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DATA PROCESSING IN THE MARINE CORPS
AS INFLUENCED BY GOVERNMENT POLICIES.

by

Bernace Malvin Symm

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DATA PROCESSING IN THE MARINE CORPS
AS INFLUENCED BY GOVERNMENT POLICIES

BY

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CHAPTER I

INTRODUCTION

Data processing can be thought of, and has been referred to, as automation, automated information, computerization, computer systems, just to name a few. All of these terms define a certain process of using a man and a machine in some combination to do a job, but the procedure employed or the end result will be the reason for the differing term used. It may be the combination of the manager and a machine to produce a product of the mind (decisions in management), or the combination of the manual worker and a machine to produce a product of the hand (production of goods). The former combination, the manager and the machine, will be the interest of this study.

Before defining terms that are not a relevant part of this study, the definitions of terms necessary to this study will be given. This study will encompass U.S. governmental civilian agencies, military agencies and the Marine Corps, and for this reason, jointly-used definitions are presented as:

data--a general term used to denote any or all facts, numbers, letters and symbols, or facts that refer to or describe an object, idea, condition, situation, or other facts; it connotes basic elements of information which can be processed or produced by a computer; sometimes data is considered to be expressible only in numerical form, but information is not so limited; data is related to information and information is related to data.¹ The second term,

data processing--the preparation of source media which contain data or basic elements of information according to precise rules of procedure to accomplish such operations as classifying, sorting, calculating, summarizing and recording.²

Since these definitions pertain to manual and automatic or mechanized processing systems, the terms of automatic data processing, for the consideration of this paper will be: data processing performed by a system of electronic (use of electron action) or electrical (use of proton and electron charge frictions) machines so interconnected and interacting as to reduce to a minimum the need for human assistance or intervention.³

These definitions may seem superfluous to the reader

¹U.S. Government, Bureau of the Budget, Automatic Data Processing, Glossary, (GPO Washington, D.C., 1962) p. 16.

²Ibid, p. 40.

³Ibid.

now, but data processing, as it will become apparent in this study, reaches deeply into various fields of activity, and it is necessary to define the basic intents and parameters of it for a better understanding.

Data processing has been a part of the decision-making process for many years. It is reasonable to assume that the collection of information, and the ultimate correlation of the necessary information toward a decision, have always been basic ingredients in the process of decision-making. As the societies on earth grew larger and more sophisticated in the required methods of decisions, man also needed more help in the collection and memory of the necessary facts. As the facts became more numerous, he also needed help to arrive at mathematical answers to overcome the natural and detrimental slowness of the human mental and physical process. This study is not intended to trace the progress of aids for the human mind. It is necessary, however, to stress that the beginning of the use of the abacus or the comptometer, in their days, may have been considered revolutionary, just as data processing has revolutionized more recent decision methods and aids.

The Chairman of the National Commission on Technology,

Automation, and Economic Progress recognized the setting of the Commission in 1946 by the consideration that:¹

"Technology is not a vessel into which people are to be poured and to which they must be molded. It is something to be adapted to the needs of mankind and to the furtherance of human ends, including the enrichment of personality and environment... Technology has, on balance, surely been a great blessing to mankind despite the fact that some of the benefits have been offset by costs... In the new technology, machines and automated processes will do the routine and mechanical work...and that our problem is to marshall the needed technologies, some of which are known and some not yet known".

Historians will probably describe the current time as an age of conscious social change; conscious, in that one reads and hears about it constantly. The changes that are happening, include the rapid growth of population, the massive flow of peoples from rural areas to the cities, the steady growth of national income and wealth, the rise of oppressed and submerged peoples, the rebellion of youth, the spread of mass education, the extension of leisure, the venture into space, and the frightening increase in destructiveness of military weapons. Change is worldwide in scope. Not all nations or regions are participating to the same degree or have

¹U.S. National Committee on Technology, Automation and Economic Progress, Technology and the American Economy, Volume I, February 1966, (Washington, Government Printing Office, 1966) p. xiii.

reached the same stage, but almost no part of the world has been left untouched.

It is easy to oversimplify the course of history, yet if there is one predominant factor underlying current social change, it is surely the advancement of technology. As men have learned the power of applying thought and experiment to the attainment of human ends and have systematically exploited the possibilities of pure science and technology, a steady flow of new methods, new designs, and new products has resulted.¹

It is also easy to assume that all change in technological methods has been easily implemented or readily accepted for most of us have been recipients of the benefits. Consider, however, labor's view which holds that automating a physical process replaces the wage-deserving labors of a man that robs him of his livelihood and that continuous substitution of man by machine will disrupt and eliminate the needs of the working class.² Labor has been replaced by machine to do

¹U.S. National Committee on Technology, Automation and Economic Progress, Technology and the American Economy, Volume I, February 1966, (Washington, Government Printing Office, 1966) p. xi.

²George Meany, An Address to the National Convention of the American Federation of Labor and Congress of Industrial Organizations, Washington, D.C., November 14, 1963.

repetitive work at a faster pace, and has been relieved to do more imaginative work. It will become clear that, properly understood and used, the computer joins man in a symbiotic existence, so long as man emphasizes the proper knowledge about this seemingly misunderstood technology. Did not the abacus displace the man's fingers and hands for more productive work? The human must also be prepared for the process and the benefits of change, before he can function as a useful member in the new changed procedure so that it can be beneficial to his society. In this respect one may readily remember the haste of the Secretary of Defense, and even the President of the United States, in the Planning, Programming, and Budgeting system, which was to be a radical change to the governmental agency fiscal systems, and was implemented by decree.¹ Until this day, the government agencies have not fully implemented the system for many reasons, perhaps the main one being their lack of preparation for and understanding the need for the change.

¹U.S., Bureau of the Budget, Memorandum to the Agencies; Programming, Planning and Budgeting, August 18, 1965.

²U.S., Congress, Senate, Sub-Committee on National Security and International Operations of the Committee on Government Operations, Planning, Programming and Budgeting, Interim Observations, dated December 2, 1968.

Subject and Approach

This study treats that area of technological advance that concerns data processing in the Marine Corps as it has been influenced by the policies of the government. Along with the previous governmental computer growth and the benefits of recognized speed for information on which to base decisions, this study of data processing is designed to gauge its relative value and use in the Marine Corps. The basic theme will not calculate the value of data processing results in dollar-savings or manpower-savings, but rather to see how to gain the necessary information to make one's decision more sound. This study has no motive to view the commander as one who should mechanistically listen for automated signals toward decisions which will automatically result in his success. There is, however, every intention to discover if data processing does "automatically" result in his success. There is also every intention to discover if data processing is the commander's automatic tool that relieves him of some of his more menial mental tasks, so that he can use his human mental facility to make decisions based on the accurate machine data processed information.

Research Questions

The questions that will require answers may be placed in three areas:

- (1) What is the role of the computer as an information management tool to aid in systematizing decision-making in the Marine Corps? This question realizes that the Marine Corps is a part of a larger unit to which it supplies, and from which it receives information and guidance, and that the word 'system' has a fluid dimension.
- (2) What is the growth pattern of data processing in the Marine Corps? The reasoning in this area of investigation is to check the steadiness of progression or to reveal the weakness of thinking, based on the whims of the times. It is assumed that a steady growth pattern reveals the efficacy of a change and a positive acceptance by those affected or benefited by such change.

- (3) The third, and final question, asks if data processing has improved the management performance in the Marine Corps. This question does not assume that the management ability has been in need of improvement, and it does not assume that a dollar-value can be attached to the value of current and past decisions. It must ask if the current decisions are made more within the time they are needed, or if the decision-maker, with data processing, has more accurate and valuable information with which he may be able to make sounder decisions.

Scope and Organization of the Study

This study will relate to the general story of data processing technology in today's society in order to focus better on the specific element of studying data processing as a management information tool in the Marine Corps. Data processing, in some manner and by some title, has reached almost every management function in the economy and almost

every economic or social element has benefited from its use.¹ To focus on the element considered necessary to this study, Chapter II will survey the growth, and the problems of growth of data processing in the government agencies. Government agencies will be those of the federal government only, but it must be recognized that the benefits of computerization and the lack of coordination among agencies in its exploitation also affects the state governments.² It is necessary to recognize that the Marine Corps, as a government function, is intricately associated with the data processing functions and policies of the governmental agencies. Chapter III will present the governmental policies, the authorities and their responsibilities as they are set forth in law, regulation and in practice. Chapter IV will treat, in greater detail, the policies and organization of the data processing effort in the Marine Corps. In this chapter the data processing efforts will also be evaluated for acceptance by the manager and the

¹U.S. National Committee on Technology, Automation and Economic Progress, Technology and the American Economy, Volume I, February 1966, (Washington: Government Printing Office, 1966) pp. 1-8.

²Intergovernmental Task Force on Information Systems. The Dynamics of Information Flow; Recommendations to Improve the Flow of Information Within and Among Federal, State and Local Governments, April 1, 1968, pp. 1-4.

commander. The hypothesis in this area is that the manager may readily accept the advantage of mechanical operations to ease his efforts, such as the adding machine which he controls; however, this same manager may not readily accept information outside of his control on which to base his decisions. In this latter case, he may be distrustful of it or merely resort to his previous mental mechanics which may duplicate the speedier, and perhaps more accurate, computer results furnished him. The fifth chapter will relate the plans for data processing in the future in the Marine Corps, if such future use is found or warranted as a continuing or expanding, worthwhile and accepted management tool. The sixth and final chapter, will be reserved for the conclusion to the questions of this study.

CHAPTER II

SURVEY OF GOVERNMENT AGENCIES IN DATA PROCESSING GROWTH

To understand the problems or the advantages attached to the growth of the computer, it may seem necessary to cite some numbers relevant to such growth. Exact numbers, sizes and specifications cannot be determined for there are many reasons why statistics gathering and forecasting are difficult. First, the rapid change of computer types, performance characteristics and peripheral equipment makes even the meaning of the number of computers installed difficult to define. One knows that in June of 1968 the forty-three federal agencies, together, owned 4,232 computer systems¹ at a total asset value of over \$3 billion,² but it becomes meaningful only when it is compared to the growth of 400 percent over the last four years,

¹U.S., Bureau of the Budget, Government-wide EDPE Utilization, Report No. 3A, dated November 25, 1968, pp. 32-34.

²Personal Interview with Mr. Walter Magee, Staff Officer, Data Processing Division, U.S., Bureau of the Budget, on February 6, 1969.

and the fact that there were none at all in the federal agencies only twenty years ago.¹ Second, as computers get more efficient, new uses and new capabilities cannot be forecast now, although about ninety percent of the agency computers have general purpose capabilities.² Consider that the computer is built to run with proper maintenance effort 24 hours a day,³ and that there are 720 working hours in the average month. The average number of hours per month of out-of and in-service use of computers in the federal agencies was 438 hours in 1968.⁴ These nearly 300 hours of available time can be increased by new computers that can do the current work even faster, or decreased by adding new work to the current computer capability. Third, the occupational

¹U.S. Bureau of the Budget, Secretary of the Treasury and the General Accounting Office, Joint Financial Management Improvement Program in the U.S. Progress 1948-1963, (Washington: Government Printing Office, 1963), pp. 17-18.

²U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 9.

³Ibid., p. 11.

⁴U.S. Bureau of the Budget, Government-wide EDPE Utilization, Report No. 3A, dated November 25, 1968, pp. 32-34 (Out-of service [usually for routine maintenance] and in-service [actual program time], are periods of non-availability for other purposes, thus, 720 hours of out-of and in-service use would be 100% utilization.)

titles and duties vary markedly from one installation to another, and a particular position may be described by over 100 titles, as was the case as late as 1967.¹ It is this speed of growth that reflects the lack of preparedness on the part of the user of this new machine. The speed of growth also demanded a change in the human operational and mental processes for the machine to become useful. However, the infant "computer" can become the Gargantua to those who cannot, or who choose not to, adjust to using its capabilities. All of the foregoing will become evident in reviewing the computer growth actions and human reactions in the federal agencies and in the Marine Corps.

The concept and mechanism of the basic elements of the computer, as a mind-extender, have their bases in previous inventions that helped man do his arithmetic or mathematics. In the beginning, our prehistoric forerunner calculated by counting on his fingers, by marking on his cave wall, or by collecting pebbles. As man's culture became more complex, he resorted to the more sophisticated "abacus" -- a physical representation system based on "fives and twos". Perhaps, the

¹U.S. Congress, House, Committee on Government Operations, Data Processing Management in the Federal Government, 90th Cong., 1st Sess., July 18, 19 and 20, 1967, p. 55.

successor of the computational assistance was rendered by his ten fingers on his two hands. Before 1833, some counting machines (Professor Schickard's counter--1623) and a calculating machine (Frenchman Blaise Pascal--1642) had been invented. In 1833, Charles Babbage's "analytical engine" was conceived using the binary system of numbers (zeros and ones), which is the basic language of mathematics of computers today. The developments of the computer moved slowly, and were not to affect man's thoughts or abilities until the end of World War II, after which "this new technology" became known.¹ This new technology was to affect society in numerous ways in which its rapidity of growth was enlightening and problematic.

Rapid Growth

The great demand and quick acceptance of computers after World War II apparently caused the building of more computers and the invention of greater machines. The invention of greater-capacity computers afforded more implementation and more expanded use. For example, to skip just a few years, in 1963, Control Data Corporation, a relatively new, but large manufacturer in the field, unveiled the biggest capacity

¹Personal Interview with the Director of Military Systems, International Business Machines, Incorporated, Washington, D. C., Mr. Jim Griffin, February 10, 1969.

machine available, its model 6600, which was to be the answer to all the possible needs of data processing. Only five years later, the same corporation unveiled a new model, the 7600; again the largest computer available. The 7600 model is able to do the higher mathematics five times faster than the 6600, and uses small computers within the larger unit to gain speed in the input-output process. This example indicates that the growth of the computer is a currently explosive process. In many ways, the huge computer is to many fields of science what the bigger optical or radio-telescope is to the astronomer, or what the more powerful accelerator is to the experimental physicist searching for the ultimate particles of matter. The 7600 model is claimed, however, to be not only for computational or scientific use, but also for data processing or business use. Unlike the other devices, the super computer provides a general purpose window into the markings of the physical world through mathematical simulation. With it, scientists and engineers can test theories and, at relatively low cost, perform otherwise complex expensive and dangerous experiments.¹

¹"The Super Computer," Newsweek, December 7, 1968, pp. 38-40.

To relate the foregoing in perspective, a brief history is necessary to show not only its current general growth, but also the rapidity of growth of ADP in the government. Consider that in 1948 there were no electronic computers or computer systems in the government, but by the end of fiscal year 1963 there were over 1,248¹ computer systems in use. Now in 1969, this number has been multiplied more than three times.² A computer system, for the purpose of this study and use of statistical quantities, is defined as one Central Processing Unit (CPU) -- oft times referred to as the brain along with the necessary or desired input-output and storage devices. The increasing number of computers takes on added importance when it is related to its parent systems costing portions of and multiples of millions of dollars, which will be discussed later. The applications of the computer in the government include business, scientific, financial and engineering purposes.

¹U.S. Bureau of the Budget, 1964 Inventory of Automatic Data Processing Equipment in the Federal Government, July 1964, (Washington, Government Printing Office, 1964).

²U.S. Bureau of the Budget, Government-wide EDPE Utilization, Report No. 3A, dated November 25, 1968, pp. 32-34 (Out-of and in-service use are period of non-availability for other purposes, thus, 720 hours of out-of and in-service use would be 100% utilization).

Excluded from these data is processing equipment used for tactical, intelligence and other classified purposes. By 1963 the computer affected almost every major government activity with special emphasis on the Department of Defense which, at that time, concentrated its computer capabilities most heavily in its supply and logistics programs, and related financial operations.¹

Problems of Managing Growth

Managing the growth of the computer has become necessary as a result of the large money costs of the machinery, and especially as a result of the uses made of this machine.

The purposes for which this new capability may be used are astounding, and demand control. For instance, in October 1968, the American Computer Expert, Professor Robert Fano warned at the World Computer Congress in Berlin:

"The Utopian Horror of 1984 is the fear of the omniscient 'Big Brother' over all of us, without any trouble. There are many private organizations already in America with data banks of intimate information about millions of Americans which is available to anyone willing to pay for it."

¹U.S. Bureau of the Budget, Secretary of the Treasury and the General Accounting Office, Joint Financial Management Improvement Program in the U.S., Progress 1948-1963, (Washington: Government Printing Office, 1963) pp. 17-18.

Professor Wolfgang Giloi of the Berlin Technical University, at the same Congress, related:

"The definite plans of the government are to use the computer to record data about the citizen's private life, his political beliefs and his previous convictions".¹

The foregoing is mentioned to indicate the possibilities of use or misuse of the computer, and how much it has "grown" into one's social existence; how it may be as a tool, used or misused, for his benefit or for his detriment, or even destruction. If the foregoing elicits any fear, it is best to remember Peter Drucker's studied response to determine if the computer is master, with the advice to "pull the plug".² As simple as it seems to not use the technology, it is to one's real detriment if he does not use it.

Since this study treats the computer in a federal agency (the Marine Corps), its growth in use and the requirements for management reflect the experience in the federal agencies and the Marine Corps. The problem of management, and the need for it, can be detected in at least four underlying

¹Ranier Malzig, "The Computer Can Be Our Downfall", Hannoverische Zeitung (West Germany), October, 1968.

Peter A. Drucker, "What the Computers Will Be Telling You", Nations Business, Vol. 54, No. 8, (August 1966), pp. 84-90.

attitudes which served as obstacles for the technology or the manager. The first of these was the desire of each agency function to have its own computer for prestige, or merely as another machine similar to a typewriter or calculator in cost and operator requirements. The computer became a status symbol to the bureaucrat. It seemed that each agency had to have the biggest and most costly with little regard for the efficient return on the costs.¹ The second was the assumption that the computer was so automatic that it would "magically" produce answers or information for "questions" fed into it. The third was its sophistication which led people to hide behind ignorance and, therefore, not wanting to learn how to use it, rejected it as being contrary to their accustomed thinking process. The fourth was the manager's reasoning that such a device would surely and automatically replace people and be a savings in personnel costs greater than the cost of the computer installation. Some of the problems that resulted from the foregoing attitudes still exist, but many problems have been corrected,

¹Jack Brooks, Congressman, in his Remarks before the 14th Annual MIS-ADP Conference of the American Management Association in New York City on March 4, 1968.

and most attitudes have been changed as a result of direct legislative action.¹ The first computer with general data processing capability, the UNIVAC I, (Serial No. 1), was introduced in the Bureau of the Census in March, 1951.² In 1954, there were ten computer systems in operation in the federal government. By 1962 there were 1,000 and by 1964 the number increased to 2,000. These numbers were in addition to the 1,000 to 2,000 computers used by government contractors that were leased or purchased at government expense and the computer component of the tactical weapons and defense systems were not a part of the central management program.³ By mid-summer of 1958 the growth of the electronic computer, in stature as well as in numbers, seemed to warrant special organizational recognition by the government because of the impact computers had upon the government generally; and because in an organizational sense, the

¹Personal Interview with Mr. Walter Magee, Staff Officer, Data Processing Division, U.S. Bureau of the Budget, on February 6, 1969.

²U.S. Congress, House, Committee on Government Operations, Automatic Data Processing Equipment, 90th Cong., 1st Sess., H.R. 4845, p. 153.

³U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 6.

central agencies were not prepared to cope fully with that impact.¹ As early as June 27, 1958 the Comptroller General, as the Congressional Watchdog, issued the first of four comprehensive government-wide management reports.² The first report recognized the tremendous potential of the computer in the agencies, and stressed concern over certain trends in ADP acquisition and use, which were believed to lead inevitably to cost inefficiencies. (Notably, each agency desired its own computer system or systems as a result of considering the computer as a "machine", instead of considering its needs in computational, recording and storage spaces and times.) The GAO saw the agencies substituting the costly ADP for less sophisticated equipment, rather than integrating ADP into agency procedures and functions on a systematic basis. The greatest concern was expressed over the lack of any one agency with the responsibility to direct and coordinate continuing developments in this field.

¹U.S. Bureau of the Budget, Report of Findings and Recommendations Resulting from Automated Data Processing (ADP) Responsibilities Study, September 1958-June 1959, p. 1.

²U.S. Congress, Government Accounting Office, Summary of Progress and Trend of Development and Use of Automatic Data Processing and Management Control Systems of the Federal Government as of December, 1957, GAO File No. B-115369.

This possible deficiency was not acted upon until 1965, when the Chief Executive distributed ADP Administration and Management responsibilities to the Bureau of the Budget with overall supervision; the General Services Administration with selection, acquisition, utilization, standardization studies for cost effectiveness; the Department of Commerce with consultative systems design and technique services to all agencies; and the Civil Service Commission with the executive-wide personnel management and training aspects of automatic data processing.¹ In October 1965, the legislators recognized the need for a coordinated management approach by stating its objectives in the computer development and use in the federal government as a Public Law.² On December 30, 1960, GAO issued a second government-wide audit report which, aside from urging greater ADP utilization in some defense functions readily adaptable to ADP, again emphasized the need for government-wide coordination of ADP management.³ The costs of installations continued to rise,

¹U.S. Bureau of the Budget, Responsibilities for the Administration and Management of Automatic Data Processing Equipment, Circular No. A-71 dated March 6, 1965.

²U.S. Public Law 89-306.

³U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 19.

and the federal agencies began to resort to leasing arrangements (apparently with incomplete and shortsighted planning) to reduce the costs of computer use. On March 6, 1963 the GAO issued the third government-wide audit report, which revealed the lack of any progress toward cost reduction, or economic use of the computers among the agencies. This 1963 report reiterated the GAO recommendation of five years standing that government-wide coordination is necessary to effect economic use. In this report, GAO recognized three areas of computer use that reflected the same attitude of management policies of the 1950's when the existing policies that applied to calculators, punched cards, and other office equipment were extended to ADP. The report revealed areas of agency-to-agency cost waste, resulting from the lack of coordination or economic analysis. The first was the lease system versus purchase system comparison of sixteen then widely-used ADP systems which revealed that purchasing the machines would result in cost savings in over one-half of the 1,000 systems then in use or an order amounting to \$100 million each year. To realize fully these savings the needs of the agencies, as a whole, must be considered instead of the initial user alone. The second area recognized the waste of available ADP capability. ADP systems are designed (technically

and economically) to operate three shifts a day, but at that time, the federal usage was a little more than one shift a day.¹ On April 30, 1964 the GAO issued the fourth report which was a reiteration of the need for and the lack of coordinated planning and management in agency computer use.² In 1959, the Bureau of the Budget summarized its findings as being the result of the passive, partial or informal leadership in the federal government that have outworn their usefulness and that in the fast growing and costly ADP program dynamic leadership is a necessity.³ By 1965 the dynamic leadership had still not occurred. The GAO made audit reports to the Congress which presented the problems with the recommendations that this new technology required a new and dynamic management approach for which the executive agency management guidelines appeared inadequate.⁴

¹U.S. Congress, Comptroller General of the United States, "Study of Financial Advantages of Purchase over Leasing of Electronic Data Processing Equipment in the Federal Government," (March 1963). GAO file No. B-115369.

²U.S. Congress, Comptroller General of the United States, "Review of Problems Relating to Management and Administration of Electronic Data Processing Systems in the Federal Government," April 1964, GAO file No. B-115369.

³U.S. Bureau of the Budget, Report of Findings and Recommendations Resulting from Automatic Data Processing (ADP) Responsibilities Study, September 1958-1959, p. 1.

⁴U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 17.

In 1960 the Bureau of the Budget advised governmental agencies, by its Bulletin 60-6, of the need for and the nature of ADP feasibility studies and planning to precede a decision to utilize ADP.¹ This Bulletin, although being a detailed and complete guide to the agencies, did not place a requirement on any agency contemplating ADP acquisition to adhere to the recommended evaluation procedures. In 1961 the Bureau of the Budget issued Circular A-54 which set forth policies for making computer selections based on exact system specifications affording all capable manufacturers consideration of bid, to give precedence to fulfillment of system needs consistent with overall costs, and to make lease versus purchase evaluations.² Since nothing heretofore required pre-purchase feedback or control, the Bureau on March 14, 1962 required all agencies to furnish annual reports on their ADP inventories, and to furnish also limited ADP utilization information. In 1963, under the Directorship of Mr. Kermit Gordon, the Bureau of the Budget published guidelines for

¹U.S. Bureau of the Budget, Guidelines for Studies to Precede the Acquisition of Automatic Data Processing Equipment, BuBud Bul. No. 60-6 of March 18, 1960.

²U.S. Bureau of the Budget, Policies on Selection and Acquisition of Automatic Data Processing (ADP) Equipment, BuBud Circular A-54, dated October 14, 1961.

appraising agencies to be used by the Bureau's Examiner and other professional staff in the Bureau.¹ Although nearing a decade of the computer in the agencies, these guidelines admitted to encouraging results in utilizing ADP, and also admitted that these results showed an actual greater efficiency in the old data processing systems in use before the computer.² This indicates that the computer was used to mechanize recurring reports, but not to help in digesting the information to be used in better decisions. The dynamic growth and development in capacity, capability and number are made evident by comparing the short time span from the UNIVAC I in 1951, the first general data processor, to 1969 with the over 4,000 computers in government with capabilities that are still not yet fully utilized or recognized.³ That such dynamic growth caused management problems in government can be viewed in the light of Peter Drucker's observations of our political and civil service systems as they

¹U.S. Bureau of the Budget, Guidelines for Appraising Agency Practices in the Management of Automatic Data Processing (ADP) Equipment, BuBud Circular A-61 dated August 3, 1963.

²U.S. Bureau of the Budget, Guidelines for Appraising Agency Practices in the Management of Automatic Data Processing (ADP) Equipment, BuBud Circular A-61 dated August 3, 1963, p. i.

³Personal Interview with Mr. Walter Magee, Staff Officer, Data Processing Division, U.S. Bureau of the Budget, on February 6, 1969.

developed in the last fifty years. Drucker contends that politics is focused not on the 90 percent of money and effort devoted to current programs, but rather to the 10 percent devoted to crisis and new programs. Politics is not congenial to managerial organization which is left to the politically-protected administrative structure -- the civil service. He recognizes that this process not only protects the incumbents in the agencies from the pressures of politics, but it also protects these same incumbents from the demands of performance. Government service is void of positive rewards and penalties for quality of performance or the lack of it. The premium in government service is on "not rocking the boat" in the agencies, on no innovation, on no initiative, but rather on following accustomed procedures and the desires of the party in power.¹

The results of the fast pace of computer development and of the slow pace of agency managerial progress become evident in yet another, perhaps even more critical area. Since the computer was for a long time considered so similar to the afore-used calculator or typewriter, the special training needed

¹Peter F. Drucker, The Age of Discontinuity, (New York: Harper and Row, 1968).

to utilize the specialized capability of the computer properly and fully was never recognized.¹ As early as 1958-1959 the Bureau of the Budget detected the lack of understanding in the agencies regarding the type or level of leadership required to employ successfully and benefit from the computer. The agencies and the Executive had not found the necessity to promulgate special attention and policies on specific equipments heretofore, but the studies of the impact of the computer technology clearly permitted no choice but to demonstrate new management attitudes at the higher levels and a greater comprehension of this technology by upper management.² Apparently, there was some stagnation in the efforts of upper management to use this new tool at all levels. In 1966, the National Commission on Technology, Automation and Economic Progress, declared that, "with 2.5 million employees, the federal government, even though the public pressure for increased efficiency in government operations is constant and insistent, has a particular

¹U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 3.

²U.S. Bureau of the Budget, Report of Findings and Recommendations Resulting from Automatic Data Processing (ADP) Responsibilities Study, September 1958-June 1959, pp. 20-21.

obligation in the management of change."¹ Without the specially trained computer-use-knowledgeable personnel on hand to use this new technology it could not be used sufficiently, properly, or economically until such training deficiency was remedied. In 1963, Mr. Bellman clearly outlined the problem of the distorted views causing some of the unpreparedness for the computer technology in his analysis. He said:

"Unfortunately, some writers have been carried away by their imaginations, turning out science-fiction instead of logical, well-founded information."

He further contended that the computer rests clearly on adaptive control processes which can help the decision or solution seeker. He focuses on the computer's limitations which, good or bad, require the user to state his questions in a logical and precise format suitable for machine consumption. This clearly indicates that the usefulness of the machine depends in great part, on the ability of the user to translate his method of thinking into the method of the machine. Indeed the machine is not human and, therefore, cannot do thinking.²

¹U.S. National Committee on Technology, Automation and Economic Progress, Technology and the American Economy, Volume I, February 1966, (Washington: Government Printing Office, 1966) p. 69.

²Richard Bellman, "Computers and Decision Making," Computers and Automation, Volume 12, No. 1, (January 1963), pp. 1-12.

CHAPTER III

FORMING GOVERNMENT POLICIES REGARDING DATA PROCESSING

Data processing, as a machine, was conceived, developed and bought by the agencies before any government policies or legislation indicated any recognition of the impact of the change to come. The technological evaluation of the computer is usually described in terms of generations.¹ A generation for the computer, unlike Webster's definition of it as a succession of a father by a child about every thirty-three years or the single stage in succession by natural descent,² signifies its basic make-up or technological position. By 1965, the U.S.

¹U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, pp. 2 & 3.

²"Generation", Webster's New Collegiate Dictionary, Based on Webster's New International Dictionary (Second Edition), (Springfield, Mass., G & C Merriam Co., Publishers, 1951). p. 345.

economy was ready to enter the third generation of ADP technology.¹ The first generation equipment contained electronic vacuum tubes, whereas the second generation's equipment introduced solid state transistors. The third generation ADP integrates with communications systems, whereby central computers of high capacity supply the needs of many users. These users, instead of acquiring ADP or visiting an ADP service center, will feed problems or information to be processed into the central computer over a communications system, which will also return their desired output of information. The technical and economic feasibility of improvement and growth benefits was proved by 1965, and the desirability to change to newer systems was considered in the policies of the law-makers of P.L. 89-306. The policies supporting P.L. 89-306 permit gradual change to newer, larger and faster capacity systems as inevitable, but demand that any change be based on 'actual' need for larger and faster capabilities and that the older equipment be fully amortized.²

¹U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 345.

²Ibid, pp. 11 and 12.

Unlike the fast and great growth of the computer, government regulation or policy moved slowly, and as will be seen, inadequately. History may argue that early regulations were necessary to bridle expenses, or that the absence of them helped to stimulate imaginative use of the technology. An overall analysis would require some more use-experience, but the stage of development and expenses from 1963 to 1967 and even to the present, demanded some attention in authority designation and agency policies about the computer.

Authority and Policy

In the 1950's, the existing management policies extended to general office equipment were considered applicable to ADP. The high and noticeable cost of ADP as an item in the agency budget was the only indicator for control. It was finally noticed by the Bureau of the Budget, exercising its executive-brand money control authority, during the annual agency-wide budget review process. The BOB derives its responsibility of policy over the departments and agencies through the Budget and Accounting Act of 1921¹ and the Budget and Accounting Procedures Act of 1950.² Until P.L. 89-306, control over the departments

¹42 Stat. 30: 31 U.S.C. 1

²64 Stat. 832: 31 U.S.C. 1

and agencies in computer management was exercised solely through BOB's authority to "...assemble, correlate, revise, reduce or increase the request for appropriations of the several departments or establishments."¹ Not until 1958, five years after the introduction of the computer in the agencies, did BOB begin a comprehensive ADP Responsibilities Study as a result of the high cost of this new budget expense item.² This study recognized the need for specialized management of ADP, for government-wide coordination and for accurate up-to-date information for all levels of management. Generally, the agencies did not coordinate or study the potentials of the technology, or economics of its use. Each agency was found to determine freely its need to satisfy its need; and it could not ultimately fit into another information system because its own machine, program or system was determined to be singularly different. There were no criteria to guide the agencies in determining their needs for data processing, or in methods to satisfy them. If these were deficiencies that impeded good management in computer uses in

¹U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 11.

²Ibid, p. 3.

1959, then they were deeply rooted, for in 1965 a similar BOB study again revealed the same deficiencies. The problems or deficiencies were noted, but adequate or responsible action to require compliance with a definitive computer-use plan was missing. The Bureau of the Budget issued "guidelines" to the agencies concerning the considerations to be made in computer use, management and procurement. From 1959 until 1965, the General Accounting Office rendered about 100 audit reports which revealed serious shortcomings in the acquisition and use of ADP in various departments and agencies, as well as ADP acquired under cost reimbursable contracts at the expense of the government. In the hearings that preceded Public Law 89-306¹ in 1965, sponsored by Congressman Jack Brooks of Texas, it was noted that a law was necessary to establish a legal demand for data processing management, since most of the deficiencies uncovered by the GAO actually constituted violations of BOB guidelines.² Public Law 89-306 may be considered as the beginning

¹P.L. 89-306, (dated 31 October 1965, this Public Law amended Title I of the Federal Property and Administrative Act of 1949 63 Stat. 377 to Provide for the Economic and Efficient Purchase, Lease, Maintenance, Operation, and Utilization of Automatic Data Processing Equipment by Federal Departments and Agencies).

²U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 3.

of a new management approach to data processing in the government, for the Executive Branch had not successfully coped with its management responsibilities before P.L. 89-306.

Public Law 89-306 delineates the responsibilities of BOB, GSA and the Department of Commerce to provide a stronger organizational plan for government ADP management. By this law, BOB retains its traditional control over fiscal matters, and the National Bureau of Standards of the Commerce Department renders technical support and strives for ADP compatibility. The General Services Administration was to establish a "revolving fund" to provide fiscal and inventory information about systems on hand and available so that a better use and cost picture would be available to the requiring agency. GSA was to establish multi-user ADP service centers, and manage the inefficient use of computer time among the agencies. In effect, the GSA was to be the general purpose ADP clearing house as a buying and leasing agent for the other agencies, with the hope that such action would eliminate the waste of single-agency purchases and insufficient use of capacity.¹ To gain a basis to estimate the

¹U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, Report No. 802 Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965, p. 5.

cost of the insufficient use of capacity, the BOB asked the agencies to report their unused computer time by monthly average for September, October and November of 1963. The agencies reported 500,000 hours which was reduced to 170,000 hours after allowing 150,000 hours for computers (a) used in sensitive areas, (b) the necessity to reserve time for contingencies, and (c) used under special circumstances which preclude joint use; reducing 140,000 hours for computers used by scientists and engineers in confined areas of investigation and deducting an added 40,000 hours for computers held for 'real time' inquiry response from distant locales. Mr. Staats, the Deputy Director of BOB, also defined this unusual time to be during the second and third shifts and on weekends.¹ A commercial time-sharing rate of 40 cents per use-second² would constitute a monthly loss

¹U.S. Congress, House, Subcommittee of the Committee on Government Operations, Hearings on H.R. 4845, "A Bill to Provide for the Economic Efficient Purchase, Lease, Maintenance, Operation, and Utilization of Automatic Data Processing Equipment by Federal Departments and Agencies, 89th Cong., 1st Sess., 1965, pp. 70 and 71.

²The 40-cents-per-second cost for commercial time sharing is used as a reasonable rate which is subject to change due to technological advances (a decrease usually) and specific added services (usually increases) such as accelerated retrieval or computation needs and competition from new time-sharing firms. This price was an 11 December 1968 quotation by Computer Response Corporation (a time-sharing firm) of Washington, D. C., to the author by Mr. James McGuire.

or waste of at least \$244,800,000 which is almost twice the \$135 million spent on computer science and research by the federal agencies in the whole of fiscal year 1964.¹ To 'save' money when replacing a system every 2 or 3 years, some agencies resorted to leasing and actually paid rental rates that approximated the full purchase price.² By leasing, it facilitated getting rid of the old system, since ownership never existed, and the agency could not be criticized for excess spending to have the newest, most prestigious data processing system. The loss of some prestige to the agency heads appeared inherent in P.L. 89-306 since they forcefully objected to GSA purchasing on the grounds that it would infringe on their own prerogatives in defining the exact machine for a job that they themselves knew

¹U.S. Congress, Senate, Committee on Government Operations, Report to the President on the Management of Automatic Data Processing in the Federal Government, 89th Cong., 1st Sess., (Doc. No. 15), 1965, p. 53. (This report was prepared by the Bureau of the Budget for the Senate Committee on Government Operations. The BOB, in defining research and development costs applied to computer sciences included the design and development of computers and of programming techniques, and mathematics related to the use of computers, including simulation and related aids.)

²U.S. Congress, Comptroller General of the United States, "Study of Financial Advantages of Purchase over Leasing of Electronic Data Processing Equipment in the Federal Government," (March 6, 1963). GAO file No. B-115369. pp. 2-8.

best. The Department of Defense expressed that central procurement would enhance the already monopolistic position of IBM and reduce the new and smaller technology entrants for they would not be able to bid for such large purchases. DOD further held that a larger number of smaller manufacturers would advance competition for better prices and technologic advances.¹ It would appear that the Sherman Anti-trust Act of 1890 would be a more appropriate recourse to maintain competition than the 1965 Data Processing Act² which was understood to infringe on agency prerogatives by having GSA tend to limit competition by bulk purchases. It also appears that the implications in management presented by the computer were either too broad to be dealt with by the federal manager (The Executive Branch) or the implications were not understood. Whichever the case, the studies were becoming lengthy by any gauge and responsibilities had to be exercised and policies had to be declared by the authority which will be treated next as the need for centralized management.

Centralized Management

By 1967 the management of ADP in the agencies was

¹U.S. Department of Defense, Deputy Assistant Secretary of Defense (Supply & Services) Paul H. Riley in his letter to the Hon. Joseph Campbell, Comptroller General dated May 7, 1963.

²Public Law 89-306.

essentially as it is now in the beginning of 1969. The much-opposed GSA central procurement role, as interpreted in P.L. 89-306, did not materialize. The agencies do submit a monthly EDPE utilization report which is available to the BOB and GAO. This report shows the out-of-service (for preventive and remedial maintenance and other down time) and in-service (set-up, re-run by manufacturer or other, development and production) time in hours. The most recent report was current as of June 30, 1968.¹ In the absence of concrete standards² for out-of or in-service, the average actual monthly hours of 438, instead of the available 720 hours in the average 30-day month, can show only that the inventory of computers is still being under-utilized. Thus, if all of the unused time were to be assessed as a cost or sale at the commercial time sharing rate of 40 cents per-use-second,³ it constitutes profits foregone or money wasted by the agencies of \$1,718 million per month. To clarify these seemingly

¹U.S. Bureau of the Budget, Government-wide EDPE Utilization, Report No. 3A, dated November 25, 1968. pp. 32-34.

²Personal Interview with Mr. Walter Magee, Staff Officer, Data Processing Division, U.S. Bureau of the Budget, on February 6, 1969.

³Personal Interview with Mr. James McGuire, Sales Representative, Computer Response Corporation, Washington, D. C., on December 11, 1968.

astronomical dollar wastes, the commercial time-sharing cost was used since it revealed the more readily perceived costs of computer time. The annual costs, by government accounting, reveal the purchase costs of computers installed in the agencies of 1,169 in 1963 at \$568 million and of 3,000 in 1967 at an annual cost of \$1.2 billion.¹ These figures reveal that, even though the price of the computer decreased, the total costs (hardware, software, personnel, and modernization) are even greater since government accounting reflects only the cost of the basic asset. By any method, the agencies are losing money by not using about 40 percent of their capacity, which is a waste of resources that merely lacks dimension. More centralized attention is suggested by the variation in total in-service time of the computers in the agencies, for in the 25 November 1968 EDPE Utilization Report the total in-service time compared to available time ranges from sixteen to sixty in percentage.

Public Law 89-306 did cause some economies by using some time available on government computers located at other than at the requiring location, rather than acquiring additional equipment which resulted in a \$26 million saving in 1967 and

¹U.S. Congress, House, Committee on Government Operations, Data Processing Management in the Federal Government, 90th Cong., 1st Sess., July 18, 19 and 20, 1967, p. 8.

another \$70 million saving by redistributing computers within the government in the same year.¹ Compared to the cost of unused time previously related, these savings of time-sharing and redistribution certainly indicate some acceptance by the agencies of centralized time and inventory management. However, the large percentages of unused time tend to indicate that even more needs to be done to share computer time to decrease costs of asset inventory and increase computer in-use time. This sums the governmental policies affecting data processing in the Marine Corps, and invites attention to the Marine Corps' Data Processing Program itself.

¹Data Processing Management in the Federal Government. Hearings before a Subcommittee of the Committee on Government Operations. House of Representatives, 90th Cong., 1st Sess., July 18, 19 and 20, 1967.

CHAPTER IV

THE MARINE CORPS DATA PROCESSING PROGRAM

As one part of the Department of Defense as a government agency, it can be properly assumed that the Marine Corps was also affected by the data processing technology. Although small relative to the other services, it still has divisions of nine enlisted and fourteen officer grades. It has 488 separate occupational skills for its personnel. There are 614 different types of organizations for a total of 1,500 separate organizations and many additional individual billets.¹

The Marine Corps has a data processing program which supports the Command and Management System² and it will be studied for answers to the original hypotheses in three areas: (1) Policy Guidance; (2) Organization, and (3) Acceptance.

¹Oscar F. Peatross, Major General, USMC, "Marine Corps Develops Advanced Command and Management Systems," Navy Management Review, Vol XII, No. 7, (July, 1967), p. 9.

²U.S. Marine Corps, Command and Management Systems Handbook, Marine Corps Order P 5200.14 dated 5 July 1968.

Policy Guidance

The historical development of data processing in federal agencies would generally apply to the Marine Corps until 1966, when the Chief of Staff of the Corps directed specific studies to evaluate the organization of Headquarters to cope with, and to benefit from, this new capability. The previous slow growth of usage, manpower unpreparedness and even objections by the manager to data processing in federal agencies have been discussed and, therefore, will not be treated again.

Although ADP was given a great status after 1966, the current importance of ADP was given perspective by the Marine Commandant. On a recent trip (January 1969) to Far East installations, General Leonard F. Chapman, Jr., the Commandant of the Marine Corps, as its senior manager, pronounced his policies and data processing status publicly at an interview with the Armed Forces Radio and Television Facilities as:

"We've gone in heavily for computers and automation systems of all kinds. The machines are marvelous, but, of course, they're no better than the men who run them. We're putting quite an effort into training Marines to operate the machines".¹

¹Interview with CMC, Marine Corps Gazette, February 1969, p. 1.

No machine, including data processing or computers, can make the decision for which it is not programmed; that is, for which it has not received direction. One characteristic of the computer that makes it unique among technological achievements is that it forces man to think about what he is doing with greater clarity and precision. Wherever it is used, the computer is improving the quantity and quality of human cogitation, and is rapidly becoming a sort of universal disciplinarian.¹ If, therefore, the computer depends on accurate directions for its performance, it seems logical to hold that the human must give it accurate directions so that he may fruitfully use its facility. This corollary seems so simple that it should have everyone turn to the computer and, likewise learn how to use it. It is this lack of desire to learn to use the computer that caused it to be less the tool that it is, and less the benefit that it could be. Top management, therefore, must force a new methodology into the thoughts of the subordinate Commanders.² It is recognized

¹Gilbert Burck and the Editors of Fortune, The Computer Age and its Potential for Management, (New York: Harper & Row, Inc., Publishers, 1965) pp. 2-3.

²Leonard F. Chapman, Jr., General, "Program Progress Report Proves Marine Corps Management Asset," Navy Management Review, Vol. XII, No. 7, July 1967. P. 5.

that it is difficult to get anyone to admit to a current negative or previously ignorant attitude regarding any innovation. Thus, the responsibility to prepare for the use of data processing rested directly with each agency for nowhere in the federal government organization is or was there a facility designated to train or prepare the agencies for data processing or computer use. Each, or most of the agencies now have a data processing or management office of some sort, yet, it was and still is the effort of the individual agency that gives it a data processing or decision system.¹

In view of the foregoing, the Chief of Staff of the Marine Corps, Lieutenant General L. F. Chapman, Jr., in 1966, directed the Deputy Chief of Staff for Administration to study the Marine Corps Headquarters for feasibility of reorganization and ability to implement the computer and data processing as a decision tool for the Headquarters and, in part, for the field commanders.² At the time of this study (during 1966) the Marine Corps had thirty ADP installations with over 1,500 personnel,

¹U.S. General Services Administration, United States Government Organization Manual, 1968-1969 (Washington: Government Printing Office, 1968).

²U.S. Marine Corps, The Youngdale Study, dated 25 April 1966.

and thirty-four computers costing over twelve million dollars. Computers were on hand, and personnel were there to run them, but a system to solicit beneficial results from such investment apparently was waiting for higher command coordination, or, as will become clear, direction.

It appears that knowledge of computer use was lacking in the entire organization since the Youngdale Study caused the CAMP (Command and Management Presentation) computer use education effort that started in April of 1966.¹ This presentation by learned computer and systems men touched the first essential -- that of overcoming objection through education. In the slightly over one year of immediate pressure-presentations to the officers and senior enlisted personnel, CAMP reached all major commands and over 26,000 personnel. Thus, having been presented as the new and necessary tool of Marine Management through CAMP, this indoctrination of management method was given to the Officers Basic School to be included as a continuing part of their command education.

The high management interest in the area of data processing can also be seen by relating to the number of officers

¹U.S. Marine Corps, The Youngdale Study, dated 25 April 1966.

sent at Marine Corps expense, to advanced degree data processing education programs, which by year was:¹

1963 - 1964	9
1964 - 1965	15
1965 - 1966	25
1966 - 1967	33
1967 - 1968	69
1968 - 1969	105

Clearly, this is an expense to the Marine Corps which must have a proven return since the growth of the numbers of officers sent to these education programs has not only continued to increase, but has increased much more than the officer build-up resulting from the Vietnam conflict needs. (The Marine Corps Officer strength at the 1964 period just exceeded 17,000 whereas in the 1968 period, it was just over 27,000.)²

The basic policies regarding data processing and management in the Marine Corps were defined by its Commandant at a joint session of the Congress as:

¹Personal Interview with Colonel A. Kositsch, Director, Management Analysis Group, Headquarters, U.S. Marine Corps, Arlington, Virginia, on 10 February 1969.

²Ibid.

"The people and the material of the Marine Corps require management, efficient management, if we are to accomplish our assigned missions quickly and economically.

We have always considered efficient management to be an inherent responsibility of command. And, although we will always treat the Marine as an individual and not as a symbol on a punched card, we can use automatic data processing and other modern management tools to help us in our jobs as commanders. Consequently, I require all my generals to learn automatic data processing and other management principles and techniques. As a minimum, they attend a computer course here in Washington or an equivalent course elsewhere. At the other end of the scale, I have had one general attend the Advanced Management Program at Harvard University, and I plan to send more officers. At our Command and Staff College at Quantico, Virginia, we have established a 100-hour sub-course in Data Processing, in addition to the 88 hours already devoted to Management Presentation at Marine Corps installations throughout the United States. Therefore, we have doubled our quotas to post-graduate management courses.

In a few years we will have developed an Integrated Information System which will electronically collect and relate information on manpower, operations, logistics, and finances. This will certainly help us in the making of command decisions relative to the management of resources.

We are applying automation to pay and personnel accounting of reservists as I speak today, and will soon do the same for regulars. I have created a small management analysis group on my staff to watch overall management problems....."¹

From the foregoing expression of the Corps' highest level policy, it appears clear that the commander as a manager was given ample guidelines in the management process, and trained manpower to exercise the intelligent use of data processing in his decisions. The organization of this new managerial process will be the topic of the next section.

Organization

Data processing gave Marine Corps Management a new dimension. Instead of making a decision based on what information existed, data processing now offered vast amounts of information from which the commander could choose.

There were the problems of integrating data processing into the normal command structure as a new technology; of having the commander accept the information so generated; and of giving the commander the technical personnel who could help him to

¹Excerpts from the statement of the Commandant of the Marine Corps, General Wallace M. Greene, Jr., concerning Fiscal Year 1968 Marine Corps Posture before a joint session of the U.S. Senate Armed Services Committee and the Department of Defense Subcommittee of the U.S. Senate Appropriations Committee.

translate his information needs to information availability using the computer.

The upper management recognized the foregoing, and also quickly saw that this new capability could and would go beyond the mere mechanization of the current methods. To refer to organization charts which may include the data processing function would be misleading, since the intent was to incorporate the new managerial process into the present organization, and to adapt the current managers to it.

Organization for this new concept was affected in two ways. The first was to prepare personnel who could manage the machines and the second was to prepare and have personnel to manage the system.

These intents were manifested in placing a Data Management Section in each major field command and a Coordinating Data Systems Office at Headquarters Marine Corps level.¹

Until 1967, the data systems movement seemed to have become a unitary wherewithal, that is, the data processor seemed to have become the prescriber of the need, the process of the analysis and the system to accomplish the job. This

¹Personal Interviews with Lieutenant Colonel David Hayes, Management Analysis Officer, Management Analysis Group, Headquarters, U.S. Marine Corps, on 31 January and 7 February 1969.

combination-man approach to the use of data processing by the manager was the less successful forerunner of the new approach in the organization and use of the data processing function which began during 1967.

The new approach saw that for top management to give financial aid to technology was not enough, but that it must also join in solving the problem of integrating data processing to make it fully productive. It predicated that if data processing is to be useful to management, then management must define the information needed on which they are to base their decisions. These premises are very similar to the 1961 predictions of Virgil Blank¹ when he contended that if management is to derive data processing benefits in its decisions, then it must not only be informed of the machine's capabilities, but also of the vast amount of techniques in its use, which place the decisions about decision systems squarely on top management's back.

The current organization of data processing, and the entire approach, are also based on the premises that there must be three inviolate, but cooperative, agents or interests in the management program for it to be efficient and effective.

¹Virgil F. Blank, "The Management Concept in Electronic Systems," Journal of Accountancy, (January 1961) pp. 59-66.

These three are the functional manager (the managing decision-maker), the data processing technician (the programmer who converts the language of the program to machine talk and back again), and the systems analyst who converts the needs for information by the functional manager into a system of information transactions which are digestible by the routine or computative abilities of the machine. Each of these is an expert in his own realm of operations, and with the combination of their expertise, and complete coordination of it into the resulting managerial system, it is designed to gain the greatest result with the least cost of overlapping or redundant effort.¹ The organization for management information and data processing at all levels of Marine Command is designed after the basic pattern that exists at the Headquarters Marine Corps level. The Commandant's Management Analysis Group exists at the Chief of Staff level,

¹U.S. Marine Corps, Missions and Functions of the MAG, Office of C/S, Marine Corps Headquarters Order, 5401.1A dated 10 April 1967. (This order defines the following responsibilities for the Management Analysis Group: 1. To analyze and present the problems in management; 2. To examine the information pertinent to any staff area for decision assistance; 3. To work with the Management Information Center of the Secretary of the Navy; 4. To develop and present for and by the Marine Corps those management elements of importance to the Marine Corps and the Department of Defense.)

as a special Group of Management general and technical specialists to supervise the entire spectrum of management processes needed within the Corps or to satisfy the needs of higher levels. This Group became necessary as a result of the vast effects of the data processing capability, and the need to harness its capacities into benefits, by defining information needs and integrating the areas of computer use toward coordinated strength. This Analysis Group may be thought of as the high-level thinking group, whose job it is to evaluate, study and recommend better management practices.

The functional commander, the user of computer results and the one who furnishes prescribed information into the computer, is the same commander or staff officer that existed before the computer. He knows best what information he needs, but may at times need help in understanding what is available through the computer that may improve his decision. He explains his need to, or derives information from, the System Analysis Branch personnel whose job it is to translate, within reason, the needs of the Manager into the capacities of the machines by means of thorough systematization and, usually, standardization. It is this Branch that has set forth the need for the advanced degree, data processing background personnel, referred to previously.

The third element of this organization, equally integrated into the Special Staff level, is the programming branch personnel who translate the designed system into the machine language which will then be used by all Marine organizations.

The foregoing fairly describes the new elements that exist to function as the Marine Corps Data Processing and Management Programs, but for them to be effective every manager's thinking must incorporate data processing concepts so that it can benefit his decision in management. It may be argued that data processing feeds centralized management to the elimination of the middle manager although he is closer to the daily operations.¹ Or, it may be just as sound to hold that data processing, understood and used, helps the middle manager or commander with his level of decisions and the central or higher level receiving only the data it needs for its level of decisions which are exceptions to middle management.² The Marine Corps, as declared by its Commandant, leaves the commander little choice but to know and implement data processing toward better management

¹Ida Russakoff Hoos, "When the Computer Takes Over the Office," Harvard Business Review, (July-August 1960), Vol. 38, No. 4, pp. 105-108.

²For a similar civilian business concept of decentralization and computer use to reap the benefits of such incorporation see: John Burlingame, "Information Technology and Decentralization", Harvard Business Review, (Nov. - Dec., 1961), pp. 121-126.

practices.

Transition to using data processing for better management was a declared policy by the Commandant, but how was this policy to be implemented or accepted?

Acceptance

The acceptance of data processing in decisions by the commanders was apparently fostered by upper management recognizing that a sound education program in its use was necessary.

Since all levels of management, as well as the lesser levels of functionaries are involved in the education process, a general survey of various data processing schools is hereby presented, along with the general intent of each investment.

Most of the data processing schools or other instruction media in the Marine Corps have been operational for a year or so, and thus indicate a recent attachment of importance to the technology.

Through the Department of Defense Computer Institute (DODCI),¹ Marine officers are offered a one week course for

¹Since DOD expresses the intents of all the services, a brief history of DODCI along with its intents and missions follows: The Department of Defense Computer Institute (DODCI) was conceived when Mr. Roswell Gilpatric of DOD, in a letter of 27 August 1963 to the subordinate department, requested

Senior Executive or General Grade officers, a two-week course for intermediate executives or upper field grade officers and a three week command and control course for senior company and junior field grade officers. All of these courses are similar in that they are intended as general indoctrination to the

thought-proposals for a DOD-wide data institute. In his letter, he recognized the high-cost of civilian computer-personnel contract purchases and the desirability of using in-house qualified personnel who were also knowledgeable in the routines of their work. He recognized that the service academies offered some computer course work, but there was still a need for a DODCI which could fill the basic immediate hard core need for computer-trained personnel. The principles of the DODCI, still in DODCI's premises, were those of Dr. George Polya about education which he wrote in the "American Mathematics Monthly",: "It has been said by many people in many ways that learning should be active, not merely passive or receptive. Merely by reading books or listening to lectures or looking at moving pictures without adding some action of your mind, you can hardly learn anything and you certainly cannot learn much". As the result of appointment to study, the office of the Deputy Director for Research and Evaluation in his July 1963 study on DODCI found that because of the data systems growth, an increasing systems effectiveness, along with the sensing of environmental parameters and some new methods of exercising the total system that there was a definite need for a DODCI, but held that all new techniques must be discussed together with their impact on commanders, technical specialists and military operators.

In 1963, the Secretary of Defense in his memorandum of 19 November assigned the responsibility of establishment and operation of the DODCI to the Secretary of the Navy who was to receive coordinative help from the Director of Defense Research and Evaluation, and the Departments of the Air Force and the Army. On 31 January 1964, the Navy proposed to establish and operate the DODCI at the Navy Communications Systems Support Activity, Washington, D. C., with the mission to teach digital computer capabilities to senior military and civilian DOD

extent that the student can reasonably understand the use of data processing after completion. During 1968, DODCI teams were made available to each of the two Marine Corps Coastal Headquarters (Fleet Marine Forces, Atlantic at Norfolk, and Pacific on Hawaii),

executives, to lessen the dependency on civilian contractors for such services and to standardize such education to fit the various computers.

By his directive Number 5160.49, the DOD approved the foregoing on 27 February 1964 along with joint funding by each service to help the Navy bear the costs of the Institute. The syllabus of DODCI, in its 1, 2 and 3 week courses treats data security, digital trainer laboratories, ADP (type) personnel, flowcharting, numbers and codes, a survey of computers, Fortran, Data Communications, decision tables, sequential devices, direct access devices, computer operations management, real-time and time-sharing, hardware procurement and procedures design as the essential training. DOD, having overlooked command and control system standardization in previous plans, directed the Navy, on 23 December 1964, to incorporate such training which the DODCI did on 12 April 1965 without increase to the course time span or manpower increase.

The one week resident course is repeated eleven times annually, the 2 week thirteen times, and the 3 week course six times each year. As of this writing, over 2,000 student officers and executives have been trained in this data processing management technology. (Special thanks is acknowledged to Major Oliver Whipple, Marine Corps, of the DODCI, for his kind assistance in compilation and interpretation of the directives and procedures affecting the Institute.)

for on-site indoctrination.¹

During 1968, the Marine Corps, recognizing the need for more data systems knowledgeable personnel, established a 14 week Computer Science School at the Marine Corps Development and Education Command, Quantico, Virginia, with a curriculum that is Marine Corps-needs-oriented, and serves the need for data systems personnel in all field commands. This school is designed to give ADP indoctrination and basic qualification to 420 technicians of other functional areas each year, and to serve the need for data systems personnel in all field commands.² The graduates of this school, along with the graduates of special courses contracted for from IBM in Washington, D. C., in systems analysis, now serve the needs of the growing requirement for management systems in the Republic of Vietnam.³

In addition to the foregoing, the Marine Corps has integrated data processing into the command and management curriculums of the middle-level Amphibious Warfare School and

¹Personal Interview with Major Oliver Whipple, Senior Marine Representative, Department of Defense Computer Institute (DODCI) Washington, D. C., on 3 February 1969.

²Personal interview with Colonel A. Kositch, Management Analysis Group, Headquarters, U.S. Marine Corps, Arlington, Virginia, on 10 February 1969.

³Ibid.

has inserted 100 hours of data processing in management in the high-level Command and Staff College at Quantico, Virginia, which is now teaching this new technology for the second year.¹

From the foregoing, it may seem that Marine computer system-thinking is wholly central, located at schools or implemented by fiat. To give a clear perspective to the organization and implementation of this new technology of management the Marine Corps tests for feasibility, program soundness and apparent acceptance by having the field commands and activities be a part during the planning and pre-implementation stages. The central coordination is done by Headquarters systems or data personnel who have cognizance of a particular area and the overall coordination is the responsibility of the Management Analysis Group.²

To give better insight to the breadth of this all-hands-coordinated-project approach, the following is a listing of the installation and the area of management being prepared for data

¹Personal Interview with Lieutenant Colonel David Hayes, Management Analysis Officer, Management Analysis Group, Headquarters, U.S. Marine Corps, on 31 January and 7 February 1969.

²Personal Interview with Colonel A. Kositch, Management Analysis Group, Headquarters, U.S. Marine Corps, Arlington, Virginia, on 10 February 1969.

processing technologies:

- (1) The Fleet Marine Force Headquarters of the Atlantic at Norfolk is preparing the numerous and complicated procedures of planning and loading the amphibious assault vessels.
- (2) The Fleet Marine Force of the Pacific is managing the studies to use data processing better in the management decisions in the combat efforts and support of the commitment in Vietnam.
- (3) Camp Lejeune has the project of preparing the regular Financial Accounting System for data processing.
- (4) Camp Joseph H. Pendleton in California is preparing the Post Exchange Stock controls, purchasing and procurement functions for data processing management.
- (5) The Marine Corps Air Station at El Toro is preparing Supply Management for a data system.
- (6) The Third Marine Air Wing is preparing the system for mechanizing the Medical Department in such areas as health records, medicines and inoculations.

- (7) The Marine Corps Air Station at Cherry Point, N.C., is preparing the system of using a real-time computer facility in Supply Management along with remote devices.
- (8) The Marine Corps Development and Education Command at Quantico, Virginia, is testing the Integrated Information System which will be expanded in the next chapter.
- (9) The Marine Corps Flight Section at Andrews Air Force Base, Washington, is preparing the system of "datamated" flight logs and air crew records.
- (10) The Recruit Training Center at Parris Island is readying the data process whereby the new marine has but one record which 'joins' him, 'classifies', 'schedules' and 'assigns' him and also pays him, thus eliminating the duality of separate personnel and pay records.
- (11) The Marine Corps Reserve is 'datamating' the entire Reserve drill and camp payment records system to operate from a central data processing bank at Kansas City, Missouri.¹

¹Personal Interview with Colonel A. Kositsch, Management Analysis Group, Headquarters, U.S. Marine Corps, Arlington, Virginia, on 10 February 1969.

This history of the use of the computer has been portrayed in its far reaching implementation which resulted from its apparent worth as a management tool of the commander and executive. The general fervor and high level interest in data processing management would indicate that there is an obvious benefit to the manager in his decisions through the knowledgeable use of the computer to perform the routine responses and seek him for the exception. These two of the original hypotheses have, therefore, been established as being truth. The third hypothesis was that the implementation of the computer was stifled by the humanly mechanistic disorder or previous decision mechanics. This hypothesis as it existed does not stand up to the proof of computer development and obvious acceptance, particularly by the Department of Defense or the Marine Corps. The technology enjoyed a rapid growth in the agencies, with emphasis on the Department of Defense, to the extent that the history does not reveal any effective humanistic obstacles in its development or managerial use.

Methods of use of the computer are legion, but this should not be taken to mean that the manager must be a high-level planner to find a use for the computer in his operation. Two

examples of the computer benefiting an operation follow, since they indicate a simple application that may be seen repeatedly in the recent Marine Corps drive to accept the benefits of data processing in management. (In deference to individuals the names and locations are omitted.)¹

In the first instance, the Motor Transport Officer at a Far East motor pool furnished personnel transportation on an on-call basis. The dispatcher sent vehicles as they were requested, but the waiting time seemed too long in view of the large number of vehicles in the pool, and the relatively small number of officers that could afford to be away from their desks. He manually surveyed the trip tickets, but because of the large number of tickets, it remained a mere survey. He requested the help of the data processing officer in this matter, who helped him to define a system whereby he would be able to have the data machine pull only those tickets that fell within certain parameters. Through this management-by-exception technique, he found that up to eight vehicles were at the same locations and for about the same times on a daily recurring basis. This cost him seven extra drivers, seven extra vehicles, times the number of concentration locations plus the gasoline, maintenance

¹Personal Interview with Major Richard Prestera, Resources Management Systems (RMS) Analysis Officer, Headquarters, U.S. Marine Corps, on 27 and 28 January 1969.

and cancellation costs to hopeful riders who had to delay their trips waiting for transportation. The obvious bulk of bus transportation system for the high concentration times and locations became the solution which could have been done manually, but it would have been hard to convince that Motor Transport Officer that it would be as fast or efficient.

The second instance of computer assistance in cost consciousness and planning assistance was in 1967 at a West Coast supply distribution point. The computer's costing sheets of the various operations of the warehousing function, such as stock-pulling, stock-staging, fork-lift usage, and truck-loading, etc., became a digestible tool once a program was defined. Before the knowledge of what the costs were of each of these functions, the trucks all appeared for their loads at the same time that the stock-pullers started their work. The work of one function (stock-pulling) had to be completed before it could move to the next stage (staging and loading) which meant that the trucks waited idly for their loads. The knowledge of the costs of each of the operations caused an alertness to new procedures whereby the entire flow of work was scheduled for sequential flow so that no one stage was idle waiting for another function to be performed. The knowledge of the cost

figures made available by the computer served as the impetus to efficient and economic resources use as well as recurring feedback about actions taken by management toward achieving economies in their plans.

In the foregoing examples of actual data use in decisions, a negative attitude to data use could easily have stifled any benefit. These examples were given as being just two among many to indicate the current acceptance of data processing in management.

Data processing has apparently caused change in the agencies and the Marine Corps. Since the change is current and growing, a study of the attitudes of the future will be the topic of the next chapter.

CHAPTER V

THE FUTURE OF DATA PROCESSING

The foregoing tells the story of the importance of data processing management in the Marine Corps. The build-up and use of this new technology is a living, current phenomenon that does not clearly break into a "what was" and a "what will be". Many of the systems, as they are being derived, defined, developed or implemented have had a recent 'birth' and some that now have the indication of a future, with no sign of a clear break from the present, will be surveyed as government views and those of the Marine Corps.

Government Views

Data processing is an expensive system which can become inexpensive when compared to the benefits derived from it. The greater the units of benefit derived from the data processing investment, the more economic will be the cost of each derivative.¹

¹Personal Interview with Mr. Walter Magee, Staff Officer, Data Processing Division, Bureau of the Budget of the United States at a Special Meeting on February 7, 1969.

The government views can be separated into three categories for this purpose: The Congress, the Executive and the Agencies. The Marine Corps' views as one of the agencies will be related in the next section separately.

The Congress in its control of the public purse is interested in governmental economies. This is to satisfy the public's desire and the constituency demand as the price of the vote. The Executive Branch practices economies along with giving the greatest governing satisfaction in the many areas of needs, and coordinating the agency efforts towards those ends. The Agencies, in their peculiar role in the Executive, must try to gain the most money appropriations from the Congress to be able to produce and exhibit the greatest results within their area of cognizance.¹

The statement of the Deputy Director of the Budget, Mr. Elmer B. Staats, before the sub-committee on Government Operations of the House of Representatives, summates the views and the future of the computer in the agencies and the Executive Branch.² In his statement, Mr. Staats referred to the statements

¹Aaron Wildavsky, The Politics of the Budgeting Process, (Boston: Little, Brown and Company, 1964).

²U.S. Congress, House, Committee on Government Operations, Automatic Data Processing Equipment, 90th Cong., 1st Sess., H.R. 4845, pp. 36-44.

of the President of the United States in his 1965 report to the Congress, which held that the history of the computer in government has shown increased productivity, increased effectiveness, and has permitted better and more economical services to the public, which could not otherwise have been possible. He further told that the computer, in large measure, has truly and appropriately come to be regarded as a major and vital resource to accomplish the primary program responsibilities of many of the Agencies.

The hearings before the Government Operations Subcommittee of the House had the purpose of study for legislation to coordinate the integration of data processing into the federal agencies on an economic and efficient basis for the future.¹

In 1967, the same Government Operations Subcommittee reviewed the effects of Public Law 89-306 which stemmed from the foregoing hearings and was designed to legislate management of data processing use.² Through Public Law 89-306, the Congress

¹U.S. Congress, House, Committee on Government Operations, Automatic Data Processing Equipment, 90th Cong., 1st Sess., H.R. 4845, pp. 1-2.

²U.S. Congress, House, Committee on Government Operations, Data Processing Management in the Federal Government, 90th Congress, 1st Sess., July 18, 19 and 20, 1967, pp. 1-2.

expressed their interest in data processing by delegating specific control and advice responsibilities to the Bureau of the Budget, the General Accounting Office and the National Bureau of Standards so that the new technology would be a sound, beneficial and economic tool to the inventory of government tools and the agencies would still have the prerogative of the choice to suit best their agency needs.¹

In 1967 the Congress showed its continuing interest in data processing management techniques by recognizing the economies already achieved through its prescribed use and its willingness to entertain additional legislation toward even greater coordination in implementation.² The future of data processing in government, as viewed by the Congress and the Agencies, is one of current legislation and coordination to implementing it on a continuing and expanding basis toward sounder business-like management uses. The most important objective yet to be met, according to Congressman Jack Brooks, "the Father of P.L. 89-306", is the free interchange of data among agencies. He maintains that to be able to gain full use of computer

¹U.S. Public Law 89-306 (see the Appendix for the text of this Public Law).

²U.S. Congress, House, Committee on Government Operations, Data Processing Management in the Federal Government, 90th Cong., 1st Sess., July 18, 19 and 20, 1967, pp. 1-2.

capability is to be able to accept and process data on an interchange basis with any other computer, and, therefore, standardization of computers and programs is a desirable pending legislation. The government views the computer as a desirable management tool needing coordination for greatest efficiency of use among the vast activities that are represented by our government.¹ The need for legislation for computer capability to permit better interchange of information can best be deduced from the currently diverse government computer population which consists of 4,232 computers, made by thirty-three manufacturers, in 215 models, with three different tape sizes and over sixty different recording notations. On March 11, 1968, the President of the United States added further impetus to the standardization need by approving the Secretary of Commerce's recommendation that the United States of America Standard Code for Information Interchange be adopted as a federal standard, which requires that all computers and related equipment entering the federal inventory after July 1, 1969 must be able to use the Standard

¹Jack Brooks, Congressman, "The Federal Government and Computer Compatibility", Datamation, (February 1969), pp. 24-25.

Code for Information Interchange when prescribed.¹ The government has come a long way in developing this technology, and is aware that all of its possibilities have not yet been exploited. The more specific use of data processing toward greater management efficiency of one agency, the Marine Corps, will be the subject of the next, and the last section of this study.

Marine Corps Views

The acceptance of data processing management and its increased usage toward better management decisions in the future in the Marine Corps may be seen as being fully grounded in the law and directives of the higher commands. If this were the end of the story, the benefits of the dynamism in data processing in the Marine Corps would be misleading.

The Marine Corps designed its data processing management to contain professional, computer systems-qualified personnel to man the systems analysis function which serves as the communications chain between the functional managers, the technically qualified programmers and these three are coordinated by

¹Joseph F. Cunningham, "The Need for ADP Standards in the Federal Community", Automation, February 1969, pp. 26-28.

a Management Analysis Group at Headquarters. This has been previously discussed as a permanent approach to derive the best management in the most efficient, comprehensive and integrated manner at the least cost.

The two aspects that require amplification or clarification are the process of integration of information to eliminate wasteful duplication, and the feedback available through the management process between the field commands and the Commandant.

Each of the two systems, the Integrated Information System¹ known as 'I²S' (eye-squared-ess) and the feedback system of the Marine Corps Progress Report² known as 'MCPPR' have enjoyed the thorough study, proposal and support of the current Commandant of the Marine Corps, General Leonard F. Chapman, Jr. The current views and the future of data processing management integration and techniques may best be realized from a survey of these, the 'I²S' and the 'MCPPR', as being a 'systematized' approach to management and information 'systems'.

¹LtGen Leonard F. Chapman, Jr., "Integrated Information To Serve the Marine Corps, "Navy Management Review", Vol. XII, No. 7 (July 1967), pp. 15-19.

²Ibid, pp. 4-5.

'I²S' is a revolutionary improvement to the Marine Corps 'Information System' of 1967 in that the information is designed to aid in the decisions on the management of resources. As an addition to adding quantitative techniques to command and management, it was designed to include, where appropriate, the tools of automation and automatic digital transmission. The only limitations placed on the 'I²S' concept are that the implementation must be technically feasible, economically practical, and professionally sound. As of this study, the system is still being improved, but the guidelines and intentions of the high command are clear.

The purpose of 'I²S' is to furnish information, as required, to commanders and their staffs at all levels of command on demand, and is to do so as expeditiously as is required. 'I²S' is conceived as being in three parts or systems. The 'Functional Systems' are to help in the management of basic resources, such as men, money and materials. The 'Tactical Systems' are designed to aid in decisions of the tactical command and control of forces in a hostile, or similar environment. The third, the 'Information System' is designed to assimilate data selected from various Functional and Tactical Systems to generate the information necessary to assist in the decision-making process in the procurement of all resources. An important product

of this Information System is the immediate, current and future evaluation of organizational readiness.

The benefit of 'I²S' proposes better management in:

- (1) A Cost Model for the Marine Corps.
- (2) DOD Resource Management Systems.
- (3) Quantitative Organizational Readiness.
- (4) Essential Elements in the Five Year Defense Program.
- (5) Quantitative decision assistance in ranged, contingency or mobilization plans.

'I²S' indicates the plans for data processing in the future, for its success requires the appropriate use of Systems Analysis Techniques, All Information Sciences, and the current technologies of advanced computer processing, advanced retrieval and in-put devices and rapid computerized communications.

'I²S' is simple in design, but is a laborious process to derive the end-product and the information needed by the System. The General Command must define the exact parameters of information which are passed to the Work Group. The Work Group laboriously studies all of the possible avenues and sources of pertinent information with the added intent to eliminate redundancy. After the Work Group, composed of representatives of supported staff agencies, has determined the information requirements to satisfy the initial functional requirements, they are

passed to the Systems Analysis Branch, who design the information system to satisfy the requirements and create the programs for the field units which are a part of the designed information system.

This is the creation of the horizontally coordinated data base for all Marine Corps Systems known as 'I²S'.¹

To close the circle of vertical information needs and feedback is the purpose of the Marine Corps Program Progress Report. This is a management 'tool', also known as the Commandants 'Red Book', which provides the Commandant and the Headquarters Staff with information in a clear and concise form for the best decisions possible. This method of information is meant for 'fast absorption' and a copy of the 'Red Book' is passed to all the General Officers in the Marine Corps.

The MCPPR 'Red Book' is high-control 'feed-out' and 'feedback' in subjects of high cost, criticality to Marine Corps performance, high controversy, specific interest to the Commandant and/or major projects specified.

The MCPPR system, as a management information display system, is designed to identify problems of high import in a

¹Lt. Gen. Leonard F. Chapman, Jr., "Integrated Information to Serve the Marine Corps", Navy Management Review, Vol. XII, No. 7, (July 1967), pp. 15-19.

simple and clear fashion so that deviation from trends can be more readily recognized.

The data information system is inherently necessary for it, since the digested 'Red Book' is based on the extractions of specified information.

The members of the Management Analysis Group constantly feed into the 'Red Book', but the cognizant staff sections brief the upper command on a monthly cyclic basis.

The 'Red Book' shows the commanders in the field the image they project to the Commandant in the areas of readiness, financial, logistics, supply and management, among others. If the projected image is not correct, it can be corrected. As the information system is developed the 'Red Book' control will become more comprehensive.¹

The plans of the Marine Corps for better management of data processing systems utilization apparently are firm. With increasingly better and more comprehensive integration and control, data processing technology is afforded the opportunity for productiveness and assistance in human decisions.

¹Lt Gen Leonard F. Chapman, Jr., Program Progress Report Proves Marine Corps Management Asset, Navy Management Review, NAVSO P 910, Vol. XII, No. 7, Office of Management Information, July 1967, pp. 4-5.

The plans and programs for data processing use in management have the direct interest of the top management and the organization for productive utilization of the technology depends on, and demands, the efforts of every level of command. If there were a question for the future, it would be to ask that the current leadership attitudes be continued to exploit fully the use of the technology of data processing toward improving management.

CHAPTER VI

CONCLUSION

While progress in the use of data processing as an instrument in the management process in the federal agencies and the Marine Corps has lacked positive direction over the past fifteen years, it has repeatedly overcome the human objections to its use and further entrenched itself, as a servant, with man.

The first question of this study was to seek the role of data processing as a management information tool in the Marine Corps. The importance of data processing in the Marine Corps can be assessed by considering its position in the 'I²S' management system. Indeed, the computer is the heart of this apparently speedy and efficient management information system. It would seem folly to think that the human mind could retain or compare the vast amount of data that the computer now offers him according to his plans or programs. The computer cannot do anything beyond the capability that man has given it, but its history in the federal government shows that the manager or commander has been reluctant to exploit its capabilities. The result of the reluctance to accept the computer can be seen by

comparing that period when the computer was relegated to the technician or lower manager for mere computations, and the more recent era where the higher managers have given data processing the high importance and support that it needs to be a productive element of the symbiotic team for management.

The second question asked for the growth pattern of data processing in the Marine Corps. The growth pattern of the computer in the federal agencies and the Marine Corps has been steady. There have been no set-backs or proofs for any of the bases of fear that caused objections to the computer at any level of management. The federal government is an organization that is large in number, and it consists of many segments, all of which do not respond to one order or policy in the same manner. The technology of data processing was implemented in the various agencies in various ways since there was no order that could effectively exact automatic or consistent compliance. The considerations regarding computer systems costs became paramount in the latter part of the sixties and the Congress exercised the will of the people by demanding some cost savings and coordination efforts by passing, the now well-known, Public Law 89-306. This Public Law did not intend to check computer growth, but to put order into the agency practices so that money would not be

wasted through purchasing capacities that were excessive through misuse. Historically, a new invention is costly at first to offset the costs of research and the computer is not unlike preceding inventions. As the costs diminish, the stage has been set for the next objective, and perhaps of even greater importance to any manager, which is the improvement of decisions, as indicated by the 'I²S' system in the Marine Corps.

The third question posed was to determine if data processing has helped the manager make better decisions. Since an answer to this question has no alternative basis with which to compare the quality of a decision, the answer can, and it must, be based on the manager's use of the computer in making better decisions. The computer has replaced the manager in doing the recurring or menial work that he had to do before, and he can thus apply more of his valuable time to his primary function, namely, making decisions and intelligent planning. As long as the computer can collect and furnish information that is faster and more accurate than the human mind, the manager has available to him more information for sounder decisions than those decisions that he previously had to base on less or insufficient information. The fact that data processing is used in the decision process does not create a better decision for the manager; but properly used, it certainly can supply him more accurate

information that can be valuable or critical to a better management decision. The technology of the computer has proved to be beneficial for more intelligent decisions. How beneficially the technology will serve the manager in his decisions can be determined only by himself in his quest to set the pace, or otherwise, to survive.

APPENDIX



Public Law 89-306
89th Congress, H. R. 4845
October 30, 1965

An Act

79 STAT. 1127

To provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That title I of the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, is hereby amended by adding a new section to read as follows:

Automatic data processing equipment. Purchase and utilization. 5 USC 630-630g-1.

"AUTOMATIC DATA PROCESSING EQUIPMENT

"SEC. 111. (a) The Administrator is authorized and directed to coordinate and provide for the economic and efficient purchase, lease, and maintenance of automatic data processing equipment by Federal agencies.

"(b) (1) Automatic data processing equipment suitable for efficient and effective use by Federal agencies shall be provided by the Administrator through purchase, lease, transfer of equipment from other Federal agencies, or otherwise, and the Administrator is authorized and directed to provide by contract or otherwise for the maintenance and repair of such equipment. In carrying out his responsibilities under this section the Administrator is authorized to transfer automatic data processing equipment between Federal agencies, to provide for joint utilization of such equipment by two or more Federal agencies, and to establish and operate equipment pools and data processing centers for the use of two or more such agencies when necessary for its most efficient and effective utilization.

"(2) The Administrator may delegate to one or more Federal agencies authority to operate automatic data processing equipment pools and automatic data processing centers, and to lease, purchase, or maintain individual automatic data processing systems or specific units of equipment, including such equipment used in automatic data processing pools and automatic data processing centers, when such action is determined by the Administrator to be necessary for the economy and efficiency of operations, or when such action is essential to national defense or national security. The Administrator may delegate to one or more Federal agencies authority to lease, purchase, or maintain automatic data processing equipment to the extent to which he determines such action to be necessary and desirable to allow for the orderly implementation of a program for the utilization of such equipment.

"(c) There is hereby authorized to be established on the books of the Treasury an automatic data processing fund, which shall be available without fiscal year limitation for expenses, including personal services, other costs, and the procurement by lease, purchase, transfer, or otherwise of equipment, maintenance, and repair of such equipment by contract or otherwise, necessary for the efficient coordination, operation, utilization of such equipment by and for Federal agencies: *Provided*, That a report of equipment inventory, utilization, and acquisitions, together with an account of receipts, disbursements, and transfers to miscellaneous receipts, under this authoriza-

ADP fund, establishment.

Equipment acquisitions and utilization.

Pub. Law 89-306
79 STAT. 1128

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October 30, 1965

Report to
Budget Bureau
and Congress.

tion shall be made annually in connection with the budget estimates to the Director of the Bureau of the Budget and to the Congress, and the inclusion in appropriation acts of provisions regulating the operation of the automatic data processing fund, or limiting the expenditures therefrom, is hereby authorized.

Appropriation.

“(d) There are authorized to be appropriated to said fund such sums as may be required which, together with the value, as determined by the Administrator, of supplies and equipment from time to time transferred to the Administrator, shall constitute the capital of the fund: *Provided*, That said fund shall be credited with (1) advances and reimbursements from available appropriations and funds of any agency (including the General Services Administration), organization, or contractor utilizing such equipment and services rendered them, at rates determined by the Administrator to approximate the costs thereof met by the fund (including depreciation of equipment, provision for accrued leave, and for amortization of installation costs, but excluding, in the determination of rates prior to the fiscal year 1967, such direct operating expenses as may be directly appropriated for, which expenses may be charged to the fund and covered by advances or reimbursements from such direct appropriations) and (2) refunds or recoveries resulting from operations of the fund, including the net proceeds of disposal of excess or surplus personal property and receipts from carriers and others for loss of or damage to property: *Provided further*, That following the close of each fiscal year any net income, after making provisions for prior year losses, if any, shall be transferred to the Treasury of the United States as miscellaneous receipts.

63 Stat. 384.
40 USC 481, 474.

“(e) The proviso following paragraph (4) in section 201(a) of this Act and the provisions of section 602(d) of this Act shall have no application in the administration of this section. No other provision of this Act or any other Act which is inconsistent with the provisions of this section shall be applicable in the administration of this section.

Scientific and
technological
advisory serv-
ices by Secre-
tary of Commerce.

“(f) The Secretary of Commerce is authorized (1) to provide agencies, and the Administrator of General Services in the exercise of the authority delegated in this section, with scientific and technological advisory services relating to automatic data processing and related systems, and (2) to make appropriate recommendations to the President relating to the establishment of uniform Federal automatic data processing standards. The Secretary of Commerce is authorized to undertake the necessary research in the sciences and technologies of automatic data processing computer and related systems, as may be required under provisions of this subsection.

“(g) The authority conferred upon the Administrator and the Secretary of Commerce by this section shall be exercised subject to direction by the President and to fiscal and policy control exercised by the Bureau of the Budget. Authority so conferred upon the Administrator shall not be so construed as to impair or interfere with the determination by agencies of their individual automatic data processing equipment requirements, including the development of specifications for and the selection of the types and configurations of equipment needed. The Administrator shall not interfere with, or attempt to control in any way, the use made of automatic data processing equipment or components thereof by any agency. The Administra-

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Pub. Law 89-306

79 STAT. 1129

tor shall provide adequate notice to all agencies and other users concerned with respect to each proposed determination specifically affecting them or the automatic data processing equipment or components used by them. In the absence of mutual agreement between the Administrator and the agency or user concerned, such proposed determinations shall be subject to review and decision by the Bureau of the Budget unless the President otherwise directs." Notice to agencies.

Approved October 30, 1965.

BIBLIOGRAPHY

Public Documents

U.S. 42 Stat. 20: U.S.C. 1.

U.S. 4 Stat. 832: 31 U.S.C. 1.

U.S. Bureau of the Budget, Automatic Data Processing Glossary, (Washington: U.S. Government Printing Office, 1962), p. 40.

U.S. Bureau of the Budget, Government-wide EDPE Utilization, Report No. 3A, dated November 25, 1968, pp. 32-34.

U.S. Bureau of the Budget, Guidelines for Studies to Precede the Acquisition of Automatic Data Processing Equipment, BuBud Bul. No. 60-6 of March 18, 1960.

U.S. Bureau of the Budget, Guidelines for Appraising Agency Policies in the Management of Automatic Data Processing (ADP) Equipment, BuBud Circular A-61 dated August 31, 1963

U.S. Bureau of the Budget, 1964 Inventory of Automatic Data Processing Equipment in the Federal Government, July 1964, (Washington: Government Printing Office, 1964).

U.S. Bureau of the Budget, Memorandum to the Agencies, Programming Planning and Budgeting, August 18, 1965.

U.S. Bureau of the Budget, Responsibilities for the Administration and Management of Automatic Data Processing Equipment, Circular No. A-71 dated March 6, 1965.

U.S. Bureau of the Budget, Policies on Selection and Acquisition of Automatic Data Processing (ADP) Equipment, BuBud Circular A-54, dated October 14, 1961.

- U.S. Bureau of the Budget, Report of Findings and Recommendations Resulting from Automatic Data Processing (ADP) Responsibilities Study, September 1958-June 1959.
- U.S. Bureau of the Budget, Secretary of the Treasury and the General Accounting Office, Joint Financial Management Improvement Program in the U.S., Progress 1948-1963, (Washington: Government Printing Office, 1963).
- U.S. Congress, House, Committee on Government Operations, Report, Automatic Data Processing Equipment, No. 802, Union Calendar 360, 89th Cong., 1st Sess., August 17, 1965.
- U.S. Congress, House, Committee on Government Operations, Data Processing Management in the Federal Government, 90th Cong., 1st Sess., July 18, 19 and 20, 1967.
- U.S. Congress, House, Committee on Government Operations, Automatic Data Processing Equipment, 90th Cong., 1st Sess., H.R. 4845.
- U.S. Congress, Comptroller General of the United States, Review of Problems Relating to Management and Administration of Electronic Data Processing Systems in the Federal Government, April 1964, GAO file No. B115369.
- U.S. Congress, Comptroller General of the United States, Study of Financial Advantages of Purchases over Leasing of Electronic Data Processing Equipment in the Federal Government, March 1963, GAO file No. B115369.
- U.S. Congress, Government Accounting Office, Summary of Progress and Trend of Development and Use of Automatic Data Processing and Management Control Systems of the Federal Government as of December 1957, GAO file No. B115369.
- U.S. Congress, Senate, Committee on Government Operations, Report to the President on the Management of Automatic Data Processing in the Federal Government, 89th Cong., 1st Sess., (Doc. No. 15), 1965.
- U.S. Congress, Senate, Sub-committee on National Security and International Operations of the Committee on Government Operations, Planning Programming and Budgeting, Interim Observations, dated December 2, 1968.

- U.S. Congress, House, Sub-committee of the Committee on Government Operations, Hearings on H.R. 4845, A Bill to Provide for the Economic and Efficient Purchase, Lease, Maintenance, Operation and Utilization of Automatic Data Processing Equipment by the Federal Departments and Agencies, 89th Cong., 1st Sess., 1965.
- U.S. Department of Defense, Deputy Assistant Secretary of Defense (Supply and Logistics) Paul H. Riley letter to the Hon. Joseph Campbell, Comptroller General dated May 7, 1963.
- U.S. General Services Administration, United States Government Organization Manual, 1968-1969, (Washington: Government Printing Office, 1968).
- U.S. Intergovernmental Task Force on Information Systems, The Dynamics of Information Flow; Recommendations to Improve the Flow of Information Within and Among Federal, State and Local Governments, April 1, 1968.
- U.S. National Committee on Technology, Automation and Economic Progress, Technology and the American Economy, Volume I, February 1966, (Washington: Government Printing Office 1966).
- U.S. Marine Corps, Missions and Functions of the MAG Office of C/S, Marine Corps Headquarters Order 5401. 1A dated 10 April 1967.
- U.S. Marine Corps, The Youngdale Study, dated 25 April 1966.
- U.S. Marine Corps, Command and Management Systems Handbook, Marine Corps Order P 5200.14 dated 5 July 1968.
- U.S. Public Law 89-306.

Books

- Arnold, Robert R., Harold C. Hill and Aylmer V. Nichols, Introduction to Data Processing, New York: John Wiley, 1966.
- Bourne, Charles P. Method of Information Handling, New York: John Wiley, 1963.
- Burck, Gilbert, and the Editors of Fortune, The Computer Age and its Potential for Management, New York: Harper & Row, Inc. Publishers, 1965.

Drucker, Peter F., The Age of Discontinuity, New York: Harper & Row, 1968.

Wildavsky, Aaron, The Politics of the Budgetary Process, Boston: Little, Brown and Company, 1964.

Encyclopaedias and Dictionaries

Webster's New Collegiate Dictionary, Based on Webster's New International Dictionary (Second Edition), Springfield Massachusetts, G. & C. Merriam Co., Publishers, 1951.

Articles and Periodicals

Bellman, Richard, "Computers and Decision Making", Computers and Automation, Volume 12, No. 1, (January, 1963), pp. 1-12.

Blank, Virgil F. "The Management Concept in Electronic Systems", Journal of Accountancy, (January, 1961), pp. 59-66.

Brooks, Jack, Congressman, "The Federal Government and Computer Compatibility", Datamation, (February, 1969), pp. 24-25.

Burlingame, John, "Information Technology and Decentralization", Harvard Business Review, (Nov-Dec 1961), pp. 121-126.

Cunningham, Joseph F., "The Need for ADP Standards in the Federal Community", Automation, (February 1969), pp. 26-28.

Chapman, Leonard F., Jr., General, "Program Progress Report Proves Marine Corps Management Asset", Navy Management Review, Vol. XII, No. 7 (July 1967), pp. 5-6.

Chapman, Leonard F., Jr., General, "Integrated Information System to Serve the Marine Corps", Navy Management Review, Vol. XII, No. 7, (July 1967), pp. 15-19.

Drucker, Peter F., "What the Computers will be Selling You", Nations Business, Vol. 54, No. 8, (August 1966) pp. 84-90.

Hoos, Ida Russakoff, "When the Computer Takes Over in the Office", Harvard Business Review, (July-August 1960), Vol. 38, No. 4, pp. 105-108.

Interview with CMC, Marine Corps Gazette, (February 1969), p. 1.

Malzig, Ranier, "The Computer Can Be Our Downfall" Hannoverische Zeitung (West Germany) October 1968.

Peatross, Oscar F., Major General, USMC, "Marine Corps Develops Advanced Command and Management Systems", Navy Management Review, Vol. XII, No. 7. (July 1967), p. 9.

"The Super Computer", Newsweek, (December 7, 1968), pp. 38-40.

Unpublished Material

Meany, George, An Address to the National Convention of the American Federation of Labor and Congress of Industrial Organizations, Washington: November 14, 1963.

Interviews

Department of Defense Computer Institute, Washington, Personal Interview with Major Oliver Whipple, Senior Marine Representative, on February 3, 1969.

Computer Response Corporation, Washington, Personal Interview with Mr. James McGuire, Sales Representative, on December 11, 1968.

International Business Machines, Washington, Personal Interview with Mr. Jim Griffin, Director of Military Systems, on February 10, 1969.

U.S. Bureau of the Budget, Personal Interview with Mr. Walter Magee, Staff Officer, Data Processing Division, on February 7, 1969.

U.S. Marine Corps, Personal Interview with Lieutenant Colonel David Hayes, Management Analysis Officer, Management Analysis Group, on January 31 and February 7, 1969.

U.S. Marine Corps, Personal Interview with Colonel A. Kositsch, Director, Management Analysis Group, on February 10, 1969.

U.S. Marine Corps, Personal Interview with Major Richard Prestera, Resources Management System (RMS) Analysis Officer, on January 27 and 28, 1969.

Other

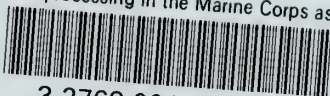
Brooks, Jack, Congressman, in his Remarks Before the 14th Annual MIS-ADP Conference of the American Management Association in New York on March 4, 1968.

Greene, Wallace M. Jr., General "Statement of the Commandant of the Marine Corps Concerning Fiscal Year 1968 Marine Corps Posture", before a Joint Session of the U.S. Senate Armed Services Committee and the Department of Defense Subcommittee of the U.S. Senate Appropriations Committee, February 1967.

Office of the Deputy Director for Research and Evaluation of the Office of Secretary of Defense, Study on the Department of Defense Computer Institute of July 1963.

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