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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This User's Guide presents a brief description of the resources and services available from the Geomagnetic Data Library to authorized users. Information is provided on appropriate procedures and guidelines for requesting or supplying data to the Library. The responsibilities of the Library include: acquisition, primary evaluations, and inventorying geomagnetic data; analysis support; information and referral service.						
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RESEARCH REPORTS DIVISION
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TN 8222-01-87

DEPARTMENT OF DEFENSE
GEOMAGNETIC DATA LIBRARY
USER GUIDE

BETTY D. VEGA
GEOMAGNETICS DIVISION

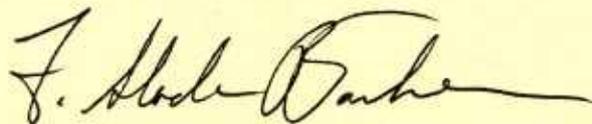
OCTOBER 1986

Approved for public release;
Distribution is unlimited.

Prepared under the authority of
Commander,
Naval Oceanography Command

This User Guide has been prepared to document the resources and services available from the Department of Defense Geomagnetic Data Library. It is intended to describe the functions of the Library and guidelines for requesting or supplying data to the Library.

RELEASED FOR PUBLICATION:



Branch Head
Geomagnetic Data Branch



Director
Geomagnetics Division



Director
Hydrographic Department

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1.0 INTRODUCTION

1.1 The Department of Defense (DOD) Geomagnetic Data Library is one of the Mapping, Charting and Geodesy (MC&G) libraries implemented under the Defense Mapping Agency's (DMA) Instruction 8000.2 of 15 December 1978. The library is one of eleven libraries under the direction of DMA (see fig. 1) and provides complete geomagnetic library service to DOD, DOD contractors, and authorized non-DOD users. DMA Instruction 8000.2 states in part:

"[The] Function of MC&G libraries is to service MC&G programs assigned to DMA and provide library services to other DOD and non-DOD elements which utilize these services.
The Oceanographer of the Navy [CNO OP-006] is assigned responsibility for acquisition and provision of geomagnetic data, and has assigned operational responsibilities for the DOD Geomagnetic [Data] Library to the U.S. Naval Oceanographic Office [NAVOCEANO]."

1.2 Within NAVOCEANO, the Geomagnetism Division operates and maintains the Library. The responsibilities of the Library include:

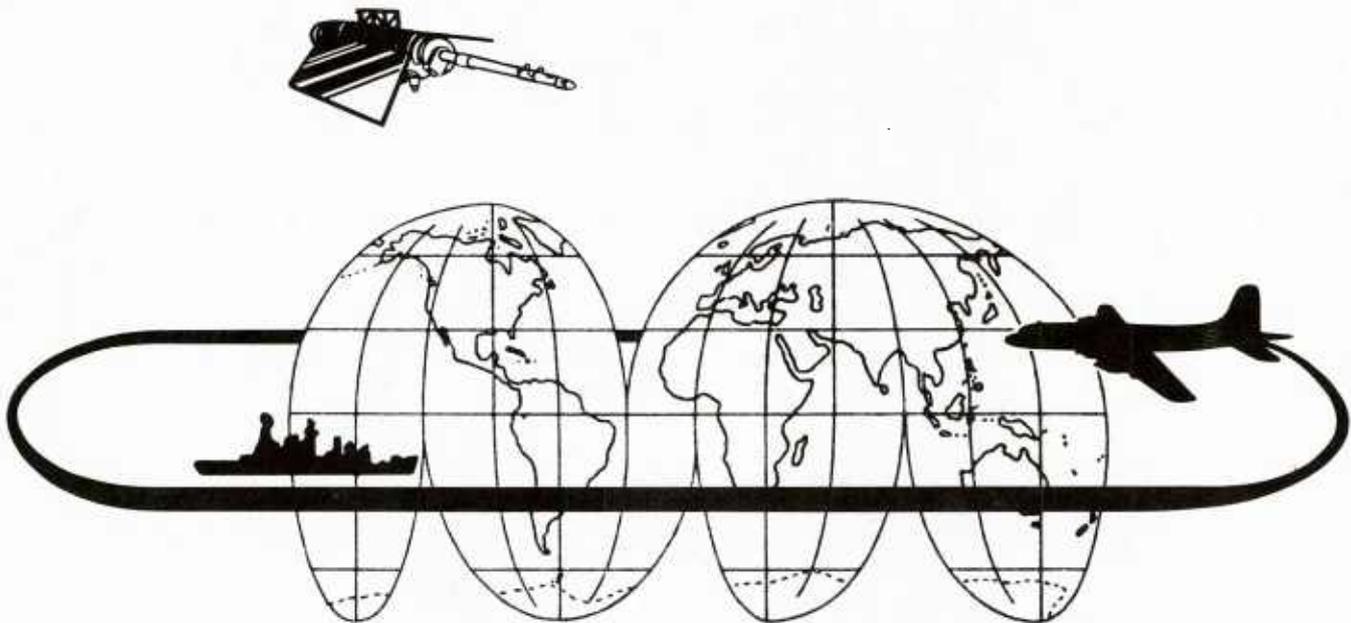
- a. acquisition of geomagnetic information;
(data, charts, publications and associated documents)
- b. recording of factual information about the holdings;
- c. performing basic or primary evaluations of the data;
- d. supporting DOD by maintaining an extensive inventory of evaluated geomagnetic data, including all classified data;
- e. providing complete library and analysis support service for the use of all elements of DOD and authorized non-DOD users.

1.3 This User's Guide presents a brief description of the resources and services available from the Geomagnetic Data Library to authorized users. Information is provided on appropriate procedures and guidelines for requesting data or supplying data to the Library.

1.4 Additional copies of this guide may be obtained by contacting:

Commanding Officer
U.S. Naval Oceanographic Office
Bay St. Louis,
NSTL, MS 39522-5001

ATTN: DOD Geomagnetic Data Library



DEFENSE MAPPING AGENCY HYDROGRAPHIC / TOPOGRAPHIC CENTER

- THE DOD LIBRARY of MAPS
- THE DOD LIBRARY of GEODETIC DATA
- THE DOD LIBRARY of FOREIGN PLACE NAMES
- THE DOD LIBRARY of NAUTICAL CHARTS
- THE DOD LIBRARY of BATHYMETRIC DATA

DEFENSE MAPPING AGENCY AEROSPACE CENTER

- THE DOD LIBRARY of AERONAUTICAL CHARTS
- THE DOD LIBRARY of GRAVITY DATA
- THE DOD LIBRARY of FREE WORLD AIR FACILITIES and FLIGHT INFORMATION
- THE DOD LIBRARY of INSTALLATION POSITIONAL DATA
- THE DOD LIBRARY of POSITIONAL DATA BASES

DEPARTMENT of the NAVY*

- THE DOD LIBRARY of GEOMAGNETIC DATA

*ASSIGNED to the U.S. NAVAL OCEANOGRAPHIC OFFICE by
NAVOCEANOCOMINST 5070.1D, 1 NOV 82.

2.0 GENERAL INFORMATION

2.1 Geomagnetic data have many military and nonmilitary applications in the fields of geophysics, geology, engineering, and navigation. For example, knowledge of magnetic compass variation in all parts of the world was recognized early in the history of sailing as essential to safe navigation. Navigators routinely noted compass variation by comparing compass readings with the direction of the North Star. Because the earth's magnetic field is constantly changing, DOD requires continual updating of several types of measurements. Airborne and satellite surveys can cover large areas most effectively while ship or ground surveys can cover smaller areas with greater resolution.

2.2 The Naval Oceanographic Office (NAVOCEANO) is a repository and distributor of geomagnetic information for DOD mapping and charting programs. Data collection activities were begun in 1830 with the systematic collection of ships' logs and increased in 1953 with the beginning of worldwide geomagnetic surveys by both ship and aircraft.

2.3 Scientists measure the intensity and direction of the magnetic field to construct charts that improve geophysical knowledge of the earth and provide more reliable navigational data for ships and aircraft. Detailed studies of specific magnetic anomalies reveal the geologic characteristics of features beneath the earth's surface, and other detailed surveys aid in the precise location of the north and south magnetic poles. In the early 1960's, there was a rapid development of techniques to use geomagnetic measurements for investigating the nature and properties of the earth's crust and upper mantle. These geomagnetic techniques have resulted in major changes in conceptual models of the ocean floor. In plate tectonics, the interpretation of geomagnetic data from NAVOCEANO files provided some of the basic patterns of crustal motion for the ocean areas. In addition, studies of the geomagnetic field have major application to the understanding of physical processes in the atmosphere such as radiation belts, aurora, and radiation levels that reach the earth's surface.

2.4 The uses of geomagnetic data range widely from United Nations sponsored projects for locating potential mineral resources to production of special purpose operational charts and models for Army, Navy, and Air Force use. Nearly all military charts provide a magnetic direction reference. The best known are nautical, aeronautical and topographic maps. Many military systems depend upon information computed from a mathematical model of the earth's geomagnetic field developed from observatories, ground network surveys, aeromagnetic and satellite surveys, and surface-ship measurements. For many DOD applications the geomagnetic models do not provide adequate detail, therefore, special charts of magnetic parameters are required. Some applications require magnetic surveys of specific areas and special data analyses to provide the necessary information.

2.5 The information in the Geomagnetic Data Library aids in the complete definition of the earth's geomagnetic field. Continual updating of this information assures the accuracy of this definition.

3.0 GEOMAGNETIC DATA LIBRARY HOLDINGS AND SERVICES

3.1 Introduction

3.1.1 Geomagnetic data are maintained in the form of analog records, microfilm, digital data, or maps/charts. Parameters include declination, inclination, horizontal intensity, vertical intensity, total intensity and secular (long-term) change. The Library holdings represent worldwide coverage of absolute or calibrated measurements of the geomagnetic parameters.

3.1.2 The sources of data maintained in the holdings are:

- a. NAVOCEANO Project MAGNET Geomagnetic Airborne Surveys
- b. NAVOCEANO Marine Geomagnetic Surveys
- c. Other U.S. Government Data Collections
(Office of Naval Research (ONR), U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), National Aeronautics and Space Administration (NASA))
- d. Industry Geomagnetic Surveys
- e. University Geomagnetic Programs
- f. Foreign Geomagnetic Data Exchanges
(International Agreements)

3.1.3 The Library maintains a collection of publications and reports. It also acts as an information and referral service.

3.2 Data Holdings

3.2.1 Classified and Unclassified Analog and Digital Files of Geomagnetic Survey Data

a. Record Types

Analog records: stored in the form of strip chart recordings, microfilm, etc.

Digital records: maintained on the UNIVAC 1180; subsets contained on the Magnetic Automated Information System (MAGAIS); produced in virtually any digital format on magnetic tape

b. Survey Types

Shipboard surveys

Aeromagnetic surveys

Satellite surveys

Random surveys

Exploratory surveys

c. Parameter Types

From shipboard surveys:

Total intensity

Differential intensity

From aeromagnetic and satellite surveys:

Total intensity

Declination

Inclination

Horizontal intensity

Vertical intensity

North component intensity

East component intensity

3.3 Data Products

3.3.1 Geomagnetic Models

Every five years, NAVOCEANO, in collaboration with the United Kingdom, produces an unclassified geomagnetic model for international use. This is the official defense establishment geomagnetic model for both the United States and the United Kingdom. The model can be distributed in the following methods:

- a. Computed values of the magnetic field and its annual change for a specific point;
- b. Grid values of latitude and longitude of the entire world at various intervals for a parameter of the magnetic field and its annual change;
- c. ASCII Fortran computer program and the spherical harmonic coefficients to compute components of the magnetic field (available on magnetic tape, computer listings, or keypunched cards);
- d. Chart series of the earth's magnetic field.

Other models are available for specific DOD applications, and assistance is available in adapting the models to DOD systems.

3.3.2 Classified and Unclassified Charts of Geomagnetic Parameters

The chart collection in the Library consists of over 2000 charts of geomagnetic information for the U.S., foreign countries, and ocean areas. The charts vary from small site maps to world charts and are available for loan or can be photocopied for permanent retention. Some of the classified charts are a direct result of data analyses for specific military applications. Some of the unclassified charts produced by NAVOCEANO are listed in NAVOCEANO Reference Publication 23, published in 1982 and entitled "U.S. Naval Oceanographic Office - Geomagnetic Surveys."

3.4 Publications

3.4.1 The publications collected by the Library are available for loan. This collection is used as the basis for a bibliographic reference service. The Library can provide limited technical information searches. Subjects relating to geomagnetics include:

Airborne magnetics	Magnetic compensation
Anomalies	Magnetic detection concealment
Antisubmarine warfare	Magnetic navigation
Bathymetric prediction	Magnetic signatures
Compass rose	Magnetometers
Data or survey reports	Magnetospheric physics
Data processing techniques	MAGSAT
Degaussing	Mapping, charting, and geodesy
Digital computer techniques	Marine geophysics
Dynamo theory	Mathematical techniques
Environmental measurements	Micropulsations
Field evaluations	Modeling
Filtering theory and techniques	Noise
Geomagnetic observatories	Particle beam theory
Instrumentation	Seamounts
Interpretation techniques	Submarine detection
Ionospheric physics	Temporal variations
MAD operational effectiveness	Upward / downward continuation

3.5 Information and Referral Services

3.5.1 The Geomagnetic Data Library:

- a. Has qualified geophysicists on staff that serve the user community by answering technical questions based on their knowledge as well as on published documentation;
- b. Assists the DOD user in obtaining unclassified data from non-DOD organizations;
- c. Provides source geomagnetic data, reference service and evaluated information to satisfy DOD requirements;
- d. Operates a geomagnetic data loan service;
- e. Provides geomagnetic data library service to non-DOD U.S. Federal agencies;
- f. Notifies appropriate DOD and non-DOD users of data receipts and information on holdings;
- g. Maintains a geomagnetic information referencing system;
- h. Identifies and implements agreements which affect exchange of data;
- i. Provides data analysis services for specific DOD requests;
- j. Assists in military applications of geomagnetic data.

4.0 REQUESTS FOR DATA AND SERVICES

4.1 The function of the DOD Geomagnetic Data Library is to service MC&G programs assigned to the Defense Mapping Agency and to provide library service to other DOD and non-DOD agencies that wish to use these Library holdings. Authorized users of this Library include all military and civilian members of the Department of Defense, their contractors, and personnel of other U.S. Government agencies. Upon written application, access to the Library holdings will be considered for U.S. private organizations and for certain foreign agencies.

4.2 Access to classified holdings requires a proper security clearance and a specific need-to-know justification. Access to proprietary information requires approval of the organization that provided the data to the Library.

4.3 The DOD Geomagnetic Data Library can provide information in a form tailored to meet the needs of individual users for either specific geographic areas or for a particular element of the geomagnetic field. The Library is prepared to provide quick response to requests for information that support planning or operations by DOD elements. The Library also maintains exchange agreements with non-DOD Data Centers such as the National Geophysical Data Center and can provide data from these sources to DOD users. If the required data and material are not in the Library holdings, the Library will normally initiate appropriate collection action.

4.4 As a general policy, requests made to the DOD Geomagnetic Data Library will be serviced at no cost. However, service requirements excessive to normal budgeting plans will be subject to reimbursement. Priorities for service will be on a first-come, first-served basis, except when the requirement carries a validated high priority.

4.5 Requests for Library service may be submitted in writing or by telephone. Supply the following information to the Library when a request is made:

Contact name

Agency

Address

Phone number

References (previous correspondence, catalogs, phone conversations, etc.)

Nature of the request (what is desired and end use)

DOD contract number (if applicable)

When possible, identify the specific end-use system. This enables the Library to alert other users to the need for, or application of, the data.

4.5.1 Written requests for Library services should be made to:

Commanding Officer
U.S. Naval Oceanographic Office
Bay St. Louis
NSTL, MS 39522-5001

ATTN: DOD Geomagnetic Data Library

4.5.2 Telephone requests may be made as follows:

AUTOVON	485-4250
FTS	494-4250
COMMERCIAL	601-688-4250

5.0 PROCEDURES FOR SUBMITTING DATA

5.1 The value of the DOD Geomagnetic Data Library is greatly enhanced when users automatically submit geomagnetic information. DOD MC&G activities or contractors funded by DOD engaged in the collection of geomagnetic data should furnish original data immediately to the DOD Geomagnetic Data Library. Where material cannot be immediately provided, notify the Library of the existence of the new data. Publishing rights will be fully protected upon request.

5.2 Forward geomagnetic information in the form of data, charts, or publications to:

Commanding Officer
U.S. Naval Oceanographic Office
Bay St. Louis
NSTL, MS 39522-5001

ATTN: DOD Geomagnetic Data Library

DISTRIBUTION LIST

45A	CG FMFEUR (MC&G Officer)	2
45A	CG FMFLANT (G-2/MC&G, NSAP Advisor)	3
45A	CG FMFPAC (G-2/MC&G, NSAP Advisor)	3
45A2	CG I MAF (G2)	1
V12	CG MCDEC (NSAP Advisor)	1
21A1	CINCLANTFLT (Codes J37B, N37B, N37, N37C, J37, NSAP Advisor)	6
50B	CINCMAC (INQM)	1
21A2	CINCPACFLT (Codes O2M, J37, NSAP Advisor)	3
50B	CINCSAC (SAC/INT)	5
21A3	CINCUSNAVEUR (N39, NSAP Advisor)	2
A6	CMC (INTM)	1
FT1	CNET	1
C2A	ALL CNET LIAISON OFFICES	3
A3	CNO (OP-006, OP-212, PME-124, 009G52)	4
FT5	CNTECHTRA	1
23B3	COMAREASWFORSIXTHFLT (CTF 66)	1
42B2	COMASWINGPAC (N30A)	1
42J	ALL COMCARAIRWING	15
28A	ALL COMCARGRU	8
28B	ALL COMCRUDESGRU	6
28D	ALL COMDESRON	25
B3	COMDT AFSC	1
50C	COMICEDEFOR	1
24E	COMINWARCOM (NSAP Advisor)	1
24A1	COMNAVAIRLANT (NSAP Advisor)	1
24A2	COMNAVAIRPAC (NSAP Advisor)	1
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FKA1G	COMNAVSEASYSYSCOM (Codes 405-24, 56Z14, 63Y)	3
FD1	COMNAVOCEANCOM (Codes N3, N321, N42)	1
FN1	COMNAVSPACECOM	1
24D1	COMNAVSURFLANT (NSAP Advisor)	1
24D2	COMNAVSURFPAC (NSAP Advisor)	1
FA22	COMOCEANSYSLANT	1
FB38	COMOCEANSYSPAC	1
26F3	COMOPTEVFOR	1
FKR4A	COMPACMISTESTCEN (Codes 3250, 4024, 5021)	3
42B1	COMSEABASEDASWINGSLANT (NAVO Flt. Rep.)	1
22A1	COMSECONDFLT (NSAP Advisor)	1
22A2	COMSEVENTHFLT (N30W, NSAP Advisor)	2
22A3	COMSIXTHFLT (NSAP Advisor)	1
FKA1B	COMSPAWARSYSCOM	1
28K1	COMSUBDEVFRONTWELVE (20B)	1
26VV1	ALL COMSUBGRU	6
24G1	COMSUBLANT (NSAP Advisor)	1
24G2	COMSUBPAC (N2161, NSAP Advisor)	2
28K	ALL COMSUBRON	24
28C1	ALL COMSURFWARDEVGRU	8
22A2	COMTHIRDFLT (N33, NSAP Advisor)	2
50C	COMUSJAPAN (J2)	1
50C	COMUSKOREA (8th U.S. Army/ENJ-PO-T)	2

50C	COMUSNAVCENT (N21, N34)	2
50C	COMUSNAVSO (N30, MC&GPOC)	2
B2A	DCA (Technical Library)	1
C3A	Defense Information School	1
B2A	DIA (DB-4D, VP-A3, DB-7B)	3
B2A	DIRNSA (T5122)	2
FKA8F	DIRSSPO (Code SP-20120)	1
B2E	DMA	5
B2E	ALL DMA BRANCH OFFICES	6
B2E	DMAAC	10
B2E	DMAHQ	10
B2E	DMAHTC	10
B2E	DMAIAGS	5
B2E	DMAODS	5
B2E	DMASPOEM	5
B2E	DMS (TSD/MCGSOC)	10
B2A	DNA (Technical Library)	1
C4L	DNL	5
FT72	ALL DPTNAVSCI	6
B2A	DTIC	10
42D1	FASOTRAGRULANT (Det Brunswick, Cecil Field, Jacksonville)	3
42D2	FASOTRAGRUPAC (Det Agana, Barbers Point, Cubi Point, Moffett Field, North Island)	5
FT46	FLEASWTRACENLANT	1
FT46	FLEASWTRACENPAC	1
FT23	FLEBALMISUBTRACEN	1
FT51	FLEMINEWARTRACEN	1
FD3	FLENUMOCEANCEN	1
FKP14	ALL FLTCOMBATDIRSSACT	2
B2A	JCS (J-3/ESD)	1
C4K	Joint Cruise Missiles Program Office (PM-3)	1
B2A	Joint Special Operations Command (J2)	1
B2A	Joint Tactical Command (CS, C3A-CS)	2
C3A	JSTPS (JLAM)	2
C3A	JSTPS (Navy Support Component)	1
FA30	LANTFLTWPNTAFAC	1
B3	National Defense University	1
B3	NATWARCOL	1
E3D2	NAVAIRDEVCCEN (Code 3012)	1
FKR3A	NAVAIRENGCEN	1
FKR3C	NAVAIRTESTCEN	1
FKR5	NAVAVIONICCEN	1
FT10	NAVAVSCOLSCOM	1
E3D3	NAVCOASTSYSCEN	1
C79A	NAVDEPDIRABRES	1
FD4	NAVEASTOCEANCEN	1
FT60	NAVEDTRASUPPCENLANT	1
FT60	NAVEDTRASUPPCENPAC	1
FKQ3A	ALL NAVELEXACT	5
C81A	NAVELEXACTDET	1

C81B	NAVELEXCENDET	1
C81C	ALL NAVELEXDET	2
E3D11	NAVENVPREDRSCHFAC	1
FB36	NAVFAC for ASW	6
FT49	NAVGMSCOL	1
C58L	NAVGMSCOLDET	1
FKP1F	NAVMINEWARENGACT	1
FD5	NAVOCEANCOMCEN	2
C40	ALL NAVOCEANCOMDET	47
FD6	NAVOCEANCOMFAC	7
FD2	NAVOCEANO (Codes 023 (2 cys), 5220, 7000, 7123, 7220, 7221, 8000, 8430, 9000, 9120, 9200)	12
E3D4	NAVOCEANSYSCEN (Codes 521, 653, 715)	3
C20G	NAVOCEANSYSCENDET	1
FF42	NAVPGSCOL	1
FD4	NAVPOLAROCEANCEN	1
E3D7	NAVSWC (Codes K-10, K-12, R-401)	3
C20I	NAVSWC DETS	2
FT39	ALL NAVTECHTRACEN	3
FF44	NAVWARCOL	1
FD4	NAVWESTOCEANCEN	1
E3D10	NAVWPNCEN	1
FKR3E	NAVWPNEVALFAC	1
FT28	NETC	1
FS3	NISC (Code 232)	1
E3C	NORDA (Codes 302, 352, 370, 371, 372, 550)	6
E3A	NRL (Codes 5004, 5110)	2
E3D9	NUSC	1
C20J	ALL NUSC DET	6
4251	OCEANDEVIRON EIGHT	1
E3D1	OCNR	1
C20D	ALL ONR Area & Res. Reps.	15
C20A	ONRDET	3
FKR4B	PACMISRANFAC	1
51A	SACLANT (C-332)	1
FT43	SWOSCOLCOM	1
50A	USCINCCENT (CCJ2-T)	1
50A	USCINCEUR (ECJ2-T)	2
50A	USCINCPAC (J37, Box 13)	1
50A	USCINCRED (RCJ2-PR)	3
50A	USCINCSO (SCJ2-P)	2
	BGS	1
	CIA (OCR, OGI)	2
	Center for Potential Field Studies, CSM	1
	CGS	1
	DARPA	1
	EG&G/Geometrics	1
	FAA	1
	JPL	1
	LDGO	1

NASA/GSFC (Code 622)	1
NOAA/NDBC	1
NOAA/NGDC	2
NOAA/NOS (Codes, C32, C32X1, C35X3, CX2, C321, C322, C351, C4, C71, C32X2)	10
NSAP	1
SACEUR	1
SIO	1
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USGS Menlo Park	1
USGS Reston	7
USSPACECOM (J20R)	1
WHOI	1
Analysis Technology	1
Boeing Aerospace Company	1
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McDonnell Douglas Corporation	1
Northrop Corporation	1
Singer/Link	1
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Avionics R&D Act.	1
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ESEIA	1
OEE	1
FORSCOM	1
30th Engr Bn	1
171st Eng Det	1
TRADOC HQ	1
USACAC	1
USAE	1
USAATCA-ASO	1
USAREUR	1
227th Eng. Det	1
649th Eng. Bn.	1
USAWESTCOM	1
29th Eng. Bn.	1
193d Inf Bde	1
USARCENT	1
AIR FORCE	
AAC/INX	1
AFGL/LSP	1
AFGWC	1

AF/IN	1
Ogden AFLC	1
AFSC	1
AU	1
CPUSS	1
HQASD	1
IFC/IP	1
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TAC	1
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NATO	
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Registration Card

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Last, First, Middle Initial

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Phone Number: _____

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DEPARTMENT OF DEFENSE

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