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FUNCTIONAL MANAGEMENT IN NASA

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by

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FOREWORD

This is a Comment Edition of Historical Note No. 53 prepared by a summer employee of the NASA Historical Staff (APPH). The author has agreed to integrate comments and corrections submitted by critical readers, a normal process of validation for all historical reports and studies.

This study is not for release outside of NASA in its present form. Please direct comments to the NASA Historian (APPH).

Eugene M. Emme

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This paper was conceived as a study of a particular management concept used by NASA, the system of functional management. Functional management involves a system of relationships between Headquarters staff offices and their counterparts in field installations common to many large organizations. The paper attempts to find out something about the history of NASA functional management, and to examine the processes by which it operates within the agency. Many of the questions examined in the paper are derived from the literature of public administration.

The paper is divided into several sections. The introduction attempts to sketch briefly the development of the concept of functional management in the literature of management, and to discuss some of the other theoretical concepts involved. Chapter II discusses the development of this concept within NASA itself. Chapter III discusses two particular case studies of the operation of functional management in NASA, the functions of personnel and procurement. Chapter IV contains a summary and some general conclusions.

The study was originally intended to be descriptive rather than critical. As a result of the research undertaken and the interviews with people involved in the system, however, it is possible to draw conclusions and make suggestions. Most of these are essentially a product of remarks and ideas expressed by NASA people themselves.

The research for this paper involved studying the documents in which NASA has described the concept of functional management and a series of interviews with personnel at Headquarters and three field Centers. For a more precise assessment of the concept in operation, two particular functions, procurement and personnel, were chosen for study.

The case studies are culled from approximately 40 interviews. The text is thus an amalgam of views of many people in many places. No attributions are made of the source of particular remarks or opinions expressed. The desire for candid comments seemed to dictate this anonymity. This lack of attribution places a burden upon the credibility of the work, for no individual is in a position to evaluate the correctness of the synthesis or of any particular comments recorded. The author can only assert that he has made every effort to summarize attitudes accurately and without distortion.

Particular appreciation is expressed to Dr. Eugene M. Emme and Dr. Frank W. Anderson of the NASA Historical Staff for providing the author with the opportunity to write this paper and for useful comments upon it. Whatever value there may be in this study is due in large measure to the numerous individuals who were generous with their time and patience in talking with the author. Any mistakes, factual or interpretative, are solely his responsibility.

J. C.

I. Introduction

Functional management is a system which places responsibility for overall management of certain agency-wide activities (including personnel, financial management, audit, procurement and supply, public information, technology utilization) with a staff office in NASA Headquarters. The Headquarters staff office (the functional managers) are given authority to communicate with, advise, and direct the activities of counterparts engaged in these activities in the various NASA field installations. For example, in the management of NASA's personnel program by the Personnel Division in Headquarters, flows of communications to the field Center personnel officers need not always be channeled through the field Center director, but may flow directly from the functional manager in Headquarters to counterpart personnel divisions within field installations.

Functional management is thus a technique designed to take advantage at all levels in the organization (both in Headquarters and in the field installations) of the expertise and experience which specialization makes available, without excessively disrupting the hierarchical chain of command within the organization. A number of objectives are to be served by this system. These include:

1. Improving the performance of these activities in the field by providing the installations with advice in particular problems, keeping them abreast of the latest techniques in the function, etc.

2. Achieving the desired degree of uniformity in the performance of these functions throughout the agency.
3. Providing clear lines of communication between Headquarters and the field regarding these key support functions.

In a sense, such communication between specialists in a particular area, whatever their location geographically or in the organization structure, is inevitable -- effective carrying out of these activities requires such relationships. The functional management system adopted by NASA recognizes the existence of such interaction and attempts to formalize it. These relationships between Headquarters and the field are recognized and sanctioned, formal channels of communication are established, clearance procedures are established to ensure that program (or "line") personnel are kept aware of the flow of communication, and authorities and limitations are placed upon the "functional managers" in NASA Headquarters. Finally, the system is designed to provide a point of responsibility for the activity in the specialized area. Functional managers in NASA Headquarters are not only given permission to communicate with and advise their counterparts in the field, but are also specifically made responsible for the carrying out of the activity in the agency at all levels.

The specific concept of functional management (or function management) can probably be traced to the work of Frederick Taylor. In developing his technique of time and motion study, Taylor came to the conclusion that traditional forms of hierarchical organization

(which he called "military organization"), with their classical emphasis upon strict hierarchical lines and unity of command, were basically inefficient in large organizations, in which activities were most effectively carried out if broken down into a series of specialized activities.^{1/}

Throughout the whole field of management the military type of organization should be abandoned, and what may be called the 'functional type' substituted in its place. 'Functional management' consists in so dividing the work of management that each man from the assistant superintendent down shall have as few functions as possible to perform. If practicable, the work of each man in management should be confined to the performance of a single leading function. Under the ordinary or military type the workers are divided into groups. Men in each group receive their orders from one man only. This man is the single agent through which the various functions of the management are brought into contact with the men. Certainly the most marked outward characteristic of functional management lies in the fact that each workman, instead of coming into direct contact with the management at one point only, namely through his gang boss, receives his daily orders and help directly from eight different bosses, each of whom performs his own particular function.

Taylor was speaking about and was basically concerned with management at a relatively low level -- the management of the lowest echelon workers by their foremen. But his concept is applicable to management at any level, in any large organization whether or not its goal is routinized activity such as production.

The question of how to handle specialization has become more acute as organizations have become larger and their goals and tasks more complex. Whether organizations are viewed as problem-solving mechanisms (Thompson)^{2/} or decision-making devices (Simon)^{3/} the

rational procedure in designing an organization is to break down the task or problem into smaller sub-tasks and to attack each of these in turn. The sub-tasks are best dealt with by individuals who are trained and experienced in handling problems in a particular activity--specialists. Thus specialization is an inevitable (or rather a defining) characteristic of organizations.

Traditional organizational patterns are often not suited to the managing of specialists. As Thompson points out, formal organization is based on the concept of hierarchy--the relationships between members of the organization (relationships of super- and subordination) are expressed in terms of the notions of rights and authority. These essentially formal relationships tend to be diffuse rather than specific, particularistic rather than universal. Objective standards governing the relationship are lacking. Particularistic norms--such as connections, mannerisms, dress, race, etc.--often govern such relationships.^{4/}

Specialization, on the other hand, introduces instrumental factors into the relationship between members of an organization. Specialists tend to deal in more rational terms--e.g., how activities relate to the efficient and successful carrying out of organization goals. For an organization based on specialization to function properly, a climate must be provided which encourages rationalism and universalism.

Both of these elements--hierarchy and specialization--are essential to an organization. But in many ways they are contradictory and tend to work against one another. Each introduces into the relations between members of the organization different--and often conflicting--standards of conduct and performance. Hierarchy injects the (control) relationship of super- and subordination based upon "status" within the organization structure. Specialization tends to reject status as the proper criterion for such relationships and inject expertise and objective standards as the proper criteria for establishing such relationships. Of course, this picture is simplified and exaggerated for the sake of illustration, but there can be no doubt that the situation and its attendant problems do exist in many organizations.

Another related problem exists. This deals with the flow of communication, consultation, and instructions within an organization. The principle of hierarchy suggests that communications, orders, etc. must flow "through channels" in order to maintain the integrity of the system of hierarchical authority. Specialization, on the other hand, suggests that such communication should take place directly between all those in the organization concerned with the activity, whatever their location in the hierarchy. This clash is compounded when the organization is comprised of a headquarters and a series of field installations. The installation directors have a distinctive mechanism for communication with headquarters, and relations between

specialists in headquarters and their counterparts in the field may often be viewed with suspicion, if not outright hostility. In addition, the problem is further compounded by the fact that in many specialized areas those with expertise tend to develop their own vocabulary and language--to the general supervisor, it is not only a problem of being aware of communication between specialists but also one of understanding such communication after he becomes aware of it.

Finally, a system which involved direct communication between specialists whatever their location in the hierarchy (and such channels will inevitably develop) runs afoul of an almost sacred principle of classical organizational theory--the principle of unity of command. This revered principle states that in a properly structured organization, "every man has but one boss to whom he reports and from whom he takes orders and instructions."^{5/} The degree to which this principle can or should be adhered to varies. In some instances, as mentioned by Taylor, it is suggested that an individual should not receive advice or instructions from any member of the organization except his immediate superior. More realistically, it is asserted that though an individual may get advice and instructions from many members of the organization, he should be formally responsible to only one superior, and in case of doubt or conflicting instructions should have one superior to whom he should turn.

This principle has long appeared in the literature of organization theory and of management. It is appealing because of its simplicity--it seems to provide a simple and basic criterion upon which

to build an organization. In addition, one NASA organization specialist suggested that it is in part derived from the Western cultural tradition. One God, one father, one wife--the notion of unity in the basic hierarchical relationships which one encounters in "informal" organizations tends to reinforce this principle. Whatever the source of its allure, many individuals adhere to the principle with feeling that may approach religious fervor and oppose any system which appears to compromise the principle with the zeal of the crusaders.

However, for the reasons suggested above, the principle never strictly operates in any organization. It would deny the services of specialization by rendering inadmissible any advice or instruction from individuals other than one's immediate supervisor. In addition, strict adherence to the principle should entail an enormous communication load to ensure that all communication flowed through the formal supervisor to his subordinates.

Since reality does not conform to theory, some attempt must be made to reconcile the two. One alternative (often found in the literature about organizations) is to ignore reality and pretend that the theory is still valid. A second is to recognize reality and adjust the theory accordingly.

The first alternative often involves the adherence to what have been called "myths" of organization. Such myths include: "Staff never commands, it merely advises," or "Functional specialists do not give

orders, but their advice is not to be lightly disregarded."^{6/}

By means of these myths, the theory--the principle of unity of command, the distinction between line and staff--is retained, while the flow of communication between specialists is recognized. But such communication is distorted--it is called advice when often it amounts to instruction. A related "myth" is often employed in organizations having a headquarters and field installations.^{7/}

It is said that these various units in the central office provide 'technical supervision' to field offices, while 'administrative direction' comes directly from the head of the central office to the regional directors and hence on down to his subordinates. Realistically speaking, of course, 'technical supervision' involves just as much real authority as does the 'advice' provided by staff units, or the 'service' given by auxiliary units. The very fact that conflict frequently arises between 'technical' instructions and 'administrative' instructions demonstrates the authoritative character of both. The plain fact of the matter is that field personnel receive commands from many sources besides their immediate 'administrative' superiors--unity of command is actually not observed.

The second alternative involves the conscious avowal that, since specialization exists, some members of the organization are going to receive orders from at least two sources. The specialist will receive orders both from other specialists and his own hierarchical supervisors. Such a system involves redefinition of theory to the extent that such principles as unity of command and distinctions between the role of line and staff are modified. However, because these principles are so deeply embedded, even a system such as NASA's--which does make explicit a rejection of unity of command--must make some allowance

for traditional theory; it tries to make some qualitative distinction between the types of communication and instruction coming from field Center management and from functional managers in Headquarters.

Given a large, complex organization, with a headquarters and field installations, one can imagine a continuum which measures the degree of authority given to specialized staff offices in the Headquarters. On one end is what may be called a "weak" staff or "bureau" type organization. With this type of organizational pattern, the headquarters staff offices (e.g., personnel) are typically quite small, and have very limited authority in communicating with and instructing counterpart offices in the field. In such an organization, the field installations are generally quite autonomous and have responsibility for development and administration of programs in the various functional areas.

On the other end of the continuum is what may be called a "strong" staff organization. Under this pattern, headquarters staff offices are typically quite large, and have substantial authority in dealing with counterparts in the field.

A typical example of a weak staff organization is the Dupont Company. In this organization, the various operating divisions are granted a tremendous amount of autonomy in their operations such as personnel, and little direction or control is exercised from the headquarters. On the other hand, the Department of Defense agencies

typically exhibit strong staff characteristics. Partly because of the authorities granted to staffs in headquarters, and partly because of the fact officers with differing ranks are involved, the headquarters staff offices in DOD agencies typically exercise a great deal of authority in directing and commanding counterparts in field installations. The system to be considered in this paper, functional management in NASA, falls somewhat in the middle of this continuum, with the headquarters staff offices having limited authorities in dealing with counterparts in field installations.

Footnotes for Chapter I

- 1/ Frederick Taylor, *Scientific Management*. New York: Harper & Brothers, 1947, p. 99.
- 2/ Victor Thompson, *Modern Organization*. New York: Alfred A. Knopf, 1961, *passim*.
- 3/ Herbert Simon, *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization*. New York: MacMillan, 1957, *passim*.
- 4/ Thompson, *op. cit.*, Ch. 4.
- 5/ Herbert Simon, *et. al.*, *Public Administration*. New York: Alfred A. Knopf, 1961, p. 214.
- 6/ *Ibid.*, p. 215.
- 7/ *Ibid.*, p. 306.

II. Functional Management in NASA

The types of relationships involved in a system of functional management are likely to develop in any large organization, regardless of the terminology used to describe them. This is perhaps especially true in a government organization, for the existence of general regulations (e.g., statutes, Executive Orders, CSC regulations) which must be followed by all agencies suggests use of some mechanism to ensure and evaluate compliance throughout an agency.

Thus, although the term "functional management" did not apply until 1961, the system of consultation and communication between Headquarters staff offices and operational counterparts in field installations apparently existed in NASA's major predecessor, the NACA. In keeping with the NACA philosophy of rather informal organization and a large amount of field installation autonomy, the Headquarters staffs were small, and the network of Headquarters-Center relationships in areas such as personnel and procurement was never strictly formalized.

In 1961, the term "functional management" first appeared in NASA organizational material, and the initial attempts at specifying how the concept was to operate were set forth. As we have seen, a basic reason for using a concept such as functional management in NASA was the fact that in a large and complex government organization there is some need for consistency in carrying out support and administrative

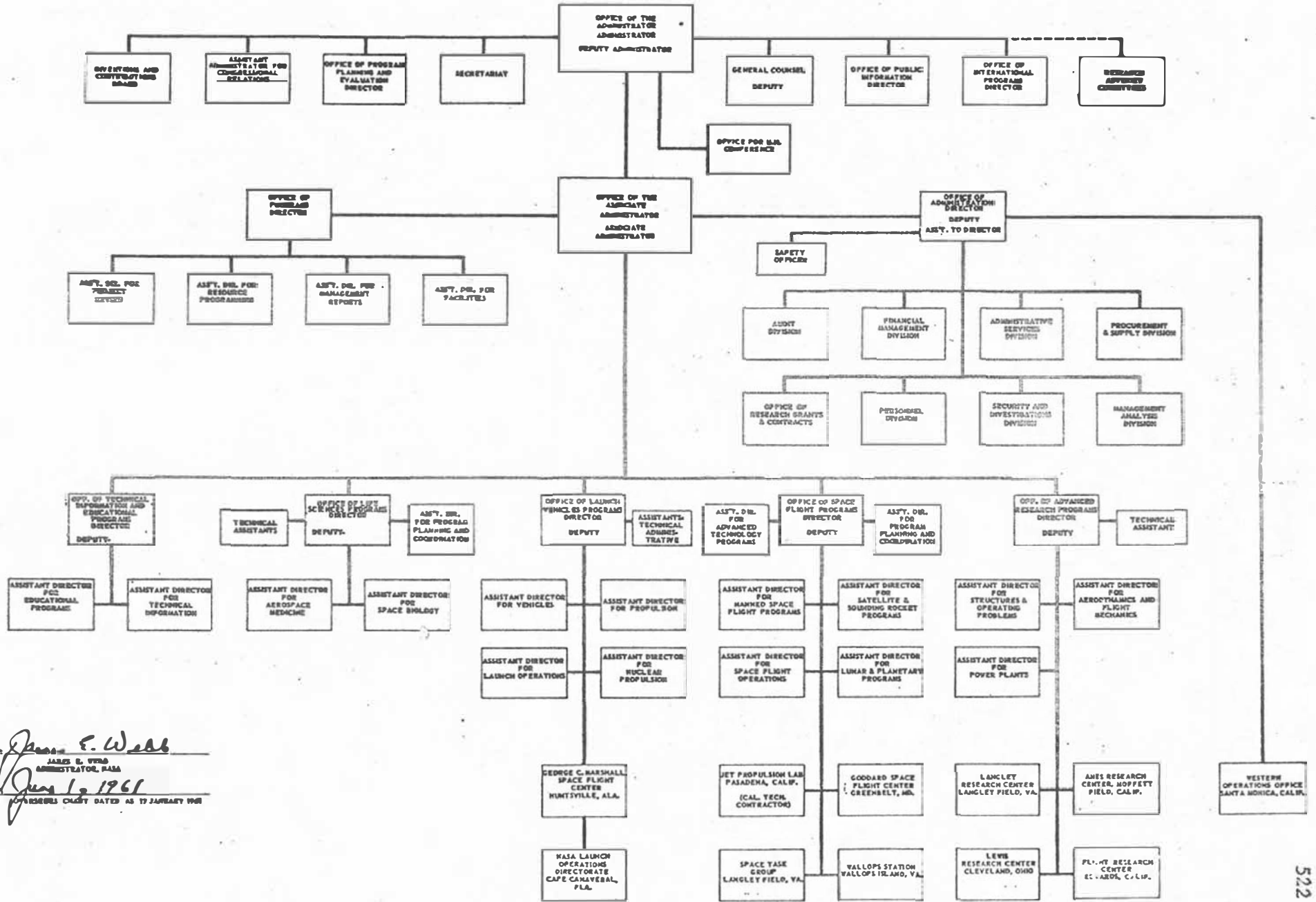
functions. Such consistency is required both by sound management practice and by the fact that these activities are in large part governed by general rules and regulations and are subject to the scrutiny of regulatory organizations (CSC, GAO, and the legislative branch).

This need and desire for consistency explain in large part the formalization of the technique of functional management. The timing of the issuance of the documents describing functional management-- appearing in 1961--can be explained by the fact that this was the year in which NASA made its first major attempt at setting forth and evaluating many of the management concepts which were to guide its development as an organization.^{1/} During this period of rethinking and setting forth basic administrative concepts, a number of significant organizational changes took place. First, management in NASA evaluated what they considered to be a drift within the agency toward a bureau structure--a series of semi-autonomous subagencies dealing with the various technical programs NASA was engaged in (e.g., launch vehicles, satellite programs, manned space flight). General management of NASA (which refers to the Administrator, Deputy Administrator, and Associate Administrator) concluded that this drift should be reversed and control over the agency's activities by general management be firmly reasserted. The first step in this process was the creation of an Office of Programs on the staff of the Associate Administrator (essentially the general manager of the agency), giving him control over budget preparation and resource allocation within NASA.

A second major step in 1961 was a basic reorganization of the agency. Prior to this reorganization (see CHART I), the various field Centers of NASA reported to the director of the program office (i.e., technical office) which had cognizance over the type of activity the Center was primarily engaged in, and only through this program office to general management. The reorganization changed this pattern, making the field Centers report directly to the Associate Administrator, just as program directors did (see CHART II). This was a step toward asserting the authority of general management and decreasing the authority of program directors.

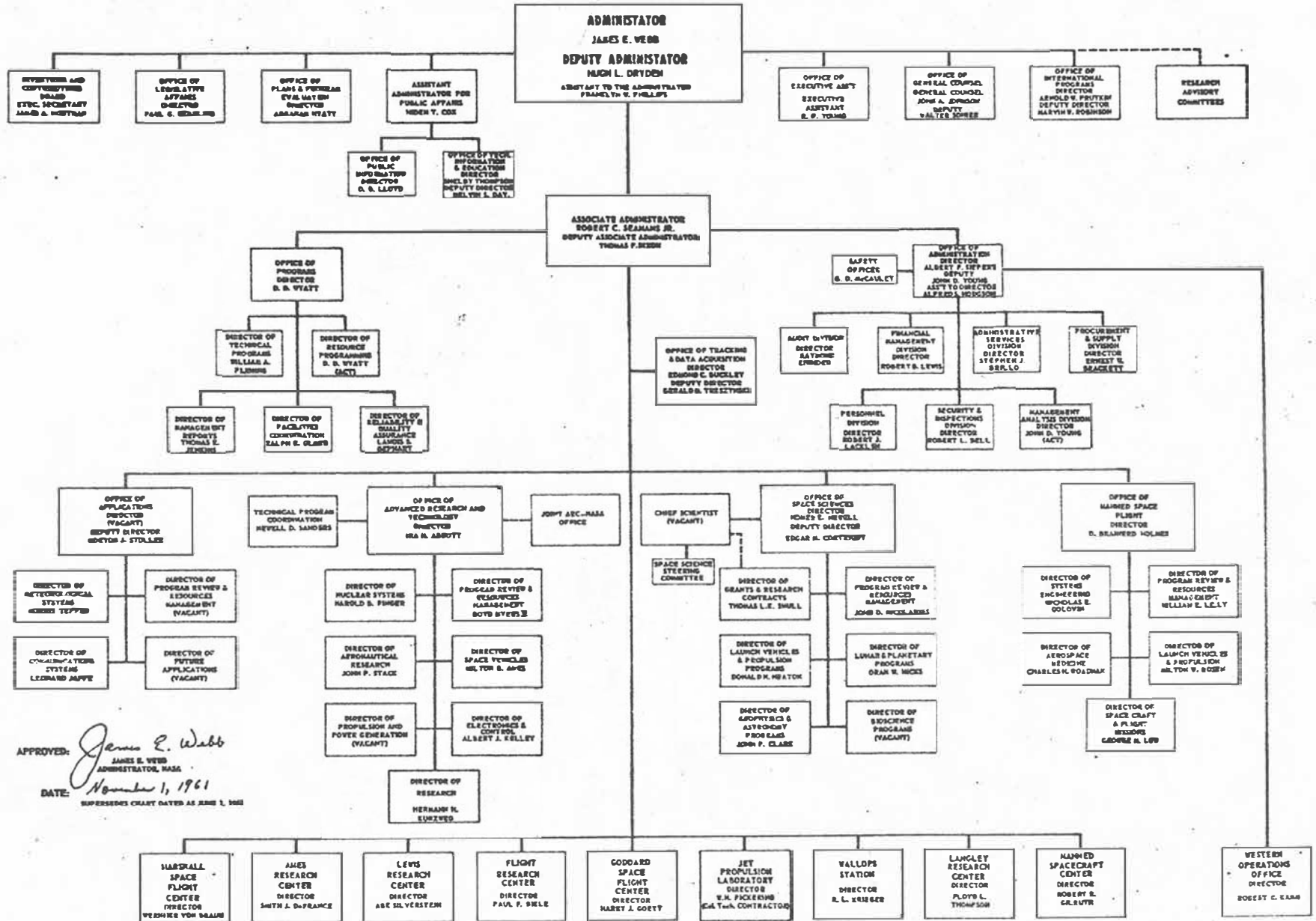
A third aspect of this reevaluation and reorganization of NASA's administrative structure was the formalization of functional management as a basic NASA organizational concept. In part, functional management was directly connected with the desire to reassert the authority of general management. Although the staff and policy responsibilities for such things as procurement and personnel were within the Office of Business Administration (which became the Office of Administration) the program directors, as part of the trend toward a semi-bureau structure, had been pressing for the placement of such staff specialists on their own staffs. As the 1961 reorganizations struck at this tendency toward autonomy for program directors, a natural concomitant was a reaffirmation of the responsibility of the Office of Administration for the management of its activities throughout the agency.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



APPROVED: *James E. Webb*
 JAMES E. WEBB
 ADMINISTRATOR, NASA
 DATE: *June 1, 1961*
 RESEMBL CHART DATED AS 17 JANUARY 1968

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



APPROVED: *James E. Webb*
 JAMES E. WEBB
 ADMINISTRATOR, NASA
 DATE: *November 1, 1961*
 SUPPLEMENTARY CHART DATED AS JUNE 1, 1961

Mr. Webb, the Administrator, desired that the administrative offices in Headquarters assume responsibility for the carrying out of their activities throughout the agency. Although as noted, there was already a good deal of interchange between the staff offices in Headquarters and their counterparts in the field, there was no clear understanding of where the ultimate responsibility for such activities lay. Under NACA it lay with the highly autonomous field Centers; in NASA up to this point, the question had not been clearly resolved. The introduction of the concept of functional management was an attempt to impress upon the Headquarters offices the extent of their responsibility. By delineating the concept of functional management, it was hoped that the Headquarters staffs might no longer be able to generally accede to the wishes of the program directors and field Centers by using the excuse that Headquarters was merely staff and could only advise. At the same time, the explicit authorities granted the functional managers were severely limited. If functional management was to work effectively, it required a high degree of expertise on the part of the functional managers. Since they are expected to exercise leadership and direction of their field counterparts but do not have many explicit authorities, the successful functional manager must have something to offer his counterparts--skill, expertise, knowledge, and techniques--which the counterparts need but do not themselves possess.

Before going on to describe the authorities granted to functional managers, something more should be said about the history of the agency, for this history provides a key to both the requirement for a system like functional management and some of the problems which implementation may encounter. Although much has been written about the fact that NASA was created by welding together existing organizations and personnel from many different backgrounds, this fact can perhaps not be stressed enough. When considering the organizational structure and managerial concepts which NASA has utilized (including functional management), the origins of the organization and the context and constraints this background places upon management of NASA are vital to understanding. NASA was created out of several organizations which were already functioning as entities--most important were the NACA, parts of the Naval Research Laboratory, the Development Operations Division of the ABMA, and the Jet Propulsion Laboratory of Cal Tech.

Each of these organizations carried a heritage when it came to NASA, each had its own operating procedures, its own pattern of relationships with a Headquarters, its own degree of expertise in performing its activities, its own line-staff relationships, its own elan as a functioning organizational entity.

The task of NASA Headquarters was to try to meld these organizations into a single agency. In addition to the fact that many pre-existing organizations were involved in the creation of NASA, the

personnel within the new agency came from many backgrounds--from the agencies incorporated in NASA, from other government agencies (particularly DOD and AEC), from universities, from industry. These individuals had different backgrounds, experiences, and predilections as to how NASA should be run. Thus NASA inherited from its predecessors a wealth of experience with varied techniques and organizational arrangements. In addition, it inherited a series of power relationships--members of the various organizations had their own clienteles, their own positions of prestige. Even if centralization of control in Headquarters had been a prime goal (which it was not), it would have been very difficult to institute.

A second major factor conditioning the type of Headquarters-field relationships which were to exist in NASA was the demanding nature of the agency's mission and program. Research and development is traditionally not amenable to a high degree of central direction and control. The climate required (especially for basic research) is one of relative freedom from strict supervision and management. While questions of basic policy direction ^{and} resource allocation should be accomplished by the Headquarters, supervision of the day-to-day activities of field installations is not feasible. What supervision there is must be generally accomplished in the field. The fact that NASA expends most of its budget (over 90%) through contracts also dictates a high degree of decentralization. Monitoring of such contracts is most efficiently accomplished at the Center level, where the proximity to contractor operation and technical expertise required for intelligent evaluation of contractor performance is available.

The NASA centers vary with regard to the activities they are engaged in--some are engaged in what may be called almost pure research while others are concerned almost completely with development of systems hardware and particular programs. Because of these differences between the various Centers, the question of uniformity of operations is perplexing. In certain areas, uniformity is simply not desirable. In others, although desirable, it is not attainable. A good example is that of personnel classification. In theory, this is an area where uniformity is both desirable and mandatory--desirable because inequality in pay for similar work is destructive of good organization morale, mandatory by CSC regulations. However, such uniformity does not exist in NASA. In part this is due to the fact that there is never a complete one-to-one correspondence between the work of personnel at different installations--and equal pay for equal work cannot be obtained if equal work does not exist. Nonetheless it seems probable that more equality among Centers might be possible (even though "equal work" does not exist, some principle such as "equal pay for equal levels of responsibility" could perhaps provide some more uniform standards for classification at the field Centers). But each Center has a vested interest in retaining--and if possible increasing--the classification of its jobs, if it hopes to attract and retain its employees. And each Center has its own power bases, which prevent easy imposition by Headquarters of a system of more equal classification. What inequality has existed has fed upon itself--one Center finds out that another is paying more for work which look similar and uses this as leverage to raise its own

classification even more. Hence consistency among the Centers is never quite achieved. This situation is gradually improving in NASA as the organization matures and as management of Centers becomes more aware of the requirements of the CSC in regard to classification (as they are more often exposed to Headquarters and CSC surveys). But this example shows that standards presumably applying to all Centers exist, but the problem of applying these standards is as yet not completely solved.

The consequences of these differences among Centers and the nature of the job to be done are fairly obvious. NASA cannot be a strongly centralized operation. The major activities of the agency are to be carried out at the field installations. Consistency of operations and procedures throughout the agency is not feasible. Attitudes toward Headquarters and the kind and degree of direction which it should provide will differ significantly. If personnel in Headquarters come from agencies run under more centralized control (such as DOD) they will have to severely modify their conceptions of their role vis-a-vis the field. What organizational structure used to provide direction to the field from Headquarters will have to take account of the context in which the agency has developed.

A number of studies and documents relating to the system of functional management came out during the 1961 reorganization phase. The formal Management Circular on the system did not appear until June 15, 1962.^{2/} One of the difficulties in the staff documents preceding the

Management Circular is a lack of clarity as to what was encompassed by the system of functional management. Since by virtue of the 1961 reorganization the program offices themselves were in a sense made "staff" to the Associate Administrator (their direct hierarchical relationship vis-a-vis the field Centers had been taken away), documents relating to functional management sometimes referred to the program directors as functions managers--for example, functional management of launch operations.^{3/} As the written materials were eventually revised and straightened out, functional management became a term applying only to those functions supervised by the Office of Administration (although it was suggested that such functions as the General Counsel and Public Affairs were also subject to similar systems of supervision).

The official document describing functional management is NACA Circular 233, "Information Material on Assignment of Responsibilities in NASA Headquarters" (June 15, 1962). Attachment B is entitled, "Functional Management Responsibilities of the Office of Administration." The following administrative activities were stated to be subject to functional management by the Office of Administration: financial management, personnel, procurement and supply, security, management analysis, industrial safety program, and administrative services.

Three major objectives were specified for the system of functional management:

- Provide assistance to Center administrative personnel in improving the services they render all other elements of the Centers. This could be achieved by such means as
 - (1) providing specialized advice and assistance which a given Center may not need on a full-time basis;
 - (2) assisting in the solution of a particularly complex administrative problem involving several Centers; and
 - (3) continually providing opportunities for Center personnel to keep abreast of new developments in a given administrative field.
- Achieve NASA-wide uniformity of policy and of administration where necessary or desirable.
- Ensure compliance with the spirit and intent of applicable laws, orders, and regulations.

The Circular then discussed the general philosophy behind functional management--taking advantage of administrative specialists without disrupting the normal hierarchical patterns of Headquarters/field relationships--and listed the specific responsibilities of Division Directors (the prime functional managers) in the Office of Administration:

- Formulating proposed policies--including making studies, developing alternatives, and preparing recommended plans of action for consideration by the Director of Administration and approval by the Associate Administrator.
- Establishing standards and procedures--including executing other steps necessary to put these policies into effect.
- Evaluating performance--the functional manager is responsible for evaluating the manner in which his function is carried on throughout the agency and must establish a system of visits, analyses, and other techniques sufficient to provide reasonable assurance that he knows what problems are arising, what assistance is required, etc. He is also responsible for reporting the more important results of his evaluation to Center general management and to Headquarters general management.
- Reviewing and recommending allocation of resources and selection of key personnel.

The authorities required to fulfill these responsibilities are also listed:

- Prescribe standards and procedures--subject to certain limitations, Division Directors may sign and issue to Headquarters and field Centers standards and procedures necessary to execute approved policy.
- Conduct surveys, analyses, and reviews.
- Communicate directly with Center and Headquarters administrative elements.
 - a. may communicate directly with Center and Headquarters administrative elements, may also issue instructions directly to counterparts in regard to their functional area after obtaining the clearance of appropriate Headquarters and Center elements. Subject to specific limitations set forth, these instructions are binding.
 - b. heads of Center administrative elements are responsible for keeping Center general management informed of direct communications from Headquarters Division Directors in accordance with the interests and desires of the Center's general management.
- Participate in the selection of the key counterpart personnel --this involves consultation by Center Director with the appropriate Headquarters Divisions Director before he makes a decision on appointments. This role of Headquarters is strictly advisory.

Finally, the instruction sets forth the limitations placed upon the authority of functional managers:

- Such authority must be delegated by the Associate Administrator.
- They may not issue major policy statements.
- Instructions must be in line with and for the purpose of carrying out policy approved by general management.

- They may not issue instructions which would result in major shifts in programs or in the assignment of personnel or other resources.
- They are responsible for getting concurrence from appropriate Headquarters offices or approval of general management in case of nonconcurrences before issuing instructions.
- They may not issue instructions which would have a substantial effect upon another functional area.
- The Division Director shall redelegate to persons under his immediate supervision his authority to issue instructions only to the extent absolutely necessary and in no case to lower than a branch chief.

The Circular took notice that conflicts may arise either between functional managers and their counterparts in field installations or between functional managers and management of the installation. These conflicts may arise, it is suggested, as a result of instructions or actions of the functional manager which are, in the opinion of Center management:

1. not in line with policy approved by NASA general management;
2. contrary to policy or instructions properly prescribed by Program Directors, other Headquarters Division Directors (i.e., other functional managers), or by Center management;
3. not in the best interests of NASA;

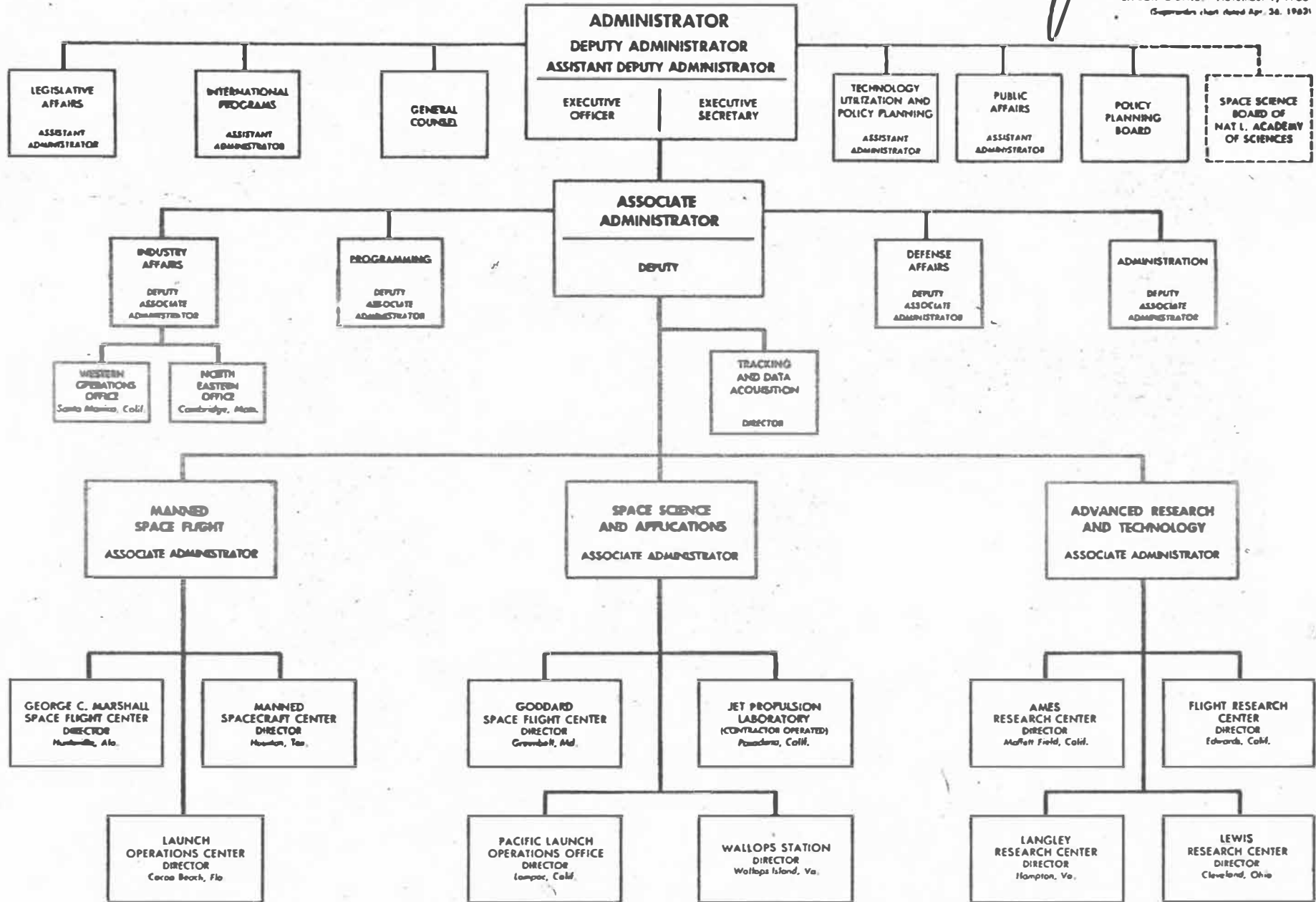
The Circular states that when such situations arise, the Center specialists or general management should bring it to the attention of the functional manager. If the issue cannot be resolved at this level, it should be presented (via the Director of the Office of Administration) to the Associate Administrator for resolution. Apparently it was not

expected by those in NASA who delineated the concept that many such conflicts would arise. However, the lack of such conflicts may indicate not only a smooth functioning system, but, alternatively, a lack of assertiveness on the part of Headquarters or the field.

In 1963, NASA underwent another major reorganization. The major change involved another restructuring of the field reporting relationships. Instead of reporting to the Associate Administrator (as they had done since 1961), the Centers once again were to report to the directors of the technical program offices in Headquarters, and through them to general management (see CHART III). The directors of the technical program offices (the Associate Administrators for Manned Space Flight, for Space Science and Applications, and for Advanced Research and Technology) have essentially two responsibilities. First, they have "program" responsibility, which includes management and direction of related groups of research and development projects which are carried out at a number of Centers (e.g., the Gemini program in the area of manned space flight, the Mariner program in the area of space sciences). Their second responsibility is "institutional"--institutional responsibility includes the general management of all facilities and personnel of a given installation. Obviously, the major burden of "institutional" management lies with the Center directors. However, under the 1963 reorganization, with field Centers reporting to the Associate Administrators for Manned Space Flight, etc., the ultimate responsibility for institutional management is placed with these Associate Administrators.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APPROVED *James E. Webb*
 ADMINISTRATOR
 EFFECTIVE DATE: November 1, 1963
 (Supersedes chart dated Apr. 26, 1963)



Thus, in their role of assuming institutional responsibility, these Associate Administrators are referred to (and will be referred to here) as "Institutional Directors."

Along with this major organizational rearrangement, the system of functional management was formally extended to offices beyond the Office of Administration. Three additional Headquarters staff offices were given functional responsibility for managing their activities throughout the agency:

- The Office of Industry Affairs was given responsibility for the procurement, reliability, and quality assurance functions (up until early 1963, procurement and supply had been managed by a Division in the Office of Administration; however, a new Office of Industry Affairs had been created in 1963).
- The Office of Technology Utilization and Policy Planning was given responsibility for management of the technology utilization and scientific and technical information functions.
- The Office of Public Affairs was given responsibility for managing the activities of public information, special services and educational programs and services throughout the agency.

The specification of responsibilities, authorities, and limitations upon the functional managers under the 1963 reorganization was essentially the same as that discussed above.

One major change in the operation of functional management was required by the 1963 reorganization. Previous to the reorganization there was no formal mechanism by which functional managers coordinated their communications to field installations with the technical offices

in Headquarters; since these Headquarters offices had no major institutional responsibility for managing the field installations, such coordination was not so essential. The 1963 reorganization--which placed the field installations under the institutional direction of the various technical offices at Headquarters--changed this. If the Institutional Directors (i.e., the Associate Administrators for Manned Space Flight, for Space Sciences and Applications, and for Advanced Research and Technology) were to have the responsibility for management of their Centers, they would have to be made aware of, and part of, the process of functional management of activities at their Centers. Thus the document specifying the guidelines of operation under the new organization states:^{4/}

...when heads of functional staffs or their properly designated delegates are communicating or working with counterparts at field installations, they will inform the appropriate Associate Administrator or other official to whom the particular field installation reports of the matter which they are planning to take up with their field installation counterparts and of the results of their contacts with Center personnel.

The three Associate Administrators responsible for Center management were directed to designate points within their offices which should receive information about contacts between Headquarters functional managers and their operational counterparts in the field. In addition to providing information to the Institutional Directors about contacts, the system whereby concurrences and clearances are obtained had to take account of the new system of Center management. And the results of inspections and surveys now would be reported not only to the

Director of Administration and through him to the Associate Administrator, but also to the Institutional Directors.

Despite these provisions for coordination and information provided to the Institutional Director, it was envisioned that functional management in operation would involve much direct contact between functional managers and their counterparts which would not require formal clearances:^{5/}

To facilitate and expedite actions for the counterparts of functional managers, direct contacts are encouraged so long as actions resulting from such contacts are consistent with approved policies and plans and are not contrary to instructions of responsible operating officials... Once effective relationships have been established with the three Associate Administrators to whom Centers report and other key Headquarters officials, the Headquarters functional staff will be able to carry out many normal day-to-day transactions without notifying the information point concerned.

This, then, is a brief description of the development of functional management in NASA and of the formal ground rules by which it is supposed to operate. In carrying out their functions of developing general policy and surveying the activities of operational counterparts in the field, functional managers are to have direct contact with these counterparts, providing them with guidance and leadership as well as instructions in certain areas, while at the same time making sure that their contacts and activities are properly coordinated with those offices in Headquarters who have direct line management responsibilities vis-a-vis the field centers.

One of the striking aspects of the authorities and limitations placed upon NASA functional managers is their essential ambiguity. That is, although the functional managers are nominally given complete responsibility for the carrying out of their activities throughout the agency, the authorities given them to carry out this responsibility are not so

clear. Thus the functional manager is expected to establish policies and standards and procedures for counterparts throughout the agency, but at the same time elaborate clearance procedures must be gone through before policies can be set out officially. The functional manager must inspect the activities of counterparts; but he cannot initiate corrective action himself. The explicit limitations on his authority--such as not issuing major policy statements, instructions which would result in major shifts of resources, or ones affecting other functional areas--also seem to undercut his responsibility. That is, it is not always clear what a functional manager can do in carrying out his responsibilities, since he labors under such substantial restrictions.

It is perhaps better to view the documents pertaining to functional management as expressing a general philosophy rather than explicit guidelines as to how functional managers are to carry out their responsibilities. An interesting question which arises is that of, in effect, "Who is in the middle?" From one point of view it might appear to be the counterparts in the field installation, for they are presumably receiving communications and instructions from two sides, both Center management and the functional managers. On the other hand, it may be the functional managers who are "in the middle." That is, they have been charged with responsibility for their activity throughout the agency, but do not appear to have commensurate authorities to ensure that they can effectively manage this responsibility. This lack of authority comes not only from the explicit limitations which have been

placed upon the activities of functional managers but also from the context in which they must work. They are dealing with counterparts who often have the whole weight of an installation behind them. Counterparts whose experience was in NACA simply are not used to receiving authoritative communications from a Headquarters staff office. Field Centers in general see their own problems as peculiar and are wary of directives from a Headquarters which they feel is lacking in experience, understanding, and sympathy toward the needs of their installation. When representing a Center opposing a Headquarters policy or directive, the counterpart carries a great deal of weight. Since the Headquarters is itself broken up into major offices which have institutional responsibility for the Centers, the functional manager cannot often hope to speak for a unified Headquarters.

In general, then, one might expect that functional management would operate in a climate of dissatisfaction. Functional managers might be expected to be dissatisfied with their lack of authority, field counterparts with the excessive interference of functional managers. By the very nature of the context and history in which functional management must operate, it would seem a priori that it would involve an atmosphere of dissatisfaction. But are the alternatives to this approach feasible? One would involve granting substantial autonomy to the field Centers--for example, simply providing each Center with copies of CSC regulations and orders and allowing it to take upon itself the responsibility for living up to them (this seems

to have been the NACA philosophy). However, such a solution does not seem feasible. Because of the size and complexity of NASA programs, the increasing scrutiny by other agencies within the executive and legislative branches, and the great degree of coordination required by programs which are carried out at a number of Centers, such decentralization is really not a feasible alternative. In addition, it would not be desirable because such an approach would rob the field of what assistance Headquarters staff offices may be able to provide--in dealing with problems which require agency-wide solution, providing assistance with special problems, concentrating on research into new techniques which operational field offices do not have time to explore.

The other major alternative would be to adopt a system of Headquarters management closer to that used in DOD. This would involve much greater intervention by functional managers in the affairs of their counterparts in the field, a flow of commands from Headquarters to the field, more active surveillance of field activities. The feasibility and desirability of such a system does not seem so clear. In terms of the climate required for basic research and the traditions of NASA's predecessor organizations, the outlook for a DOD-type organization would not seem bright. However, as NASA's mission has changed--as the major program (manned space flight leading to the Apollo mission) has developed and the requirements for coordination between the various Centers has increased--the agency has experienced tendencies toward much more centralization in the area of manned space flight. As will

be discussed in more detail later, this tendency toward increased centralization of control over its field Centers by the Office of Manned Space Flight has progressed to the point where the staff of the Associate Administrator for Manned Space Flight includes a substantial number of administrative specialists (e.g., procurement and personnel people) who essentially interject themselves between the functional managers and their counterparts in field installations. If program imbalance and its emphasis upon one particular mission continues (as seems likely), it is likely to increase the tendency toward placing an intermediate "Headquarters" between "the" Headquarters and the field Centers. Such a system contradicts the basic tenets of functional management, and if it persists calls for a reevaluation of functional management.

Footnotes for Chapter II

- 1/ For a more detailed and complete account of this process, see Robert Rosholt, An Administrative History of NASA (unpublished, duplicated for NASA use).
- 2/ "Informational Material on Assignment of Responsibilities in NASA Headquarters," NASA Circular No. 233, June 15, 1962.
- 3/ "Management of Technical and Administrative Activities in the Research and Space Flight Centers," July 13, 1961.
- 4/ "Adapting NASA's Organization and Management to Future Challenges," staff study by Office of Administration, October 1963, Appendix D, p. 9.
- 5/ Ibid., p. 10.

III. Case Studies: Personnel and Procurement

In addition to presenting a general account of functional management in NASA, case studies of functional management in two particular areas will be presented. The two functions chosen for study are personnel and procurement. These two activities are functionally managed by two different organizational elements in NASA Headquarters. Personnel is the province of the Personnel Division of the Office of Administration, while Procurement is handled by the Procurement Office of the Office of Industry Affairs. The two activities selected differ in another and more significant aspect. Procurement is one of the most vital functions which NASA is engaged in--over 90% of the NASA budget is expended via contracts. Thus, in terms of the allocation of NASA resources, procurement is perhaps the most important NASA support activity. Although certainly far from unimportant in terms of achieving NASA goals, personnel practice does not have the salience that procurement does. Related to this fact, it might be surmised that the scrutiny the agency comes under from other parts of government--particularly Congress and the White House--is greater in the case of procurement than personnel (although, of course, the Civil Service Commission constantly scrutinizes the personnel activities of NASA). In addition, the process of procurement--essentially the expenditure of funds--would seem to lend itself to tighter controls by Headquarters than would the less quantifiable and objective process of personnel management. Because of these

facts, one might expect a priori that somewhat closer control of field activities is exercised by Headquarters in procurement than in personnel.

In addition to these differences, the two functions also share a significant similarity. Both procurement and personnel activities in field installations are governed by fairly detailed regulations promulgated by the functional managers in NASA Headquarters. Both activities are fairly amenable to formalization of procedures via general regulations. NASA procurement was made subject to the Armed Service Procurement Act when the Space Act was passed in 1958. Gradually, the NASA Procurement Office has modified and supplemented the Armed Services Procurement Regulations to fit NASA's own requirements and now has developed a complete set of NASA Procurement Regulations. Personnel policy is promulgated by the Civil Service Commission via the Federal Personnel Manual. NASA's Personnel Division either simply forwards such FPM instructions to the field or supplements them with NASA instructions when necessary. In some areas, like classification, NASA has succeeded in exempting itself from much of the Civil Service classification system and has developed its own classification system.

Thus, these two particular areas were selected both for their similarities and differences. It was hoped that a comparison of the two would provide some insight into the operation of functional management.

The major technique utilized was a series of interviews with personnel both in NASA Headquarters and in three field installations. The paper does not deal with "hard" empirical evidence, such as quantitative measurements of communication flows or analysis of the content

of such communications. A basic assumption underlying the research is that the operation of a system like functional management depends to a large extent upon the perceptions, values, and experience of those involved in it. Thus, a series of interviews with approximately 40 personnel was conducted. These personnel came from the Procurement Office and the Personnel Division (the functional managers), and counterparts in procurement and personnel divisions in three field installations (in addition, a few interviews were held within the Headquarters Contract Division and the Headquarters Personnel Division--the operational offices servicing Headquarters, which are treated just as field center offices). The individuals interviewed ranged from Division Directors to Branch and Section Chiefs. By interviewing personnel at various levels, it was hoped that some impression might be formed of the levels, both in Headquarters and in field installations, between which communication flows.

The three Centers visited were chosen because it was hoped they would be representative of the three kinds of Centers which make up NASA. The Centers visited include the Langley Research Center, the Goddard Space Flight Center, and the Manned Spacecraft Center. Langley is the oldest of the NASA Centers, and was the first Center of the NACA (Langley was established in 1917), the only NACA laboratory for 23 years. Langley is often referred to as the "mother" of NASA Centers, since all of the NACA/NASA Centers were formed by elements from Langley (Lewis, Ames, Flight Research Center, Wallops) as well as the Manned Spacecraft Center itself. Langley (and the other Centers under the institutional

direction of the Associate Administrator for Advanced Research and Technology) engages primarily in basic aeronautical, structural, material, and instrument research. Its activities support all programs and all other Centers. The Goddard Space Flight Center is much newer, having been formed as part of NASA out of a nucleus of personnel transferred to NASA from the Naval Research Laboratory. Goddard (under the institutional direction of the Associate Administrator for Space Science and Applications) is concerned with research and development of scientific and applications (meteorological and communications) satellites, as well as responsibilities for the tracking network used in conjunction with NASA satellites. The Manned Spacecraft Center, under the institutional direction of the Associate Administrator for Manned Space Flight, in Houston is one of the newest of NASA Centers, established in 1962. It has a single program responsibility--the development of equipment for NASA's manned space flights, astronaut training, and operations during NASA's manned space flight. Thus, these Centers differ significantly in both their history and current missions.

In addition to attempting to get some impression of how functional management generally works in practice, several specific questions or hypotheses were considered. Some of these are listed below.

First, and perhaps most basic, do individuals in Headquarters and in the field have a common understanding of what functional management is, what it is designed to accomplish, how it is supposed to work?

Secondly, the system on its face brings to mind some of the comments made by Weber about the dangers of specialization. Max Weber asserted

that specialization ~~was~~ destructive of traditional hierarchy in organization-- the standards which it brought into decision-making in organizations often did violence to the principle of decision-making authority resting upon hierarchical position.^{1/} One who has been very critical of functional specialization in business enterprises, Peter Drucker, says the following:^{2/}

...But even proper functional organization by stage of process does not adequately serve the structural requirements of the business. It makes it difficult to focus on business performance. Every functional manager considers his function the most important one, tries to build it up and is prone to subordinate the welfare of the other functions, if not the entire business, to the interests of his unit. There is no real remedy against this tendency in the functional organization. The lust for aggrandizement on the part of each function is a result of the laudable desire of each manager to do a good job.

Functional organization of necessity puts the major emphasis on a specialty, and on a man's acquiring the knowledge and competence that pertains to it. Yet the functional specialists may become so narrow in his vision, his skills and his loyalties as to be totally unfit for general management.

A further weakness is the difficulty of setting objectives in the functional pattern and of measuring the results of functional work... Its objectives will therefore tend to be set in terms of 'professional standards' rather than in terms of the success of the business...

Because of this, functional organization leads to levels upon levels of management. It can rarely train or test a man in business performance, and almost never in a position where he has full responsibility for results. And, largely because it needs many levels, it tends to erode the meaning of each job and make it appear nothing but a steppingstone to a promotion.

Thus it might be hypothesized that functional management tends to aggravate the alleged dysfunction of specialization in organizations-- tending to keep the specialists in the field aware that they represent a technical discipline or profession and making them feel restive when

subject to the discipline of general managers within their installation. Do functional managers represent technical standards and forms of behavior which undermine the Center's management of its functional specialists? On the other hand, the reverse situation could exist. That is, functional managers might view their role as that of defending professional standards, while field specialists felt their loyalties to be to their installation rather than to these standards. Field specialists may, in fact, feel that functional managers prevent them from adequately servicing their installation.

Another question examined is that of the relation between NASA's functional management and the principle of unity of command. NASA's organizational literature often states that functional management is a frank disavowal of the principle of unity of command, recognizing that it is unrealistic in any large organization, and explicitly formalizing a series of multiple reporting relationships for field people.

Administrator James Webb stated in a speech before the American Society for Public Administration:^{3/}

This approach requires a unique type of individual. Those that are only at ease and secure when they 'serve only one boss' are ill adapted to provide effective performance on staffs organized in such a manner... Thus the division directors [in the Office of Administration] share with the Center directors the responsibility for performance of administrative elements within the Center. The administrative elements in the Center do in fact have two bosses. This concept places a premium on competent leadership in the headquarters administrative divisions. There is no escape into the jargon that 'I am only a staff man, but they don't take my advice.' The functional manager approach places a premium on people who can operate on the basis of competence and confidence in relationship to Center Director and Center administrative elements rather than on traditional authority concepts; i.e., 'I have the right to issue directives and you have the obligation to carry them out.'

Do field people really perceive that functional managers are their "boss" in any sense? Do functional managers perceive their role as any more or less authoritative than their field counterparts do? What is the role which inspections or surveys plays in this process of direction from functional managers?

Another area examined is that of conflicts. On its face, the system might lead to a number of types of conflicts. Functional managers and their counterparts might disagree about policy or about specific actions. Functional managers and general Center management might have similar conflicts. Technical personnel in Centers might have disagreements with or oppose the types of policies or regulations put forth by functional managers. In the latter types of conflicts, administrative specialists at the installation might feel themselves to be somewhat in the middle--caught between Headquarters and their own Center personnel.

Another area studied was that of the reactions of field personnel to the type of relationship they have with Headquarters functional managers. Do they feel that functional managers intervene too much in their affairs, and in too much detail? Conversely, do they feel that functional managers do not manage enough, do not supply them with enough guidance?

The following two sections will set forth the case studies of two areas of functional management in NASA, personnel and procurement. A general summary of attitudes of both functional managers and their counterparts will be presented, with special reference to the specific questions suggested above.

Personnel

In general, the personnel of the Personnel Division in NASA Headquarters tended to see three major roles as basic to their management of field counterparts. The first is that of promulgating to the field the basic policy guidelines which are to govern NASA personnel practices. These policies come basically from the Civil Service Commission. Usually in the form of additions to the Federal Personnel Manual (FPM), such policy from the CSC is binding upon all of NASA. In most cases there is no need for Headquarters to do more than to call such changes in the FPM to the attention of the field installations, without additions or modifications of such policy to specific NASA needs. FPM instructions tend to promote uniform personnel practice throughout the Federal government (and hence throughout NASA).

In many instances the FPM instructions from the CSC grant a certain amount of discretion to the various government agencies; in such instances, the Personnel Division must formulate NASA policy on the subject. An example is found in the area of grievance procedure. The FPM merely stipulates that every agency must have a grievance procedure to permit its employees to express dissatisfactions. It is left to the discretion of the agency what form such grievance machinery takes. The Personnel Division drafts a grievance procedure and sends it out to the field installation for comment. Such comments are supposed to be incorporated in a revised draft which is then made NASA policy. In this instance, the policy-making procedure resulted in a uniform NASA procedure

as to grievances. In other instances, when the agency is given discretion, such discretion may be delegated to the field Centers themselves. In cases like this, no uniform NASA procedure exists, and local option is given to the various installations. In situations such as this, the functional managers view their role as basically letting the Centers know that some policy must be made and providing the Centers with some alternatives which they may either use or ignore.

A second basic activity which functional managers perceive themselves as performing is that of offering advice and assistance to their field counterparts in the application of established policies to difficult and critical situations. Specific examples of what this entails were difficult to ascertain, but the process as seen by the functional managers is a fairly informal one whereby counterparts call up Headquarters to get questions answered, ambiguities in the FPM or NASA regulations straightened out. In addition to providing such assistance, the functional managers also see their role as one of providing support in carrying out NASA personnel policy to counterparts. Thus, where a personnel officer in the field might be having difficulty in dealing with a government employees' union, he might come to Headquarters to get an authoritative ruling and to use the Headquarters as either a club or a scapegoat in dealing with a local problem. The functional managers tend to think that such was part of their proper role.

The third basic aspect of functional management as seen from Headquarters is that of surveying (or inspecting, although those interviewed objected to the use of this word) the activities of counterparts

in the field. The personnel survey technique is very similar to that used in procurement. A team is sent out (one is supposed to visit every Center at least once every two years) from Headquarters to spend time at a Center, reviewing and evaluating its personnel activities. The team holds an evaluation conference with the Center before it returns to Headquarters, and eventually compiles an evaluative report which is submitted to the Center Director, the Institutional Director, and the Associate Administrator for Administration. A copy of the report is also submitted to the CSC. Submission to the CSC is not required, but is done by NASA Headquarters as a courtesy. This submission of survey reports to the CSC will be discussed in more detail in later sections of the paper.

Various techniques are used in the survey. Interviews are held with both personnel officers and a sampling of supervisors in the installation, desk audits are made of personnel actions and documentation, a questionnaire is administered to a sampling of installation employees and supervisors to determine how well they have been apprised of their rights and duties as NASA employees. The basis for the survey is a "Guide for Evaluating Personnel Management Activities" which has been formulated by the Personnel Division (after consultation with the field Centers), which includes a listing of 61 elements of personnel management, a standard of performance for each element, and a procedure for measuring whether the standard has been met by the installation visited.

The functional managers view the surveys as having three basic purposes. First, they are designed to evaluate the adequacy of personnel

activities at the Centers and to give NASA management a report on the strength and weaknesses of these activities throughout NASA. Second, they are designed to aid the Centers in personnel activities by letting them know what is expected of them, by giving them an outside appraisal of their activities, by establishing some kind of rapport between Headquarters and field personnel officers. Third, they are designed to provide the field with a dry-run for the Civil Service Commission surveys which are made every three years. Just prior to CSC surveys, the Personnel Division engages in deficiency evaluation surveys, to aid the Centers in making a good showing when the CSC surveys take place. Headquarters functional managers stressed that they attempt to make the survey not an inspection--a visit and evaluation by officials from the outside who are attempting to find fault--but rather a sort of consultative process between members of the same family.

There seems to be a good deal of dissatisfaction, both manifest and latent, among functional managers in personnel. This stems from some feeling that although they are charged with the responsibility for all NASA personnel activities, they are not given commensurate authorities. Functional management was described by one as "like standing in quicksand." None views himself as really being a boss of his counterparts in the field, feeling that he has to rely on persuasion rather than command. A number of allusions were made to Headquarters management of personnel in military agencies, generally reflecting an attitude that there is a much more clear-cut line of authority given to the staff in DOD organizations (although many also asserted that such an organizational pattern would not be feasible in NASA). Most of those

interviewed attributed conflicts with field Centers to management of Centers rather than to counterparts, who are thought to be generally sympathetic to the standards and policies being put forth by Headquarters.

The area of most dissatisfaction was that of classification. As noted before, this particular area is somewhat different from other parts of personnel management. The difference seems to be that in classification there is a clear-cut standard which seems to provide a criterion upon which disagreements and differences may be simply resolved. Since this standard--something like "equal pay for equal work"--exists, those charged with responsibility for classification seem to feel that they "know" how things ought to be done in the field, and when such things are not done, they tend to feel somewhat dissatisfied. This differs from some other areas of personnel in that in these areas there is generally no such feeling that a "right" answer exists, but rather that one can only subjectively judge the activities of field installations. This is not to say that classification personnel are not sensitive to the intricacies of organizational politics which tend to complicate the problem of classification, but rather that the existence of these somewhat clear standards tends to make it more difficult for them to accept the limitations which internal politics may place upon their authority. Thus a classification office in the Personnel Division might talk about a survey of an installation in which 30 to 40% of the positions in the sample were found improperly classified (e.g., the description of the duties entailed did not justify the grade level of the position) and of the complete lack of corrective action taken. The playing off of one Center against another to increase grades was

also galling to the classification officers in Headquarters. Again, though, the fault is believed to lie not with the classification officers in the Centers (who are seen as members of the same discipline and devoted to the same standards) but in management of the Centers. The resolution of the difficulty has to come from the level of general management. DOD takes corrective action; NASA does not. It is a case of the tail wagging the dog, one classification man asserted.

It is somewhat difficult to generalize about the attitudes of counterpart personnel offices because not all in any given Center expressed the same view and those in different Centers varied substantially. Some general impressions will be attempted, with more detailed discussion to follow. All Center personnel have essentially the same conception of what role the functional managers ought to play, although there are substantial disagreements about whether or not they did in fact fulfill this function. The conception expressed by field personnel as to the proper role for functional managers agreed with that expressed by the functional managers themselves. Field people feel that the proper role for functional managers is that of the development of NASA-wide policy where this is required, the dissemination of such policy to the field, inspection of field activities, and provision of advice and interpretation when this was requested by the field. The proper role of functional managers is seen as that of leadership, not direction, of field counterparts.

Functional managers are not perceived by anyone interviewed as having the same authoritative or hierarchical relationship with field

personnel that these personnel have with superiors in their own installations. Although some feel that functional managers attempt to assume such a role, none feels that it is a proper one. Again, there was much allusion to the system of field management used in DOD, with emphasis being that such is not the system NASA has or should have.

The attitude of the field toward inspections--both their general necessity and the adequacy of those used in personnel--is generally favorable (with the notable exception of Langley, which vehemently attacks the survey system as used by NASA). Many did suggest that NASA surveys are copied from the Air Force and asserted that it is not clear that the standards closely conformed to those used by the CSC. There is general agreement that such surveys are necessary, and that it is sometimes useful to have an outside appraisal.

The field personnel do not see a substantial number of conflicts arising between policies put forth by the functional managers and the needs of the Centers. However, they do view themselves as under a good deal of pressure from Center management to speed their activities. When conflicts do arise, there is general consensus that the proper method of operation is to get together with their own management to arrive at a consistent Center position and then to approach Headquarters. Field personnel officers do not seem to feel themselves in the middle between Headquarters and their installation, simply because they see themselves first and foremost as members of their own installation, and only subordinately as members of a professional discipline whose standards were to be defended independent of their own institutional

loyalties. That is, the functional managers are not generally perceived in conflict situations as representing professional or technical standards, but rather as representing a different policy perspective (Headquarters) which is aligned against that of the field.

The question of level of detail of intervention in field affairs brought about extremely varied responses. Some asserted that this is no problem--there is a good division of labor between what the functional managers are doing and what the counterparts have to do, and excessive intervention is no problem (such seemed to be the prevalent attitude at MSC). Others asserted that there is too much intervention, that functional managers want to manage day-to-day affairs of the installations, and this simply is not their role (this attitude was expressed by some personnel people at GSFC). Finally, some asserted that the difficulty lies in the other direction--a lack of leadership and guidance from functional managers, a lack of support in attempting to represent the needs of a good personnel system both to counterparts themselves and to Institutional and General management (this view was expressed by personnel of the Headquarters Personnel Division).

Persons at MSC seem most satisfied with the scheme, feeling that it works much as it is supposed to. They do not feel that the functional managers intervene too much in their affairs, and at the same time feel that they receive sufficient guidance and assistance from Headquarters. They tend to view the surveys as quite acceptable and at times even useful. What conflicts they seemed to perceive are the area of classification, but these do not seem to cause much

anxiety. They simply assert that if the Center feels strongly about a classification matter, they will ignore the Headquarters, while if they do not feel too strongly they will try to go along. In general they are satisfied that their inputs to policy are adequately accounted for, although there is some complaint that the clearance procedures involved in policy making are so elaborate and require so many concurrences that at times policy never gets made. It is somewhat noteworthy that of all the installations considered, MSC seems the most satisfied, since they are probably under more pressure to accomplish their tasks than any of the others. Perhaps this satisfaction is merely an indication that they are left alone more than others. (It might be noted that the Director of the MSC Personnel Division was recently named Deputy Director of the Personnel Division in Headquarters, perhaps an indication that he has been personally successful in working under functional management.)

Attitudes at GSFC are somewhat peculiar. Some seem very satisfied with their relations with Headquarters. Their satisfaction stems from the fact that they think they are generally left alone. Most express an intense loyalty to the installation and some distrust of Headquarters because of its lack of understanding of their needs. They are quite satisfied with relations with Headquarters primarily because they feel they are provided with sufficient autonomy. Others in Goddard Personnel express more dissatisfaction. The intense loyalty to the installation is generally expressed, together with somewhat strong views about the proper role of Headquarters: essentially the view that the Headquarters reason for existence and proper role is that

of serving the installations, and that Headquarters should be passive unless called upon. Dissatisfaction centers around the notion that the functional managers do not understand their role and wanted to manage instead of serve. Their incapacity to manage stems from their distance from the operations of the field and from their lack of experience in problems which the field encounters. Headquarters functional managers are pictured as desiring to "have something to show" for their efforts, hence their excessive intervention in what should be essentially local affairs. The basic criticism seems to be that functional managers require too much NASA-wide consistency in personnel policies, reducing unnecessarily the options available to the Centers (it may be noted, however, that one individual interviewed at Goddard suggested that in fact the beauty of functional management in NASA is that the functional managers do not reduce such options as occurs in DOD organizations).

Personnel officers in Langley also tend to be somewhat critical of their relations with their counterparts. Langley differs significantly from the other Centers considered here primarily in its heritage or tradition. The personnel interviewed have worked together for long periods of time and have developed patterns of personnel policy within their installation which they feel were suited to the needs of the installation. Compared to the NACA pattern of much field Center autonomy, almost any assertion of Headquarters leadership might be expected to be viewed as excessive by Langley personnel. In general, the complaints of Langley personnel officers are not particularly vehement, with the exception of the reaction of

Personnel officers in the NASA Headquarters Personnel Operations Division (which is treated as a field Center servicing NASA Headquarters) express a good deal of dissatisfaction. Their complaints are generally not that the functional managers intervene too much in their affairs, but rather that they intervene too little, providing too little guidance. The dissatisfaction is somewhat muted by the fact that functional management is felt to be not a particularly salient characteristic of their day-to-day operations. The feeling is often expressed that so long as one is able to keep in good standing with one's immediate superior, one's relationship with the functional manager does not matter very much. The major dissatisfaction seems to deal with the feeling that the functional managers are not successful in dealing with the program directors (Associate Administrators for MSF, SSA, OART), impressing upon them, for example, the needs of such things as a good classification program. Many noted that the fault does not lie with the functional managers, but rather with the system itself, which gives them responsibility but not sufficient authority.

Procurement

The Procurement Office personnel interviewed feel that there are four major elements in their role as functional managers. The first function is that of promulgating the regulations which govern NASA procurement activities. The NASA Procurement Regulations contain the policies and procedures which are to govern the contracting activities of all NASA field installations. They cover the various types of contracts (e.g., fixed fee, cost plus fixed fee, incentive), the procedures to be followed when contracting (e.g., formal advertising, negotiation), the types of clauses and steps which must be followed in each type of contract, the administrative and approval procedures which must be followed. The regulations are a manual which specify to all contracting personnel the procedures they should follow.

When considering changes in the Procurement Regulations, the Procurement Office (actually the Policy and Regulations Division) drafts proposed additions or changes to the Regulations and sends them out to the various field centers for their comments (as well as to the Institutional Directors in Headquarters, and the General Counsel's staff in Headquarters). These comments are then consolidated and considered before the final regulation is issued. This process is intended to ensure that the needs of the various different field installations will be accounted for in the process of formulating NASA procurement policy. In this coordination process, the Procurement Office deals with the chief of the procurement division in an installation, permitting him to circulate the proposed policy to those

members of his staff he chooses. They do not deal directly with subordinates of the division chief's staff.

In addition to this NASA-wide policy, the Centers themselves are permitted to develop procedures and policy in areas where the Procurement Office feels there is no need for NASA-wide regulations. These Center procurement policies are nominally supposed to be sent to the Headquarters Procurement Office for review, to ensure that they are in conformance with NASA procurement policy, but because of a lack of staff, the Procurement Office rarely is able to engage in such review. Lack of adverse comment (because of lack of review) is tacit approval of these policies developed by the field Centers.

A second major function of the Procurement Office in its relations with field Center procurement divisions is that of offering advice and assistance to them when it is requested. Such advice may involve interpretation of ambiguities in the Procurement Regulations or other laws or Executive Orders providing them with coordination with other government agencies, or substantive help in particular problems. An example of the latter is the aid which the Procurement Office has supplied some Centers in converting large contracts from cost-plus-fixed-fee to incentive contracts. When the Gemini contract was converted to incentive, members of the staff of the Procurement Office went down to MSC to take part in the task force charged with making this conversion. This interchange of advice and assistance was not generally cited by Headquarters or the field

as a major activity; it is done at the discretion of field personnel; it is a service provided if they need it.

The third major area is that of the contract approval process. The Procurement Regulations provide that certain types of contracts must be submitted to Headquarters for approval before they are signed. In the three Centers involved here, all contracts involving more than \$2½ million and all non-personal service contracts which will last more than 3 years must be submitted to the Procurement Office for approval. This approval process is somewhat complex, since approval must be obtained not only from the Procurement Office, but also from the Institutional Director and the General Counsel's staff. According to the regulations, the Center must allow for 15 days approval time, although in reality the time required may be much longer (Langley personnel asserted it usually took at least three weeks, while MSC personnel said it sometimes took up to four months). This approval process is perhaps the most important single control device available to Headquarters in relation to actual procurement transactions taking place in the field. The dollar amounts requiring Headquarters approval have been regularly increased, presumably giving the field more and more discretion. In addition to reviewing the actual contract to ensure that it "reflect(s) the application of sound business judgment, conform(s) with procurement policies and procedures," and that it "would be in the best interest of the Government,"^{4/} Headquarters also requires that the field submit a procurement plan prior to beginning work on the actual contract. This plan is reviewed by Headquarters to ensure that the proposed approach to the procurement is most advantageous.

The final major segment of functional management is the survey process (the responsibility of the Contract Management and Surveillance Division of the Procurement Office). This process is carried out by teams from the Procurement Office which visit NASA installations to review their procurement activities. The teams spend about two weeks at each installation, with individuals from the various divisions of the Procurement Office reviewing activities in their special field. The survey procedure has recently been modified and now attempts to concentrate not so much on an audit of particular activities of field offices as on the general management of procurement activities at the installation. The team concentrates upon how well the regulations are being adhered to, how they are being interpreted, what difficulties are being encountered by the field in applying the regulations. A pre-survey visit is made by Headquarters personnel to talk with the Center procurement people about what problems they may be encountering, so the personnel making up the survey team may be selected on the basis of areas which will aid the Center most. After the survey has been made, a draft report is sent to the Center so that they may comment upon and rebut criticisms made. Then the final report is sent to the Institutional Director. The Procurement Office views the purpose of the survey as that of stimulating the Centers to be aware of their responsibilities.

A certain number of deviations from Procurement Regulations are inevitably found. Headquarters personnel attributed these to a number of causes:

- . pressure by Center management to get the procurement job done expeditiously
- . lack of knowledge of procurement regulations, primarily because procurement personnel at Centers have been drawn from many agencies; they may sincerely misinterpret the regulations, thinking they are acting properly
- . policy disputes -- where field disagrees with the procurement policy; often this is because they have not been subject to Headquarters surveillance long enough to realize the importance of following regulations
- . excessive workloads
- . lack of cooperation from the contractor.

A large percentage of the personnel in the Procurement Office came from the Department of Defense, particularly the Air Force. Hence they have in the past worked under a system of headquarter-field relationships which differs significantly from that used in NASA. Relationships between them and their counterparts in the field are much less authoritative than those they have previously experienced. In addition, the clearance procedures required in NASA are very extensive. This is particularly true in the case of Centers under the institutional management of the Office of Manned Space Flight. OMSF has developed its own procurement staff. Hence the review which goes on at the level of the Institutional Director is much greater in relation to these Centers than others (neither OSSA or OART has a large staff of procurement specialists). Although a few of those interviewed feel somewhat restive in their new environment, most do not seem particularly dissatisfied with their authority in relation to counterparts in the field. They recognized that they were not "bosses" of their

counterparts and that much of their effectiveness has to come out of persuasion and a great deal of coordination with many other organizational elements. They seem to see their role as that of producing the policy which their counterparts are to implement, and to attempt to ensure that they do so. They seem to feel that procurement personnel are all members of a single fraternity, but that since people in the field are likely to be under substantial pressure from those they are serving, and are likely to develop loyalties to their own installations, Headquarters has to be on guard to keep the regulations and professional standards before them.

What dissatisfaction there was (in addition to the slight restiveness some felt after coming from DOD to NASA) dealt partly with the lack of personnel available to review the policies made by the field. In addition, concern was expressed about relations between the Procurement Office and Centers reporting to OMSF. The placement of procurement personnel essentially between the Procurement Office and counterparts in field installations would seem to be a violation of the spirit of functional management. Responsibility for management of activities in installations is supposed to lie with the Procurement Office. However, since the installations under the OMSF must report to this office, the placement of a procurement staff which actively reviews procurement activities in the Centers is blurred, and the authorities of the Procurement Office vis-a-vis these Centers is diluted. The existence of such a staff in OMSF is currently under review. In addition to the problems it creates

for the Procurement Office, it creates even greater ones for the Procurement Division people in those Centers reporting to OMSF (such as MSC). This will be discussed later, but it may be mentioned that the situation is a classic case of what has been called "counterparting"--a central overhead unit is created to aid top management in coordinating and supervising the activities of other offices in an agency, but this control is diluted by the establishment of counterpart units in various organizational elements which makes it difficult for the overhead unit to deal effectively with the other elements.

As in the case of Personnel, there was general agreement between functional managers and counterparts in the area of procurement as to what role the functional managers should play under the system as now constituted. But again, as in the case of Personnel, counterparts have some distinct ideas about how the system might be changed to aid in more effective carrying out of procurement activities. The relationship between the Procurement Office and counterparts is seen not as one between superior and subordinate, for those communications received from functional managers are not instructions or commands. Of course, the procurement regulations are authoritative in the sense that they must be followed, and approvals or disapprovals from the Procurement Office are binding, but generally it was not felt by counterparts that they "worked for" the functional managers.

In the first major area of functional management (as perceived by the functional managers themselves), that of policy and regulation promulgation, there is some dissatisfaction expressed by field counterparts.

Some expressed the view that they do not have much influence upon the regulations that are enunciated by the functional managers. Those who did criticize the policy-making process assert either that they never receive proposed regulations for comment in the first place, or if they do, never feel that their suggestions are considered. Some feel that this is inevitable, since so many installations and offices have inputs to the final regulation. However, in general, this type of criticism--that field inputs are not considered--is not widely expressed. Another criticism of the policy-making process deals with dissatisfaction with the regulations set forth. Some assert that the regulations were taken directly from DOD and Air Force regulations, with little consideration of modification for NASA needs. A final criticism suggests that in some ways not enough regulations are established. In areas where a standard NASA policy or procedure would be advantageous, nothing is done. The only concrete example of such a lack suggested is that of the absence of a standard NASA Procurement Request form. In general, though, there seems to be a good deal of satisfaction with this activity by functional managers--with the process by which the field is taken into the formulation of NASA policy, and with the regulations themselves. Although many mentioned that the regulations were "beginning to bind" no major dissatisfaction is expressed.

In the area of providing advice and assistance to field Centers, again the field seems satisfied that the functional managers were doing a

satisfactory job. People in field installations seem to perceive this as a somewhat limited aspect of Headquarters-field relationships, stating that requests for such guidance are rare. However, when major assistance is required--such as in the case of the Gemini conversion to incentive contract--Headquarters is perceived as willing and able to provide such assistance.

The contract approval procedure is the most criticized aspect of functional management. Many different kinds of criticism are made. The first merely asserts that the content levels requiring approval are such that Headquarters approval is required in too many cases, hampering the carrying out of procurement activities. Tied in with this is the criticism, that the time required for approval is simply excessive. Estimates of approval time by field personnel ranged from a minimum of three weeks to up to four months. When a request for a procurement is made sufficiently early, the time required for Headquarters approval can be "programmed in" the procurement process and the delays provided for. But when a request is not made early, or some rush is required, the approval time is found to be intolerably burdensome by some in the field (most criticisms were made at MSC, where the most pressure is presumably felt to get contracts approved).

A second kind of criticism deals with the existence of procurement specialists in OMSF. At MSC, many expressed the view that the proper way in which functional management should work would be for the Center and OMSF to get a common position and then to "fight it out" with the Procurement Office and the General Counsel's office. This

does not occur, since the procurement specialists in OMSF are seen as second-guessing the procurement people at MSC, and hence severely weakening their position vis-a-vis the other Headquarters elements.

At this point, another difficulty may be mentioned, though it is not strictly relevant to functional management. Procurement personnel at MSC suggested that one of their difficulties lies in the fact that they felt themselves to be "in the middle" between technical people at the Center and technical people in OMSF. Thus the technical people at the Center request a procurement be made, specifying the item and standards (such as reliability and quality control) which should be made part of the contract. The procurement personnel at the Center begin to act upon this request, only to find that when they go through OMSF for approval, the standards in the contract are reevaluated there, and approval held up until the difference of opinion between the technical people at the Center and those in OMSF are resolved.

A third kind of criticism made of the approval procedure is simply that it is based upon arbitrary and somewhat irrational standards (that is, the levels used have no particularly rational basis). It is asserted that the levels were chosen because of some kind of curiosity in Headquarters to know what was going on in field installation procurement, and that this curiosity was naturally directed at the larger contracts. These contracts generally turn out to be ones which people in Headquarters tend to know most about anyway and are a very small fraction of those contracts made. An alternative approval procedure suggested was that of approval of a statistical sampling of contracts,

with the sample size determined by the quality of contracting found in those approved. In this way, it was suggested, Headquarters can exert a much greater influence upon the quality of procurement being engaged in by field installations. If errors or shortcomings are detected in contracts coming up for approval, the size of the sample can be raised; if contracting appears to be done efficiently and correctly, the sample size could be reduced.

The final criticism of the approval procedure dealt with that done by the General Counsel's office. Almost all those interviewed asserted that this is much more of a stumbling block in getting approval than is the Procurement Office. The major criticism is that the kind of comments and inputs which the General Counsel can make are actually matters of policy--suggestions as to what, from a policy standpoint, should be included in a contract. However, such comments are expressed in terms of legalisms and absolute truths, thus disguising the fact that they simply express an opinion as to how best to make a contract. In addition, the lack of strong precedents relevant to research and development contracting, and the application by the legal staff of precedents developed out of contracting in an earlier era are criticized. Finally, it was suggested that when a contract sent up for approval comes back with comments, no accurate designation is made of where the comments came from, thus making it difficult to sort out those coming from the General Counsel's office and those from other offices.

In the area of surveys, some differences of opinion were expressed.

Procurement personnel at Langley seemed quite satisfied with the procedure, asserting that not only is it necessary from Headquarters point of view, but also useful from the installations vantage point, providing them an independent perspective and often useful insights. Personnel at Goddard and MSC do not seem to agree. The disagreement did not deal with objections to the procedure, but rather with a lack of conviction that it made any contribution. Some even denied that such surveys even exist. Others suggest that though they are aware of their existence, they know of nothing ever resulting from them. It seems fairly clear that at MSC at the branch chief level, and at the director's level at Goddard, the surveys make little impression. From the standpoint of Headquarters surveillance, such lack of salience is no problem; from the standpoint of the survey as an aid to counterparts, something is lacking. It should be noted that apparently quite recently, the survey procedure has been revised by the Procurement Office. The new procedure may change these attitudes.

Footnotes for Chapter III

- 1/ Weber's discussion may be found in H. H. Gerth and C. Wright Mills (trans. and eds.), From Max Weber: Essays in Sociology (New York: Oxford University Press), 1946.
- 2/ Peter Drucker, The Practice of Management (New York: Harper & Brothers, 1954), p. 208.
- 3/ James Webb, "Administration and Management of Space Exploration," speech delivered before American Society for Public Administration, April 13, 1962, Detroit, Michigan.
- 4/ Office of Procurement, "Organizations and Functions," July 1963.

IV. Summary and Conclusions

Some summary answers to the questions suggested earlier may now be provided. The first deals with the existence of a common understanding among both Headquarters functional managers and their counterparts in the field as to the nature of functional managers, how it is to work, what relations are supposed to exist between the Headquarters staff offices and counterparts in the field. This common understanding is obviously necessary if relations between functional managers and their counterparts are to be harmonious and effective. In general, such an understanding seems to exist. Both functional managers and counterparts seem to have essentially similar conceptions of what it is each is supposed to be doing under the ground rules currently established. Some differences do exist in perceptions of what functional managers are actually doing, and in how the ground rules might be profitably changed. In the first category fall those attitudes of field people that functional managers intervene too much in their affairs, try in effect to manage more than they are supposed to. In the second category fall those in Headquarters who think that if they are to carry out their activities they must be given greater authority in dealing with counterparts, and those procurement personnel in the field (especially at MSC) who think that the approval procedures for contracts should be changed, permitting installations more autonomy.

In general, though, it may be concluded that a substantial gap in communication about the nature of functional management is not a

problem. Disagreements as to what it should be are to be expected, but even in this area they do not seem so substantial as to be unduly disruptive of Headquarters-field relationships. One possible major problem area may be mentioned here. It has not been possible in this study to determine clearly whether or not general management in NASA is satisfied with the way in which functional management is carried on. It is possible that some dissatisfaction does exist here, for example, a feeling that the functional managers are not carrying out their proper role, are not aggressive enough in dealing with their counterparts in the field. If this is the case, then a serious gap in communication and perception does in fact exist--not between functional managers and their counterparts, but between functional managers and higher management. The resolution of such a problem would probably depend upon some statement by higher management, either a re-assertion of the authorities of functional managers or perhaps some general reorganization which placed the Office of Administration on a somewhat higher level organizationally. The impression gathered in this study is that some problem like this does exist, more in the Office of Administration than in the area of procurement, and that some more explicit spelling out of functional management or some such re-organization might be beneficial. From the point of view of the functional managers (and presumably of those who direct their activities within Headquarters), the major difference observed between those in Procurement and Personnel was the much higher degree of confidence in what they were doing and

their authorities to do it displayed by procurement personnel. This, it is suggested, is partly due to their somewhat stronger position in the overall organization of Headquarters. If more authority and confidence is to be expected from functional managers in the Office of Administration, an increase in the "level" of this activity within Headquarters might be a good first step.

A second general question considered was the relation between functional management and the question of specialization in large organizations. One hypothesis suggested was that functional management tended to emphasize the common community of specialists within a given field and thereby reduce the loyalties and responsiveness of counterparts to the needs of their own Center management. Although there was no opportunity to get opinions from higher Center management, the indications from those who were interviewed are that such is not a major problem in NASA. In the first place, though it is true that many of the functional managers do view a major part of their role as that of representing technical and professional standards to counterparts, they are not viewed in this light by the counterparts themselves. Counterparts of course do view themselves as members of a technical or professional division, with its own standards as to what constitutes a "good" procurement or personnel program. They view themselves as just as aware of these standards as are the functional managers, and in effect "don't need anyone else to tell them about" the standards. What functional managers do represent to field counterparts is

essentially another policy perspective, another installation (not so much a "Headquarters"). What functional managers promulgate to the field are essential matters of NASA policy (which may or may not be viewed as in conflict with the policy views of the Center), not by any means technical or professional standards. The views and directives of Headquarters are seen as representing different--essentially "political"--decisions, and are no more technical or instrumental than those decisions or policies made by the Centers themselves. Thus functional management does not in fact tend to aggravate the dysfunction between hierarchy and specialization.

Another and related area may be mentioned at this point. If functional management is operating as it should, the functional managers should not only be concerned with the activities of their counterparts in the field, promulgating policies to them, making sure these are carried out, offering them advice and assistance. The effective functional manager should also have an impact upon Institutional Directors, and through them on Center management. He should aid his counterparts not only directly but also indirectly, by making those for whom the counterpart must work directly aware of the policies, procedures, techniques, and constraints under which an effective personnel or procurement officer must work. Naturally the bulk of what effective relationships a counterpart can establish with his Center management and with the technical program people he serves must be done at the Center level, through contacts between counterparts and those they serve.

It would seem that functional managers might also play an important role in the process of interaction between counterparts and Center management and technical program personnel. In the simplest instance, Center management may be impressed with the requirements of procurement officers by virtue of promulgation of certain procedures in the Procurement Regulations. More generally, pressure by Center or technical management upon counterparts to take short cuts, modify policy, etc., might be fended off by either simple invocation of the authority of the functional management office or by direct appeal. In the area of procurement, such seems to be the case, for the Procurement Office has sufficient prestige and relations with institutional and field management to aid its counterparts in this fashion. The major exception would seem to be in the area of Manned Space Flight, where the existence of a procurement staff in the Institutional Director's Office tends to blunt the relations between the Procurement Office and field Center management, and to make relations between counterparts and the functional managers somewhat strained. In the case of personnel, the relations between functional managers and institutional and Center management do not seem so good. This is evidenced by the complaints of some personnel people that one difficulty they encounter is a lack of sufficient guidance from functional managers, and a feeling that it is not always clear that general management

favors the policies promulgated by the functional managers. Again, this problem seems to stem in large part from the lack of "status" of the Personnel Division in NASA Headquarters, and from a consequent timidity on the part of Personnel people in dealing with institutional and Center management. One step which might tend to ameliorate this difficulty would be to make it more clear that the policies set forth by the Personnel Division have been reviewed and approved by general management. Of course, one of the objectives in the functional management system is that of freeing general management from the responsibility of reviewing such directives (by delegating the authority to issue such policy to functional managers). But the difficulty which functional managers seem to encounter in dealing with institutional and Center managers suggests that this delegation of authority has not been clearly recognized, and some step to either reinforce the delegation or to have general management actually approve such policies might be in order.

The third major area to be considered is the relation between functional management and the concept of unity of command. As noted above, NASA literature on the subject speaks of "more than one boss" and multiple reporting relationships. It was fairly clear from the study that most people in Headquarters and in the field did not believe that functional management involved an individual having more than one boss, even though the multiple reporting process obviously did exist. The types of communication between functional managers and their counterparts were seen as not having the quality of superior to subordinate which relations between a man and his "boss" were felt to have. Naturally the promulgation of a regulation to the field is communication of an authoritative and binding nature (since the field is obligated to follow such regulations), but these were not perceived as instructions binding particular behavior that one receives from a boss. In addition, there was a general feeling that if one was successful in remaining in good standing with his superior in the installation then the evaluation of one's performance by the functional managers was not very important. Generally, functional management did not seem to place individuals in doubt as to whom they should appeal for instruction. Although multiple reporting relationships do exist, it is generally clear to those in the field who is their ultimate superior.

It could be suggested a priori that functional management would work most effectively if multiple reporting relationships tended to exist more at higher levels in a counterpart office (e.g., the Division Chief's office) than at lower echelons. Since multiple reporting relationships are sometimes confusing and violate one's intuitive notions of how an organization should be instructed, it would seem rational to concentrate them as much as possible at one level, leaving the normal chain of command unencumbered at lower levels within a counterpart office. Such seems to be the case generally. Although there is contact at most levels in field offices, such contact decreases the lower the echelon in the counterpart office (from division to branch to section). Complaints about Headquarters intervention in field matters were more prevalent at the division level than at the branch or section level, another indication that although there is contact at all levels, authoritative communications tend to be funneled through the division chief only by him to lower levels.

Some suggestions for modifying functional management seem to emerge from the comments of those who participate in it. One of the major difficulties encountered in functional management in personnel seems to be the lack of confidence exhibited by functional managers that they have the support of management in NASA when they are attempting to deal with counterparts. Such lack of confidence in their role results in the criticisms of some in the field that enough guidance is not provided, that decisions are not made because approval of all concerned

can never be secured, and the fact that functional managers do not seem as effective in relating the needs of a good personnel program to Institutional and Center management as they are in dealing with their own counterparts. The solution to this problem is not evident from the research for this paper.

One possible solution might be to in some way elevate the importance of the functions of the Office of Administration in the Headquarters hierarchy. This would provide functional managers a good deal more confidence in the support they will receive from Headquarters in dealing with counterparts and with institutional and Center management, much in the way Procurement Office personnel seem to exhibit such confidence.

Another means of attaining this objective might be reissuance of manual instructions more forcefully asserting the authorities of functional managers. Either of these steps need not imply that functional managers will be performing essentially different functions vis-a-vis their counterparts, but would in some measure make them more effective in performing those functions which they are already charged with.

As a third alternative, it might also be desirable to impress more fully upon the functional managers that their success in large part depends upon the expertise which they can provide, not upon their explicit authorities in dealing with counterparts. Reiterating to

functional managers the concept that theirs is an authority of ideas, not of formal status, might help some of those functional managers who have come from strong staff agencies in DOD more efficiently (and with less dissatisfaction) perform their functions within the context in which the NASA system places them.

In a way, these suggestions cut against each other. Two seem to suggest increasing the authorities of functional managers, while the other seems to emphasize pointing up their limitations. Nonetheless, it would seem that a little of both is needed. (The first idea would not actually increase the explicit authorities of functional managers, but would rather merely give more weight or prestige to functional managers in carrying out their functions.)

Perhaps before such an essentially incremental change is contemplated, a more basic question pertaining to functional management must be answered. As has been suggested before, NASA has experienced a trend toward increased centralization and control over operations of field installations. Such a trend is to be expected--with the emphasis being placed upon manned space flight and the increasing requirements for Center coordination, Headquarters (through the Institutional Director) is bound to attempt to exercise more influence over the field Centers. However, if such a trend is going to continue--and there seems every reason to believe it will even after the Apollo Program is over--

a reconsideration of the whole scheme of functional management is perhaps in order. The difficulties currently being encountered because of the existence of rather modest administrative staffs in the Office of Manned Space Flight suggest the even greater difficulties which may be encountered if the trend toward enlarging the influence exercised (and hence the staffs) by the Institutional Directors. It would appear illogical to charge the staff offices--the functional managers--with responsibility for the carrying out of their functions at the field installations if their relationships with counterparts are confused because of a new organizational level between the functional manager and his counterpart. If it is decided that the Institutional Director shall develop his own administrative staff, then functional management of administrative functions in those installations reporting to him lies with his staff, not the Headquarters staff offices currently called functional managers. On the basis of this paper, a conclusion as to the proper solution to this difficulty obviously cannot be reached. But it is a question which deserves substantial consideration.

A second major area which may be in need of improvement is that of contact between functional managers and their counterparts. The primary area of face to face contact is the surveys or inspections. As noted in the body of the paper, such surveys (both in procurement and personnel) are viewed in the field as necessary evils rather than positive

contributions to their activities. In part this attitude will necessarily exist, for a major part of the survey function is that of inspecting the activities of counterparts and reporting upon them to management in NASA Headquarters. Because of this fact, criticism by some field personnel that the surveys should not be formalized and conducted by teams probably should not be acted upon. Because of the necessity for the surveillance activity, and because of requirements of efficiency, it would seem that visits by teams are essential. It is not as clear, though, why copies of reports of personnel surveys must be sent to the Civil Service Commission. Such an action (which the CSC does not require) would seem to rob the surveys of what good they might have as mutual exchanges of information between Headquarters and the field, since it obviously makes the survey team much more "outsiders" than they would be otherwise.

In addition to face-to-face contact via the survey procedure, other opportunities for such contact are available. This contact is obviously very useful, for it aids personnel in understanding the problems of each other, in establishing personal relationships, and in general in widening the perspective of both sides. Several alternatives for increasing such contact are available. One such method of increasing contacts is a regularly scheduled conference at which personnel from Headquarters and the field get together to discuss

mutual problems, hear speakers with expertise in their field, etc.

This device is used in Procurement (via an annual procurement officers conference) and in the area of training in Personnel. Everyone concerned seemed agreed that these conferences were very useful.

The only criticisms came from some training officers who felt that the programs were too much taken up with formal lectures by outside experts, and left not enough time for informal discussions. The general agreement that these conferences were useful and aided greatly in improving relations between Headquarters and the field suggests that they might profitably be instituted in other areas of personnel.

Another possibility is that of encouraging more informal visits between the field and Headquarters. As noted above, this was the chief complaint of personnel officers at Langley--that the Headquarters officers rarely came to Langley except as part of formal survey teams. In addition to more visits by Headquarters people to the field, visits by field people to Headquarters would also seem desirable, to let them know something more about the decision-making process in Headquarters, the environment in which functional managers must operate. These visits might best take the form of an officer going to spend a week or ten days sitting with a counterpart, observing how he goes about his job.

A third alternative would be that of a system of formal rotation of personnel for extended periods. This has been often considered for

NASA but has never been considered feasible. This is partly because it has been felt that NASA officers both in Headquarters and the field have been too busy learning their own jobs and performing their functions to be sent out for extended periods to the field (or to Headquarters). In addition, the lack of uniformity in activities of field installations has made it somewhat difficult for an individual to step into the job of a counterpart at another installation and be capable of working efficiently. However, a good deal of informal rotation has been undertaken. Thus, many of the personnel in the Contract Management and Surveillance Division of the Procurement Office have come from Center procurement offices, and the recently appointed Deputy Director of the Personnel Division was formerly Chief of the Personnel Division at MSC. A continued emphasis (and perhaps a formalization of the concept) on the idea of drawing upon the entire agency as a source in filling key vacancies, wherever they may occur, would seem very desirable. Although formal rotation of personnel from jobs in Headquarters to counterpart jobs in the field (and vice versa) is not feasible, as much switching of positions as can be accomplished via the process of filling vacancies will be highly valuable. In addition, the program whereby Management Interns in Headquarters spend part of their training period in the field, and the encouragement of young officers in the field to come to Headquarters would seem very desirable. One major obstacle in rotation of personnel is that it appears that positions in Head-

quarters are not viewed as generally desirable by people in the field (as one said, "being sent to Headquarters is like being sent to Siberia"). Thus, there does not seem to be a great deal of desire on the part of field personnel to be stationed in Headquarters for long periods of time, though short visits are viewed favorably.

All of these conclusions are necessarily tentative, for they are based upon a very preliminary study. Functional management seems to have been the natural outgrowth of the mission NASA was charged with and the historical context out of which the agency grew. Any modification of the system must take these factors into account. As the agency gains experience as an entity on its own, as its mission evolves, some decisions as to the direction functional management shall take will be in order.

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