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THE DEFENSE MAPPING AGENCY: COMBAT SUPPORT TO DOD(U)
ARMY WAR COLL CARLISLE BARRACKS PA P C ROBISON
11 APR 88

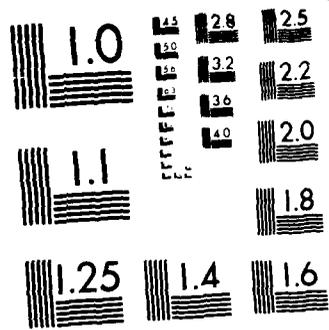
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USAWC MILITARY STUDIES PROGRAM PAPER

THE DEFENSE MAPPING AGENCY:
COMBAT SUPPORT TO DoD

AN INDIVIDUAL STUDY PROJECT

by

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Colonel Jay Mumford
Project Adviser

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U.S. Army War College
Carlisle Barracks, Pennsylvania 17013
11 April 1988

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ABSTRACT

AUTHOR: Peter C. Robison

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The Armed Services rely on support from sources not only internal to their respective service but external as well. The Department of Defense agencies are vital links that contribute critical support to the overall mission of military deterrence and warfighting. Among these agencies is the Defense Mapping Agency whose mission is to provide mapping, charting and geodetic products, services and training at the right time, in the right place, and in the right quantity so that the military can carry out its mission. DMA supports the planning and execution of military operations by producing everything from paper maps and charts to film strips to digital data. With the development of "smart" weapons systems, DMA will play an ever more essential role. This paper is intended to provide the reader with an understanding of DMA's vital role of combat support to the DoD.

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THE DEFENSE MAPPING AGENCY: COMBAT SUPPORT TO DoD

CHAPTER I

INTRODUCTION

This paper provides information about the Defense Mapping Agency and its role in DoD. It is an analysis of the Agency's mission and goals and is based on articles that have appeared in employee newspapers, other DMA publications, the author's personal interviews and tours, and other sources. The paper will explain DMA's roles and mission so that the reader can gain an understanding of DMA's vital role of combat support to DoD.

BACKGROUND¹

The Defense Mapping Agency (DMA) was established in 1972 to combine the mapping, charting and geodesy (MC & G) functions of the Defense community into a single, efficient, cost-effective joint agency and to best utilize the exploding new computer technology which was having such an impact on military operations.

DMA is under the direction and control of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (C3I) with the Director being responsible to the Joint Chiefs of Staff for operational matters. DMA's position in DoD are further defined in Appendices 1 and 2.

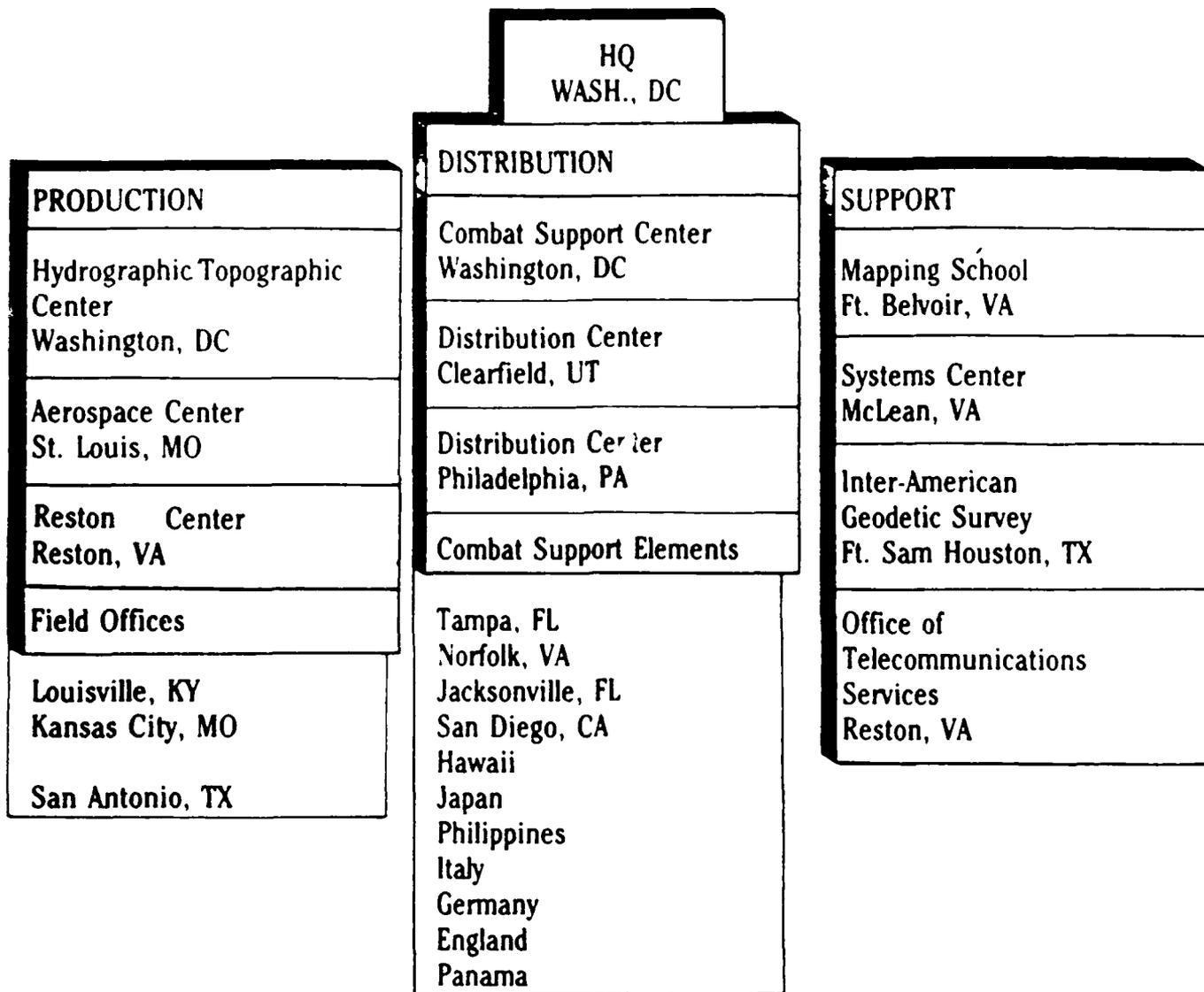
Through the years each service of the military has had a need for providing mapping and charting products to their respective service. During World War II, the relatively small Army and Navy mapping units had to meet a demand to provide the worldwide requirements of that conflict. The Army Map Service was created from former mapping activities and the Hydrographic Office expanded to a larger facility. During this period The Army Air Force Aeronautical Chart Plant was established to meet the increasing demand by the flying forces, and the Inter American Geodetic Survey was established for long-range mapping projects in the Latin American countries.

In the 1950's the Office of the Secretary of Defense had become concerned that the three services might be duplicating production systems then under development. When the Defense Intelligence Agency (DIA) was formed, management of MC & G programs was assigned to it and during the next decade DIA made significant progress in determining requirements, establishing program guidance, developing priorities, integrating programs and eliminating some duplication among the services. In 1970 the President's Blue Ribbon Study Committee recommended consolidation of all MC & G activities into a new centralized agency, and in the fall of 1971, President Nixon directed a reorganization of the Defense Department's intelligence effort and the establishment of a new Defense Mapping Agency. Since then, DMA has grown and has been reorganized to its present configuration as shown in Illustration 1.

DMA Facilities Worldwide

(Updated for FY 87)

PRODUCTS • MODERNIZATION • FACILITIES/RESOURCES • USER REQUIREMENTS



MISSION2

The combat support missions of DMA are;

- o To enhance national security and support our strategy of deterrence by producing and distributing to the Joint Chiefs of Staff, Unified and Specified Commands, Military Departments, and other Department of Defense users, complete, credible, effective, and usable mapping, charting, and geodetic products, services, and training at the right place, in the right quantity, and at the right time.
- o To ensure our warfighting forces have available to them effective mapping, charting and geodetic support should our strategy of deterrence fail.

Two incidental missions of DMA are:

- o To provide nautical charts and marine navigational data to worldwide merchant marine and private vessel operators.
- o To maintain liason with civil agencies and other national and international scientific and other organizations engaged in mapping, charting and geodetic activities.

GOALS3

The goals of DMA as established in FY 86 are:

- o Focus on People:
 - o Leadership involvement
 - o High quality work environment
 - o Superior personnel and career programs
- o Focus on Mission:
 - o Complete, credible products, services, and training
 - o Timely, effective support to operational military commands
- o Focus on Customers:
 - o Increase satisfaction
 - o Improve dialogue
 - o Improve requirement identification
 - o Emphasize DMA support
- o Focus on Modernization:
 - o MARK 85/MARK 90 effectivity
 - o One DMA Concept
- o Focus on Research & Development:
 - o Identification of new technology application
 - o Support new product requirements
 - o Innovative solutions to customers need
 - o Improved crisis support

ENDNOTES

1. Defense Mapping Agency, MC & G; The First Decade of The Defense Mapping Agency.
2. DMA, Defense Mapping Agency: Annual Report 1986, opening page.
3. DMA, DMA FY 1986 Goals.

CHAPTER II

FOCUS ON PEOPLE

"With active involvement of the DMA leadership, pursue a high quality work environment with emphasis on: health and safety, care for each other, and responsive and positive personnel management and career enhancement programs at all levels; make DMA a highly satisfying and exciting place in which to contribute to national security".1

The DMA leadership places employee welfare at the very top of the list of goals because if an employee is satisfied with his/her job and environment, productivity increases. That means that DMA will be doing a better job for the country in its combat support role. Personnel and career programs have been initiated to enhance an employee's career, and a high quality work environment is being transformed from existing structures as well as new facilities under construction. As former director MG Robert Rosenberg stated in one of his articles to the employees,

"Our people programs are leading to more efficient use of DMA manpower and a formalized system of advanced training and definitive career paths in various disciplines. You have a clear opportunity to advance along lines spelled out up front - and to advance as far as your skills and dedication will take you. The

leaders of tomorrow's DMA are in these pipelines today and I am convinced both you and the Agency will benefit from this overall effort."2

ENDNOTES

1. DMA, DMA FY 1986 Goals.
2. Robert Rosenberg, "Direct Line: Leaving Brings Mixed Emotions," Orienteer (Defense Mapping Agency Aerospace Center, St. Louis), 18 September 1987, p. 2.

CHAPTER III

FOCUS ON MISSION

"Alert all employees concerning the nature of the threat to national security. Enhance security and deter warfare by providing complete, credible, effective and usable products, services and training to the Unified and Specified Commands, the Military Departments, the Merchant Marine, and other users at the right place, in the right quantity and at the right time; ensure that our war fighting forces are provided effective MC & G support to accomplish their missions should deterrence fail."1

PRODUCTS, SERVICES, AND TRAINING²

DMA products and services come in a multitude of forms.

Illustration 2 is a listing of these products and quantities produced and distributed during FY 87. Just over half of the products are conventionally printed maps and charts while the remainder are in other formats, such as film or digital. All production and distribution of both hard copy and digital products is under the direction of the Agency, with a workforce of some 9,500 highly skilled military and civilian personnel, some 65 percent of whom are professionals and paraprofessionals. Fifty percent of the production resources support tactical operations for land, sea and air; thirty three percent is geared to missile and bomber operations including cruise missile and Pershing II; thirteen percent accounts for safety of worldwide navigation; and about four percent is for planning and evacuation activities. Illustration 3 depicts DMA's FY 87 resource allocation.

A major class of products is digital maps which are used in aircraft and marine simulators, in weapons targeting and in a wide range of other military operations. Digital data is used by E-3A, AWACS, B-52, A-10 and other aircraft, aboard battleships, aircraft carriers, nuclear-powered submarines, for troop and tank navigation and for battlefield intelligence. This application is also used in the guidance of cruise and Pershing II missiles by matching the terrain or features to stored digital map scenes. As emerging technology continues to revolutionize military weapons systems, a dependence on DMA is expected to increase.

Through DMADMS (Defense Mapping School) located at Ft. Belvoir, VA, DMA maintains a staff composed of personnel

ILLUSTRATION 2

Source: Defense Mapping Agency
Annual Report FY 87
(Advance copy)

TYPICAL PRODUCTS

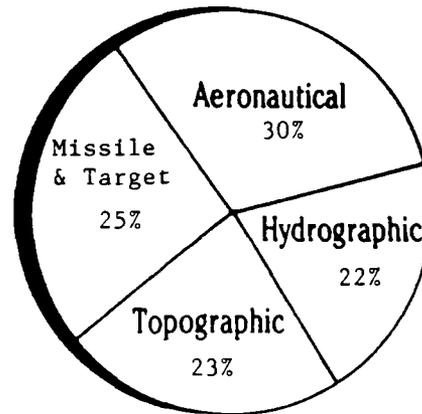
	MAINTENANCE PRODUCTION		INVENTORY DISTRIBUTION	
	Oct 86-Sep 87		Oct 86-Sep 87	
	QUANTITIES		LINE ITEMS IN INVENTORY	COPIES DISTRIBUTED
	NEW	REVISED		
HYDROGRAPHIC				
Harbor/Approach Charts	48	116	2,660	470,255
Coastal Charts	26	48	1,784	330,458
Combat Charts	24	3	324	158,986
Navigation Publications	5	111	1,373	2,279,620
TOPOGRAPHIC				
1:50,000 Topographic Maps	290	180	26,966	18,762,895
1:100,000 Topographic Maps	105	12	1,217	3,217,810
Joint Operations Graphics (Ground)	23	128	5,048	1,506,987
City Products	30	34	1,646	375,536
AERONAUTICAL				
Operational Navigation Charts	--	32	270	2,265,604
Jet Navigation Charts	--	11	122	1,157,471
Joint Operations Graphics (Air)	29	134	3,509	8,247,806
Joint Operations Graphics (Radar)	18	70	1,504	508,084
Tactical Pilotage Charts	18	32	506	4,795,760
Air Target Charts	29	181	4,351	2,191,754
DIGITAL				
Digital Terrain Elevation Data (DTED)	619	319	10,566	39,641
Digital Feature Analysis Data (DFAD)	672	86	4,489	5,652
Strategic Target Points	5,292	3,657	--	--

Source: Defense Mapping Agency
Annual Report FY 86
(Updated for FY 87)

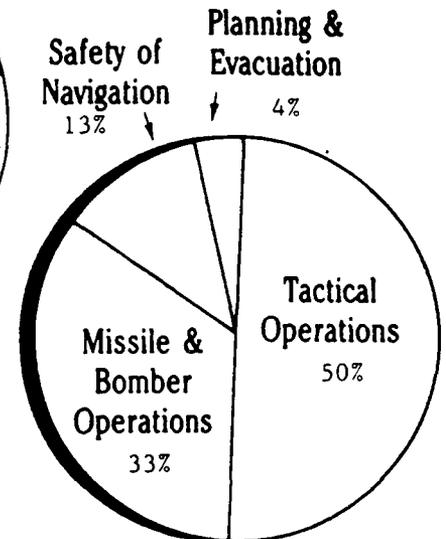
DMA Resources

FY 1987 FUNDING (MILLIONS)

RDT&E	253.9
Procurement	31.5
O&M	484.1
MILCON	15.7
Total	785.2



RESOURCE ALLOCATION



FOREIGN AGREEMENTS

92 Countries
Assigned Coproduction

	DMA COPRODUCER	
Aeronautical	74%	26%
Hydrographic	67%	33%
Topographic	76%	24%
Digital	86%	14%



representing all of the military services and provides training to meet the MC & G requirements of the military and civilian personnel of the Armed Services as well as other government agencies. The school provides mobile training teams that carry training directly to user organizations in their operational settings worldwide. It is the only school of its kind in the military, and is accredited by the Southern Association of Colleges and Schools.

Training extends beyond the mapping school from DMAIAGS (Inter American Geodetic Survey) which assists Latin American cartographic agencies in performing surveys and producing maps and charts. Its headquarters is located at Ft. Sam Houston, TX where instruction covers nearly all disciplines of mapping, charting and geodesy. IAGS has engaged in several major programs in cooperation with other U.S. and Latin American agencies. Among these are harbor and port surveys, tidal observation stations, and a tsunami warning system against giant sea waves produced by submarine earth movement or volcanic eruption.

TIMELY, EFFECTIVE SUPPORT³

DMA can best be described as a combat support agency and as much as anything else, a readiness agency. It has provided crisis mapping support for military contingencies ranging from the 1985 ACHILLE LAURO hijacking to the Libyan operation to the 1986 Bolivian cocaine sweep to the current Persian Gulf escort operation. Although DMA was created in 1972 it received little

publicity until the 1983 invasion of Grenada by U.S. Marines and Army troops. A very significant result of the after-action review of this operation was that DMA is now in the loop at the Joint Chiefs of Staff at a much earlier point as part of the crisis management unit set up when world situations indicate possible U.S. military deployment, for any reason.

Support was also provided for the Bolivian drug enforcement operation which involved several DMA components in a coordinated effort. The in-country project office of DMAIAGS provided hundreds of map sheets in various scales, plus other information, DMAHTC (Hydrographic/Topographic Center) provided color and black and white prints of Landsat photography, while DMAAC (Aerospace Center) forwarded information on several hundred airfields.

The current Persian Gulf situation is another example of DMA's role. The Agency was called upon to produce two separate charts on a crisis basis that directly supported international activities of highest National Command Authority priority. In addition to delivering the charts, several classified products of critical importance were produced to support the operation.

In order to increase combat support response, DMA has entered the world of real-time command and control systems with the activation of four terminals tied to the Worldwide Military Command and Control System Intercomputer Network, known as WIN. With terminals located at the production centers, Combat Support Center, and DMAHQ, an instantaneous command channel among DMA components and between DMA and the National Command Authority, the Unified and Specified Commands, the services, and other

defense agencies, has been established. This network will revolutionize the nature of DMA's relationship with supported commands. Its use will initially focus on crisis management, automation of the MC & G area requirements submission process, and entry of real-time updates to national data bases.

Crisis management procedures will be expedited through teleconferencing, allowing users at separate geographic sites to exchange information in a real-time conversational mode or to store and retrieve messages. An additional feature of the system is FTS Mail (File Transfer Service), which is expected to virtually eliminate the standard mail delays that have characterized communications between DMA components and DMA liason officers located throughout the world. FTS will allow DMA to establish its own data bases which presents a potential for complete automation of the manual-dependent area requirements system. The contingency planning function is also expected to reap significant benefits from WIN since the network will provide DMA planners at all levels with access to the Joint Operations Planning System (JOPS).

DoD Headquarters staffs and combat commands worldwide are increasing their dependence on DMA to support crisis actions. Although less than three percent of production resources are prioritized for crisis and contingency operations they may be the most important since these brush-fire crises can escalate if they are not met with capable U.S. forces immediately. Maj. Gen. Robert F. Durkin, USAF, stated upon assuming the directorship of DMA 30 September 1987, "Two words have become important additions

to my vocabulary the past few years. Those words are 'timely' and 'tailored' - particularly as those words apply to support to the Unified and Specified Commands and their combatant components. Support which is not tailored is inefficient support, and support which is not timely is no support at all."4

ENDNOTES

1. DMA, DMA FY 1986 Goals.
2. The following are the primary sources used for this section: E.A. Wilkinson, "Mapping the Earth in Bits & Bytes," Defense 85, May 1985, pp. 18-24;
DMA, The Defense Mapping Agency, (Recruiting folder, 1982);
Robert Rosenberg, "Direct Line: DMA Must Do More With Less," Orienter (DMAAC, St. Louis), 20 March 1987, p.2;
Robert Rosenberg, "Direct Line: We Made History in FY 86," Orienter (DMAAC, St. Louis), 17 October 1986, p.2.
3. The following are the primary sources used for this section: Robert Rosenberg, "Direct Line: DMA Welcomes Appraisal," Orienter (DMAAC, St. Louis), 22 August 1986, pp.1-2;
"DMA Is On-Line To Worldwide Network," Orienter (DMAAC, St. Louis), 8 January 1988, p. 1;
"DMA Was Pro-Active In Persian Gulf Support," Orienter (DMAAC, St. Louis), 21 August 1987, p. 1;
"Maj. Gen. Durkin Takes Command," Orienter (DMAAC, St. Louis), 30 October 1987, p. 1.
4. "Maj. Gen. Durkin Takes Command," Orienter (DMAAC, St. Louis), 30 October 1987, p. 1.

CHAPTER IV

FOCUS ON CUSTOMERS

"Increase customer satisfaction through efficient and cost effective production, timely responsiveness, two-way dialogue and improved identification, validation

and prioritization of current and future MC & G requirements; emphasize DMA's support role to operational military commands."1

INCREASE SATISFACTION²

DMA produces a wide variety of products in support of the military, ranging all the way from harbor and approach charts to filmstrips for the cockpits of combat aircraft. Looking across the validated requirements from all of the users, all of the Unified and Specified Commands, the military departments, and the intelligence community, DMA has a requirement over the next five-year period to maintain or generate over 96,000 unique products. Of those, 45 percent don't exist in today's inventory, 29 percent are adequate but must be maintained, and some 26 percent are of limited utility and must be upgraded.

DMACSC (Combat Support Center) has the task of maintaining, cataloging and distributing currently 66,000 unique line items consisting of 172 million copies, including maps, charts, publications, point positioning data bases, digital products, and video laser disks. These products are produced by DMA production centers, National Ocean Service, U.S. Geological Survey, FAA, ICAO, miscellaneous organizations, and foreign governments. They are shipped to a wide variety of users to include the Military Services, Unified and Specified Commands, White House, Congress, other DoD agencies, CIA, NSA, Maritime Agency, Coast Guard, and the public. To fulfill this mission the CSC staffs two major

distribution depots within CONUS and 10 offices and military detachments worldwide, as well as 230 independent sales agents worldwide.

As a means to improve responsiveness DMA has inaugurated a new computer system for requisitioning a map or chart. The new computerized system, known as GET A MAP, should make it simpler to order desired materials. The principle advantage of computerization for customers is that they will now be able to check and correct their order form before it is submitted. As an adjunct to this system, DMA maintains a 1-800 number at the CSC to expedite customer requests. These are steps in bringing the distribution system into the modern production system, and to ensure rapid and efficient availability of products to the operational forces.

IMPROVE DIALOGUE³

A recent concept to improve dialogue is the placement of professional DMA technical MC & G advisors in the Unified and Specified Commands to help identify product and area requirements as well as to represent the Agency. To date only EUCOM and SAC are staffed but LANTCOM and CENTCOM soon will be added to the expanding list of liason positions. In addition to the Commands DMA has placed liason officers within the Military Departments to insure that their weapons system developers are aware of MC & G support needed and what is available. There also is a liason position within the OSD so that items of MC & G interest are

properly identified, and there are positions with several foreign government military mapping units, namely, the Phillipines, Indonesia, Korea, and United Kingdom. These officers are placed in foreign units so that their MC & G capability will be compatible with DMA's which strengthens ties with users and allies.

IMPROVE REQUIREMENT IDENTIFICATION⁴

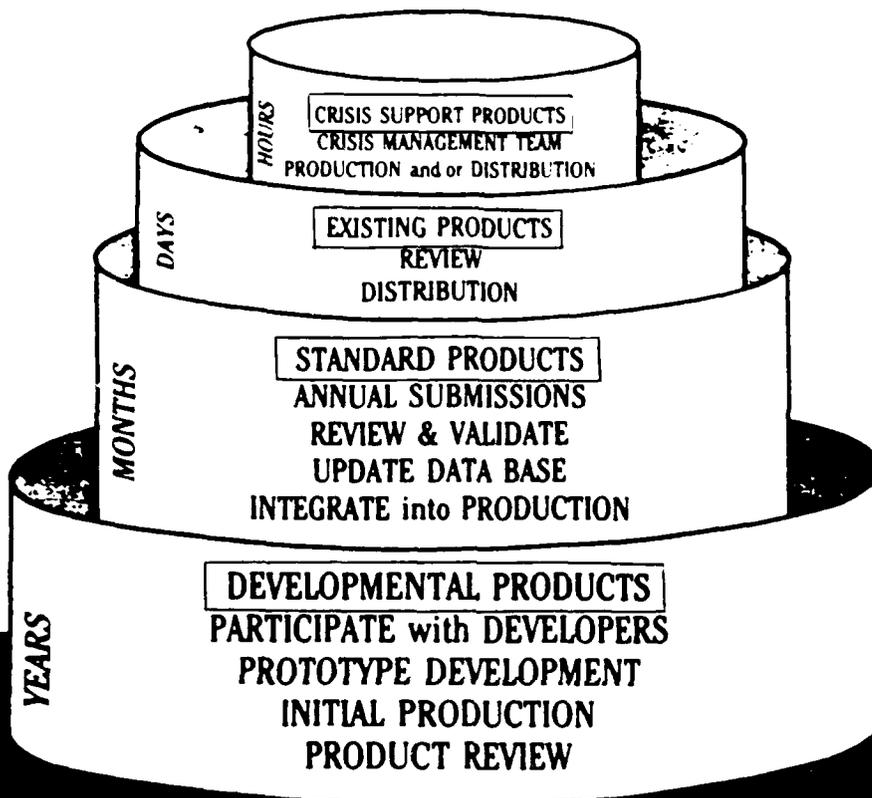
The DMA requirements process is a multi-tiered model which is based on priorities. Activities of the Agency are driven by this process which can take years as in the case of production for new weapons system support; months for production of standard products; to days to process existing product requests and distribution of existing products; to hours in analyzing rapid response requirements and review by the Crisis Management Team. These concepts plus a broader look at the requirements process are depicted in Illustration 4.

Further, DMA is now included in the JCS contingency planning cycle, to ensure that MC & G requirements are identified early enough to permit proper evaluation by DMA and production of updated materials when required. At the same time, there is a concerted effort to look at the requirements process, under which the Unified and Specified Commands, the JCS and other users provide their best estimates of operational needs each year. In February of each year a requirements letter is sent to the J-2 MC & G officers requesting identification of DMA support needed for

Source: Defense Mapping Agency
Annual Report FY 86
(Updated for FY 87)

Requirements Process

USER REQUIREMENTS FOR:



PRODUCTS • MODERNIZATION • FACILITIES/RESOURCES • USER REQUIREMENTS

CRISIS SUPPORT PRODUCTS

- Requests to DMA
- Review by Crisis Management Team
- Provide Standard Products where Available
- Produce Special Products where Required
- Rapid Response Required

EXISTING PRODUCTS

- Requests to DMA
- Requests Reviewed
- Product Availability Determined
- Product Distribution

STANDARD PRODUCTS

- Biennial Area Requirements Submission
- DMA Review & Validation
- Review with JCS/J-3 & C-1
- Update Automated Data Base
- Analyze Priorities & Precedences
- Program for Production

DEVELOPMENTAL PRODUCTS

- Required for New Weapon Systems
- Participate with Developers
- Develop Prototype
- Participate in System T&E
- Finalize Product Specification
- Produce for Initial
- Deployment

MC&G production and distribution are based on user requirements. DMA distributes available maps and responds to crises requirements upon request. Requests for new standard products can take up to 30 months to fill. Service and CINC requirements for new coverage far outstrip DMA resources to respond. Production of new standard products is based on priorities established by JCS. DMA works closely with weapon system developers to plan for meeting new kinds of products and services. In all cases, DMA attempts to meet the highest priority requirements based on user and JCS priority determinations.

their operations plans. DMA provides catalogs of available products and after users review and prioritize their needs, they return their list by June or July at which time the requirements are reviewed and validated. There is a requirement for flag officer approval of this tasking and DMAHQ staff personnel work directly with the Commands and Military Departments to ensure that realistic requirements are forwarded to the agency. This policy is an effort to keep high level involvement with senior people, to refine requirements and to eliminate overlap and duplication. Production schedules are based on those mutually agreed upon priorities.

EMPHASIZE DMA SUPPORT5

As part of a continuing program to emphasize DMA's combat support mission, the senior leadership of the DoD are visiting the agency. Visits by former Secretary of Defense, Caspar Weinberger, and the current SecDef, Frank Carlucci, have been beneficial, particularly because of the emphasis placed on budget constraints and an overlapping review of the status of all DoD joint agencies. Visits to the Agency by the SecDef and other high-ranked domestic and foreign visitors are but one phase of a planned effort to ensure that all elements of DoD, other government agencies and the Congress are aware of the importance of DMA's combat support.

The Director of DMA, Maj. Gen. Durkin, is also planning a series of visits to the operational commanders throughout Europe

in order to strengthen the link between the agency and the user. Additionally, a number of liason officers have been appointed to represent DMA's interests at major commands, within OSD and in the OJCS to facilitate the exchange of information.

During his directorship, recently retired Director of DMA, Maj. Gen. Robert A. Rosenberg, USAF, made several visits to Capitol Hill to meet with senior leadership of DoD. The objective of these visits was to express concerns regarding the increasing demands being laid upon the Agency and the impact to production. On February 24, 1986, the General was called to testify before the Investigations Subcommittee of the House Armed Services Committee, dealing with possible reorganization of the Department of Defense, including elimination of agencies like DMA. He firmly assured the Congress that DMA products, services and training are essential to operational military commanders but also that the Agency's support to the Military Departments is equally important. The Congressmen learned that DMA supports the DIA, the NSA and the CIA, and that there is close cooperation with the U.S. Geological Survey, the Coast Guard, the Maritime Administration and the Departments of State and Commerce. There are also cooperative production and exchange agreements with more than 80 nations, involving air, land and sea products which contribute about 40% additional capability to the DMA production line.

ENDNOTES

1. DMA, DMA FY 1986 Goals.

2. The following are the primary sources used for this section: Interview with Kenneth Barnes, Chief, Plans, Programs and Operations Branch, DMACSC, Washington, 24 November 1987; Robert Rosenberg, "Direct Line: DMA Must Do More With Less," Orienteer (DMAAC, St. Louis), 20 March 1987, p. 2; Robert Rosenberg, "Direct Line: We Made History In FY 86," Orienteer (DMAAC, St. Louis), 17 October 1986, p. 2; "Users And SC Managers Confer," Orienteer (DMAAC, St. Louis), 13 November 1987, p. 2.
3. The following is the primary source used for this section: Robert Rosenberg, "Direct Line," Orienteer (DMAAC, St. Louis), 26 June 1987, p. 2.
4. The following are the primary sources used for this section: Interview with Mikal Jackson, Assistant Deputy Director, Plans and Requirements, DMAHQ, Washington, 24 November 1987; Robert Rosenberg, "Direct Line," Orienteer (DMAAC, St. Louis), 26 June 1987, p. 2; Robert Rosenberg, "Direct Line," Orienteer (DMAAC, St. Louis), 21 March 1986, p. 2; Robert Rosenberg, "Direct Line: DMA Welcomes Appraisal," Orienteer (DMAAC, St. Louis), 22 August 1986, pp.1-2.
5. The following are the primary sources used for this section: Robert Rosenberg, "Direct Line," Orienteer (DMAAC, St. Louis), 26 June 1987, p. 2; Robert Rosenberg, "Direct Line," Orienteer (DMAAC, St. Louis), 21 March 1986, p. 2; Robert Rosenberg, "Direct Line: DMA Story Must Be Heard," Orienteer (DMAAC, St. Louis), 16 May 1986, p. 2; Robert Durkin, "Direct Line: Visits Are Vital To DMA," Orienteer (DMAAC, St. Louis), 22 January 1988, p. 2.

CHAPTER V

FOCUS ON MODERNIZATION

"Ensure the successful transition and integration of Mark 85 Effectivity 1 segments into the Production Centers and the successful development and planning for transition and integration of Mark 85 Effectivity 2 segments, while improving quality and fulfilling the initialized FY 86 production program; pursue overall

development of the modernization program with no increase in cost or delay in schedule."1

MARK 85/MARK90²

DMA has undertaken a major modernization program to insure continued support to the CINCs whose capabilities are being rapidly expanded by sophisticated weapons systems. This is in reality a Congressionally-mandated conversion into a virtually all-digital production mode, driven by varied source information and increasing requirements. The objective of the Exploitation Modernization Program (EMP) is to provide, by the early 1990's, a digital production capability which will improve flexibility and enhance DMA's ability to respond to user needs, including support to the Unified and Specified Commands. The all-digital environment will result in a 75 percent decrease in production time, and a 50 percent reduction in production cost. The EMP has two phases: MARK 85, which delivered new production capabilities between 1985-1987, and MARK 90, which targets all-digital production by the mid-1990's. MARK 85 has delivered four systems while MARK 90 activities are now in the review stages.

ONE DMA CONCEPT³

Coupled with the EMP are Agency-wide personnel programs to create a "One DMA" concept, intended to tie all operational elements into a single, digitized production effort with

worldwide data transmission links not only between DMA elements but, in time, directly to the operational commands. When fully operational, the new "production line" will encompass everything from the time the source data is collected to the user's hands. All this has to be fed in a consistent fashion into one disbursed production line which must be compatible with all the input sources needed for information, and with all other elements of the DMA system. When the EMP is completed DMA will have one of the largest data bases in the world to which military planners will have access. Using data compression techniques this information will be stored on high-capacity optical disks.

As DMA enters the transitional period of the Modernization Program, major infusions of new equipment and techniques are underway, and extensive training of hundreds of personnel is mandatory. Ensuring a smooth transition, without a loss in production, is a major challenge to the Agency. In order to design an effective training program for the EMP, employees were surveyed to analyze their MC & G skills and a new Career Management Program has been established which is vital to the greater efficiency demanded by the EMP.

Not only are personnel and equipment being addressed in the EMP but organizational structure and facilities as well. DMASC (Systems Center) was established in January 1987 to perform all research, development and engineering, including hardware and software maintenance, for the DMA production line. The change is expected to streamline and maximize the use of resources for research, development and technical innovation. The SC will also

operate the Operational Configuration Control Board, a mechanism by which the single production line will be in step in all of its geographic locations.

With the advent of an all-digital production system in the 1990's, DMA will have the basis for developing an automated mapping and charting system for the future. The key elements in such a system will be automated feature extraction, a worldwide spatial data base, and knowledge-based cartography. The Modernization Program promises major productivity improvements that will enable elimination of the large backlog of unmet user requirements. Massive data requirements for these new systems could rapidly overwhelm DMA's current production resources but the modernization program will provide the expanded digital production capability essential to support requirements.

ENDNOTES

1. DMA, DMA FY 1986 Goals.
2. The following is the primary source for this section: Robert Rosenberg, "Direct Line," Orienter (DMAAC, St. Louis), 21 March 1986, p. 2.
3. The following are the primary sources used for this section: Donna Bolinger-Miles (American Forces Information Service), "DMA Aims To Digitize The World," Orienter (DMAAC, St. Louis), 10 July 1987, pp. 1-2;
Robert Rosenberg, "Gen. Rosenberg Explains The Concept of 'One DMA'," Orienter (DMAAC, St. Louis), 23 January 1987, pp. 1-2;
"282 Employees From AC Transfer To Systems Center," Orienter (DMAAC, St. Louis), 16 October 1987, p. 2;
"Survey To Analyze Skills For The Mark 90 Program," Orienter (DMAAC, St. Louis), 1 May 1987, p. 1.

CHAPTER VI

FOCUS ON RESEARCH & DEVELOPMENT

"Mold the R & D program to pursue efforts that ensure the early identification of new technology applications and new product requirements, provide high promise of impacting production, furnish innovative solutions to customers' increasing requirements for information content, and increase DMA's ability to respond to operational commands in crisis situations."1

IDENTIFICATION OF NEW TECHNOLOGY APPLICATION

Virtually every new weapon system, battle management system, and intelligence analysis system in development will require some form of digital MC & G data for operation. However, because of the size and magnitude of development efforts in new weapons and C³I systems throughout the Military Departments, DMA simply does not have the capability to pursue the research efforts required to satisfy all of the unique needs and data requirements of these systems. Therefore, DMA must focus on development of standard products which have broad applications and offer the capability of interoperability among both U.S. and NATO systems.

To this end a policy was established through a DEPSECDEF

Program Decision Memorandum, August 1985, which states that each of the Military Departments will:

"Review ongoing system development programs to identify the need for unique mapping, charting and geodesy (MC & G) products. Beginning in the FY 1988 POM, fund [unique] MC & G activities in the program element for the associated system for later transfer to DMA for execution. Ensure that, as new systems enter full-scale development, the necessary funds for MC & G requirements are identified and programmed."

Further, a new Defense Department directive will require that all DoD elements and weapons system developers include standard DMA data in the initial design of all systems - or defray the costs for conversion of DMA data to each special requirement. The Agency will be involved at the earliest possible stage of weapons system development so that MC & G requirements may be defined and, if necessary, limited to appropriate proportions. As a result of this action, the savings in time and money to DMA can be significant.

SUPPORT NEW PRODUCT REQUIREMENTS

An aggressive research and development program to investigate and implement alternatives to conventional production techniques has been established at DMASC (Systems Center). The need for such a requirement has grown in recent years which parallels the development of sophisticated weapons systems for

the armed services. In the mid-1970's, the services began developing "smart" weapons systems that often required new or special support from DMA if they were to function accurately. All too often these systems would be in the field before the support requirement was coordinated with DMA, under the assumption that the Agency would be able to provide the special data or products simply on demand. Some weapons system contractors maintained that DMA could provide all sorts of data bases to support their systems while in fact the data did not exist or was not intended to be produced. In the early 1980's, efforts were begun to identify MC & G needs for new weapons systems, but, since developers wanted to keep their product costs down, requirements often were considered separately - or not at all. The result was a continued proliferation of special purpose demands that continued to heavily tax DMA's resources.

In March 1986 DoD issued a modified Directive 5000.3, "Test and Evaluation," that should help both DMA and product users to make better use of current limited resources. This directive provides that DoD elements are now responsible for planning, programming and budgeting for adequate resources to support testing, including all necessary funds for MC & G data or products from DMA, early in the development cycle. It also requires testing and evaluation of compatibility and interoperability with existing or planned equipment and systems, including compatibility of existing MC & G data systems.

INNOVATIVE SOLUTIONS TO CUSTOMER NEEDS3

As a result of the above Directive DMA has established positions whereby the MC & G data needs of new systems are determined at the concept stage while ensuring that system developers better understand DMA capabilities and limitations. This involvement means that the Agency will track with emerging systems and developing technology, and that its limited funds will be allocated in a more efficient manner.

To this end more than 700 military systems developers and users of DMA products and data joined DMASC (Systems Center) managers in Washington during the period 22 September - 2 October 1987 for a symposium keyed to their needs and DMA's plans for a high-technology future. The first-of-its-kind symposium provided an opportunity for participants to express their concerns and how they see themselves interfacing with DMA's modernization program, as it relates to advanced military systems. The symposium afforded the opportunity to share information and ideas of how to coordinate DMA's efforts in the next few years. The Agency's effort to achieve standardization of digital MC & G requirements resulted in an award from the Defense Standardization Program Office during FY 1987.

An example of this standardization effort can be cited using the Tactical Terrain Data (TTD) product. TTD is intended to be the basic digital operational terrain data set supporting future land combat. With the cooperation of the Military Departments, DMA is developing a prototype for evaluation and for

use in meeting future system design requirements. Only prototypes and test versions of TTD will be produced before completion of DMA's production system modernization (Mark 90) in 1992. Representatives from DMA, Army, Navy, Air Force, Marine Corps, and other interested government agencies have participated in joint DoD TTD working group meetings to explore the interoperability issues vis-a-vis their current systems.

IMPROVE CRISIS SUPPORT4

In order to increase the volume of products currently produced by the agency through its Aerospace Center in St. Louis and its Hydrographic/Topographic center in Brookmont, MD, and their field offices, a new production center has been established at Reston, VA. The DMA Reston Center will be fully operational by 1992 and will interchange data with other production elements which will result in increased productivity.

ENDNOTES

1. DMA, DMA FY 1986 Goals.
2. "New Directive Requires DMA Data in Design of New Weapons Systems," Orienteer (DMAAC, St. Louis), 11 July 1986, p.1;
3. The following were used as primary sources for this section: Robert Rosenberg, "Direct Line," Orienteer (DMAAC, St. Louis), 21 March 1986, p. 2;
"Setting Standards," Orienteer (DMAAC, St. Louis), 24 December 1987, p. 3;
"What Is 'GET A MAP'," Orienteer (DMAAC, St. Louis), 13 November 1987, p. 2;
Department of the Army, US Army Engineer Topographic Laboratories, Memorandum, Subject; Tactical Terrain Data (TTD), 26 October 1987.

4. The following was used as a primary source for this section: Robert Rosenberg, "Leaving Brings Mixed Emotions," Orientor (DMAAC, St. Louis), 18 September 1987, p.2.

CHAPTER VII

SUMMARY

DMA is a combat support agency. Since its formation in 1972, DMA has grown in size and importance. Users of MC & G products worldwide have recognized that DMA can provide the products to support all phases of military operations. DMA is a vital link to the military services and with the development of "smart" weapons systems will continue to be at the forefront of technology. As the 1990's and the "one DMA concept" approach, users can be assured that DMA is doing its part to meet their requirements of vital combat support.

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8. Department of the Army, US Army Engineer Topographic Laboratories, Memorandum, Subject; Tactical Terrain Data (TTD), 26 October 1987.
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16. Rosenberg, Robert A. DMA Annual Report, Director's Message. Posture statement for FY 86.
- Cover title: Defense Mapping Agency; Annual Report 1986
17. Rosenberg, Robert A. "Direct Line." Oriente, 26 June 1987, p. 2.
18. Rosenberg, Robert A. "Direct Line." Oriente, 21 March 1986, p. 2.
19. Rosenberg, Robert A. "Direct Line: DMA Must Do More With Less." Oriente, 20 March 1987, p. 2.
20. Rosenberg, Robert A. "Direct Line: DMA Story Must Be Heard." Oriente, 16 May 1986, p. 2.
21. Rosenberg, Robert A. "Direct Line: DMA Welcomes Appraisal." Oriente, 22 August 1986, p. 1-2.
22. Rosenberg, Robert A. "Direct Line: Leaving Brings Mixed Emotions." Oriente, 18 September 1987, p. 2.
23. Rosenberg, Robert A. "Direct Line: We Made History In FY 86." Oriente, 17 October 1986, p. 2.
24. Rosenberg, Robert A. "Gen. Rosenberg Explains The Concept of 'One DMA'." Oriente, 23 January 1987, pp. 1-2.
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28. "Setting Standards." Oriente, 24 December 1987, p. 3.
29. "New Directive requires DMA Data in Design of New Weapons Systems." Oriente, 11 July 1986, p. 2.
30. "Survey to Analyze Skills For the Mark 90 Program." Oriente, 1 May 1987, p. 1.
31. "Third Production Center Is Established In Virginia." Oriente, 18 September 1987, p. 1.

32. "282 Employees From AC Transfer To Systems Center." Orienteer, 16 October 1987, p. 2.

33. "Users and SC Managers Confer." Orienteer, 13 November 1987, p. 2.

34. "What Is 'GET A MAP'." Orienteer, 13 November 1987, p. 2.

35. "DMA Is On-line To Worldwide Network." Orienteer, 8 January 1988, p. 1.

APPENDIX I

Source: JCS PUB. 2 DECEMBER 1986

UNIFIED ACTION ARMED FORCES (UNAAF)

SECTION XI, MAPPING, CHARTING, AND GEODESY

4-77. General

a. Purpose. The purpose of this section is to set forth the broad responsibilities for guidance of the Defense Mapping Agency (DMA), the Military Departments, and the CINCs in fulfilling DOD-wide requirements for mapping, charting, and geodesy (MC&G).

b. Principles Governing Production and Distribution. The DMA is responsible for providing a broad spectrum of MC&G products and services to support operations essential to the national security of the United States. This support includes the production and distribution of MC&G data and products essential for military operations, planning, and training missions and support of other DOD activities. The DMA provides program management and coordination of all DOD MC&G resources and activities in developing an MC&G program responsive to overall requirements and priorities established in support of the Joint Chiefs of Staff.

4-78. Scope

a. MC&G. MC&G includes, in addition to the production of maps and charts, the following activities: (1) geodetic surveys for control, target positioning, and related purposes; gravity, geomagnetic, and hydrographic data; cartographic, photogrammetric, and digital data; (2) satellite geodesy; (3) geographic name indexing; (4) cartographic phases of area analysis intelligence production; (5) terrain and ocean bottom model production; and (6) evaluation of source material and products.

b. Related Data. Related data include MC&G source materials required for production of: (1) maps, charts, and geodetic and geophysical data; (2) air and sea navigation publications and information services; (3) terrain and ocean bottom models; (4) gazetteers; (5) target materials; (6) graphics for support of special forces activities; (7) materials for support of weapon systems and navigation systems; (8) digitized terrain and feature data; (9) air weather charts; and (10) geodetic and geophysical models and data for weapon systems; and (11) LANDSAT data and imagery.

4-79. Responsibilities of the Chairman, Joint Chiefs of Staff

a. To advise the Secretary of Defense on MC&G requirements and priorities.

b. To provide guidance to DMA and the unified and specified commands to serve as the basis for inter-relationships between these organizations.

c. To obtain advice and recommendations from the Director, DMA, on matters within his area of responsibility.

4-80. Responsibilities of the Defense Mapping Agency

a. To organize, direct, and manage the DMA and all resources assigned to DMA.

b. To serve as Program Manager and Coordinator of all DOD MC&G resources and activities. This includes review of the execution of all DOD plans, programs, and policies for MC&G activities not assigned to DMA.

c. To provide staff advice and assistance on MC&G matters to the Secretary of Defense, the Military Departments, the Joint Chiefs of Staff, other DOD components, and other government agencies, as appropriate.

d. To develop an MC&G program for review by the Joint Chiefs of Staff and approval by the Secretary of Defense, using established Planning, Programming, and Budgeting System procedures.

e. In support of the Joint Chiefs of Staff, to review requirements and priorities and to develop a consolidated statement of MC&G requirements and priorities.

f. To ensure responsive support to the MC&G requirements of the Military Departments and the unified and specified commands.

g. To establish policies and provide DOD participation in national and international MC&G activities in coordination with the Assistant Secretary of Defense (International Security Affairs), the Secretaries of the Military Departments, and the CINCs; to execute DOD responsibilities under interagency and international MC&G agreements.

h. To establish DOD MC&G data collection requirements; to collect or task other DOD components to collect and provide necessary data.

i. To establish DOD MC&G RDT&E requirements in coordination with the Assistant Secretary of Defense (C3I) and the Secretaries of the Military Departments; to task other DOD components or private contractors to accomplish such requirements.

j. To carry out the statutory responsibilities for providing national charts and marine navigation data for the use of all vessels of the United States and of navigators generally.

k. To provide distribution of MC&G data and products to the Military Departments and the unified and specified commands.

l. To operate a school system responsive to the requirements of the Services for training of DOD civilian and military personnel in MC&G skills.

m. To maintain MC&G source data libraries of materials and provide services on such data to all DOD activities.

n. To ensure that the Joint Chiefs of Staff, the Military Departments, and appropriate OSD staff elements are kept fully informed of DMA activities of concern to them.

4-81. Responsibilities of the Military Departments

a. To develop and submit to DMA their MC&G requirements and priorities.

b. To provide support, within their fields of responsibility, to the Director, DMA, as required to carry out the assigned mission of the agency.

c. To assess the responsiveness of DMA to their operational needs.

d. To provide DMA their recommendations on MC&G products and the content of international standardization agreements.

e. To coordinate with the Director, DMA, all MC&G-related programs and activities.

f. To provide members of the DOD MC&G Programs and Requirements Review Group.

g. To identify to DMA those MC&G production capabilities of their departments that are available to satisfy DOD-wide requirements after satisfying departmental command and departmental MC&G requirements, and to conduct those MC&G programs and activities assigned by the DMA to utilize the identified additional capabilities.

4-82. Responsibilities of the Unified and Specified Commands

a. To develop and submit to DMA their MC&G requirements and priorities.

b. To provide support, within their fields of responsibility, to the Director, DMA, as required to carry out the assigned mission of the agency.

c. To assess the responsiveness of the DMA to their operational needs.

d. To maintain within their headquarters the staff capability to direct the MC&G activities of their command.

e. To satisfy, insofar as practicable, their approved MC&G requirements from assigned resources.

f. To coordinate with the Director, DMA, all MC&G-related programs and activities.

g. To identify to DMA those MC&G production capabilities of their commands that are available to satisfy DOD-wide requirements after satisfying command MC&G requirements, and to conduct those MC&G programs and activities assigned by the DMA to utilize the identified additional capabilities.

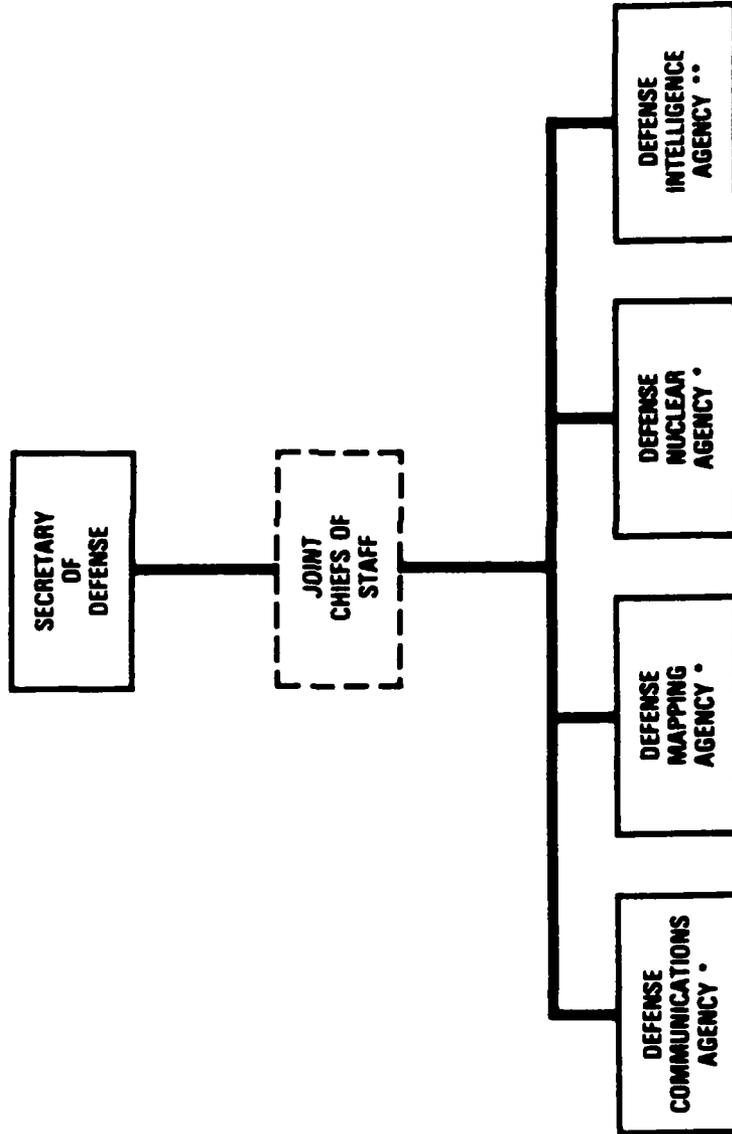
h. To maintain, within the limits of available resources, constant research for source materials for maps and charts and to furnish copies to the appropriate libraries of DMA.

APPENDIX 2

Source: JCS PUB.4 AUGUST 1985

ORGANIZATION AND FUNCTIONS
OF THE JOINT CHIEFS OF STAFF

**RELATIONSHIPS OF DEFENSE AGENCIES TO
THE JOINT CHIEFS OF STAFF**



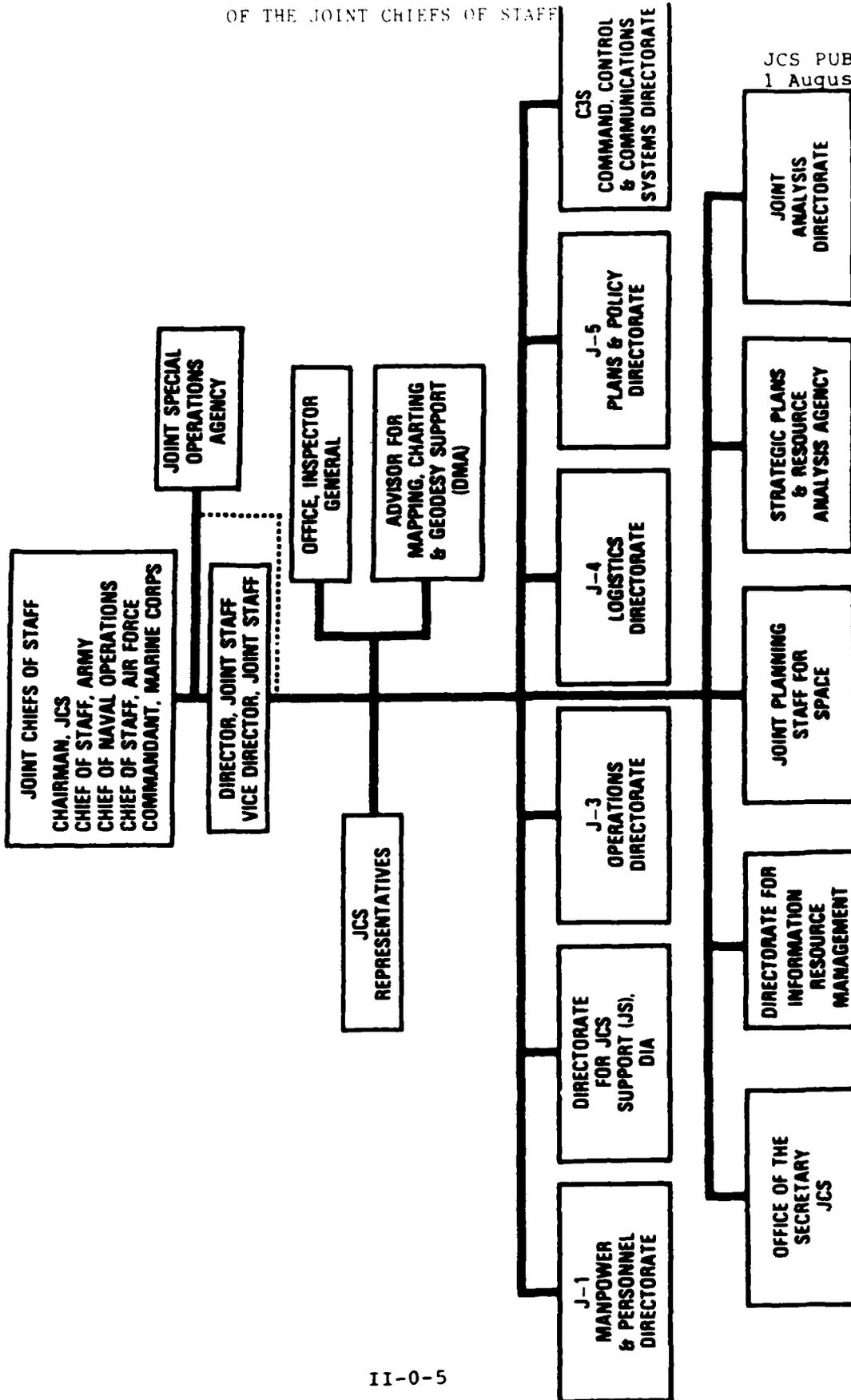
* UNDER DIRECTION, AUTHORITY AND CONTROL OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING. RESPONSIBLE TO THE JCS FOR OPERATIONAL MATTERS. CJCS (FOR JCS) MAY TASK AND COMMUNICATE DIRECTLY.

** PROVIDES INTELLIGENCE STAFF SUPPORT THROUGH THE DIRECTOR, JOINT STAFF

Chart 3

ORGANIZATION AND FUNCTIONS OF THE JOINT CHIEFS OF STAFF

ORGANIZATION OF THE JOINT CHIEFS OF STAFF



JCS PUB 4
1 August 1985

Chart 4

-----STAFF MONITORSHIP.

ORGANIZATION AND FUNCTIONS
OF THE JOINT CHIEFS OF STAFF

JCS PUB 4
1 August 1985

MAPPING, CHARTING AND GEODESY SUPPORT
ADVISOR OF THE JOINT STAFF

Organization: An officer of general or flag rank assigned from the Defense Mapping Agency Plans and Requirements Directorate and serving the Joint Staff in a dual capacity; subject to the supervision and guidance of the Director, Joint Staff.

Mission: The Mapping, Charting and Geodesy advisor on the Joint Staff is responsible for providing advice and assistance to the Joint Chiefs of Staff on MC&G matters.

Functions: Under the authority and direction of the Director, Joint Staff and subject to the supervision and guidance of the Director, Joint Staff, the MC&G shall:

1. Provide advice to the OJCS on matters pertaining to MC&G support.
2. Act in liaison capacity between the JCS and DMA insuring prompt and responsive DMA participation and support in the Joint Staff matters requiring MC&G considerations.
3. Make briefing officers available, as requested, to the individual members of the JCS on MC&G matters scheduled for consideration by the Joint Chiefs of Staff.
4. Attend meetings of the Joint Chiefs of Staff and the Operations Deputies on matters pertaining to MC&G products and support.
5. Insures that the Joint Chiefs of Staff are kept fully informed concerning DMA activities of substantive concern to them.
6. Be the focal point for coordination with Director for Plans and Policy (J-5) for developing the JSCP and JSPD MC&G annexes.
7. Be the focal point for coordinating with Director for Operations (J-3) on adjusting production to satisfy urgent requirements in support of current operations.
8. Brief the Joint Chiefs of Staff annually on MC&G requirements of the unified and specified commands.

DEFENSE MAPPING AGENCY

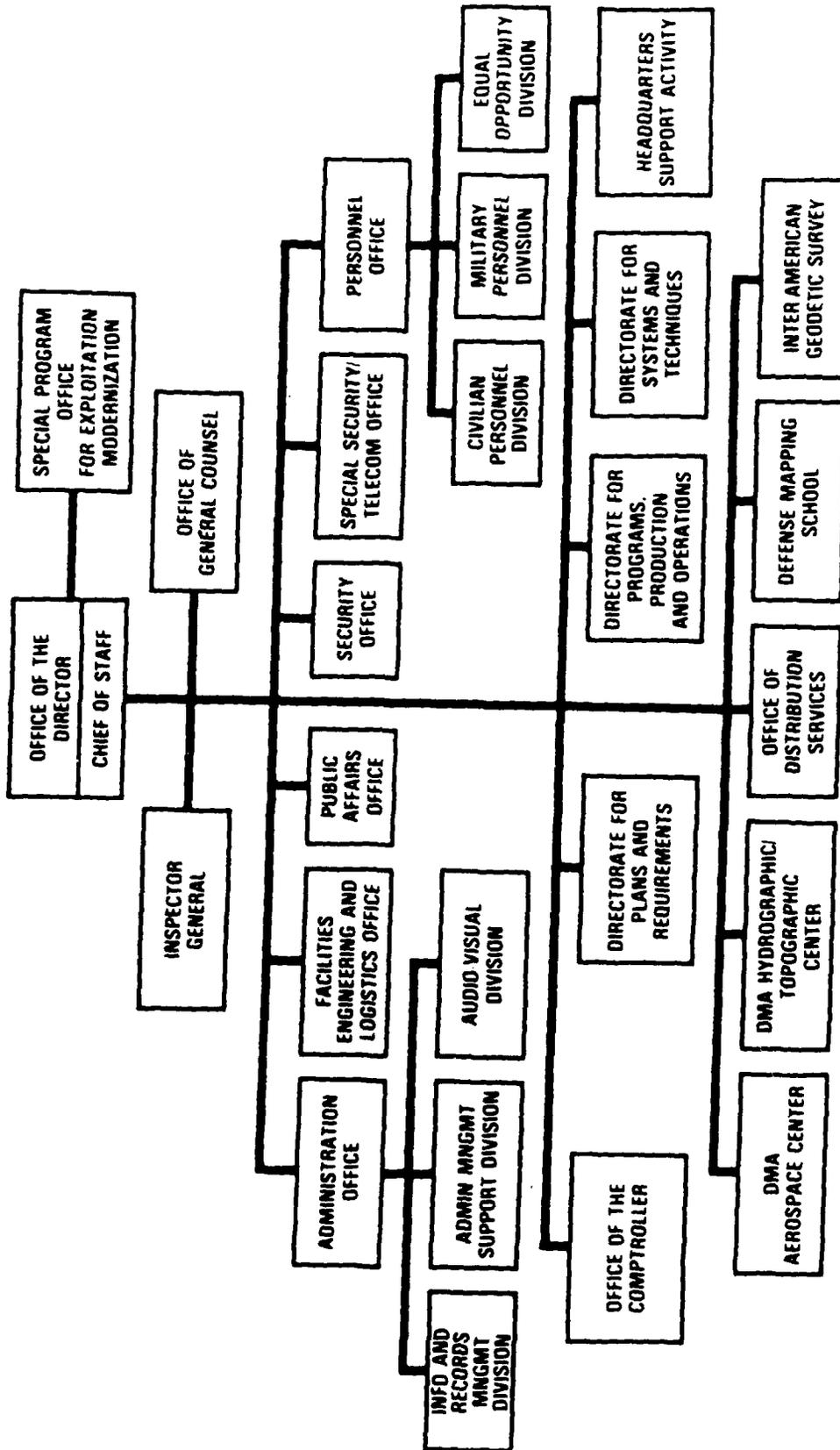


Chart 38

VII-5-2

JCS PUB. 4 AUGUST 1985
ORGANIZATION AND FUNCTIONS
OF THE JOINT CHIEFS OF STAFF

JCS PUB 4
1 August 1985

DEFENSE MAPPING AGENCY

Organization: As shown on the Defense Mapping Agency (DMA) Organization Chart (Chart 38).

Establishment: The DMA is established as a separate agency of the Department of Defense under the direction, authority, and control of the Assistant Secretary of Defense, Command, Control, Communications, and Intelligence. The DMA shall be responsible to the Joint Chiefs of Staff for operational matters within their cognizance, as well as requirements associated with the joint planning process. For these purposes, the Chairman of the Joint Chiefs of Staff is authorized to task and communicate with the DMA directly.

Mission: The mission of DMA is to provide support to the Secretary of Defense, the Military Departments, the Joint Chiefs of Staff, and other DoD components, as appropriate, on matters concerning mapping, charting, and geodesy (MC&G). The Director, DMA, shall:

1. Organize, direct, and manage the DMA and all resources assigned to the DMA.
2. Serve as Program Manager and coordinator of all DoD MC&G resources and activities. This includes review of the execution of all DoD plans, programs, and policies for MC&G activities not assigned to DMA.
3. Provide staff assistance and assistance on MC&G matters to the Office of the Secretary of Defense, the Military Departments, the Joint Chiefs of Staff, other DoD components, and other government agencies as appropriate.
4. Develop MC&G guidance for the DoD. Review Military Department programs and fiscal documents as related to MC&G matters and recommend appropriate action to the Secretary of Defense.
5. In support of the Joint Chiefs of Staff, review and validate MC&G requirements and priorities, and develop a consolidated statement of MC&G requirements and priorities.
6. Insure responsive support to the MC&G requirements of the Military Departments and the unified and specified commands.
7. Establish policies and provide DOD participation in national and international MC&G activities in coordination with the Assistant Secretary of Defense (International Security Affairs), and execute DoD responsibilities under interagency and international MC&G agreements.

8. Establish DoD MC&G data collection requirements, and collect or task other DoD components to collect and provide necessary data.

9. Establish DoD MC&G RDT&E requirements in coordination with the Under Secretary of Defense for Research and Engineering, and task other DoD components or private contractors to accomplish such requirements.

10. Carry out the statutory responsibilities assigned under U.S. Code Title 10, Chapter 639, Section 7391, 7393, and 7394, for providing nautical charts and marine navigation data for the use of all vessels of the United States and of navigators generally, and the responsibilities assigned under U.S. Code Title 44, Chapter 13, Section 1336 for the printing of notices to mariners and other publications.

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