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Civil Applications Committee

2005

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 Commerce (DOC), Department of the Interior (DOI), Department of Transportation (DOT), Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), Department of Health and Human Services (HHS), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), U.S. Coast Guard (USCG), U.S. Army Corps of Engineers (USACE), and the U.S. Department of Agriculture (USDA). Additional non-voting associate members of the CAC include representatives of the Office of the Director of National Intelligence (DNI), Defense Intelligence Agency (DIA), Department of Energy (DOE), Department of State (DOS), National Geospatial-Intelligence Agency (NGA), and National Reconnaissance Office (NRO).

Functions and Responsibilities

Functionally the CAC is composed of a technical and coordinating committee – chaired by the Director of the USGS – that meets monthly; an Executive Steering Group – chaired by the Deputy Secretary of the Interior – that meets as necessary, 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. In addition, the CAC sponsors the Emergency Response Working Group (ERWG), Imagery Derived Products Working Group (IDPWG), Requirements Working Group (RWG), Security Working Group (SWG), and Thermal Event Sensing Working Group (TESWG) on an ad-hoc basis.

Primary CAC responsibilities are: facilitating the relationship between the Civil Community, the Department of Defense (DOD), and the Intelligence Community (IC); providing oversight of all Civil Community source collection and management; supporting National disaster response; representing and advocating civil requirements and interests in various DOD and IC forums; providing an inter-community forum for technology and information exchange; coordinating training for CAC member agency personnel; providing oversight for the Global Fiducials Program; promoting civil use of Imagery Derived Products (IDPs); and ensuring Civil Community needs are considered and addressed in the design of future space architectures.

The CAC provides a forum through which 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.

Data Acquisition and Management

Through the National Civil Applications Program (NCAP), the USGS Eastern Geographic Science Center staff at the ASC assists CAC member agencies by processing requests for the acquisition of National 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 to the requestor.

Collection managers at the ASC also serve as Departmental Requirements Officers for the Civil Community. 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. 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.

The Global Fiducials Library (GFL) is managed at the ASC. Classified remotely sensed data is collected on a regular basis for sites selected for their significance in long-term studies on environmental processes and change. The ASC staff works with the CAC sponsoring agencies to define new site information and determine collection requirements. Tasking and acquisition of data, archiving, and dissemination services are provided for library users. The imagery and associated imagery derived products are used to support current agency programs while also being stored for future use by the scientific community. Program issues are worked in coordination with the GFWG as a means for communicating with the GFL user community.

CAC Highlights

American Society of Photogrammetry and Remote Sensing (ASPRS) Classified Session

The CAC IDP and Training Coordinator, Mr. Ben Ramey, served as the co-chair of a classified session held March 8, 2005 at the Bethesda, Maryland Headquarters of the National Geospatial-Intelligence Agency, as part of the ASPRS annual conference, which was held in Baltimore, Maryland. The session included presenters from the Department of Defense, Intelligence, and Civil Communities, as well as from the private sector, and focused on applications of National Systems data and technology. The Civil Community provided five presentations: (1) *Civil Community Capabilities Requirement Document*, by Mr. Thomas Duke of the CAC Secretariat;

(2) *Civil Applications Committee Thermal Event Sensing Working Group*, by Mr. Paul Greenfield of the USDA Forest Service and Mr. Ed Harne of the Bureau of Land Management; (3) *Supporting Alaska Forest Inventory and Analysis (FLA) Field Inventory with NTM*, by Mr. Jan Johnson of the USDA Forest Service; (4) [REDACTED], by Mr. Everett Hinkley of the USDA Forest Service, and (5) *Louisiana Wetlands Monitoring – Atchafalaya Delta Project*, by Dr. James Thomas of the National Oceanic and Atmospheric Administration (NOAA). An estimated 85 people attended the session.

CAC Membership

In September 2004, the CAC Chairman sent a letter to Secretary Ridge formally inviting the Department of Homeland Security (DHS) to become a member of the CAC and CAC Executive Steering Group (ESG). This action was a follow-up to prior discussions with the office of the DHS Geospatial Information Officer regarding the possibility of DHS petitioning the CAC for membership. Though DHS was established in 2002, the U.S. Coast Guard and the Federal Emergency Management Agency have continued to maintain membership in the CAC as individual agencies pending a decision at the departmental level regarding broader DHS membership. As of December 31, 2005, a DHS response was still pending.

In 2002, CAC representatives assigned from the DOT and HHS were absorbed into the new Department of Homeland Security. In October of 2004, the CAC Chairman sent letters to the Secretaries of Transportation and Health and Human Services requesting identification of new primary and alternate representatives to the CAC and ESG. HHS responded by designating a new representative to the CAC. As of December 31, 2005, a response from DOT was still pending.

Blue Ribbon Independent CAC Review

The CAC Blue Ribbon Study was jointly sponsored by Dr. P. Patrick Leahy, Chairman, Civil Applications Committee and Acting Director of the USGS, and Mary Margaret Graham, Deputy Director of National Intelligence for Collection, to review the processes by which the Intelligence Community supports civil/domestic users, and to assess the appropriate future role of the CAC.

The study was conducted under a contract jointly funded by the Office of the DNI, USGS, and NOAA, and awarded to Booz Allen Hamilton (BAH). The study comprised an Independent Study Group (ISG) of non-government experts, and a Senior Steering Group (SSG) composed of key government stakeholders.

ISG membership included: Keith Hall, Chair, Vice President of BAH, and former Director of the NRO; LTG Edward Anderson (U.S. Army, Ret), BAH, former Deputy Commander, US Northern Command; Jeff Baxter, Independent Consultant, who served as special advisor to Congressional Committees, law enforcement and national agencies; Thomas Conroy, Northrop Grumman/TASC, former senior executive within the Central Intelligence Agency (CIA) and the NRO; Dr. Paul Gilman, Oak Ridge Center for Advanced Studies, former Assistant Administrator for the Office of Research and Development within EPA; LTG Patrick Hughes (U.S. Army, Ret), Vice President of Homeland Security for L3 Communications and former Assistant Secretary for Information Analysis at DHS; Kemper Lear, BAH, former policy analyst at NSA; Kevin O'Connell, Director of the Center for Intelligence Research and Analysis, and former

Director of RAND's Intelligence Policy Center; and Joseph Whitley, Alston & Bird, former General Counsel of DHS.

The ISG explored current and potential applications of Intelligence Community capabilities by domestic users, and focused on the processes by which the support is accomplished. The ISG heard from a wide variety of civil, law enforcement and homeland security government organizations to understand both needs for remote sensing and experience with Intelligence Community capabilities.

The ISG completed its work in August 2005, and presented its findings and recommendations to the Study Co-Chairs and the SSG in September 2005. Since September 2005, a number of senior administration officials have been briefed on the findings and recommendations in an effort to assess support for implementation. A final decision on implementation is expected early in FY 2006.

CAC Executive Steering Group (ESG)

No meetings were held during 2005.

Disaster Response

During 2005, CAC members requested imagery in support of the following events:

Name/Location	Type	Date
[REDACTED]	Earthquake/Flood	Jan
National Petroleum Reserve North Slope Test Well Damage Threat	Coastal Hazard	Feb
Hurricane Dennis	Hurricane	Jul
[REDACTED]	Volcano	Aug
Hurricane Katrina	Hurricane	Sep
Hurricane Rita	Hurricane	Sep
Hurricane Wilma	Hurricane	Oct
[REDACTED]	Volcano	Oct
Anatahan Volcano, Mariana Islands	Volcano	Nov
[REDACTED]	Landslide	Dec
Mount Augustine Volcano, Alaska	Volcano	Dec
[REDACTED]	Volcano	Dec
Mount Spurr Volcano, Alaska	Volcano	Dec
[REDACTED]	Volcano	Dec

Participation in External Forums

During 2005, the CAC participated in the following external forums to represent civil interests and advocate for civil requirements:

- [Classified Session of the annual] American Society of Photogrammetry and Remote Sensing (ASPRS) Meeting
- Domestic Requirements Working Group (DRWG)
- Future Needs Working Group (FNWG)
- Geospatial Intelligence Board (GIB)

- Imagery Policy and Security Committee (IPSCOM)
- [Third Annual] Measurement and Signatures Intelligence (MASINT) Conference, Panel on Civil Applications of MASINT
- Mission Requirements Board (MRB)
- National Security Space Office (NSSO) Environmental Working Group
- INSAR (Interferometric Synthetic Aperture Radar) Program Review
- Operations Committee (OPSCOM)
- Space Radar Program Review
- Space Radar Requirements Coordination Group
- USGS National Civil Applications Program (NCAP) FY05 Program Review

Document Reviews

The CAC Secretariat is routinely called upon to facilitate Civil Community review of various policy and technical requirements, and advanced systems concept documents generated by DOD and IC organizations. The nature of the reviews is to ensure inclusion of Civil Community requirements, identify opportunities for technology and information exchange, and ensure that new or revised policies do not compromise civil use of National Systems data. When possible, the CAC Secretariat solicits review and comment by the CAC membership; occasionally however, due to prohibitively short deadlines for review and comment, the CAC Secretariat is unable to solicit member inputs. During 2005, the following documents were reviewed (**Only documents with unclassified titles are referenced**):

- (U) USGS National Civil Applications Program FY05 Program Review Final Report
- (U//FOUO) Intelligence Community's Multi-Intelligence Acquisition Program (IC MAP) Enterprise Roadmap
- (U//FOUO) CAC Blue Ribbon Study Terms of Reference (TOR)
- (U//FOUO) Intelligence Community's Multi-Intelligence Acquisition Program (IC MAP) Analyzed User Requirements Focus Group Comments
- (U//FOUO) Space Radar (SR) Program Memorandum of Understanding
- (U//FOUO) Initial Capabilities Document for Space Radar (SR) Program
- (U) Capabilities Development Document (CDD) for GeoScout Block 2
- (U) Joint Spectral Initial Capabilities Document (ICD)
- (U) National System for Geospatial-Intelligence (NSG) Strategic Concept of Operations (CONOPS) for 2015 (Draft)
- (U) Draft Joint Capabilities Document (JCD) For Geospatial-Intelligence (GEOINT) 2010-2020
- (U//FOUO) CAC Blue Ribbon Study Final Report

Outreach

Due to strong emphasis on the CAC Blue Ribbon Study during 2005, outreach activities were scaled back to redirect CAC Secretariat resources to support of the study. Although a new working group was proposed to develop an annual and long term plan for expanded committee outreach activities, a conscious decision was made to forego implementation of the group pending the outcome of the Blue Ribbon Study. The Secretariat conducted the following outreach briefings during 2005:

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February 11 – Congressman Curt Weldon (R-PA) and staff for various Senate and House of Representatives members, Rayburn House Office Building (CAC Overview, CAC support to disaster response)

February 23 – Mr. John Palatiello, Chief Executive Officer for the Management Association for Private Photogrammetric Surveyors (CAC support to disasters)

April 12 – Mr. Charlie Allen, Assistant Director for Central Intelligence for Collections with Dr. Charles Groat, Director USGS and Chairman, CAC (CAC Blue Ribbon Study)

April 13 – Dr. Earnest Paylor, Office of the Secretary of Defense (CAC support to the Pacific Disaster Center)

May 2 – Mr. Craig Chellis, Director of Operations, Pacific Disaster Center (civil utility of Space Radar)

July 25 – Mr. Josh Filler, Director for State and Local Support, Department of Homeland Security (CAC Briefing)

August 10 – Mr. Hal Hagameir, Deputy Director, National Security Space Office (CAC support to NSSO activities)

October 4 – Mr. Alan W. Voss, Tennessee Valley Authority (CAC briefing and discussion of potential for future participation in the CAC)

[REDACTED]

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

[REDACTED]:

- [REDACTED]
- [REDACTED]

CAC 2005 Monthly Meetings and Briefing Topics

Jan	Improving Response Capabilities	Curt Weldon
	Advanced Systems Center Future Imagery Architecture (FIA) Planning	Teresa Dean
	Mt. St. Helens Update	Roz Helz
	Thermal Event Sensing Working Group (TESWG) Status Update	Paul Greenfield
	NASA Science and Space Systems Benefiting the Wildfire Community	Ron Birk
	[REDACTED]	Michelle Herman
Feb	Customer Service Interview Summary	Liz Queipo
	Operational Security (OPSEC)	Mark Smith
	USGS Commercial Satellite Data Contracts, Access, and Capabilities	Mike Duncan
Mar	[REDACTED] Program Overview and Update	Ralph Baker
	Naval Research Laboratory's Geospatial Information Database (GIDB) Portal System	Kevin Shaw
Apr	[REDACTED]	Gina Otto
	Uses of Imagery within the USCG Port Geographic Information System (GIS) Architecture	Ned Mamula
	Spectral Exploitation Project	Stan Grossman
	Spatial Technologies	David Smith and Brian Van Pay
May	Economic and Environmental Security	John McGrew
	EPA Remote Sensing Activities	Terry Slonecker
	Commercial Source Imagery Library (CSIL) to Unclassified National Imagery Library (UNIL) Transition	Tom Millman
	Commercial Remote Sensing Licensing	Kemp Lear
	Digital Globe's Next Generation System: Worldview	Dennis Jones
Jun	Offsite Meeting at U.S. Army Corps of Engineers Topographic Engineering Center	
Jul	No Meeting	
Aug	Agriculture Threats	John Williams
	Acquired Immune Deficiency Syndrome (AIDS) Mapping	Chris Price
	Remote Sensing Applications for Infectious Disease	David Hartley
	National Signatures Program	Ron Fleming

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Aug	Systems Upgrade Briefing Part 1	Norm Miller
	Systems Upgrade Briefing Part 2	Keith Wargel

Sep	Space Radar (SR) Program	Linda Wolters
	Interferometric Synthetic Aperture Radar (InSAR) Program	Rolando Amuedo
	Water: An Emerging Challenge for U.S. Security Policy	Jan Hren and Ward Staubit
	Airborne Real-Time Cueing Hyperspectral Enhanced Recon (ARCHER) Program	Drew Alexa

Oct	No Meeting Due to Scheduled Blue Ribbon Panel Senior Steering Group Meeting	
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Nov	Arctic Man	John Payne
	Applied Fluorescence Remote Sensing	John Anderson
	Spectral and Geological Investigations of the Shinkolobwe Uranium Mine, Democratic Republic of the Congo (DROC)	Gerald Arp

Dec	Supporting Alaska Forest Inventory and Analysis (FIA) Field Inventory with National Technical Means (NTM)	Jan Johnson
	USGS Support to U.S. Northern Command (NORTHCOM) and Katrina/Rita Disaster Response	Sherry Durst
	Geospatial Intelligence (GEOINT)	Dave Windmiller
	Landsat Data Continuity Mission Status Update	Ray Byrnes

Working Group Activities

Global Fiducials Working Group

A very successful GFL Cryosphere Workshop was held in June 2004. During 2005, collection parameters were defined and site specific justifications were prepared for many of the locations selected at the workshop. Following entry of this information into the GFL database, test images were examined to ensure that the correct area was identified for each site. Plans were also made to finalize sea ice and permafrost site selection during the later part of 2006.

Emergency Response Working Group

No activity was reported.

Imagery Derived Products Working Group

No activity was reported.

Requirements Working Group

No activity was reported.

Security Working Group

No activity was reported.

Thermal Event Sensing Working Group

In 2005, the Thermal Event Sensing Working group completed a requirement which is now available for the Department of the Interior, Department of Homeland Security – FEMA, and the Department of Agriculture – Forest Service. [REDACTED]

Member Agency Activities

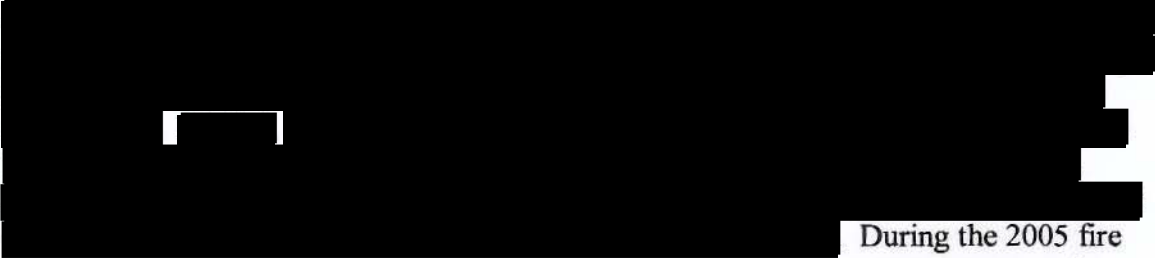
U.S. Department of Agriculture

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 2005 included:

Forest Service

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 accurately reference 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 2005, this technique was used to advantage where control was needed in remote wilderness areas and in the glacier-covered mountains of Alaska, while surveyors obtained control for the accessible portions of the project by traditional methods.

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, control extension work covering approximately 13,000 square miles was completed in 2005, saving field personnel over \$140,000 in surveying costs.

-  During the 2005 fire season, 4.4 million acres were burned in Alaska, the third highest acreage on record.
- **Other Activities** – The Forest Service is directed by Congress to perform a National Forest Inventory and Analysis (FIA) 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 2005, selected sites in Interior Alaska were imaged and statistical information such as forest/non-forest, tree type, health, etc. was derived for 154 new permanent measure plots from those images, and approval was obtained for non-literal IDPs. The products will be used to supplement other plot data collected by field personnel in more accessible locations. With an average cost of \$4,000 per plot in Alaska, this activity saved field personnel over \$600,000 in data collection costs. In addition, all of these plots were in areas that were difficult and/or dangerous to access.

There is interest in testing National Systems data to aid in pest and disease mapping in Michigan where the Emerald Ash Borer is having serious economic impacts.

Department of Commerce

National Geodetic Survey

The National Geodetic Survey's Remote Sensing Division (RSD) is responsible for providing shoreline data in support of NOAA's Nautical Charting Mission and hydrographic survey operations. The opportunity to use National Systems data has been critical in providing timely shoreline data for various areas including ports, shipping channels, and open shoreline in remote areas such as Alaska and the U.S. Territorial Islands. In 2005 RSD requested data for six Alaskan project areas: Keku Strait, Gulf of Esquibel to Bucareli Bay, Krenitzin Islands, Shumagin Islands, Harvard/Yale Glaciers (Prince William Sound), and Sukkwan Narrows. In addition to the Alaskan projects, RSD has requested imagery to support updating shoreline data for many of the islands under the jurisdiction of the Commonwealth of the Northern Mariana Islands (CNMI). Similar to the 2004 American Samoa project (Swains Island), RSD has acquired National Systems data during 2005 for the purpose of upgrading these CNMI large

scale NOAA Nautical Charts. This includes not only providing shoreline data but also updating the positional information of these islands from the older astronomical datums to the current 1984 World Geodetic System (WGS84) datum. The positional shift of these islands when updated often exceed one mile from the original charted position.

Coastal Service Center

NOAA's Coastal Services Center (CSC) used National Technical Means (NTM) data in 2005 to support National Marine Sanctuary (NMS) visitor use. NTM data were acquired for the Gray's Reef NMS, located 20 miles east of the Georgia coast, and the Flower Garden Banks NMS, located off the coasts of Texas and Louisiana. Fifteen IDPs were produced from the NTM imagery. The sanctuaries management and research studies plans 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 Coast Guard Auxiliary flight observations to detect seasonal variations in visitor use.

National Marine Fisheries Service

Dr. James Thomas of the NOAA Fisheries Office of Habitat Conservation presented a series of briefings on the effects of Hurricanes Katrina (August 29, 2005) and Rita (September 24, 2005) on NOAA-sponsored restoration projects undertaken in southern Louisiana under the auspices of the Coastal Wetlands Planning, Protection and Restoration Act. The separate briefings were to: Dr. William Hogarth (NOAA Assistant Administrator for Fisheries), Mary Glackin (NOAA Assistant Administrator for Program Planning and Integration), and Congressman Wayne Gilchrest (Maryland). Nine projects between the Mississippi River Delta and Pecan Island near the Texas-Louisiana border were examined using imagery derived products from before and after the hurricanes. Little to no damage was observed at most projects as a result of the passage of the hurricanes. East Timbalier Island, even though it did continue to function as a barrier island, did lose an estimated 33 hectares between October 2004, and October 2005 (post-Rita). Big Island Mining and the Sediment Delivery Area projects (Atchafalaya River Delta) did lose some floating aquatic vegetation as a result of the hurricanes. However, overall these two projects gained wetlands area (Big Island Mining = 162 ha; Sediment Delivery Area = 154 ha.) since their inception in 1998. The functional integrity of all projects was maintained ensuring that they continued to contribute to the goals of the Coastal Wetlands Planning, Protection and Restoration Act to protect and restore Louisiana wetlands.

Department of Homeland Security

The CAC has invited DHS to become a member, but a response is still pending. FEMA and USCG are long standing members of the CAC and petitioned to remain separate members after the standup of DHS in 2003.

Federal Emergency Management Agency

The FEMA mission, as part of the Department of Homeland Security, is to reduce the loss of life and property while protecting our nation's institutions from all types of hazards, caused either by natural disasters or from terrorist assaults. FEMA accomplishes this task through a comprehensive, risk-based emergency management program of preparedness, prevention, response, and recovery.

Since its creation, FEMA has responded to hundreds of disasters in all 50 states, Puerto Rico, Guam, the Pacific Island Trust Territories, and the U.S. Virgin Islands. FEMA reacts quickly when it becomes clear that a hurricane or other potentially catastrophic disaster is about to occur and equipment, supplies, and people are pre-positioned in areas likely to be affected. In other situations, when disasters such as tornadoes or earthquakes occur without warning, FEMA must respond immediately with staff and supplies, and determine if other federal agencies are required. FEMA will also lead the national response to any sort of biological or radiological attack. FEMA will facilitate and coordinate the involvement of other federal response teams in the event of a major incident or incident of national significance. FEMA also manages the federal government's national response and recovery strategy. While the disaster response phase is quick and dramatic, the recovery phase is often long and painful. Communities and individuals must cope with great loss. In some disasters, entire towns have been virtually destroyed. In others, the community survives but residents lose everything they own. FEMA will lead the nation's recovery from catastrophes and help minimize the suffering and disruption caused by disasters.

During 2005, multiple requests for the use of National Systems data were submitted by FEMA to aid in responding to emergencies and disasters. All events were natural in cause. Extensive wind and water damage resulting from tropical cyclones (typhoons and hurricanes), severe storms and tornadoes required the use of national assets. Derived products from both pre and post event data were quickly disseminated to the entire response community. This included, but was not limited to, FEMA's Urban Search & Rescue Teams, the American Red Cross and Rapid Need Assessment Teams consisting of Federal, State and local first responders. The quality and timeliness of this information provided a sufficient level of confidence on which to base operational decisions which saved lives and protected property.

U.S. Coast Guard

The United States Coast Guard is a military, multi-mission, maritime service and one of the nation's five Armed Services. Its mission is to protect the public, the environment, and U.S. economic interests in the nation's ports and waterways, along the coast, on international waters, or in any maritime region as required to support national security. The Coast Guard's five operating goals – Maritime Safety, Protection of Natural Resources, Maritime 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 Coast Guard missions, including emergency response and maritime security. Some of these benefits are described below:

- **Search and Rescue** – The U.S. Coast Guard is best known worldwide for its search and rescue (SAR) expertise, which dates back more than 200 years to the earliest days of the Revenue Cutter Service and Life-Saving Service. Despite the nation's best efforts to prevent maritime accidents, the Coast Guard responds to about 60,000 emergency calls

and saves nearly 5,000 lives annually. Historically, the Coast Guard's SAR response involves multi-mission stations, cutters (ships), aircraft, and boats linked by communications networks. The National SAR Plan divides the U.S. into regions, with the Coast Guard acting as the maritime SAR coordinator. To meet this responsibility, the Coast Guard maintains facilities on the East, West and Gulf coasts; in Alaska, Hawaii, Guam, and Puerto Rico; and on the Great Lakes and inland U.S. waterways. Today, the Coast Guard Intelligence Coordination Center (ICC) often augments SAR response efforts with National Systems, as appropriate, to refine large search areas for quicker response times to help prevent loss of life at sea. For hurricanes Katrina, Ophelia, Rita and Wilma, the ICC submitted 14 imagery collection requirements from August 30 to October 19, 2005.


- **Maritime Port Security** – Worldwide, maritime cargoes and vessels are increasingly targeted by organized criminal conspiracies or individuals involved in alien smuggling, cargo theft, drug smuggling and terrorism. Exploiting weaknesses in port security is central to these crimes. The associated costs reduce the competitiveness of those affected, including the ports. So long as threats to trade exist, port security will remain as essential to port operations as cargo and good labor relations. Traditional views of port security responsibilities must be expanded. A complex transnational set of security issues threaten the maritime industry and the movement of cargo in international trade. Those threats include terrorism, piracy, smuggling of stowaways and drugs, cargo theft and fraud, bribery, and extortion. Sea robbery provides an excellent example of the complexity of port security issues. The nature of sea robbery necessitates that port security controls include both the waterside and the land side access of ports. The use of National imagery plays a vital role in ICC 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.

Department of the Interior

Bureau of Land Management

BLM is responsible for managing 164 million acres of public land, primarily in the West and Alaska. BLM has used National Systems data as one of its natural resource mapping and assessment tools since 1994. Starting with mapping wetlands, BLM use of National Systems data expanded to support other activities. However, in recent years some traditional uses of this data, such as hydrographic meander line mapping, has diminished as commercial high-resolution satellite imagery has become available. Unfortunately, commercial high-resolution satellites cannot fully match all the capabilities of National Systems data, and the Bureau continues to exploit the unique capabilities provided by these high tech tools. Below is a summary of major BLM activities involving the use of National Systems data in 2005.

- [REDACTED]

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- **Bering Glacier** – BLM has used National Systems data to monitor the environment around the Bering Glacier for over eight years. The objectives of these activities include; a) delineate and monitor glacier forelands and ice margins, b) monitor beach side and ice erosion, c) identify and assess existing and potential anadromous fish habitat, d) identify Dusky Canada Geese habitat, e) monitor and assess seal populations, and f) assess hazards for recreation and transportation. As a result of these activities, BLM, along with the USGS, and with input from the Intelligence Community, has developed procedures and techniques to accurately map and measure subtle changes and movement of earth and ice masses. National Systems data have played an important role in enabling BLM to understand and monitor this unique environment. Ablation measurements using NTM are currently being validated with on-the-ground measurements. National Systems continue to be an important source of information for the Bering Glacier monitoring program since weather poses significant obstacles to commercial platforms and/or human validation. Currently this is the only valid source of acquiring clear definition of ice margins. In addition, the Global Fiducials Program continues to archive seasonal information on the Bering Glacier.
 - **Beaufort Sea Coast/ J.W. Dalton No. 1** – Coastal erosion on the Beaufort Sea coast has accelerated in recent years to the point where the BLM is taking remedial action on the J.W. Dalton No. 1 well to prevent a release of hazardous materials. Historical National Resource information was reviewed to determine the extent and rate of erosion along the Beaufort Sea coast. The coastline had observable shoreline erosion with the J.W. Dalton well posing a significant hazard. Historical NTM also provided information regarding the extent of the ice pack and its relationship to the change in shoreline conditions. In years where the ice pack had significantly receded, shoreline erosion increased significantly. Recently, IDPs depicting the rates and extent of erosion along the Beaufort Sea coast were used to brief the Assistant Secretary of Interior for Lands & Minerals Management in order to secure funding for the J.W. Dalton well clean-up and protection effort.
 - **National Petroleum Reserve-Alaska** – The National Petroleum Reserve-Alaska (NPR-A) is an Indiana-sized area on the North Slope of Alaska that is the center of increasing interest for the production of oil and natural gas. Numerous leases have been issued for exploratory drilling and more are slated for sale. Although new drilling technology minimizes the impact on the environment, this delicate ecosystem requires continued monitoring to evaluate the effectiveness of our environmental policies. National Systems data provide unique capabilities for year-round environmental monitoring and are important tools that allow BLM to validate the guidance it provides to oil and gas companies. North Slope: Prior to development within the National Petroleum Reserve-

Alaska (NPRA), BLM Alaska has been collecting baseline information on several sites using the only reliable source: NTM. These sites are proposed for oil and infrastructure with construction scheduled for the winter of 2006-2007. Ground validation of vegetation is planned for the summer of 2006. BLM is also investigating the use of NTM for hydrology research within NPRA. Global Fiducials Program currently has the largest DSA for seasonal monitoring the area northeast of Teshukpuk Lake in NPRA.

- **Arctic Man** – BLM utilized National Resources to monitor the Trans-Alaska Pipeline (TAP) access utilization by approximately 13,000 Arctic Man spectators. Access to this unique Alaskan event is along the TAP and the potential for damage to the pipeline is significantly increased during the event. The area of the race is some of the best snow machine riding country in the world and is also critical winter habitat for the Alaska Moose. National Resources were used to determine movements of moose populations in relation to snow machine activity, and determine relative use patterns by snow machines prior, during and after the Arctic Man event. No other platform had a repeat cycle to compare use on BLM lands and adjacent TAPS. We obtained a commercial image on April 8, 2005 to utilize as a base for comparison.
- **Lake Havasu Boat Census** – National Resources were utilized during the 2005 summer vacation season to obtain information regarding the number of boats on Lake Havasu, AZ. Extensive visitor use information is available for the 105 shoreline camps along the Arizona side of Lake Havasu, from Lake Havasu City south to the Parker Dam. However, there was no quantifiable information available for the number of boats on the 19,100 acre lake at peak use periods during the intense use days of the summer Holidays. Information was obtained for July 4th and Labor Day as well as a non-holiday period. Boat census statistics and GIS point files will be utilized by BLM recreation, fisheries and natural resource managers in the area.

U.S. Geological Survey

Activities are ongoing to enhance and replace key infrastructure components at the ASC. Legacy systems have been operational for 6-8 years and must be updated to remain compatible with changing community architectures and to ensure continued operation. The major secure communications components were upgraded in November 2005. The data receipt and archive systems (Dissemination Element and Primary Product Server) are scheduled for replacement with an Image Product Library (IPL) in January 2006.

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The USGS Volcano Hazards Program, in collaboration with the ASC, made important use of National Systems data in support of program activities at domestic volcanoes, as well as worldwide volcanoes of interest to the Volcano Disaster Assistance Program. Principal activities in 2005 include:

- Continue to provide information to the Volcano Hazards Program response to the ongoing eruption at Mt. St. Helens, Washington and at Anatahan Volcano, in the Commonwealth of the Northern Mariana Islands. These eruptions have been progressing for several years and remain in an eruptive state today. At the end of 2005, support was provided on the impending eruption of Augustine Volcano, Alaska. All of these

volcanoes pose a health and safety hazard to the surrounding areas.

- Generate literal image derived products for Frosty Peak, Dutton, Chiginagak, and Peulik Volcanoes in the Aleutian Islands, Alaska. These are broad-area products used in mapping geologic features and hazard assessments.

In addition, several other U.S. volcanoes were periodically monitored: Gareloi and Tanaga (seismic burst); Cleveland and Shishaldin (steaming and ash plume); Korovin (steaming and new summit lake); Mt. Spurr and Chiginagak (summit lake), all in Alaska. Several foreign volcanoes were also monitored: Galeras, Colombia (seismic activity); Tungurahau, Ecuador and Colima, Mexico (continuous eruption); Santa Ana, El Salvador (ash eruption).

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The USGS Landslide Hazard Program used National Systems data to assess the result of a large landslide caused by a magnitude 7.6 earthquake in Northern Pakistan in late 2005. The landslide formed two lakes that – if there is a catastrophic failure of the dam – could cause a massive flood in an area already damaged by the earthquake. Stereo data generated a digital elevation model (DEM) of the slide and surrounding area to be used in a flood potential model.

The USGS also provided support to a project identifying natural resources potential in Afghanistan. The data was used to generate a DEM that will be used in mapping, hydrologic studies, and geologic and minerals assessments.

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At the USGS Rocky Mountain Geographic Science Center (RMGSC) in Denver, a Memorandum of Understanding (MOU) between USGS and U.S. Air Force Space Command (AFSPC) Headquarters was signed in January 2005. The purpose of the MOU is to develop policies to facilitate cooperation and coordination between AFSPC and USGS in the development of regional geographic information data sets for the purpose of sharing of mapping information between AFSPC and military installations and various city, county, state, tribal and federal agencies. Similarly, USNORTHCOM and USGS established a Memorandum of Agreement, which was signed by Bernd "Bear" McConnell, Interagency Coordination Director, and Tom Casadevall, Central Regional Director for USGS.

Notable accomplishments at the RMGSC in support of scientific efforts within the civil community include:

- **Glacier Monitoring** – Investigations were performed to enhance the current methodology to generate auto-correlated elevation models using softcopy photogrammetric hardware and software with NTM data. Snow/ice classifications were performed to more accurately map the extent of snow/ice coverage on South Cascade Glacier for more accurate ice volume calculations. Three dimensional perspectives and shaded relief views were also generated and delivered to aid in the analysis. Methodologies were also investigated and tested for image to image registration before IDP generation using multiple NTM imagery of the South Cascade Glacier.
- **Extension and Enhancement of the Sea Ice Melt Study** – Analysis of melt ponds was performed on five sites from data collected in 2002. All 2002 imagery was organized and

cataloged and processed depending on the amount of cloud cover and image anomalies. As a result, over fifty literal IDPs were generated for processing. Enhanced image processing methodologies for generating the melt pond statistics were investigated as well.

- **Fort Irwin IDPs** – New methodologies were investigated, developed and implemented using MET technology to generate literal IDPs. A total of 40 literal IDPs were released on March 1, 2006 to support a digital update of the NGA 1:50,000-scale map series over Fort Irwin, California. This resulted in the development of new methodologies to ingest mapping, charting, and geodesy (MC&G) data into MET to generate literal IDPs.

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Work continued at the Washington Water Science Center in Tacoma on the Ice and Climate Project. Glaciers around the world are retreating. With support from the CAC, the Ice and Climate Project used observations from National Systems to expand its glacier monitoring program in the Northwest U.S. and Alaska. In the North Cascade Range of Washington, seasonal observations from 10 glaciers, acquired at the time of maximum snow accumulation and at the end of the ablation season, are being used to determine glacier wastage and its subsequent hydrologic impact, particularly the contribution to late summer flow. For Glacier National Park, Montana, observations of 14 glaciers at the end of the ablation season show continuing glacial retreat. In Alaska, observations of the 2 glaciers that are part of the USGS Glacier Monitoring program are used to supplement field measurements. A cooperative program with the Alaska office of the Bureau of Land Management extensively uses National Systems to monitor the rapid wastage of Bering Glacier, the largest glacier in Alaska. The project has produced a variety of IDPs, including digital elevation models, and literal products used to map terminus positions, determine ablation rates, and estimate glacier velocities.

U.S. Army Corps of Engineers

The USACE Topographic Engineering Center (TEC) participated in the Global Fiducials Program/Working Group during 2005. The USACE GFWG Working Group representative attended the Working Group meetings held in January and March; discussions this year focused on Phase 1 collections and GFL Workshops to solicit researchers' and scientists' expertise on additional worldwide sites in various eco-regions; USACE forwarded to the GFWG Chairman a list of names with Desert Region expertise. The USACE sites for Phase 1 collection were on a collection schedule as of April 2005 and later reported as complete; the 1999 validations stand. Additionally, TEC produced 63 urban terrain IDPs in CY2005.

U.S. Environmental Protection Agency

The EPA continued to use National Systems data to support environmental research applications. The EPA's Environmental Photographic Interpretation Center (EPIC) is the Agency's lead for exploitation and analysis of National Systems data and continued to provide scientific expertise to EPA customers and assistance to other civil and IC agencies. EPA, through the leadership of the CAC, utilized National Systems for the following projects:

- **Accuracy Assessment** – EPA continued its collaborative accuracy assessment of land use and land cover change, derived from 1990 and 2000 National Land Cover Data (NLCD). Working with USGS personnel under an Interagency Agreement with EPA,

several hundred points were evaluated and accuracy statistics provided. In addition, research and training on the use of Classification and Regression Tree (CART) technology for land cover mapping was conducted.

- **Global Fiducials Program** – EPA continued to be an active participant in the GFP, providing over 30 sponsored sites to the program. EPA assisted in the planning of scientific workshops for the peer-review of current and future sites in the program.
- **Other IC Community Involvement** – EPA has taken advantage of several educational opportunities within the IC by attending classes in data processing and information technologies.
- **Advanced Measurement Initiative** – In collaboration with the CIA, EPA applied for and won an EPA Advanced Measurement Initiative (AMI) proposal for the “Automated Ortho-rectification of Historical Imagery.”
- **Disaster Response** – EPA/EPIC provided significant imagery support to the emergency response efforts for Hurricanes Katrina, Rita and Wilma, which included the utilization of CAC resources. Analytical products were created to assist EPA’s On-scene Coordinators in identifying hazardous leaks at petroleum refineries and chemical plants.
- **Research Presentation** – During the May CAC meeting, Terry Slonecker provided a briefing to the CAC on current remote sensing research activities in the EPA and on areas where interagency/CAC collaboration might be possible.
- **Additional Accredited Site** – The EPA research center in Research Triangle Park, North Carolina, received collateral secret accreditation for processing NTM data. Current activities are limited to data visualization and analysis. As of yet, the facility is not approved for IDP production.

National Science Foundation

NSF continues to participate in the GFP and the GFWG. Over one hundred sites are under active consideration by NSF for sponsorship. The 26 LTER program field sites, which include two in the Antarctic and one in the Arctic, are of principal interest and are active. Following a joint USGS/NSF workshop in June 2004 which defined the scientific goals for Phase 2 sites related to glaciers and ice sheets, progress has been made on collection parameters and some sites have been activated. A recommendation from this workshop was to gather separate experts to define the scientific rationale for sites in permafrost. NSF and USGS have developed plans for this second workshop and anticipate that it will be held at the USGS National Center in Reston, Virginia, in May 2006.

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