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Civil Applications Committee

2002

Activity Report

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Civil Applications Committee Background

Overview

The Civil Applications Committee (CAC) is an interagency committee that coordinates and oversees the Federal civil use of classified collections. The CAC was officially chartered in 1975 by the Office of the President to provide Federal civil agencies access to National Systems data in support of mission responsibilities. In recent years, CAC activities have expanded beyond traditional mapping applications to a broad range of environmental and remote sensing applications central to Federal agency missions. Examples include monitoring volcanoes; [REDACTED]; coordinating emergency response to natural disasters, such as hurricanes, earthquakes, and floods; monitoring ecosystems; and mapping wetlands.

Membership

The CAC is made up of voting representatives from the Department of the Interior (DOI), U.S. Department of Agriculture (USDA), Department of Commerce (DOC), Department of Transportation (DOT), Department of Health and Human Services (HHS), U.S. Coast Guard (USCG), Federal Emergency Management Agency (FEMA), National Aeronautics and Space Administration (NASA), U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), and the National Science Foundation (NSF). The CAC charter identifies the Director of Central Intelligence (DCI) as an ex officio member of the CAC. Additional non-voting associate members of the CAC include representatives of the National Imagery and Mapping Agency (NIMA), National Reconnaissance Office (NRO), Defense Intelligence Agency (DIA), Central Intelligence Agency (CIA) Community Management Staff, Department of State (DOS), and Department of Energy (DOE).

Functions and Responsibilities

Functionally the CAC is composed of a technical and coordinating committee – chaired by the Director of the U.S. Geological Survey (USGS) – that meets monthly; an Executive Steering Group – chaired by the Deputy Secretary of the Interior – that meets twice annually, and the CAC Secretariat, which is hosted by the USGS. The CAC sponsors the Global Fiducials Working Group (GFWG) as a standing interagency working group that meets monthly. In addition the CAC sponsors the Imagery Derived Products Working Group (IDPWG), the Security Working Group (SWG), the Emergency Response Working Group (ERWG), and the Requirements Working Group (RWG) on an ad-hoc basis.

Primary CAC responsibilities are to facilitate the relationship between the Civil Community, the Department of Defense (DoD), and the Intelligence Community (IC); provide oversight of all Civil Community source collection and management; support National disaster response; represent and advocate civil requirements and interests in various DoD and IC forums; provide an inter-community forum for technology and information exchange; coordinate training for CAC member agency personnel; provide oversight for the Global Fiducials Library program; promote civil use of Imagery Derived Products (IDPs); and ensure Civil Community needs are addressed in future space architectures.

The CAC provides a forum through which the Federal civil agencies coordinate data requirements, develop tasking strategies, certify proper use of data, and track and plan for the

progress and evolution of National Systems. The CAC coordinates the use of imagery exploitation and application resources and supports remote sensing research and development activities at special facilities, such as the USGS Advanced Systems Center (ASC). At these facilities, appropriate capabilities and exploitation tools are available for CAC members to use for end-to-end data processing and developing custom products. Through the CAC, arrangements can also be made for technical support from military and IC agencies.

CAC Highlights

Expansion of CAC Membership

Monthly CAC membership was expanded to include the Department of Health and Human Services as a voting member, and the Department of State and DIA as non-voting associate members.

CAC Executive Steering Group

The CAC Executive Steering Group (ESG) was established under the Chairmanship of the Deputy Secretary of DOI to provide a forum for senior administration officials to discuss and resolve key National policy issues that impact Civil Community access to, and exploitation of data from National Systems. The initial meeting was held February 7, 2002 at the National Reconnaissance Office to familiarize the members with National Systems capabilities and CAC and member agency activities. A second meeting was held June 28, 2002 at the USGS ASC. The second meeting focused on the need for an integrated National Remote Sensing Strategy, and the projected technical and budgetary impacts of the Future Imagery Architecture (FIA) on Civil Community infrastructure.

CAC Secretariat Staff Support

In April 2002, two additional USGS FTEs (Rich Hornick, Tom Duke) were added to the Secretariat staff to serve as Civil Community Requirements Coordination Liaisons. In October 2002, Mr. Ben Ramey joined the Secretariat staff, replacing Denise Perreca as the IDP and training coordinator.

NIMA Commercial Imagery Strategy

In March 2002, the CAC Secretariat received the draft document *NIMA Commercial Imagery Strategy 2002* for review and comment. Although no formal comments were transmitted to NIMA, the CAC observed that the new draft did not significantly address the concerns expressed by the Civil Community in response to the *NIMA Commercial Imagery Strategy 2001*. Although the CAC does not formally represent the Civil Community on commercial imagery issues, it does maintain an interest in this issue in order to understand how future commercial imagery policies may impact Civil Community access to National Technical Means (NTM). In the context of the broad diversity of Civil Community information needs to meet scientific, environmental, and hazards related missions, the NIMA commercial imagery strategy is limited in terms of the ability to provide access to the range of airborne and overhead sensors necessary to meet current and future projected civil missions. Therefore, the CAC supports the concept of a separate, but parallel commercial imagery strategy for the Civil Community.

Response to Senate Select Committee on Intelligence (SSCI) Directed Action

In January 2002, the SSCI issued a directed action to the DCI to "engage the Civil Community to review civil applications of classified remote sensing data and determine how commercial imagery can be used to meet these requirements." In response, the DCI Community Management Staff (CMS) requested that the CAC Secretariat coordinate a Civil Community response to CMS.

The response noted at the outset that the CAC does not formally represent the Civil Community on issues related to commercial imagery. However, it also pointed out that development of separate community based commercial imagery strategies, or even development of a National commercial imagery strategy alone is insufficient. While commercial satellite imagery will play a critical role in meeting civil remote sensing needs, it cannot address the full spectrum of National information needs. Development and revision of policies related to commercial imagery are not clearly separable from policies related to civil space, or use of National Systems. There is a need to develop a more comprehensive understanding of information needs across the civil, DoD, intelligence, and law enforcement communities. It is important to understand how those needs can be satisfied through an integrated National strategy that incorporates the best use of airborne and satellite data from civil, commercial, DoD, and National Systems data sources, and demonstrates clear value by providing decision support for achieving the management goals of the current administration.

The CAC recommended that within the context of the National Space Policy review, action be taken to develop a National Remote Sensing Strategy (NRSS) that supports administration priorities; addresses civil, DoD, intelligence, and law enforcement needs; meets the needs of first responders at all levels of government in support of homeland security; integrates civil, commercial, National, and international collection sources (airborne & satellite); recognizes a lead agency for land remote sensing; supports a national geospatial data strategy (geospatial one stop); and provides critical decision support to policy makers.

Commercial Remote Sensing Space Policy Development

On June 28, 2002 President Bush directed the review of the existing National Space Policy, National Security Presidential Directive (NSPD-15). The intent is to develop a new Commercial Remote Sensing Policy that better meets the political and economic goals of the original policy. The stated goal is to have a revised policy ready for the President's signature in the late February 2003 timeframe. The National Security Council (NSC), with support from the Office of Scientific and Technical Policy (OSTP) is directed to chair the review. Initially, NASA, the National Oceanic and Atmospheric Administration (NOAA), and DOI were the only Civil Community agencies invited to participate in the review. On September 02, 2002, Mr. Jim Devine of USGS briefed the CAC membership on the ongoing policy review process, providing visibility into the key Civil Community points of interest contained in the first rough draft of the proposed new policy. A number of concerns were expressed by the CAC membership regarding the need to coordinate input to the draft policy from a broader spectrum of civil agencies. Mr. Glenn Bethel (USDA alternate CAC representative) was selected to represent CAC interests on the policy review working group. As a result of follow-on discussions with the NSC, a process was developed to provide for broader input from civil agencies through the DOI representative.

National Reconnaissance Office Remote Sensing Study

In 2002, the CAC co-sponsored the *U.S. Government (USG)-Civil-Commercial-National Technical Means (NTM)* descriptive study funded and conducted by the National Reconnaissance Office. The study was intended to describe what comprises remote sensing in the U.S., define the important characteristics, characterize the involvement of the U.S. in satellite remote sensing and define the consumers, identify the market for commercial remote sensing in relation to commercial business costs, explore the complementarity of systems in the various sectors, identify important foreign remote sensing systems, and answer the question *Is satellite imagery a "commodity?"* The study concluded that there is substantial use of satellite remote sensing across all four sectors by the USG; that the business case for the commercial sector is uncertain; that there is little cross use of civil systems vs. NTM in the USG; and that homeland security, law enforcement, and public health requirements for use of remote sensing are not well defined.

Advisory Assistance To The Law Enforcement Working Group (LEWG)

The LEWG is an organization of senior representatives of the Federal Law Enforcement Community, created in 1999, to address issues related to acquisition of intelligence information from the IC for law enforcement and regulatory purposes. With the stand up of the Office of Homeland Security, the LEWG has expanded the scope of its interaction to include many elements of CAC member agencies that have enforcement or regulatory responsibilities, as well as first responders and homeland security agencies.

In 2002, the LEWG sought support and advice from the CAC on issues related to developing means for access and use of IC information. Over the last year, the CAC has provided continued support to the LEWG and has acted as a key advisor. The LEWG is currently working to renew its charter, using the CAC as an exemplar.

Assessment of FIA Impact on Civil Infrastructure

At the direction of the CAC Chairman, in April 2002 the Secretariat initiated an assessment of the technical and budgetary impacts of FIA on civil infrastructure. The Secretariat performed an inventory of existing installed infrastructure in Civil Community secure facilities. With systems engineering assistance provided by NIMA, the Secretariat conducted a program review of FIA, evaluating programmatic schedules and technical components for relevance to civil infrastructure. For each Civil Community secure facility, the Secretariat developed a five year proposed approach for updating civil infrastructure to achieve FIA readiness. The proposed distribution of specified technical modifications or replacements to hardware and software, required operational maintenance, training, and research and development, along with associated costs, were keyed to the proposed fiscal year of implementation.

Insufficient information was available to estimate the potential costs for future connectivity to the National System for Geospatial Intelligence (NSGI), non-USGS site connections to the Secure Encrypted Network (SEN), systems integration support to implement new capabilities, FTE salaries (except for new R&D positions), or facilities rents and maintenance. Costs for these items may represent a significant additional cost in each facility. Finally, costs for upgrades to USACE and USCG facilities were not estimated or included. The assumption is that DoD will fund upgrades within these facilities.

The assessment was briefed at the June, 2002 CAC-ESG meeting. Because the cost estimates presented were only intended to reflect a rough order of magnitude for potential costs, it was recommended that individual agencies conduct more detailed assessments of their respective facilities in order to develop refined cost estimates to support future budget initiatives within their respective Departments or agencies. In addition, the ESG Chairman tasked the CAC Secretariat to expand the assessment by developing a detailed Civil Community Capability Requirements Document (CRD) to reflect changes needed in the civil infrastructure to achieve FIA era readiness.

Special Events

In May 2002 the CAC conducted a special all-day session on Commercial Space Remote Sensing. The session featured speakers from government, industry, and academia, and provided a diverse range of perspectives on status of the industry, growth of commercial markets, and factors impacting broader government use of commercial imagery.

In December 2002, the CAC held a special offsite meeting jointly hosted by the Department of Energy Nevada Test Site, and the 547th Intelligence Squadron, at Nellis AFB, Nevada. The meeting included a tour of the Nevada test site.

Disaster Response

During 2002, CAC members requested imagery to respond to and to study impacts of more than a dozen disaster-related events:

██████████ Earthquake	March
Detroit Oil Spill	April
Maryland Tornadoes	April
West Virginia Floods and Landslides	May
Alaska Wildfires	May
Minnesota Flooding	June
Western Wildfires	June
██	July
Texas Flooding	July
Hurricane and Tropical Storm Impacts on Coastal Wetlands (Atlantic and Gulf Coasts)	September
Central Alaska Earthquake	November
Veterans' Day Tornadoes (Southeast and Ohio Valley)	November
██	December

Participation In External Forums

During 2002 the CAC participated in the following external forums to represent civil interests and advocate for civil requirements:

Overhead National Users Exchange Group (ONUEG)
Intelligence Community Mission Requirements Board (MRB)
Imagery Policy and Security Committee (IPSCOM)
Operations Committee (OPSCOM)

NIMA Geospatial Intelligence Council (GIC)
NIMA Geospatial Intelligence Board (GIB)
NIMA Future Needs Working Group (FNWG)
National Security Space Architecture (NSSA) Integrated Spectral Architecture (IPT)
Law Enforcement Working Group
Intelligence Community Multi-Intelligence Acquisition Program (IC MAP)
USGS National Civil Applications Program (NCAP) Steering Committee

Outreach

Under the direction of the CAC Chairman, in 2002 the CAC Secretariat implemented a robust outreach program to senior officials in the civil, DoD, intelligence, and Law Enforcement (LE) communities. The objectives of the outreach effort were to enhance the visibility of CAC activities at senior levels across government; facilitate civil agency participation in development of a new commercial remote sensing policy; provide advisory assistance to the LEWG; and develop new relationships across government to begin the process of clarifying the role of CAC in support of homeland security activities. Significant CAC or CAC/NCAP sponsored meetings and briefings included:

- **April 10** – Measurement And Signatures Technology Conference at NRO (CAC-Civil Applications of MASINT)
- **April 15** – Overhead National Users Exchange Group, Mr. Charlie Allen, Assistant Director of Central Intelligence for Collections (CAC)
- **April 17** – Mr. Gene Whitney, USGS Liaison to White House/OSTP (CAC)
- **April 19** – Capt. Justin Sherin, Joint Forces Command, HQ-Homeland Security (CAC, NCAP)
- **May 15** – Ms. Kathy Kiernan, Deputy Director, Bureau of Alcohol Tobacco and Firearms (ATF), and Chairperson, Federal LEWG; and Mr. Ted Baltas, Director of Intelligence, ATF (CAC, NCAP)
- **May 15** – Mr. Tom Bozek, Director, Critical Infrastructure Protection, Office of the Secretary of Defense (CAC, NCAP)
- **May 23** – Ms. Kathy Kiernan, Deputy Director, ATF, and Chairperson, Federal LEWG, at ATF (CAC Support to LEWG)
- **June 6** – Mr. Ken Piernick, Director, Intelligence and Detection Directorate, Office of Homeland Security, and Director of Central Intelligence/CMS Homeland Security Staff (CAC, NCAP)
- **June 12** – Joint Interagency Coordination Group, JFCOM HQ-HLS at Joint Forces Command-Headquarters Homeland Security Staff (CAC)
- **June 21** – Joint Chiefs of Staff Intelligence Planning Staff, CMS-Homeland Security Staff, and the Office of Homeland Security (CAC, NCAP)
- **July 11** – Mr. Jason Freihage, USGS Budget Examiner, Office of Management and Budget (CAC, NCAP)
- **July 29** – Mr. Larry Parkinson, Assistant Secretary of the Interior for Law Enforcement and Security; Mr. Steve Calvery, Director, DOI Law Enforcement and Security; Mr. Michael Rosetti, Counselor to the Secretary of the Interior (CAC, NCAP)
- **July 30** – Mr. John Lenoir, Counsel to the Director, U.S. Marshalls Service (CAC, NCAP)

- **August 15** – Mr. William Myers, Department of the Interior Solicitor (CAC, NCAP)
- **August 23** – Ms. Joan Downs, Department of State, Director for Intelligence Resources (CAC briefing specifically to address DOS membership status in the CAC both from the intelligence (INR), and civil (OES) sides)
- **September 20** – Mr. Gil Klinger, Director, National Space Policy, National Security Council (CAC-Briefed by Dr. Groat)
- **September 27** – Mr. Steven Cooper, Chief Information Officer, Office of Homeland Security (CAC)
- **October 15** – Mr. Scott Snyder, National Security Agency liaison to Department of the Interior (CAC, NCAP)
- **October 17** – Mr. Richard Speer, Intelligence Analyst, U.S. Attorneys Office, Fairbanks, Alaska (CAC)
- **October 28** – Ms. Jan Hren, USGS liaison to CIA, Office of Technical Intelligence (CAC, NCAP)
- **November 14** – NORTHCOM J2 (Intelligence), J3 (Operations), and J6 (Communications) staff members O-6 and below @ Petersen AFB, Colorado (CAC)
- **November 22** – LTC Marianne Burtnett, Chief of Staff, Office of Homeland Security (CAC, NCAP)
- **November 22** – MG (ret) John D'Araujo, Assistant Director, Response and Recovery Directorate, FEMA (@ NIMA Bldg 213); and Mr. Jack Hild, Deputy Director, Office of the Americas, NIMA (CAC)
- **December 9** – Mr. J. William Leonard, Director, Information Security Oversight Office/National Archives and Records Administration (CAC, NCAP)

Imagery Derived Products

The CAC Secretariat was successful working with NIMA and IPSCOM to secure broadened approval for the production and release of Imagery Derived Products (IDPs). This includes authorizations for digital elevation models, land use-land cover mapping, and products to support disasters and hazard response. These approvals allow CAC agencies to produce and disseminate needed products in a more timely and efficient manner.

New metadata guidelines for Imagery Derived Products (IDP) were developed and distributed in January of 2002 for comment. The new guidelines will facilitate exchange of IDP data in a common format.

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

Training

During 2002, the CAC Secretariat developed and conducted one NTM training course:

National Technical Means Alaska – February 13-14, 2002 in Anchorage, Alaska

Separately, under CAC sponsorship, USGS Eastern Region Security Operations developed and conducted a security refresher course August 7, 2002, for member agencies.

Budget

At the close of 2002, the most significant budget issue facing the CAC is how to fund the projected impacts of FIA on civil secure facilities. The June 2002 CAC-ESG meeting did not result in adoption of a recommendation for how to fund the projected impacts either through a Department or agency acting as executive agent for the Civil Community, or separately through individual Department and agency budgets. Refining the rough cost estimates for impacts of FIA developed by the CAC Secretariat remains a high priority; individual agencies operating secure facilities should dedicate resources to this task in 2003 in order to have lead time for developing future budget initiatives.

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CAC Monthly Meetings - Briefing Topics (2002)

Jan	Central MASINT Organization Overview and the Handling of MASINT	Peter DeForth
	Global Fiducials Library Working Group: FY02 Objectives & Issues	Lawrence Friedl
	DOI Support to Homeland Defense	Steven Calvery

Feb	No CAC Meeting	
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Mar	Gravity Mapping of Underground Facilities	Steve Malys
	EO-1 Status	Ray Byrnes
	Systems Update	Don Neireiter

Apr	Civil Imagery Requirements Review	John Worth
	Potential Civil Applications	Al Fuerst
	Volcano Disaster Response to [REDACTED]	Rosalind Helz
	Potential FIA Impacts on Civil Infrastructure	Gary Feltz

May	Special Session on Commercial Imagery	
	Commercial Imagery: Setting the Stage	Chip Groat
	Policy Context and Conditions	Kevin O'Connell
	Civil Imagery Context: Civil Satellite System Capabilities	Ron Birk
	Federal Context: FGDC Responsibilities & Activities	Ron Birk
	Commercial Context: Technical Plans and Business Realities	Dick Buenneke
	Commercial Challenges: Policy Directions and Drivers	Brett Alexander
	Budget Perspective: Intelligence Climate and Budget Realities	Andrew McIlroy

Jun	MASINT Classification Guide	Dennis Pinnix
	Status of the Global Fiducials Working Group	Lawrence Friedl
	NIMA's Support to the Salt Lake City Olympics	Mark Riccio
	Vehicle Update Briefing	Pieter Decker

Jul	Information Needs Development	Don Machino
	ELF Signals as Possible Earthquake Predictors	Jeannie Seelbach & Tom Bleier
	IMINT Program Briefing	Ron Stocks
	Community Management Staff - Homeland Security Initiative	Airis Papas

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Aug	No CAC Meeting	
Sep	GeoServer Program	Bruce Shetler
	Historical Imagery Declassification Update	Lynn Smith
	Introduction to SIGINT	Lou Poehlman
	National Space Policy Review Update	Jim Devine
Oct	Future Multi-INT CONOPS	Paul Parowski
	National Space Policy Review Update	Jim Devine
	USGS Secure Encrypted Network	Wendy Budd
	FOPEN	Jan North
	Three-Color Processing	Keith Jerdan
Nov	National Space Policy Review Update	Jim Devine
	Airborne Flight Testbed Projects in Alaska	John Payne
	L Band INSAR Initiative	Paul Rosen
	Gap Study [REDACTED]	Mark Choiniere
	NIMA Disaster Response Report	Heidi Smith
Dec	Special Session at Nellis Air Force Base, NV	
	The 2002 Wildland Fire Season	Paul Greenfield
	Steward Creek Project – Proof Of Concept	Bruce Keating
	Mineral Spectral Characterization, Detection and Mapping Using Hyperspectral and Hyperspatial Remote Sensing	Joe Sadlik
	Predator Brief	Jim Burlingame
	Southern Nevada GIS and Aerial Photography Program – Clint Woods, Clark County, NV, Center For Enterprise Information Technology, GIS Management Office	Clint Woods

Working Group and Member Agency Activities

Requirements Working Group

The CAC RWG has been inactive during this reporting period and now meets only on an ad hoc basis. However, the CAC Secretariat has been involved in several requirements-related activities worthy to report during this period. At the June 2002 ESG meeting an action was directed to the secretariat to develop a Civil Community Capabilities Requirements Document. This document will assess the impact of FIA on civil infrastructure and document operational requirements that are critical to maintaining the Civil Community's ability to use NTM from emerging systems. This document should be ready for community review in early 2003.

The CAC Secretariat Office coordinated with the NCAP Steering Committee on the development of the Concept of Operations for the U.S. Government Use Only (USGUO) Digital Orthophotoquad Operations Concept. Review and comment of the draft document for IDP related approval processes were performed.

The CAC Secretariat Office provided representation to several working groups in support of civil requirements issues. They were:

- LEWG: discussions were held on developing closer ties between the CAC and LEWG.
- NSSA: participation and support of the Environmental Monitoring Working Group.
- NSSA: participation and support of the Integrated Spectral Architecture Working Group.

Global Fiducials Working Group

The Global Fiducials Program provides a library for long-term collection and archive of classified imagery of environmentally-sensitive and indicative sites around the globe. The GFL creates a long-term archive legacy of information for current and future research, policy making, and understanding of processes associated with the causes and effects of environmental change.

The GFWG is composed of representatives from each agency with an active interest in sponsoring sites and participating in the coordination of Civil Community input to the program. The group works to address programmatic concerns and resolve issues associated with site management.

During 2002, agency representatives continued their work to reevaluate and revise their site nominations. The nominated sites were classified using a previously established schema to ensure diversity of ecosystem types as well as geographic locations. The agencies are now working with ASC staff to initiate collection for about half of the planned 500 sites. The remaining half will be determined following an effort to include more sites outside of the United States to improve global representation.

Acquisition of imagery for sites already validated by sponsoring agencies is underway and data is being archived in the library system. The imagery and associated IDPs are being used to support current agency programs while also being stored for future use by the scientific community.

U.S. Department of Agriculture

USDA agency missions continue to benefit from the use of National Systems data for emergency

response, natural resource inventory and monitoring, mapping, development of conservation measures, and land management support. Applications during 2002 include:

USDA Forest Service Mapping Activities:

The Forest Service is responsible for mapping all National Forest lands. One of the critical steps in the mapping process is to obtain ground control point coordinates in order to reference accurately the map to a world coordinate system. The Forest Service typically uses Global Positioning System (GPS) technology to collect control by physically visiting field sites. In remote locations, such as wilderness areas, GPS field crews are prohibited from using motorized vehicles and can spend weeks hiking to the required locations to take the needed measurements. The Forest Service has tested and obtained approval for a technique to collect control that eliminates the need to visit these remote field sites. In 2002, it was used on three projects. In each case, surveyors obtained control for the accessible portions of the project, and the new technique was used where control was needed in remote wilderness areas and in glacier-covered mountains.

In addition to collecting control as described above, the process of control extension can be used to generate control locations based on a minimal number of field-surveyed control points. As part of the National Digital Orthophoto Program, the Forest Service is responsible for creating and maintaining digital orthophoto quadrangles over National Forest lands. In support of this activity, four control extension projects were completed in FY 2002, covering approximately 9,000 square miles. This activity saved field personnel over \$100,000 in surveying costs during the year.

Natural Resources Conservation Service (NRCS) and Guam Natural Resources Inventory
In FY2002, the NRCS National Cartography and Geospatial Center (NCGC) in Fort Worth, Texas, requested and received Digital Orthophoto Quarter Quads (DOQQs) derived from IDPs for Guam. NCGC requested the IDP DOQQs to support the National Resources Inventory (NRI) Program in Guam. For the NRI, NRCS data collectors need high quality imagery to photo interpret features including land cover/use, water quality, and resource concerns. In 2000, NRCS-Pacific Basin purchased 1-meter panchromatic and 4-meter multispectral IKONOS imagery over Guam. The panchromatic and multispectral data were merged by NCGC to make a 1-meter resolution natural color mosaic of the island. From the mosaic, hardcopy 1:4,800 scale maps were made over each of the 741 Primary Sample Units (PSUs). Unfortunately, the IKONOS data were not able to support all the data collection needs for two reasons.

1. The data contained up to 20% clouds making the IKONOS data useless over the affected PSUs.
2. NRCS-Pacific Basin purchased the Geo-level of rectification (50 meter, CE90). Unfortunately, this level of rectification was inadequate, and numerous PSUs were significantly offset from their historical locations. NRCS considered purchasing Rational Polynomial Coefficient (RPC) files to do orthorectification of the IKONOS data, but because all the scenes were collected at an elevation of less than 72 degrees, Space Imaging wanted NRCS to sign a product accuracy waiver because the delivered products would be out of specification due to the lower look angle. Because of the \$20,000 cost for the RPC files and the uncertain outcome of their use, NRCS looked elsewhere for solutions.

During interagency coordination meetings, NRCS-Pacific Basin learned of the availability of the IDPs and requested them through the National Headquarters Resources Inventory Division. The task to acquire and process the IDPs was given to the NCGC Resources Inventory Support Branch. NCGC signed the IDP release form provided by DOI/USGS/NMD/RMMC on November 4, 2002. The IDPs were received on December 9, 2002. The data were imported into ERDAS Imagine and mosaicked together. NCGC again produced hardcopy 1:4,800 scale maps of the 741 PSUs and provided them to NRCS data collectors in Guam on December 20, 2002. NCGC also provided the IDP DOQQs and mosaic as MrSID compressed files. The NRCS data collectors are using the IDPs in areas where IKONOS encounters significant cloud cover and also to reconcile the correct locations of PSUs. The primary disadvantage of IDPs is that vegetation type is hard to interpret from black and white images.

Other Activities:

The Forest Service is directed by Congress to perform a National Forest Inventory and Analysis for all lands within U. S. borders, and to develop a strategy to incorporate remote sensing and other advanced technologies into this analysis. The benefits of National Systems data to support inventory and monitoring applications have been studied by the agency in previous years, with satisfactory results. In 2002, selected sites in Alaska were imaged; from these images statistical information such as forest/non-forest, tree type, health, etc. will be derived.

Department of Commerce

The Department of Commerce National Oceanic and Atmospheric Administration has been a participating member of the CAC since its inception. From the beginning, the NOAA National Ocean Service (NOS) has used National Systems data in support of its coastal mapping program, but the past several years have seen increased use for various applications by other NOAA offices.

NOS

The NOS National Geodetic Survey (NGS) Remote Sensing Division continued to use National Systems data to support the nautical charting program during 2002. These data were used for updating and evaluating the adequacy of nautical charts.

During 2002, the NGS used National Systems data for shoreline compilation in support of the coastal mapping program for Alaska projects including Kasaan Bay and Aialik Bay, as well as for several islands within the Northwest Hawaiian Islands chain.

The NOAA Coastal Services Center (CSC) used NTM data in 2002 to support National Marine Sanctuary (NMS) visitor use. NTM data were acquired for Gray's Reef NMS, located 20 miles east of the Georgia coast, and Flower Garden Banks NMS, located off the coasts of Texas and Louisiana. The sanctuaries management and research studies plan focus on the long-term status of fish populations, benthic invertebrates, oceanographic conditions, sediment transport, benthic habitat, and visitor use. A boat census was performed for each sanctuary using NTM data and USCG auxiliary flight observations to detect seasonal variations in visitor use.

National Marine Fisheries Service

The National Marine Fisheries Service (NMFS) is using archival imagery to study Chinook

salmon habitat along the Sacramento River between Sacramento and Keswick Dam to identify diversions and other factors in the river and examine change in the riparian zone along the river. The imagery has not been exploited and no IDP request has been made. An alternate digital data source has been obtained from the Naval Oceanographic Office, which has been declassified and is being used by the NMFS office in Santa Rosa, California.

In September 1998, a massive dredging project was completed in the Atchafalaya River Delta creating new wetlands habitats in coastal Louisiana. Imagery has been acquired for September 1995, 1998, 1999, 2000, 2001, and 2002. The imagery has been exploited by USGS to determine shorelines and areas of accretion and erosion from year to year. IDP approval has been obtained and products have been produced. The project was presented at the Federal Reconnaissance Users Conference at the NRO. Effort is continuing on this project with Coastal Wetlands, Planning, Protection, and Restoration Act (Breaux Bill) funding and is directed at improving shoreline delineation in conjunction with efforts by Larry Handley at the USGS National Wetlands Research Center in Lafayette, Louisiana.

The National Marine Mammal Laboratory (NMML) Alaska Fisheries Science Center continued to analyze data from imagery collected in previous years to evaluate distribution and abundance estimates of harbor seals in glacial haulouts and Steller sea lions located in remote locations. One domestic imagery request was approved but no new data was acquired due to specific technical requirements requested by NMML. A search was conducted to identify archival data that may fulfill NMML requirements without requesting new collects. The Global Fiducials Library was queried by geographic location for any data relating to Steller sea lion breeding or haulout sites. The imagery found during this search was not applicable for population studies of marine mammals.

Another query of the library was conducted to verify existing data on Hawaiian monk seals located in the Northwestern Hawaiian Islands at the request of the Southwest Fisheries Science Center. A preliminary review of the archival data suggested that a complete analysis should be initiated to follow up a study that began in the mid 90s. A Domestic Imagery Request (DIR) requesting this data will be forthcoming in 2003.

Department of the Interior

Bureau of Land Management

The DOI Bureau of Land Management (BLM) has used NTM data since 1994. The first project using NTM was the Alaska Wetlands and Hydrography Project. This collaborative effort brought together the IC Environmental Program, BLM, and U.S. Fish and Wildlife Service. The project developed procedures to use NTM for inventorying wetlands, documenting wetland trends (losses and gains), and identifying the boundaries for hydrographic features. This initial effort of employing NTM was very successful and BLM has continued to use NTM for these purposes. Since that initial success BLM has employed NTM imagery to support other activities and has continued to implement an infrastructure to support field use of NTM. Below is a summary of 2002 activities that involved NTM data:



Bering Glacier

The objective of these NTM activities include; (a) delineate and monitor forelands and ice margins, (b) monitor beach side and ice erosion, (c) identify and assess existing and potential anadromous fish habitat, (d) identify dusky Canadian Goose habitat, and (e) assess hazards for recreation and transportation. Control panels were established in 1998 to monitor long-term changes in the glacier forelands area. Additional control panels of improved design were deployed in 1999 and 2000 in both the Bering Glacier forelands and the Berg Lake area on the west flank of the Bering Glacier. Monitoring continued in 2002. The project has significantly improved knowledge of monitoring subtle earth and ice movement and new products derived from NTM are being assessed for accuracy.

National Petroleum Reserve – Alaska

This project was begun in 1999 as a test of NTM data to detect subtle environmental changes resulting from oil and gas development. Ice roads are used to minimize environmental impacts in this fragile environment. Unlike conventional roads, the location of ice roads and ice pads are difficult to detect after they have melted. NTM is used to precisely locate winter drilling activities so that summer field studies can be accurately designed and implemented. In 2002, BLM used NTM data to produce maps that accurately delineated the extent of ice and conducted numerous vegetation transects to monitor the area for environmental change. The information derived from this research will guide future ice road construction to further minimize the impact of oil and gas development.

Alaska Land Transfer

Classified imagery was used to map meander hydrography to assist Cadastral Survey field work. Much of the current activity is on small islands in the Aleutian archipelago where accessibility and weather conditions effectively prevent the use of other data alternatives.

Katala Site Clean-up

BLM in Alaska used NTM to map the area around an abandoned exploratory oil well in south central Alaska. The Katala site has nearly one-hundred years of recurring oil exploration activity, resulting in the area being littered with many artifacts from that activity. Much of the equipment has been overgrown by dense vegetation. BLM used NTM and other data to map specific occurrences of abandoned equipment, oil drums, and well heads to facilitate site clean-up.

BLM believes that NTM data can meet many of the information requirements that support its mission. While recognizing the technical and policy restrictions that limit the utility of this data, BLM is convinced of its value and continues to explore new and appropriate applications.

U.S. Geological Survey

Geology Discipline

The Volcano Hazards Program, with support from the ASC, continued to make extensive use of NTM in support of program activities at domestic volcanoes and of responses at foreign volcanoes carried out by the USGS Volcano Disaster Assistance Program (VDAP). Highlights in 2002 include:

- (1) Provision of information and [REDACTED] in response to the [REDACTED]
[REDACTED].
- (2) Provision of information in support of VDAP response to the [REDACTED]
[REDACTED].
- (3) Provision of information [REDACTED]
- (4) Provision of information on the [REDACTED]
[REDACTED]

Other activities include ongoing surveillance [REDACTED]
[REDACTED] which appears to be moving toward renewed large-scale activity.

In the U.S., the Volcano Hazards Program has monitored unrest at Shishaldin and at Veniaminof (in the Aleutians). [REDACTED] was made and released showing the results of the eruption of the Cleveland Volcano in the Aleutians (February – May, 2001), in support of mapping efforts by the Alaska Volcano Observatory staff. The program has continued collection of baseline imagery at selected volcanoes in Alaska, the Cascades, and Hawaii.

In 2002 the Earthquake Hazards Program used NTM to locate ground breaks, landslides, and other features produced by the Nenana Mountain (M6.7) and Denali Fault (M7.9) earthquakes in Alaska. The very large Denali quake produced an offset of 14 feet where the Alaska oil pipeline crosses the fault. The pipeline was undamaged because, when it was built, USGS input resulted in a design that was able to accommodate the kind of fault movement and ground shaking that occurred in the November 3 quake.

Advanced Systems Center

The USGS ASC in Reston, Virginia continued to support data acquisition and management activities for CAC Agencies. Imagery analysis and product generation is provided for disaster and hazards events. The Real-Time Land Change Team worked with scientists to monitor volcanic activities including volcanoes Pago, Fuego, Colima, Nyirangongo, Popocatepetl, Cotopaxi, and Reventador. Disaster support for 2002 included the production of orthophoto products for areas along the Alaska pipeline affected by the Central Alaska earthquake and areas affected by the tornadoes in the mid-west. During 2002, the ASC collected additional data to support the Louisiana Wetlands study for NOAA and to verify the results of the Multi-Resolution Land Characterization (MRLC) project for EPA. Data collection and archiving was initiated for many Global Fiducial sites and to support USGS data revision activities.

Department of Homeland Security

The Department of Homeland Security (DHS) USCG is a military organization that serves around the world around the clock and protects the American public's most basic needs: safety and security, the environment, and economy. USCG is a military, multi-mission, maritime service that has answered the calls of America continuously for over 211 years. Comprised of active duty, reserve, civilian, and auxiliary personnel, it provides a broad range of services to the American people in times of peace and war. The Coast Guard's five operating goals – Maritime Safety, Protection of Natural Resources, Mobility, Maritime Security, and National Defense – define the focus of the service's missions and enable it to touch everyone in the United States. The Coast Guard's military structure, law enforcement authority, and humanitarian function make it unique within the government and enable it to support broad national goals. It is well positioned to be the first on scene bringing the right people, the right equipment, and the right partnerships to respond to any emergency.

The Coast Guard continues to benefit from the use of National Systems data in support of emergency response and maritime security missions. Some of these benefits are described below:

Search and Rescue

The Coast Guard Intelligence Coordination Center (ICC) continues to refine collection strategies and parameters for using nationally owned remote sensing systems to support search and rescue at sea. ICC image analysts, in coordination with image scientists from various national agencies, are working together to analyze data collection, dissemination, and exploitation techniques to determine the most effective means to support to Coast Guard operations in preventing loss of life at sea.

Post Hurricane Support

During 2002, the ICC conducted several experiments to determine the feasibility and practicality of using National Systems for post-hurricane disaster support verifying positional accuracy of maritime aids to navigation. Data gathered during these experiments determined the value of using National Systems during extreme weather operations too dangerous for manned systems to operate in. USCG is planning further experimentation in this area to support concept of operation planning and coordinate operational planning cycles with other Federal response agencies.

Oil Spills

The ICC has successfully used National Systems for assessing and monitoring oil spills internationally and domestically. The data collected during spills in and around New Orleans, the lower Mississippi River, Key Largo, and Prince William Sound have provided valuable time critical information essential for command elements responding to these incidents. When organic tactical collection assets are unavailable to respond and support these incidents, the ICC stands ready to task and exploit National Systems data for operational planning needs.

Port Security

In the wake of the September 11 terrorist attacks, the Coast Guard immediately mobilized more than 2,000 reservists in the largest homeland defense and port security operation since World War II. The Coast Guard has increased in vigilance, readiness, and patrols to protect the country's 95,000 miles of coastline, including the Great Lakes and inland waterways.

The use of National Systems data plays a vital role in the ICC's support to this mission. Although, commercial imagery can be an effective force multiplier, in most cases it is not timely enough to satisfy urgent requirements for force protection and situational awareness. When organic assets are unavailable or not adequate to satisfy security requirements, exploiting national assets can mean the difference between operational success and failure in locating and identifying potentially dangerous cargoes/vessels.

U.S. Environmental Protection Agency

National Land Coverage Data (NLCD) Accuracy Assessment

The formal accuracy assessment data for Federal Regions 8 and 9 for the 2000 NLCD program (formerly MRLC), was created from NTM sources at the ASC. Under an Interagency Agreement between EPA and USGS, several hundred sampling points, representing all land cover classes, were verified by analysts at the ASC. Through the IDP process, data were released as spreadsheets and will provide critical 'truth data' for the formal assessment of accuracy for the NLCD dataset in Regions 8 and 9. Follow on research, planned for the coming year, involves the accuracy assessment of NLCD-generated Land Cover Change by way of NTM sources.

IC Community Involvement

EPA continues to be involved with several committees and workgroups related to IC issues. EPA attends and has presented research at the NRO sponsored Spectral Quality Metrics workgroup. In 2002, a NIMA Pathfinder report on hyperspectral imagery (HSI) and multispectral imagery (MSI) software tools was published for community use. EPA had a very active role on the creation of this report. Technology transfer between the IC and civil organizations continues to be an important issue for this agency. EPA was contacted for technical support relating to imagery analysis by organizations within NIMA in 2002; EPA has tested several image processing software programs for IC organizations and has communicated comments back to the respective organizations for software improvements. EPA has also taken advantage of several educational opportunities within the IC by attending classes in data processing and information technologies.

Global Fiducials

EPA continued to be an active participant in the Global Fiducials Program for initial collection, including several international sites. EPA also assisted in further refinement of the program with the current GFWG chair.

IC Conferences

EPA gave a presentation at the NRO sponsored Federal Reconnaissance Users Conference in February 2002.

U.S. Army Corps of Engineers

The Topographic Engineering Center (TEC) represents USACE on the CAC. TEC also participates in the activities of the Global Fiducials Working Group. TEC continues to work closely with IPSCOM on gaining and maintaining approval authority for production of IDPs. During CY 2002, TEC received approval for two DIRs, both of which were related to the GFL. The first was approval for GFL collections made on behalf of research efforts by Engineer Research and Development Laboratories, part of USACE. The second DIR that was approved

allowed for the release of imagery collected for the Global Fiducials Program to other USACE elements monitoring the long-term effects of ongoing Everglades Restoration Projects. This release was requested to enable the evaluation of the usefulness of NTM imagery collected over long time frames.

National Science Foundation

NSF-supported scientists very much appreciate the assistance provided by the CAC and the Intelligence Community in making IDPs available that provide new information on environmental change at NSF's Long Term Ecological Research (LTER) sites and in several areas of the Polar Regions. The CAC process supports our scientific endeavors while maintaining appropriate oversight of our national security interests.

During calendar year 2002, NSF has moved forward with defining scientific goals and data collection parameters for a large group of sites that are part of the Global Fiducials Program. As data are collected, an important archive will be built. NSF recognizes that this is an investment that will not likely payoff in the short term but rather the actions now will lay the framework for researchers who will exploit the data beginning in perhaps a decade. NSF believes that the Global Fiducials Program is a sound investment for future environmental research.

NSF sponsored researchers and NSF staff have learned considerably more over the last year about the potential research uses of IDPs. Of particular relevance is that NSF continues to learn about the research limitations of the imagery associated with the fact that the resolution of the IDPs is sometimes not sufficient to allow examination of surface phenomena and direct comparison with imagery from conventional commercial sources. In practice, this means that researchers have to carefully consider the size of surface features or phenomena that are appropriate for comparative time series analyses. Despite this limitation, researchers continue to make the point that the imagery is valuable for time series analysis of a wide array of land surface phenomena.

Barrow, Alaska

Images continue to be assessed and used but specific publications have not yet been produced. The declassified imagery is archived at Michigan State University in the laboratory of Dr. Patrick Webber and at the Joint Office of Science Support (JOSS - <http://www.ofps.ucar.edu>) with work underway to get the data into the Arctic Systems Science (ARCSS) data center at the National Snow and Ice Data Center (NSIDC). Snap shots of the imagery appear on the Michigan State University website (<http://www.cevl.msu.edu/acl/data/remote.html>). Within the last year, the following working groups have begun to use the data: Hinkel (U. Cincinnati), Maslanik (U. Colorado), Manley (U. Colorado), Eicken (U. Alaska Fairbanks), Nelson (U. Delaware), Beck (U. Cincinnati) and Stow (San Diego State U.). These groups have found the imagery valuable for high spatial resolution coverage of the Barrow area during a period when aerial photography of the Barrow area was severely limited; however, these assessments are ongoing and final analysis is still pending. To date, the primary limiting factors related to use of the imagery has been that ground control for high precision georectification has not matched the resolution of the imagery and the tonal balance of the imagery is not optimal. This latter aspect limits its usefulness in publications. With the installation of high-resolution real-time differential GPS (DGPS) in Barrow last summer, it is now possible for image products to be georectified to a level of accuracy. Identification and acquisition of ground control points or accurate rectification of the

imagery should be complete after the 2003 field season. This will increase the attractiveness of the declassified imagery to the various user groups. Researchers anticipate that the imagery will be valuable as more in depth retrospective assessments are conducted of land cover change and alteration of the human disturbance regime in the Barrow area at the landscape scale. Other analyses of the imagery have been included as part of proposals for further research pending in NSF's Biocomplexity Program.

Research at LTER Sites

Literal IDPs have been released for several of the LTER sites and are used regularly to illustrate examples of land surface change. For example, Dr. Bruce Hayden made a presentation about scientific uses of declassified imagery at the Historical Images Declassification Conference held on 20 September 2002. Dr. Hayden focused on LTER use of data at the Sevilleta, Jornada, McMurdo, and Virginia Coastal reserve sites. Dr. John Vande Castle also presented information about the use of such imagery to track changes in land use. See:

<http://www.lternet.edu/archives>

http://intranet.lternet.edu/archives/documents/Newsletters/NetworkNews/fall02/fall02_pg06.html

http://www.lternet.edu/technology/gfl/gfl2001_jvc_lter_files/frame.html

Participation in the Global Fiducials Program

NSF actively participates in the Global Fiducials Program and the GFWG. Over one hundred sites are under active consideration by NSF for sponsorship. The LTER program sites, as well as several sites in the Polar Regions, are of principal interest. NSF and the LTER Network Office have been working with the GFL at the ASC to verify the scientific goals for the specific sites under consideration. Data collection parameters have been identified for the LTER sites and some of the polar sites, and a request for data collection to proceed was made in late calendar year 2002. Regular data collection to begin populating the data archive will immediately follow verification work. Efforts continue to verify scientific goals and data requirements for the remaining candidate GFP sites that are of interest to NSF.

Surface Heat Budget of the Arctic Ocean (SHEBA)

No new analyses using previously released IDPs have been reported, but researchers continue to use prior products in modeling and interpretational activities.

Jornada LTER

The first study that used literal IDPs of the Jornada LTER site has now been published in a peer-reviewed journal (Goslee, S.C., Havstad, K.M., Schlesinger, W.H., Peters, D.P.C., and Rango, A., *Rate and Pattern of Shrub Invasion Over Six Decades on a Semi-Arid Grassland in New Mexico, USA*, Journal of Arid Environments, 2002).

Dry Valleys Region

An experiment to evaluate glacier front changes over time in the Dry Valleys was begun in 2002 as a partnership between Dr. Andrew Fountain, of Portland State University, and the U.S. Antarctic Resource Center hosted at USGS. The goal is to use IDPs from the archive to fill gaps in time series coverage over the last two decades. Dr. Fountain gained permission in 2002 to work in the [REDACTED] and work began in late calendar 2002. Initial efforts have identified imagery at time intervals appropriate for assessing glacial

change. In 2003, the images identified in the search will be evaluated and exploitation will begin.

Ross Sea Region Penguin Population Study

An experiment to use NTM imagery to develop methods for using commercial high-resolution imagery to estimate populations of penguin colonies is underway. Collections have been made and open source data, including ground truth work, has also been collected. Data will be assessed in calendar 2003 by Dr. Jerry Kooyman of Scripps Institution of Oceanography in collaboration with Richard Sanchez of USGS.

Data Acquisition and Management

The USGS ASC staff handles requests from all CAC agencies for the acquisition of national imaging systems data. The team provides expertise for acquiring, receiving, archiving, and disseminating data in support of a wide variety of scientific investigations and mapping projects with unique requirements. Government and contractor personnel work together with customers to analyze these requirements, plan and coordinate support for submitting data requests, and acquire approval from appropriate authorities. Archive searches are also performed to locate existing data sources to meet project needs in addition to initiating new data collections. Upon receipt of data, USGS specialists perform a quality assessment to ensure that requirements are met, archive the data, and deliver a copy of the data to the requestor.

The GFL is also managed and operated by staff at the ASC. As with other operations, this includes defining the sites and determining collection requirements in coordination with the CAC sponsoring agency, DIR generation, tasking and acquisition of data, archiving of data, and dissemination to library users. During the last quarter of 2002, the library system was upgraded to support Enhanced Imagery Systems data formats. Program issues are worked in coordination with the GFWG as a means for communicating with the GFL user community

CAC Departmental Requirements Office

The [REDACTED]

[REDACTED] Their presence increases visibility and facilitates the communication of civilian community needs. The presence of USGS staff representing the CAC community at meetings in which imagery acquisitions are adjudicated provides opportunities to further explain and defend CAC agency collection needs. Regular participation in the Domestic Requirements Working Group is particularly important because most CAC requirements fall within the U.S. and its territories. Daily interaction with other Departmental Requirements Officers and specialized teams facilitates solving problems with imagery collections, production, and distribution while increasing awareness and knowledge of USGS staff. This improved coordination with other members of the imagery community results in higher success rates for competing and obtaining source on a non-interference basis with other agency requirements.