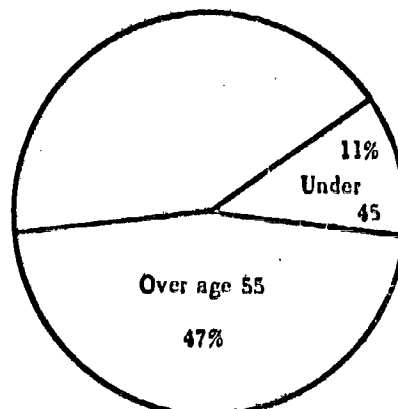
* Includes such specialties as contracting, procurement, marketing, real estate and finance.

** Includes management analysis, program management, computer systems management and general administration.

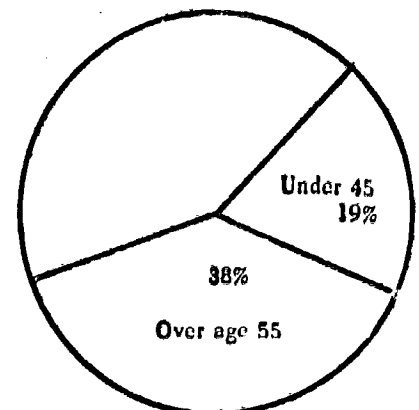
AGE DISTRIBUTION BY OCCUPATION



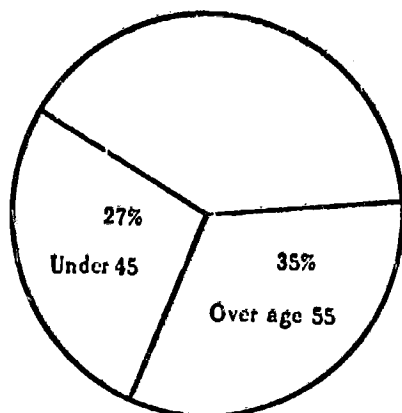
MEDICAL



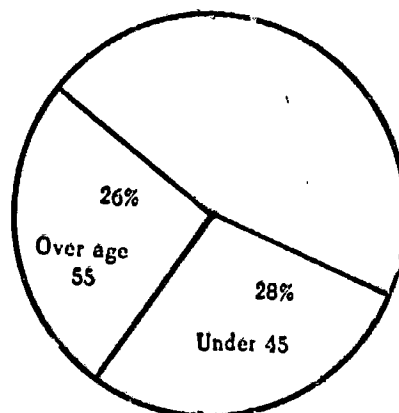
BIOLOGICAL
SCIENCE



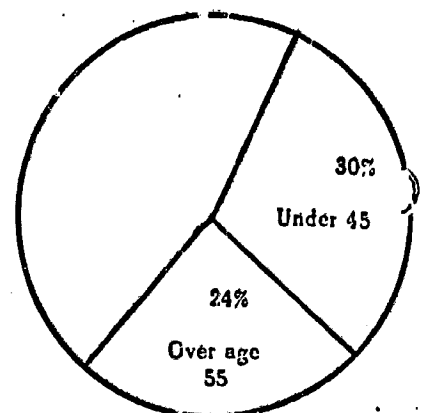
ADMINISTRATION



LAW



ENGINEERING



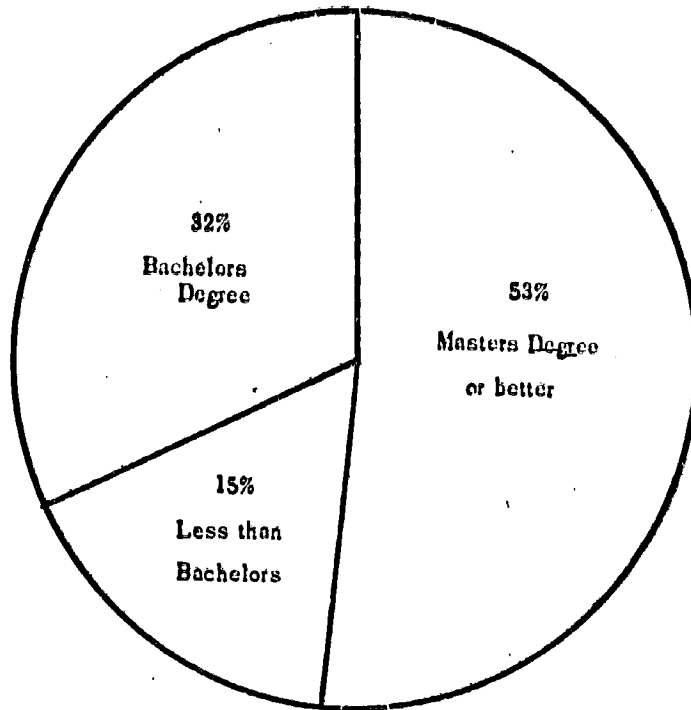
PHYSICAL
SCIENCE

• A third of all executives in the Inventory are over age 55 and just over a fifth are under 45. Executives in the biological science and medical groups tend to be significantly older than the norm, while physical science and engineering executives tend to be younger.

• The GS-16 - 18 group in every occupation is somewhat older than the total group in that occupation. For example, 59% of the GS-16 - 18 executives in the biological sciences are over 55, as are 54% of the medical officers. Only 4% of the GS-16 - 18's in the biological sciences and 12% of the medical officers are under 45.

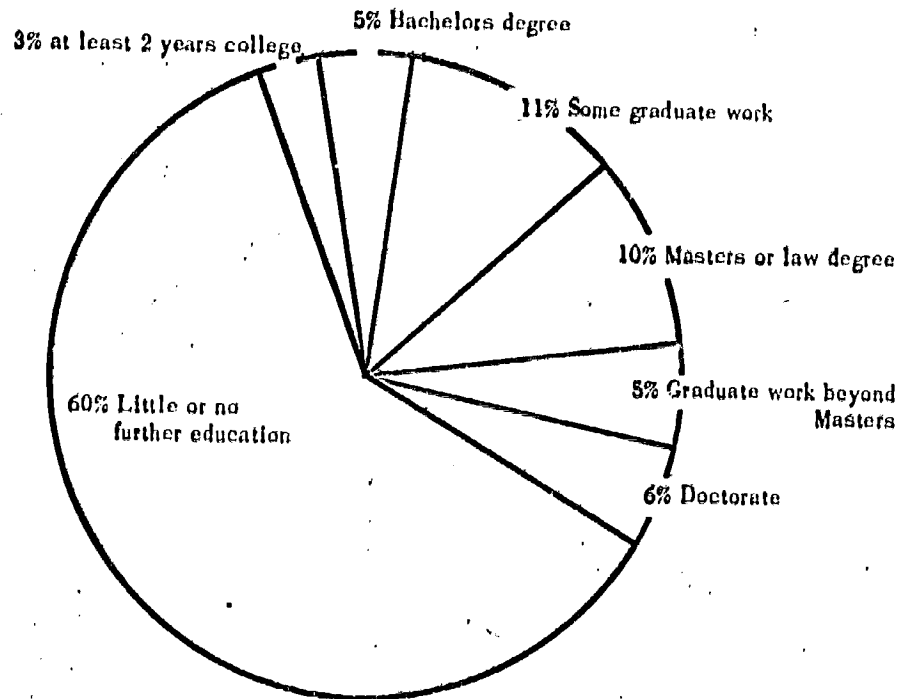
EDUCATION LEVEL OF PRESENT EXECUTIVES

About 85% of the executives have at least one college degree and more than half hold Masters level degrees or better.



The educational differences between those in grades GS-15 and those in the higher grades are slight.

EDUCATIONAL ATTAINMENT AFTER ENTERING GOVERNMENT SERVICE



Nearly 40% of those who entered Government service with less than a Doctoral degree have subsequently completed significant amounts of education:

○ About 20% have completed a Masters level degree or better . . .

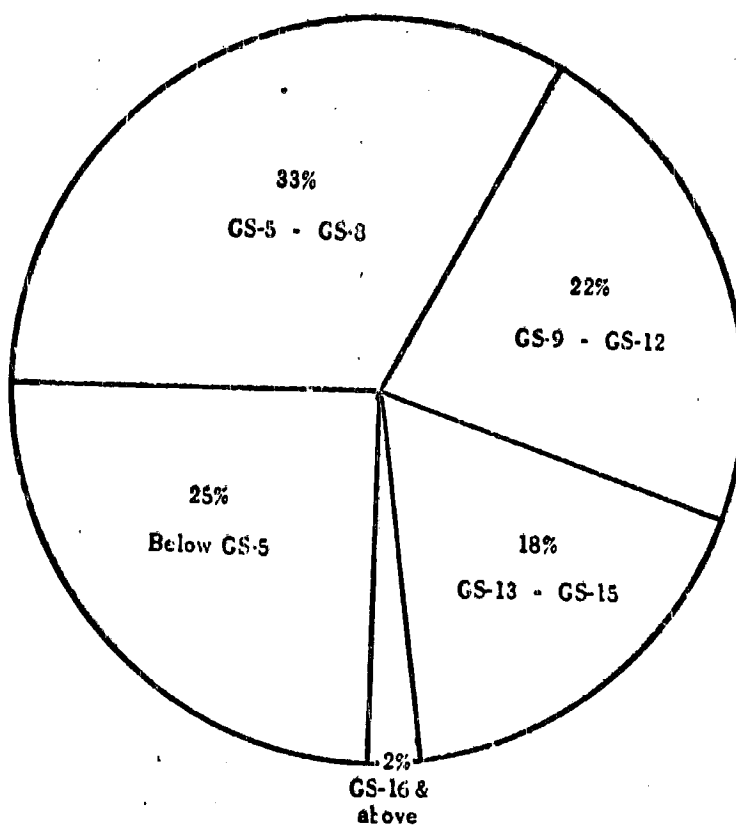
○ 6% have completed Doctoral degrees.

Of the approximately 5,000 executives who entered the Government without a college degree, 37% have since earned at least one degree; 15% have earned multiple degrees.

Of those now holding doctoral level degrees, 1 out of 6 obtained them after first entering Federal service.

ENTRANCE GRADE OF FEDERAL EXECUTIVES

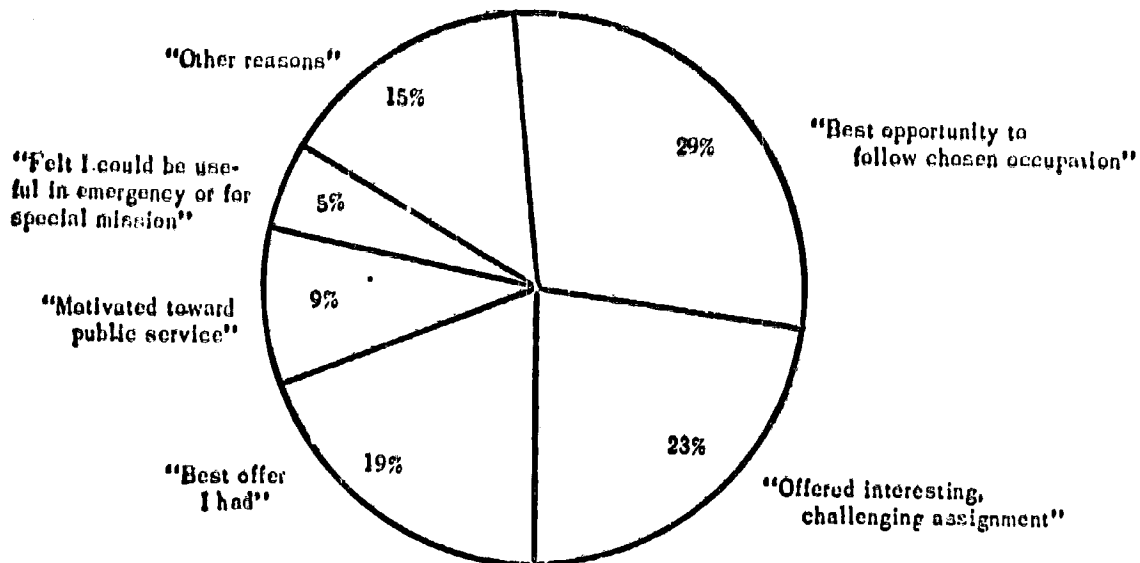
Although more than half of the executives first entered the Federal service in jobs below grade GS-9, nearly a quarter entered below GS-5, and almost 20% came into Government at GS-13, 14, or 15.



REASONS FOR ENTERING GOVERNMENT

The most commonly cited reason for entering Federal service is that it offered the best opportunity for pursuing a chosen occupation.

The next most frequent reason was to accept an interesting, challenging assignment.



Only 1 in 8 executives under age 45, and 1 in 20 under 35 reported that they had accepted a Federal job because it was the best offer they had.

"Motivated Toward Public Service":

15% of managers
3% of engineers, biologists, and physical scientists

"Offered the Best Opportunity to Follow Chosen Occupation":

more than 50% of biologists
37% of physical scientists
35% of engineers
less than 20% of general administrators and staff managers

"Planned a Federal Career":

54% age 55 and over
33% age 44 and under

"Had No Definite Intentions":

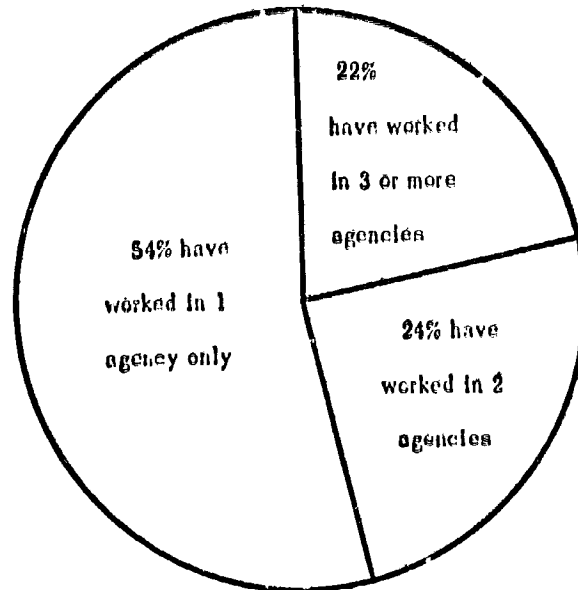
21% age 55 and over
39% age 44 and under

MOBILITY

Extent of Mobility of Present Executives

More than half of the executives have spent their entire Government career within a single agency.

"Movement Across Agency Lines"



Most of the mobility has occurred comparatively early in the careers of the executives:

Over 70% have made no interagency move since they reached GS-13

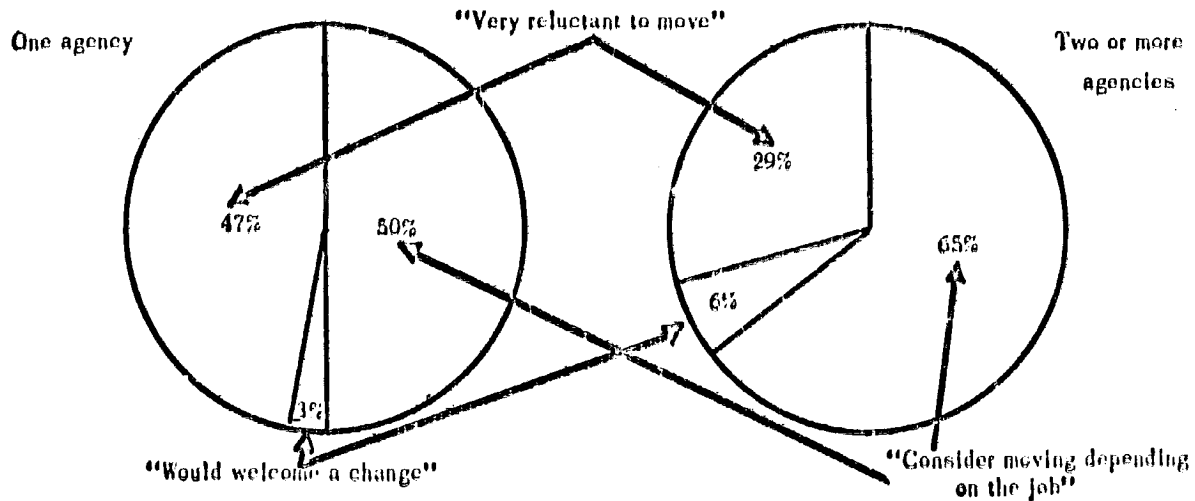
Fewer than 1 in 10 worked in as many as three agencies at the middle management level or above.

Overseas Service

No overseas service	58%	Military only	27%
Both civilian and military	5%	Civilian only	10%

Attitudes Toward Changing Jobs

Over half of the executives who have worked in only one agency are willing to consider changing jobs. Only 46% of this group state that they would prefer not to change jobs at this time. Those who have worked for more than one agency are more willing to change than those who have had their entire career in a single agency.

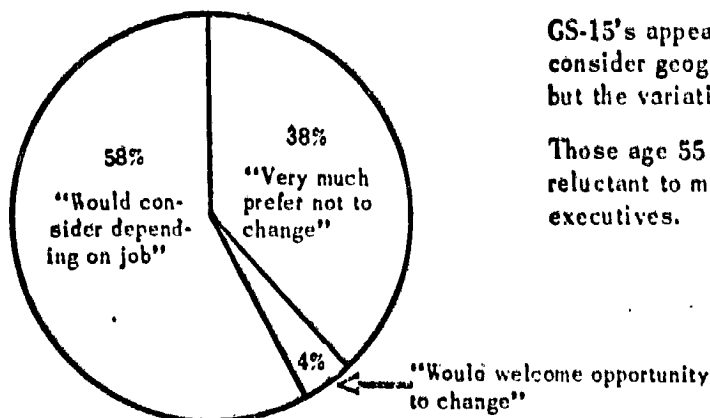


Younger executives express more willingness than older executives to change jobs.

Biological scientists show least willingness to change (58%), compared to 81% of the budget people, 74% of the personnel managers, 72% of the social and behavioral scientists, 71% of the engineers, 70% of the general administrators, and 62% of the physical scientists.

Attitudes Toward Changing Geographical Location

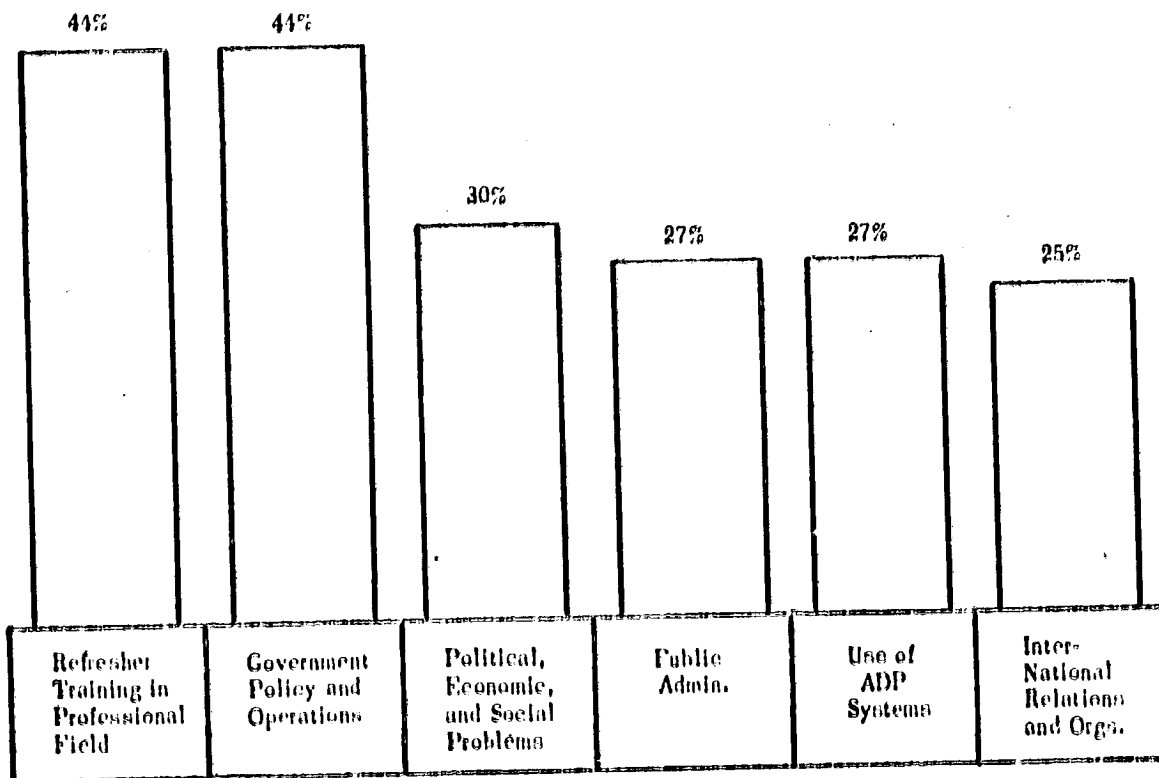
More than 6 out of 10 executives are willing to consider making a geographic move, depending on the job.



GS-15's appear more willing to consider geographical changes, but the variation is very small.

Those age 55 and over are more reluctant to move than young executives.

TRAINING DESIRED



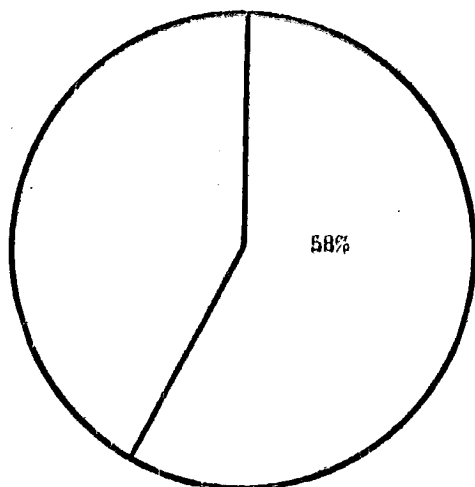
There are marked occupational variations in the areas in which executives desire to receive training:

More than half of the physical scientists and engineers want advanced or refresher training in their technical or professional fields.

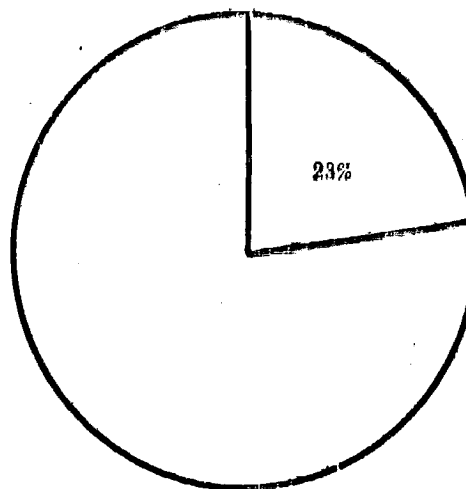
They express much less interest in training in such areas as Government policy and operations, public administration, and political, economic, and social problems than do other occupational groups.

RECOGNITION OF EXCELLENCE

AWARDS FROM WITHIN AGENCY



AWARDS FROM OUTSIDE SOURCES



In several large agencies about 75% of all executives have received awards from their agencies whereas in other agencies as few as a third of the executives have been given such recognition.

The fact that there are no major differences among agencies in regard to the proportion of their executives receiving outside recognition suggests that the differences noted result more from differences in agency practice than from differences in executive quality.

SUMMARY

	%	
AGE	34	Have reached the age of 55.
	21	Are under age 45.
SEX	98	Are male.
LENGTH OF SERVICE	64	Have 20 years or more.
	43	Have at least 25 years.
EDUCATION	85	Have at least one college degree.
	50	Have Masters level degree or better.
RETIREMENT	11	Could retire now.
	30	Will be eligible to retire within 5 years.
CAREER FACTS	2	Entered at GS-16, 17, or 18 levels.
	18	Entered at GS-13, 14, or 15 levels
	54	Spent entire career in one agency.
	52	Entered because it offered:
		- best opportunity for pursuing a chosen occupation. - interesting, challenging assignment.
	54	Would consider changing jobs for the right opportunity.
RECOGNITION	58	Have received formal recognition within the last 10 years from their agencies.
	23	Have been honored by other organizations.

FURTHER STUDY

Beginning in 1968, the Civil Service Commission will conduct a comprehensive and continuing analysis of information in the Executive Inventory. This will permit more effective agency and Government-wide executive manpower planning by creating a broad basis for estimating executive manpower resources and projecting recruitment and development needs. And overall it will form a solid foundation for effecting substantial improvements in the way Government meets its executive manpower requirements.

APPENDIX D

JOB DESCRIPTIONS

Present Employment

Section one of this appendix contains the job descriptions of the Apollo project managers sampled (information was not available on 6.7 per cent). Job descriptions are exactly as recorded in the EAS except that the hardware involved is not specifically identified in order to maintain the confidence of the project managers involved.

Section two of this appendix contains a partial listing of prior job descriptions. Job descriptions are exactly as recorded in the EAS with same exception as above.

APPENDIX D

Section 1

Job Descriptions

1. This position demands responsibility to Center management for the delivery of a quality piece of hardware to the launch site in schedule. There is also responsibility for managing and directing Center and contractor resources affecting this hardware. One must have the ability to plan, manage, direct, and coordinate the efforts of many diverse elements of Government and contractor organizations which affect configuration and schedule. A knowledge of spacecraft systems and program goals is required.
2. This position maintains responsibility for successful project completion within approved scheduling and budgeting. This requires a broad knowledge of spacecraft systems, engineering, and the fundamentals in several and diverse disciplines. Moreover, one must have a facility for rapid and effective communication and the ability to assume leadership over a broad spectrum of personnel from technician to corporate vice-president.
3. This position involves total responsibility for the research and development, pre-production, production, test, and pre-flight coordination of the hardware. The magnitude of this program is in excess of 750 million dollars. This office is the focal point for all directives from NASA to the prime contractor and for dissemination of the contractors' progress to all elements of NASA. The project manager directs the activities of twenty-six engineers, including representatives at the prime contractor's plant and five NASA locations.
4. The duties of this office include managing Center activities affecting the hardware, maintaining schedule and configuration, and coordinating activities between the three Centers (MSFC, MSC, and KSC), Headquarters, and contractors as required.
5. This position requires the provision of overall technical and management direction of the development and delivery of the hardware. Duties consist of engineering and resource planning and direction for defining and executing hardware design, development, production, test, and delivery. Facilities, manpower, tooling, and materials must be provided and adjusted to meet project needs both at contractor sites and NASA installations. The position requires the ability to manage contractor and Government technical and administrative personnel. Emphasis must be directed into areas where scientific and engineering break-throughs are required to meet the hardware mission requirements while maintaining firm budgetary control at a level in excess of one billion dollars.

6. This position demands the assessment of technical fabrication and schedule problems and the assurance of design qualification
7. As project manager one must define, direct, review, and evaluate Center performance throughout the planning and coordinating phases. One must provide contractor direction in the design, development, integration, production, test, delivery, and pre-flight check of the hardware.
8. This position demands coordination and direction of a centralized effort to bring to focus all hardware work performed in the Center and by other agencies and industry in support of the Center. This includes responsibility for the development and production of all hardware of this type assigned to the Center. The project manager plans, defines, and monitors the progress, interrelation, and coordination of the development and production of this type of hardware for advanced space vehicles. The manager represents this effort to the Center, other NASA Centers, other agencies, industry, and scientific and technological groups concerned. The position demands technical experience, mature judgment, management ability, personal presentations, and a wide range of other technical and managerial skills such as planning, coordinating, and exercising self-discipline. One must have the ability to establish and maintain an effective leadership role to assure effective implementation of the program.
9. This office is responsible for the development, production, configuration, control, and field support for the hardware. This requires an engineering degree or equivalent with extensive experience in the area. Overall management skill is required with experience in financial management, logistics, research and development, and Government contracting. One must be able to make presentations, conduct conferences, and be able to motivate both Government and industry technical and management personnel.
10. This office is responsible for the development, production, configuration, control, and field support of the hardware. This responsibility includes budgeting, technical direction, and technical support in terms of contract management involving a billion dollar project.
11. This position is responsible for extensive hardware development. Experience, management ability, and the ability to get along with people are required.

- 12 This office is responsible for delivering the hardware on time, within allocated resources, and within established quality and reliability standards for the manned lunar mission. A broad knowledge of program planning, financial management, configuration management, contract management including incentive contracting, and subsystem management is required. Also, the ability to negotiate with large organizational groups and industry to resolve conflicts for the best interests of the program is required.
- 13 This position demands responsibility for the management, budgeting, scheduling, controlling, and reporting affecting the hardware. This includes control and coordination of resources and efforts, plans, and schedules for components and assembly of the hardware.
14. This office plans and directs a centralized design, development, production, and field support program. This office establishes policies, plans budgets and schedules, and directs work to be performed by contractors and Government personnel. This requires broad knowledge of basic engineering principles of design, production, testing, and quality control. One must negotiate acceptable positions among several diverse groups and have the ability to foresee possible pitfalls in cost and schedule areas.

APPENDIX D

Section 2

Job Descriptions
(prior employment)

Prior NASA Employment.

1. As a lab manager, this position is responsible for Center operations and field activities. The organization consists of 600 scientific, engineering, and clerical personnel with over thirty per cent in nationwide field locations. The position requires policy formulation involving design, manufacturing, and other disciplines.
2. As a NASA representative at the contractor's plant, this position is responsible for presenting a single, on-site point for program direction and guidance in accordance with the overall program requirements as initiated by the Center and the project manager. An engineering background in missile or space vehicle development and testing is required. One must have the ability to communicate orally and in writing and the ability to assess technical approaches and concepts. One must be influential in directing the decisions of the contractor and Government supervisors and managers.

Prior Federal Service.

1. This position demanded service as a research and development engineer for the hardware. Performance of continual surveillance of the above hardware's development, production, and flight programs to insure engineering integrity was required. Served as a principle government contact for solution of problems involving engineering, performance, and schedules.
2. This position required supervision of the design of the hardware. Also, advice and assistance in final launching was required. The objective was to solve tasks independently with freedom in methods of attack for the accomplishment of objectives.

Industrial.

1. Served as a marketing and field engineering representative for several major manufacturers of high voltage equipment and lighting gear. Recommended solutions to electrical problems of customers in the power and lighting area.
2. Supervised and accomplished preliminary design of propulsion, secondary power, environmental control, inlet, and fuel systems of advanced air breathing and rocket military aircraft and missiles.

Other

- 1 Responsible for electrical distribution and transmission system for a public utility. Basic duty was to keep system operating and to provide annual plan and budget for growth.
- 2 Conducted theory and lab classes in A.C. machinery and electronics for junior and senior college students. Carried the title of instructor.

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