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DEFENSE MAPPING AGENCY WASHINGTON DC
AN APPROACH TO EFFECTIVENESS/PRODUCTIVITY, (U)
1980 J J JABLONSKI

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From its inception, (DMA) management recognized that manpower and funding increases sufficient to satisfy the backlog of all worldwide requirements for (MC&G) support could not reasonably be expected. Accordingly, the Agency's objective has been to narrow the gap between MC&G needs and resources by satisfying only those requirements which have withstood a rigorous review and validation process and by increasing our effectiveness/productivity. In the first instance, DMA works continually with the user during the requirements develop to point out the most cost effective method of meeting their MC&G requirements. In the second		

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instance, we increase our productivity by such management initiatives as eliminating, realigning, and consolidating activities; by taking advantage of automation and technology to improve production techniques and processes; and by motivating our people to find more efficient and effective means of carrying out the DMA mission. The vehicle for pursuing these objectives was designated the DMA Effectiveness/Productivity (E/P) Program.

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JOSEPH J. JABLONSKI has been a Budget Analyst at the Headquarters Defense Mapping Agency since May 1976. Previously (1972-1976), he served as the Budget Officer at the DMA Hydrographic Center in Suitland, Md., and as a Budget Analyst with the Maritime Administration (1969-1972).

A native of Camden, N.J., he graduated from St. Joseph's University in Philadelphia, Pa., in 1965 where he earned a Bachelor of Science degree in Accounting. Mr. Jablonski received a commission in the U. S. Air Force upon graduation from St. Joseph's and served four years as an auditor while stationed at McGuire AFB, N.J.; Karamursel, Turkey; and Langley AFB, Va. In 1976, Mr. Jablonski received an Outstanding Achievement Award for improvement of financial management in the government by The Association of Government Accountants.

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AN APPROACH TO EFFECTIVENESS/PRODUCTIVITY (E/P)

By Joseph J. Jablonski

There is an increasing emphasis on improving productivity in government. The theme of the Second Annual Management Conference held in Cherry Hill, N.J., on February 10-13, 1980, was "A More Productive Government." The conference was sponsored by the Office of Personnel Management, the Office of Management and Budget, and the General Services Administration. The major purpose was to provide an opportunity for government executives to identify major management problems and what can be done to resolve them.

This article details the successful approach that the Defense Mapping Agency (DMA) has taken in the implementation and operation of its Effectiveness/Productivity Program. Many of the concepts and principles of this program are not unique to our organization and are adaptable throughout the government.

ENVIRONMENT FOR E/P

The Defense Mapping Agency's successful approach to improving effectiveness and productivity can be understood best in the context of the Agency's creation and mission. DMA was formed in 1972 from the mapping, charting and geodesy (MC&G) elements of the Army, Navy and Air Force.

On November 5, 1971, President Nixon directed the establishment of the Defense Mapping Agency. The goal of consolidation was to achieve optimum efficiency and economy while continuing to satisfy the legitimate MC&G requirements of the separate Military Services. The primary mission of DMA is to

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provide worldwide MC&G support to the Department of Defense. The domestic portion of these requirements is primarily met through use of products of the U.S. Geological Survey and the National Ocean Survey. DMA currently operates with an authorized strength of 8,483 (444 military and 8,039 civilian) and an FY 1980 budget of approximately \$300 million.

DMA's specific mission is to provide the Armed Forces with maps, charts and geodetic products, data and services essential to military operations and planning. This includes land, sea and air navigation products and other products that become an integral part of strategic and tactical weapons systems. The soldier and marine depend upon DMA's topographic maps and combat charts. Air crews depend upon aerial navigation charts and flight information publications. Naval forces depend upon surface and subsurface nautical charts and navigational aids. Missile accuracies depend upon our precise positioning of launch and target areas by geodetic and geophysical means. In addition, DMA has a statutory responsibility to support the civil maritime community with up-to-date and adequate navigational materials.

The Agency has six major organizational elements: the Headquarters located in Washington, D.C.; two production centers, one located in Brookmont, Md., and one in St. Louis, Mo.. The Defense Mapping School at Fort Belvoir, Va., trains military cartographic and geodetic personnel; the Inter American Geodetic Survey in Panama assists and advises the Latin American countries in carrying out mapping and survey programs; and the Office of Distribution Services in Brookmont, Md., distributes DMA products to the Military Services, other DoD Components, Federal civil agencies, mariners and foreign governments. MC&G production is concentrated in our two production centers: The Hydrographic/Topographic Center oriented

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toward Army land combat programs and the Navy's sea navigation requirements; and the Aerospace Center oriented more to the strategic and tactical aircraft and missile elements.

NEED FOR E/P PROGRAM

In 1972, DMA sought a vehicle for focusing attention throughout the Agency on the need to reduce the gap between validated MC&G requirements and the resources necessary to produce them. This gap is attributable to a number of circumstances.

First of all, there are the demands of advancing technology. DMA's production is widely diversified because its products are geared to the individual needs of particular weapons systems, be it a submarine or a ballistic missile. As systems become more sophisticated, so must DMA technology, and this takes on some rather astounding proportions when one considers the rate at which weapons technology is expanding. Today we are repeatedly being faced with requirements for accuracies and terrain descriptors considered impossible only a few years ago.

There were also other catalysts--most importantly the fact that DMA was formed in a timeframe when DoD mapping resources had been reduced proportionately to general resource reductions levied against the intelligence community (in the early 1970's). The initial resources provided DMA were short of what would be required just to maintain the adequacy of existing products in the field, let alone keep pace with the new products required to meet present DoD requirements and those needed to support an expanding technology. For example, in some cases,

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as many as two-thirds of existing maps and charts were considered inadequate. The funding gap between what existed and what was required to meet all DoD requirements amounted to about \$68 million annually, about one-third of DMA's initial budget.

From the beginning, DMA management recognized that manpower and funding increases sufficient to satisfy the backlog of all worldwide requirements for MC&G support could not reasonably be expected. Accordingly, the Agency's objective has been to narrow the gap between MC&G needs and resources by satisfying only those requirements which have withstood a rigorous review and validation process and by increasing our effectiveness/productivity. In the first instance, DMA works continually with the user during the requirements development process to point out the most cost effective method of meeting their MC&G requirements. In the second instance, we increase our productivity by such management initiatives as eliminating, realigning and consolidating activities; by taking advantage of automation and technology to improve production techniques and processes; and by motivating our people to find more efficient and effective means of carrying out the DMA mission.

The vehicle for pursuing these objectives was designated the DMA Effectiveness/Productivity (E/P) Program. The program was titled Effectiveness/Productivity to emphasize the need for balanced attention to the quality and utility of the support that DMA provides to its customers, as well as to economy in operations. The factors associated with increasing effectiveness and productivity at DMA are:

Effectiveness

- Higher priority work done
- Better products
- Invalid needs eliminated
- More responsive service

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Productivity

- Transfer resources from support to production
- Improved techniques
- Productivity-enhancing equipment
- Product value engineering
- Better management

DMA's E/P Program is not acquisition oriented, nor is it dependent on budget increases. Rather, it is a self-help program whose objective is to generate within DMA our own "additional" resources. The concept is to use appropriated funds more productively so we can satisfy additional requirements without added resources. DMA's objective is to improve efficiency in all areas of the organization and to reprogram savings into our production areas.

E/P STRUCTURED FOR SUCCESS

In organizing the initial E/P program, DMA set about to establish a structure designed to capitalize on an environment already conducive to change. This was a direct result of the establishment of a new organization.

Since approximately 80 percent of DMA's Operation and Maintenance appropriation is devoted to the pay of personnel, significant improvements in productivity can only be achieved with and through these people. To gain their support, the people involved had to be convinced of the merits of the cause. Accordingly, DMA had to translate the resource deficiency [the \$68 million gap] into terms which our people could relate to their work area and specific job. This is one of the key elements of DMA's program.

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The productivity program had to prove its own worth and be credible at the operating level. People had to be able to understand E/P in terms of organizational, as well as personal goals, and be able to comprehend how saved dollars could be converted into increased production of maps and charts. To accomplish this, DMA set up an extensive educational and motivational program, including such things as productivity displays, awards, newspaper articles and, most importantly, a reporting system that routinely assesses progress against goals.

In order to show management support, an organizational structure had to be established that demonstrated top management's concern about the success of E/P and their active involvement and interest in perpetuating it as a management tool. DMA's Deputy Director, Management and Technology, our top civilian, serves as the overall E/P program coordinator.

THREE E/P STUDY CATEGORIES

DMA structured its E/P program to systematically document its concern with and progress toward increased efficiency. DMA procedures call for studying the Agency and its Components organizationally, functionally and operationally, each under three categories. Under Study Category I, authority is delegated to DMA Component Directors, and studies are initiated by the Components. Studies under Categories II and III are initiated by the Headquarters with appropriate participation by the Components. Category II studies are those which cross DMA organizational lines. Category III studies are those that affect DMA products or services external to DMA and that require coordination with outside agencies. Under all three categories, responsibility is collocated with the functional authority inherent at the respective organizational levels. This approach has

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proved a very important aspect of DMA's program, both in terms of economy and in maximizing effectiveness and direction. It insures the involvement of the entire organization and assures that all functional areas are considered for improvement.

TWO STUDY APPROACHES

DMA studies are systematically pursued under a two-phased study approach: Phase I is essentially exploratory in nature and designed to examine the feasibility or improvement potential of an item. When it is determined that the potential return of an item is minimal, the project is stopped as a formal E/P item. Studies that demonstrate a high improvement potential are approved for further development and implementation under Phase II. In this way, all studies that meet criteria for a Phase II effort will be documented and approved for further analysis.

RESULTS TO DATE

As stated previously, DMA's goal is not merely to identify savings potential, but to convert dollars saved into increased productivity. It is this aspect that sets DMA's E/P program apart from the defunct Cost Reduction Program (CRP). Unless a savings can be identified, tracked and specifically reapplied to increased map and chart production, a measurable E/P benefit is not validated. For example, a savings in a support function reapplied within that same function (rather than in a map and chart production) is not creditable to DMA's E/P program. DMA's E/P savings are not considered valid until they are reallocated by our program office and applied to new production. These savings then have the unique feature of being identifiable and auditable in our program/budget documents.

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MAJOR IMPROVEMENT CATEGORIES

DMA has four categories that comprise its major improvement actions:

- a. Improvements in the Agency's organization configuration and management practices.
- b. Improvements through the development and introduction of new technology and productivity enhancing capital investments.
- c. Reductions in labor intensity through improved production techniques and processes.
- d. Economies in materials and operating expenses.

EXAMPLES OF MAJOR IMPROVEMENT ITEMS

To date, DMA has studied and implemented approximately 500 E/P actions providing savings in excess of \$55 million. The following are a few examples of validated major improvement items aligned against each of the four categories:

<u>Category</u>	<u>Description</u>	<u>\$ in Millions Savings</u>
a.	<u>Organization Configuration and Management Practices</u>	
	(1) Consolidation of two Washington area production centers	\$ 9.3
	(2) Consolidation of distribution activities	\$ 1.7
b.	<u>New Technology and Productivity Enhancing Investments</u>	
	(1) Development of five-color printing process	\$ 1.9
	(2) Improvement in Photographic Rectification Equipment	\$ 0.8
c.	<u>Improved Production Techniques and Processes</u>	
	(1) Change in printing cycles of Flight Information Publications	\$ 3.0
	(2) New direct positioning methods	\$ 4.7
d.	<u>Economies in Materials and Operating Expenses</u>	
	Change in grade of map paper	\$ 1.2

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NEED TO MEASURE EARNED PRODUCTIVITY

When DMA established its productivity program, it recognized the need to develop a system to verify that the benefits gained were being converted into a greater level of services for DMA customers. DMA's goal was a classical input/output productivity measure. This was a challenge since we were faced with a number of especially demanding objectives and problem areas.

PROBLEM AREAS ENCOUNTERED

DMA's primary problem was to establish uniform procedures for analyzing the productivity improvement potential given the wide diversity of our products. Our products have to serve a variety of purposes and users; in fact, the Agency has about 600 different product lines and categories of services. The problem is even more complex when one considers the hundreds of different types of products in any single line because of mapping variables such as terrain, scale, accuracy requirements and production options.

Another problem was the need to assure consistency of measurement. Our production mixture can and does change drastically depending on where critical world situations develop.

DMA SOLUTION

The DMA production centers have developed and refined comprehensive production standards for many of their products. These standards are broken

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down into the various functional phases involved in the mapping production process; e.g., research, compilation, engraving and printing. The standards are maintained and revalidated at least once a year. The standards are used to program production and associated resource requirements. Individual products will usually take more or less time than the standard, but production over a period of time will tend to normalize around the standard.

Each of the production centers also has a production management information system to record the completion of products through their various functional phases and to record the expenditure of resources and manhours against the production of each item. DMA decided to use these standards and the data captured in the production management information systems to develop and compute synthetic output units which would have the quality of homogeneity and would compensate for the variables of production pipeline time.

DMA calls this synthetic output unit a Standard Output Unit (SOU). It represents the MC&G product or service output of one direct labor man-year in the E/P base year, which is FY 1973. Stated another way, what could the investment of a man-year buy DMA in the base year; e.g., if the production standard for one type of DMA product (e.g., Joint Operations Graphic) in FY 1973 was one man-year, then the standard output unit value of one such product is one SOU.

For each product, the base year SOU value is held constant for future years. The actual equivalent completions of that product during the year are recorded in the Management Information System. Then the total equivalent completions of that type of product are multiplied by its SOU value to derive the earned SOU's; these are summed for all of the products and services of a production center to determine

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the total earned SOU's for the entire Agency. For the base year and each succeeding year, the total output in SOU's can be divided by the total man-years of input effort to develop a productivity index, which is used to track the productivity trend from year to year.

This approach has proven to be workable and to be sufficiently accurate for measuring productivity trends on all products for which production standards have been developed and validated.

BENEFITS

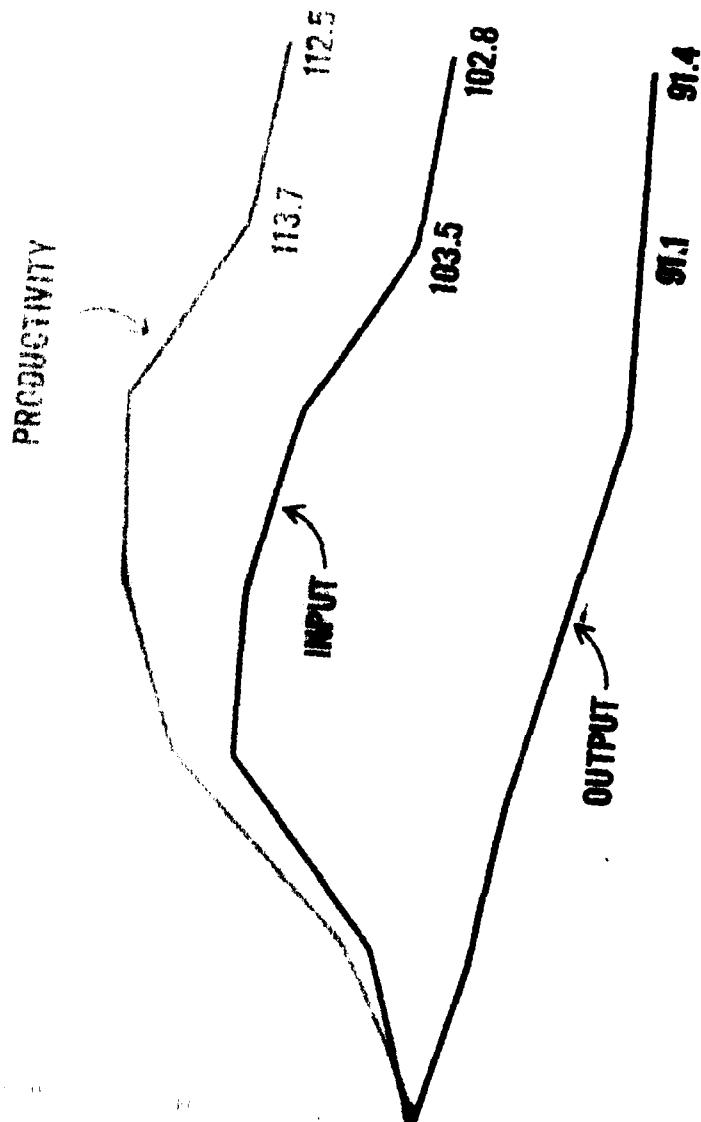
You will find, just as DMA did, that measurement proves a valuable internal management tool. It not only provides a means for assessing the overall productivity of your work force, but also assures that optimum utilization is made of your activities. An index of this type is capable of determining the effect of a change or improvement in any one element of the organization or collectively on the overall organization. You can evaluate the efficiency of one program against others for management control purposes or for determining where the greatest potential return can be gained from additional resources. Employing manpower standards as a measure provides a ready tool for assessing the adequacy of your standards. DMA also utilizes the dollar based E/P measure in support of its budget request. This has been extremely beneficial in explaining our return on the dollar to DoD and OMB. A final benefit is the motivation factor. This is perhaps the greatest result from our measurement system. Measurement has made DMA employees more conscious than ever before of the results of improvement.

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SUMMARY

The importance of the human element should not be underestimated. It's the people--the workers down on the production line--that are going to "make or break" a program of this type. The degree of attention that management gives to employee motivation and comprehension can easily equate to success or failure. DMA is convinced that the time and effort expended in "selling" the E/P program to its people was the key to its success.

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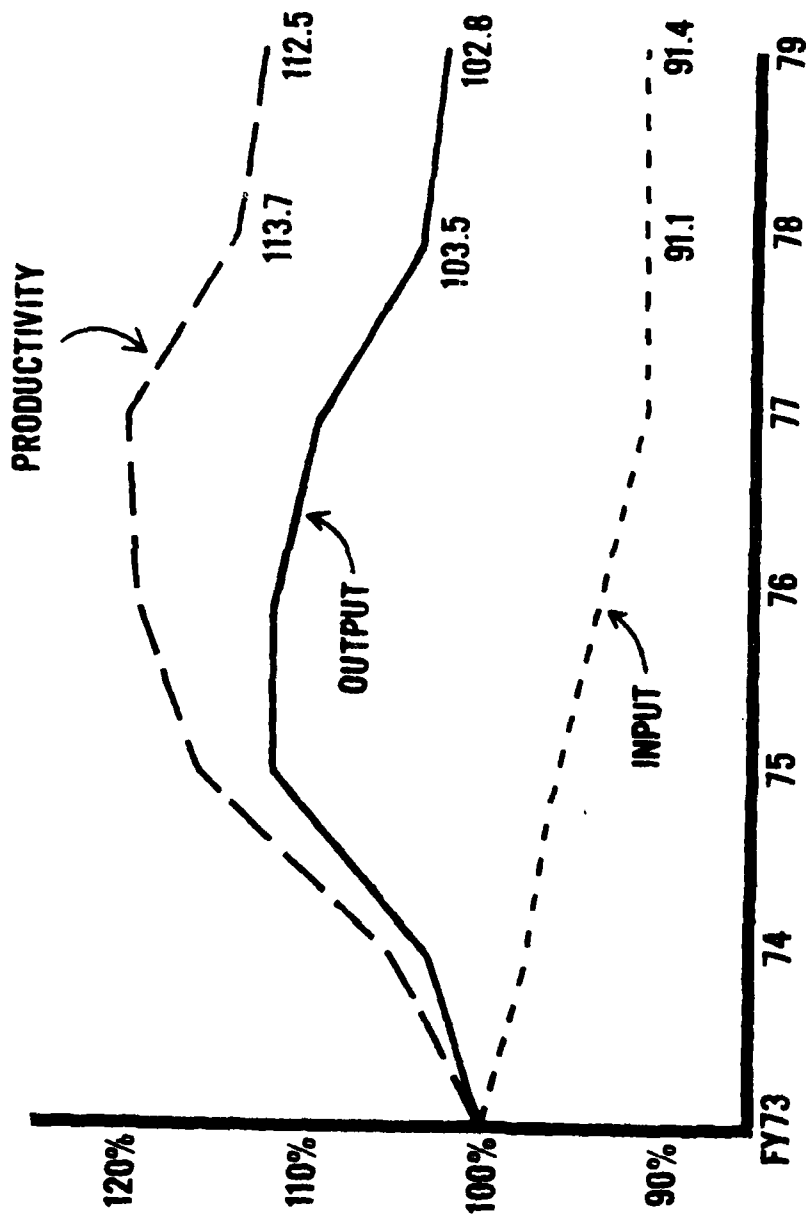
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