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RESEARCH AND DEVELOPMENT PROGRAM

FY 1992/FY 1993 BUDGET ESTIMATES

FOR THE

DEFENSE MAPPING AGENCY

FEBRUARY 1991

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COMPONENT: DEFENSE MAPPING AGENCY
 FY 1992 - FY 1993 BUDGET ESTIMATES

Program Element: 0305139B

Budget Activity: Intelligence and Communications #5

PE Title: DMA Mapping, Charting, and Geodesy (MC&G) Production System Improvements

A. (U) RESOURCES (\$ in Thousands)

Project Number and Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
(U) 100 Source Collection Optimization	307	847	5,205	8,050	Cont	Cont
(U) 200 Product Definition and Production Implementation	2,966	6,044	18,055	18,463	Cont	Cont
(U) 300 Product Independent Production Improvements	1,689	1,152	11,851	28,718	Cont	Cont
(U) 400 MC&G Standardization	1,003	3,543	1,758	1,918	Cont	Cont
(U) 500 Distribution Modernization	157	0	0	0	0	0
(U) 700 Digital Production System(DPS)	255,703	213,082	189,921	0	0	2,005,700
(U) TOTAL PROGRAM ELEMENT 0305139B	261,825	224,668	226,790	57,149	NA	NA

B. (U) BRIEF DESCRIPTION OF ELEMENT: This program element includes all R&D costs associated with improving DMA's production system and related MC&G developments including source collection optimization, MC&G product related developments, new MC&G production and distribution improvements and efforts in standardizing MC&G digital products. This PE also supports costs associated with the completion of the Digital Production System (DPS). DPS is the development, acquisition, and installation of a capability to produce MC&G products using digital source materials.

C. (U) JUSTIFICATION FOR PROJECTS LESS THAN \$10.0M IN BOTH FY 1992 AND FY 1993: FY 1990 through FY 1993 accomplishments and plans are discussed in the individual project descriptions for this program element. All other information such as related activities, work performed by, and other appropriation data is also included in the individual project descriptions.

D. (U) COMPARISON WITH FY 1991 DESCRIPTIVE SUMMARY: Activities previously included in Project 500 have been included in Project 300 to provide better integration between distribution functions and the MC&G production process. In FY 1991 and beyond the MC&G product distribution is reviewed as a function of the overall MC&G production process. Project 400, previously, Distributed Production Development, has been renamed MC&G Standardization, and those activities related to MC&G digital product standardization previously in Project 200 have been moved to Project 400. Activities previously included in Project 300 which were related to establishing a production capability for new MC&G products are now included in Project 200 which has been renamed from Product Development to Product Definition and Production Implementation.

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COMPONENT: DEFENSE MAPPING AGENCY
FY 1992- FY 1993 BUDGET ESTIMATES

A. (U) RESOURCES (\$ IN THOUSANDS) THEN YEAR DOLLARS

PROJECT NUMBER AND TITLE	FY1990* ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) 100 SOURCE COLLECTION OPTIMIZATION	307	847	5,205	8,050	Cont	Cont

B. (U) BRIEF DESCRIPTION OF PROJECT: To evaluate new collection systems or enhance the use of existing systems in order to provide adequate and affordable source data from which MC&G products can be derived.

C. (U) JUSTIFICATION FOR PROJECTS LESS THAN \$10.0 MILLION IN BOTH
FY 1992 AND FY 1993:

(U) PRIOR ACCOMPLISHMENTS: (a) Began examination of innovative techniques to handle store and process data supporting gravimetric products. (b) Formulated Geodetic and Geophysical (G&G) requirements for future programs. (c) Continued Global Positioning System (GPS) processing software development. (d) Continued to research and evaluate alternate source data such as multispectral imagery (MSI). (e) Initiated design engineering drawings for digital echo sounder for hydrographic data collection.

(U) CURRENT YEAR PLANS: (a) Develop alternate methods for collecting G&G data. (b) Implement and assess modifications to meet requirements for Block II GPS satellites. (c) Continue development of advanced bathymetric and hydrographic collection systems. (d) Continue efforts to research and evaluate alternate source data such as multispectral imagery (MSI) to support DMA products.

(U) FY 1992 PLANS: Continue efforts in new data collection activities with a major focus in the following four areas: (a) Continue hydrographic activities including data collection and data processing techniques in both deep water and coastal regimes. (b) Continue work developing alternate methods for collecting G&G data. These include orbit determination software, geodetic positioning software and procurement of geodetic receivers. (c) Continue efforts to research and evaluate alternate source data such as multispectral imagery (MSI) to support DMA products. (d) Initiate development efforts for the Requirements Management System (RMS) for managing the acquisition of primary DMA source material.

(U) FY 1993 PLANS: (a) Continue hydrographic collection efforts to include the development of next generation echo sounder for GPS equipped ships, acoustic imaging, an airborne laser sounder and a multispectral scanner. (b) Provide support and analysis for studies associated with advanced Air Force aircraft inertial navigation systems by developing concepts and methods for production of gravity products to support these systems. (c) Continue efforts to research and evaluate alternate source data such as multispectral imagery (MSI) to support DMA products. (d) Continue RMS activities.

D. (U) WORK PERFORMED BY: The Analytical Sciences Corp. (TASC), Reading, Massachusetts; U.S. Naval Oceanographic and Atmospheric Research Laboratory (NORAL), Bay St. Louis, Mississippi; Naval Surface Warfare Center (NSWC), Dahlgren, Virginia; U. S. Air Force Geophysical Laboratory (AFGL), Lawrence G. Hanscom Field, Massachusetts and competitively selected contractors.

G. (U) RELATED ACTIVITIES: N/A

H. (U) OTHER APPROPRIATION FUNDS: N/A

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

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COMPONENT: DEFENSE MAPPING AGENCY
 FY 1992- FY 1993 BUDGET ESTIMATES

A. (U) RESOURCES (\$ IN THOUSANDS) THEN YEAR DOLLARS

PROJECT NUMBER AND TITLE	FY1990* ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) 200	2,966	6,044	18,055	18,463	Cont	Cont

PRODUCT DEFINITION AND PRODUCTION IMPLEMENTATION

B. (U) BRIEF DESCRIPTION OF PROJECT: To investigate and develop techniques, methodologies and systems for satisfying the MC&G product and service needs of the war fighter. This involves the investigation and implementation of emerging technologies related to MC&G products and services and developing new products to meet user requirements. Included in this activity is the introduction of new and existing products into the DMA production system.

C. (U) JUSTIFICATION FOR PROJECTS LESS THAN \$10.0 MILLION IN BOTH FY 1992 AND FY 1993:

(U) PRIOR ACCOMPLISHMENTS: (a) Introduced Arc Digitized Raster Graphics (ADRG) into production. (b) Initiated development of the Digital Chart of the World (DCW). (c) Completed prototypes for Tactical Terrain Data (TTD), Interim Terrain data (ITD), Digital Point Positioning Data Base (DPPDB), and Video Point Positioning Data Data Base (VPPDB). (d) Continued development of a static radar prediction prototype. (e) Developed prototype Geodetic & Geophysical (G&G) products. (f) Initiated Hydro/Bathymetric efforts for developing statistical methods/tools, both qualitative and quantitative, for processing, evaluating, tagging and integrating existing and future Hydro/Bathymetric data. (g) Developed initial Digitized PPDB production capability. (h) Developed ITD production capability. (i) Initiated efforts for a capability to scan and collect Terrain Feature Data. (j) Developed Special Operations support products. (k) Developed Statement of Work (SOW) for TFAS scanner to support high-resolution DFAD and Interim Terrain Data (ITD).

(U) CURRENT YEAR PLANS: (a) Continue efforts on development of TTD and DPPDB. (b) Continue VPPDB efforts. (c) Prototype other priority required new hydrographic, topographic and aeronautical products for new weapons system development. (d) Initiate efforts for high-resolution synergistic exploitation for special operations type product development. (e) Initiate G&G modernization efforts. (f) Continue TFAS Scanner efforts. (g) Continue Hydro/Bathy efforts to improve data processing techniques.

(U) FY 1992 PLANS: (a) Continue TTD and DPPDB development. (b) Complete VPPDB efforts. (c) Continue prototype development and initiate development of production techniques and equipment for required new hydrographic, topographic and aeronautical products. (d) Continue efforts on high resolution synergistic exploitation research. (e) Continue G&G efforts. (f) Complete TFAS Scanner development. (g) Continue Hydro/Bathy improvements. (h) Initiate efforts to update current DPS product specifications.

(U) FY 1993 PLANS: (a) Continue TTD and DPPDB development. (b) Continue development for required new hydrographic, topographic and aeronautical products. (c) Continue ongoing synergistic exploitation research of high resolution data. (d) Continue G&G efforts. (e) Continue efforts to update DPS product specifications. (f) Initiate product specification development initiatives for new products.

D. (U) WORK PERFORMED BY: Development efforts will be competitively bid, or may require sole source contracts with DPS contractors (see Project 700).

E. (U) COMPARISON WITH FY 1991 DESCRIPTIVE SUMMARY:

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NARRATIVE DESCRIPTION OF CHANGES

1. TECHNICAL CHANGES: Activities previously included in this project relating to digital data product standards have been moved to Project 400. Activities from Project 300 relating to production capabilities for specific MC&G products are now included in this project.
 2. SCHEDULE CHANGES: None.
 3. COST CHANGES: Adjustments resulting from the technical changes described above have altered the FY 1991 estimate from \$5,738 thousand to \$6,044 thousand.
- F. (U) PROGRAM DOCUMENTATION: MC&G digital product standardization activities have been moved to Project 400 to provide better management visibility.
- G. (U) RELATED ACTIVITIES: Direct interface with DoD weapon system developers is effected to assure MC&G product and requirement compatibility and standardization.
- H. (U) OTHER APPROPRIATION FUNDS: PDA(FY91-\$2.3M, FY92-\$1.0M, FY93-\$16.9M) Requisite Hydrographic and Bathymetric production equipment, Digital and Video PPDB production equipment, and required G&G processing equipment.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A
- J. (U) MILESTONE SCHEDULE: Major efforts associated with this project include research and development of new products associated with developing weapons systems (i.e. TTD and DPPDB); an initiative to improve Hydrographic/Bathymetric data processing techniques; and a development initiative to improve processing and production of G&G data. The G&G program is projected for a FY94 completion.

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COMPONENT: DEFENSE MAPPING AGENCY
 FY 1992- FY 1993 BUDGET ESTIMATES

A. (U) RESOURCES (\$ IN THOUSANDS) THEN YEAR DOLLARS

PROJECT NUMBER AND TITLE	FY1990* ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) 300 PRODUCT INDEPENDENT PRODUCTION IMPROVEMENTS	1,689	1,152	11,851	28,718	Cont	Cont

B. (U) BRIEF DESCRIPTION OF PROJECT: To develop production techniques, processes and systems to improve the efficiency, timeliness and capabilities of the DMA production system to better satisfy product requirements and reduce DMA production costs.

C. (U) JUSTIFICATION FOR PROJECTS LESS THAN \$10.0 MILLION IN BOTH FY 1992 AND FY 1993:

(U) PRIOR ACCOMPLISHMENTS: (a) Initiated studies for improving Hydrographic/Bathymetric Data processing techniques. (b) Developed an MC&G unique digital scanner as part of the Digital Segment (DC/S) of the DPS. (c) Conducted comprehensive study of DMA's distribution process. (d) Began redesign of the DMA product catalog.

(U) CURRENT YEAR PLANS: (a) Continue catalog improvement efforts. (b) Continue efforts to improve distribution operations. (c) Initiate efforts to design methods for assessing product and customer requirements and developing an automated forecasting capability. (d) Initiate efforts to improve or maintain production accuracy and decrease production costs.

(U) FY 1992 PLANS: (a) Continue catalog improvements. (b) Continue distribution improvement initiatives. (c) Continue research in forecasting print quantities for product and customer requirements. (d) Initiate automatic feature extraction efforts to improve production efficiencies. (e) Initiate efforts on a life cycle upgrade for Source Acquisition Segment (SA/S). (f) Initiate efforts for a Geographic Names Processing System (GNPS) to DPS interface. (g) Begin efforts to implement a Development and Test Facility (DTF). (h) Initiate efforts to develop a smart tasking capability for DMA.

(U) FY 1993 PLANS: (a) Complete catalog improvements. (b) Continue efforts to improve warehouse operations and research to improve forecasting print quantities for product and customer requirements. (c) Continue development of required automatic feature extraction efforts. (d) Continue SA/S upgrade and GNPS to DPS interface efforts. (e) Continue GNPS/DPS interface efforts. (f) Continue DTF development. (g) Continue smart tasking efforts. (h) Initiate efforts to develop an alternate media archive capability for DMA data storage. (i) Initiate additional production improvement activities including point target management, data purging, rule automation, as well as the incorporation new source materials into the production system. (j) Begin efforts to consolidate DPS mainframe computers to improve efficiency and reduce operational/maintenance costs. (k) Initiate improved data base and product revision management and production capabilities. (l) Initiate efforts to develop a quick response capability for DPS.

D. (U) WORK PERFORMED BY: Production improvement efforts which constitute most of these activities will be competitively bid or may require sole source acquisition with DPS contractors (see Project 700). Other activities in this project will be performed by Service Laboratories and academia.

E. (U) COMPARISON WITH FY 1991 DESCRIPTIVE SUMMARY:

NARRATIVE DESCRIPTION OF CHANGES

1. TECHNICAL CHANGES: Project 500, Distribution Modernization efforts were folded into this project.

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2. SCHEDULE CHANGES: None.

3. COST CHANGES: The FY 1991 estimate has been reduced from \$3,440K to \$1,152K. This reduction is the result of the reallocation of some product associated efforts previously included in Project 300 to Project 200, and by focusing more of our resources on MC&G Standardization activities (Project 400).

F. (U) PROGRAM DOCUMENTATION: N/A

G. (U) RELATED ACTIVITIES: N/A

H. (U) OTHER APPROPRIATION FUNDS: PDA (FY91 - \$44K, FY92 - \$53K, FY 93 - \$5.5M). Additional sensors into the production system and Development and Test Facility (DTF).

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE: Major efforts associated with this project include Auto Feature Extraction efforts; Life Cycle Upgrade for SA/S; a GNPS to DPS interface; DTF development; Catalog improvements; Smart Tasking; an Alternate Media Archival capability; and additional production improvement activities.

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COMPONENT: DEFENSE MAPPING AGENCY
 FY 1992- FY 1993 BUDGET ESTIMATES

A. (U) RESOURCES (\$ IN THOUSANDS) THEN YEAR DOLLARS

<u>PROJECT NUMBER</u> <u>AND TITLE</u>	<u>FY1990*</u> <u>ACTUAL</u>	<u>FY1991</u> <u>ESTIMATE</u>	<u>FY1992</u> <u>ESTIMATE</u>	<u>FY1993</u> <u>ESTIMATE</u>	<u>TO</u> <u>COMPLETE</u>	<u>TOTAL</u> <u>PROGRAM</u>
(U) 400 MC&G Standardization	1,006	3,543	1,758	1,918	Cont	Cont

B. (U) BRIEF DESCRIPTION OF PROJECT: MC&G standardization activities are directed to develop a comprehensive suite of military standards and specifications for the exchange, manipulation, and display of MC&G digital data. The purpose of this effort is to achieve inter-operability of data bases supporting a wide variety of weapons programs, simulators, and command and control systems. Support for this effort will promote the development and use of standards within DoD, other government agencies, and allies to further enhance inter-operability, expand the MC&G production base, and reduce development and production costs. Further, this effort will reduce both weapon system development costs and operational costs by reducing dependencies on system specific MC&G data sets.

C. (U) JUSTIFICATION FOR PROJECTS LESS THAN \$10.0 MILLION IN BOTH FY 1992 AND FY 1993:

(U) PRIOR ACCOMPLISHMENTS: (a) Developed operations concept for Digital Geographic Information Tailoring System (DIGITS). (b) Began MC&G digital product standards development. (c) Initiated the development of contract package for Digital Chart of the World (DCW) effort. (d) Began utility software development. (e) Began MIL-STD data set requirements analysis. (f) Initiated storage media assessment and product storage compression.

(U) CURRENT YEAR PLANS: (a) Continue utility software development (b) Continue standards development. (c) Aggressively promote the use of MC&G standards within DoD and other government agencies.

(U) FY 1992 PLANS: Continue ongoing standardization efforts in: (a) data definition, (b) manipulation and display software and, (c) storage media. Complete the DCW development.

(U) FY 1993 PLANS: Continue standardization effort in: (a) data definition, (b) manipulation and display software, and (c) media storage media.

(U) WORK PERFORMED BY: Service Labs, Service Academies, International forums, Civil Agencies, Historically Black Colleges and Universities, Competitively selected contractors (ESRI, SAIC, etc.)

(U) RELATED ACTIVITIES: N/A

(U) OTHER APPROPRIATION FUNDS: NONE

(U) INTERNATIONAL COOPERATIVE AGREEMENTS: Digital Chart of the World (DCW) International agreements with United Kingdom (UK), Australia, and Canada.

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COMPONENT: DEFENSE MAPPING AGENCY
 FY 1992- FY 1993 BUDGET ESTIMATES

A. (U) RESOURCES (\$ IN THOUSANDS) THEN YEAR DOLLARS

PROJECT NUMBER AND TITLE	FY1990 Actual	FY1991 Estimate	FY1992 Estimate	FY1993 Estimate	TO Complete	TOTAL Program
(U) 700 DIGITAL PRODUCTION SYSTEM	255,703	213,082	189,921	-0-	-0-	2,005,700

B. (U) BRIEF DESCRIPTION OF MISSION REQUIREMENT AND SYSTEM CAPABILITIES: The Defense Mapping Agency (DMA) Digital Production System (DPS) is an Office of the Secretary of Defense (OSD) mandated, congressionally endorsed, effort to attain an all-digital production capability for DMA using available source material. This capability consists of three fully equipped, interdependent production centers generating MC&G products. When completed, DPS will give DMA the flexibility to adapt its production line to future changes in acquisition and collection of source materials. Compared to previous capabilities, the DPS is expected to increase DMA's production capability to support current and new weapon systems and tactical operations, and to produce improved responsiveness through a decrease in product generation time. The DPS objectives are a 100 percent increase in product output and a 75 percent reduction in pipeline time. The DPS consists of two phases, MARK 85 and MARK 90. MARK 85 is complete. It provides the capability to use new source material in the existing DMA production process. MARK 90 will convert DMA's existing production process to an all digital process. MARK 90 consists of five segments. They are:

- (U) Source Preparation Segment - assesses, evaluates, and integrates all source materials for production programs.
- (U) Data Extraction Segment - provides for the extraction of terrain elevation and feature data from available sources.
- (U) Product Generation System - supports the generation and revision of MC&G products by capturing and integrating data from various sources.
- (U) Data Services Segment - responsible for the centralized management and transfer of source materials and all digital data.
- (U) Production Management Segment - provides resource allocation, production monitoring and quality assurance support.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) PRIOR ACCOMPLISHMENTS: Development of the MARK 85 capability was completed. DMA now has the capability to use new source material in its existing production process. Fabrication of the special purpose hardware is complete for most segments. The coding and debugging of segment unique software also continues. The DPS hardware deliveries have begun and testing has commenced at the DMA Reston Center.

(U) CURRENT YEAR PLANS: Testing and debugging of segment unique software will continue with delivery of 75% of the total planned software for DPS. This software will undergo testing, integration and intra-segment capability demonstration leading to Initial Operating Capability (IOC) in March of 1991. Delivery of equipment to the other two DMA production centers will begin. This equipment will undergo installation, check-out, and test.

(U) FY 1992 PLANS: Testing and debugging of segment unique software will continue with delivery of the remaining 25% of the total planned software for DPS. Inter-center production capabilities will be demonstrated and tested leading to Full Operating Capability (FOC) in November of 1992.

D. (U) WORK PERFORMED BY:

- (U) Source Preparation Segment - E-Systems, Garland TX.
- (U) Data Extraction Segment - General Dynamics Corporation, San Diego CA.
- (U) Product Generation Segment - Intergraph, Huntsville AL.
- (U) Data Services Segment - Hughes Aircraft Corporation, El Segundo CA.
- (U) Production Management Segment - General Electric, Valley Forge PA.

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E. (U) COMPARISON WITH FY 1991 DESCRIPTIVE SUMMARY:

NARRATIVE DESCRIPTION OF CHANGES

1. TECHNICAL CHANGES: None
2. SCHEDULE CHANGES: None
3. COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION: NA

G. (U) RELATED ACTIVITIES: NA

H. (U) OTHER APPROPRIATION FUNDS: PDA (FY90-\$112.3M, FY91-\$110.3M, FY92-\$10.6M)
The FY1990 and FY1991 procurement funds are for the purchase of two MARK 90 systems. Purchase of the hardware for the initial DMA production center was accomplished with RDT&E funds. FY 1992 procurement funds are required to cover planned modifications to the MARK 90 hardware initially delivered for test and demonstration.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE: Initial Operational Capability (IOC) of the Digital Production System is planned in March 1991. Full Operational Capability (FOC) is scheduled to occur in November 1992.

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COMPONENT: DEFENSE MAPPING AGENCY
FY 1992 - FY 1993 BUDGET ESTIMATES

Program Element: 0305159B

Budget Activity: Intelligence and
Communication #5

PE Title: Defense Reconnaissance Support Program

A. (U) RESOURCES (\$ in Thousands)

Project Number and Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
(U) 600 Defense Reconnaissance Support Program (DRSP)	3,661	7,375	6,955	6,127	Cont	Cont

B. (U) BRIEF DESCRIPTION OF ELEMENT:

(U) This project evaluates developing or planned sensor systems for potential MC&G data exploitation. Developments also address data extraction algorithms and operational scenarios. Additional activities include test and evaluation to ensure source material support of MC&G product requirements.

C. (U) JUSTIFICATION FOR PROJECTS LESS THAN \$10.0M IN BOTH FY 1992 AND FY 1993:

(U) Prior Accomplishments: (a) Tests, demonstrations and training were conducted to support the DMA source collection activities. (b) Utility studies continued for non-conventional source exploitation. (c) Developed a concept-of-operations (CONOPS) for alternative sources and commenced feasibility studies for non-conventional source types. Upgrade requirements for source screening are in the installation checkout and test (IC&T) stage.

(U) Current Year Plans: (a) Complete proof-of-concept for alternative sources for use by DMA in the production of MC&G products. (b) Completing upgrade requirements for source screening. These efforts are further described in the Congressional Justification Book for Tactical and Intelligence Related Activities.

(U) FY 1992 Plans: Continue analyses of alternate sources for use by DMA in the production of MC&G products. These efforts are further described in the Congressional Justification Book for Tactical and Intelligence Related Activities.

(U) FY 1993 Plans: Continue analyses to ensure quality of the collection product is not degraded and that delivery milestones are met. These efforts are further described in the Congressional Justification Book for Tactical and Intelligence Related Activities.

(U) Work Performed By: Private contractors and government research laboratories.

(U) Related Activities: NA

(U) Other Appropriation Funds:

	<u>FY 1990</u>	<u>FY 1991</u>	<u>FY 1992</u>	<u>FY 1993</u>
(U) Procurement, Defense Agencies				
Other Capital Equipment	515	2,725	2,333	2,418

(U) International Cooperative Agreements: NA