

Survey of US Federal Government Departments
And
Academic Institutions that Perform Archival services
Or collect satellite imagery data products.

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Introduction

As was discussed at the AACIII meeting in Ottawa, October 18-20, 2005 Darrel Williams and David Brown volunteered to identify those US academic institutions and federal government agencies that provide archival services or access to satellite imagery, or other types of geospatial data products. Although various companies acquire, archive and distribute satellite imagery data, they were not included as part of this survey. Information from the survey may be used in future discussions by the Committee to help it make decisions about the scope and mandate of the NSLRSDA data archive.

This document provides initial results that were compiled by conducting research via the Internet and by contacting specific agencies that were identified by John Faundeen. The list of agencies and academic institutions that appear here are not to be considered exhaustive, but only represent a preliminary list that may be expanded upon.

In many instances, it was very difficult to discern whether an institution is developing and maintaining a data archive for satellite imagery, or related geospatial data products, from an analysis of the information that appears on each institution's Internet site. In these instances, the institution was contacted for further information with varying results – i.e., there were no responses.

It should be noted that the US National Archives and Records Administration has delegated its archival authority to only one federal government department that maintains an archive for satellite imagery. That department is the *National Oceanic & Atmospheric Administration, National Climate Data Center*. Although NARA has not formally delegated its archival authority to NSLRSDA, it would appear as though the NSLRSDA archive is the only federal government data archive that has been endorsed through the legislative process.

Library and Archives Canada provided the services of a research assistant, Elizabeth Doyle, to help conduct the survey.

US Federal Government Agencies

A. United States Department of Agriculture (USDA): Imagery Archive

<http://www.fas.usda.gov/pecad/remote.html>

The Foreign Agricultural Service serves as the repository and manager of the USDA Satellite Imagery Archive. Access is available to USDA subscribers only. The USDA Imagery Archive is the repository for all acquired USDA satellite imagery. The Archive was established in 2001 as a cost-sharing agreement among the various subscribers.

B. United States Geological Survey (USGS)

1. Earth Resources Observation & Science (EROS) Data Center

<http://edc.usgs.gov/>

The U.S. Geological Survey (USGS) Earth Resources Observation Systems (EROS) Data Center is the national archive of remotely sensed images of the Earth's land surface. These data are acquired by civilian satellites and aircraft and used to study a wide range of natural hazards, global environmental change, and economic development and conservation issues. The archive also is a leading source of aerial, map, elevation and land cover data and related information that have been collected by the USGS and other sources. The USGS EROS Data Center has been archiving, managing, and distributing land remote sensing data and other Earth surface data for more than 30 years.

1.1 National Satellite Land Remote Sensing Data Archives (NSLRSDA)

<http://edc.usgs.gov/archive/nslrda/overview.html>

In 1992, ***Congress directed the Department of the Interior to establish a permanent Government archive containing satellite remote sensing data*** of the Earth's land surface -- and to make these data easily accessible and readily available for study. Residing in the U.S. Geological Survey's (USGS) EROS Data Center, this collection of information is known legally as the National Satellite Land Remote Sensing Data Archive (NSLRSDA).

Over the past three decades the Nation has acquired data from the Landsat series of satellites which are held at the EROS Data Center as part of the NSLRSDA archive. This collection includes imagery from Landsats 1 through 5 and 7, including data from the Thematic Mapper (TM), Multispectral Scanner (MSS) and the Enhanced Thematic Mapper Plus (ETM+) sensors. Landsat GeoCover data are also included.

In addition, the archive includes data captured from the Advanced Very High Resolution Radiometer (AVHRR) carried aboard National Oceanic Atmospheric Administration's polar orbiting weather satellites, more than 1,000,000 declassified intelligence satellite photographs, data from CNES's SPOT instrument, and the Shuttle Radar Topography Mission (SRTM) data.

2. National Geospatial Program Office

<http://www.usgs.gov/ngpo/>

The USGS Director has realigned the geospatial programs for which the USGS has a leadership responsibility into a National Geospatial Programs Office (NGPO) to serve the needs and interests of the geospatial community. This realignment brings *The National Map, Geospatial One-Stop, and the Federal Geographic Data Committee* into a single program office.

The National Map provides public access to high-quality, geospatial data and information from a consortium of Federal, State, and local partners to enhance America's ability to access, integrate, and apply geospatial data at global, national, and local scales.

The Federal Geographic Data Committee (FGDC) is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis through a data publishing effort known as the National Spatial Data Infrastructure (NSDI). Geospatial One-Stop provides access to federal, state and local geographic data through a portal service.

C. National Aeronautics and Space Administration (NASA): Distributed Active Archive Centers (DAAC)

The NASA DAACs serve as the operational data management and user services arm of NASA's Earth Observing System Data and Information System (EOSDIS). The data centers process, archive, document, and distribute data from NASA's past and current Earth-observing satellites and field measurement programs. Each center serves a specific Earth system science discipline.

NASA Earth Science Data Centers include:

1. Land Processes (LP) - DAAC

<http://lpdaac.usgs.gov/main.asp>

The Land Processes Distributed Active Archive Center (LP DAAC) was established as part of NASA's Earth Observing System (EOS) Data and Information System (EOSDIS) initiative to process, archive, and distribute land-related data collected by EOS sensors, thereby promoting the inter-disciplinary study and understanding of the integrated Earth system.

The role of the LP DAAC includes the higher-level processing and distribution of ASTER data, and the distribution of MODIS land products derived from data acquired by the Terra and Aqua satellites. The LPDAAC is located at the USGS's Earth Resources Observation Systems (EROS) Data Center.

2. Alaska Satellite Facility (ASF) - DAAC

<http://www.asf.alaska.edu/>

The Alaska Satellite Facility, located in the Geophysical Institute at the University of Alaska Fairbanks, downlinks, processes, archives, and distributes SAR data from the European Space Agency's ERS-1 and ERS-2 satellites, NASDA's JERS-1 satellite, and the Canadian Space Agency's RADARSAT-1 satellite.

3. Goddard Earth Sciences (GES), Data and Information Services - DAAC

<http://daac.gsfc.nasa.gov/>

The Goddard Earth Sciences (GES) Data and Information Services Center (DISC) is the home of the GES Distributed Active Archive Center (DAAC). It is one of eight NASA Science Mission Directorate (SMD) DAACs that offer Earth science data, information, and services to research scientists, applications scientists, applications users, and students. The GES DISC is the home (archive) of Precipitation, Atmospheric Chemistry and Dynamics as well as data and information from other related disciplines. The GES DISC is located at Goddard Space Flight Center, in Greenbelt, Maryland.

The following is a list of data related services that the Center provides to its users to help them get the most out of our data resources.

- Giovanni online, interactive data analysis
- OPeNDAP
- Near archive data mining
- On-Demand subsetting

4. Global Hydrology Resource Center (GHRC) - DAAC

<http://ghrc.msfc.nasa.gov/>

The Global Hydrology Resource Center (GHRC) provides both historical and current Earth science data, information, and products from satellite, airborne, and surface-based instruments. The GHRC acquires basic data streams and produces derived products from many instruments spread across a variety of instrument platforms. The GHRC is supported by NASA and is the data management and user services arm of the Global Hydrology & Climate Center (GHCC) in Huntsville, Alabama.

The Center provides access to passive microwave data products from the Advanced Microwave Sounding Unit, (AMSU-A), Special Sensor Microwave/Imager (SSM/I) and the TRMM Microwave/Imager (TMI).

5. Langley Atmospheric Sciences Data Center (LaRC) - DAAC

<http://eosweb.larc.nasa.gov/>

The atmospheric science data center processes, archives and distributes Earth science data to complete research on the radiation budget, clouds, aerosols and tropospheric chemistry. ASDC imagery products include:

- Airborne Multi-angle Imaging SpectroRadiometer (AirMISR) Imagery
- Clouds and the Earth's Radiant Energy System (CERES)
- Multi-angle Imaging SpectroRadiometer (MISR) Imagery
- NASA Water Vapor Project (NVAP) Imagery
- Polar Ozone and Aerosol Measurement (POAM) II Imagery
- Special Sensor Microwave/Image (SSM/I) Imagery.

6. National Snow and Ice Data Center NSIDC) - DAAC

<http://nsidc.org/daac/>

The National Snow and Ice Data Center (NSIDC) archives and distributes brightness temperature data, polar atmosphere data, satellite imagery, sea ice data, snow cover data, and ice sheet data to study various research questions related to agriculture, the atmosphere, the biosphere, glaciers and ice sheets and hydrospheric analysis.

6.1 Arctic System Science (ARCSS) Data Coordination Center

<http://arcss.colorado.edu/arcss/intro.html>

The Arctic System Science (ARCSS) Data Coordination Center (ADCC) at the National Snow and Ice Data Center (NSIDC), USA, is funded by the National Science Foundation's (NSF) to archive and disseminate data and information generated from the Arctic System Science program. The ARCSS program is a multidisciplinary approach to understanding polar processes for climate and global change.

7. Oak Ridge National Laboratory (ORNL) - DAAC

<http://www.daac.ornl.gov/>

The Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) is a NASA-sponsored source for biogeochemical and ecological data and models useful in environmental research. Data have been collected on the ground, by aircraft, by satellite, and from computer models. The ORNL DAAC is a source for biogeochemical and ecological data useful for studying environmental processes.

8. Physical Oceanography (PO) - DAAC

<http://podaac.jpl.nasa.gov/>

The Physical Oceanography Distributed Active Archive Center (PO.DAAC) is responsible for archiving and distributing data relevant to the physical state of the ocean. Most of the products available at the PO.DAAC were obtained from satellites and are intended for use in oceanographic and interdisciplinary scientific research about sea surface temperatures, ocean topography and ocean winds. The Center includes data from the following satellites or sensors:

- | | | | | |
|------------|--------|-------------|---------|----------|
| • ATSR | AVHRR | ERS-1/ERS-2 | GEOS-3 | GEOSAT |
| • GHRSSST | GOES | GRACE | In-Situ | Jason-1 |
| • MOSID | NIMBUS | NSCAT | SeaSat | SeaWinds |
| • ADEOS-II | SSM/I | TOGA | TOPEX | POSEIDON |

9. Socioeconomic Data and Applications Center (SEDAC) - DAAC

<http://science.hq.nasa.gov/research/daac/sedac.html>

SEDAC is operated by the Center for International Earth Science Information Network (CIESIN), a unit of the Earth Institute at Columbia University based at Lamont-Doherty Earth Observatory in Palisades, New York. SEDAC's missions are to synthesize Earth science and socioeconomic data and information in ways useful to a wide range of decision makers and other applied users, and to provide an "Information Gateway" between the socioeconomic and Earth science data and information domains.

Data holdings include:

- Gridded Population of the World (GPW)
- Global Rural Urban Mapping Project (GRUMP)
- Population, Landscape, and Climate Estimates (PLACE)
- China Dimensions Data Collection
- Environmental Sustainability Index (ESI)
- Human Footprint and Last of the Wild

D. NASA: Jet Propulsion Laboratory

<http://www.jpl.nasa.gov/index.cfm>

The Jet Propulsion Laboratory manages various satellites relating to Earth observation missions. Current missions include the acquisition of data from the ACRIMSAT spacecraft, Aqua, Aura, Jason-1, QuikSCAT and Terra satellites.

E. NASA: National Space Science Data Center

<http://www.ssec.wisc.edu/datacenter/>

The National Space Science Data Center (NSSDC) provides multidisciplinary data and information services, including a large digital data archive from past NASA space science missions along with directories, catalogs, and access to widely distributed science data resources. The NSSDC is responsible for the long term archiving and preservation of all space science data and serves as the permanent archive for most OSS mission data. It also provides support for the Sun-Earth Connection Active archive (SECAA) within its Space Physics Data Facility partner at Goddard.

F. NOAA Satellite and Information Service: National Environmental Satellite, Data, and Information Service (NESDIS)

<http://www.nesdis.noaa.gov/>

NESDIS operates NOAA's National Data Centers for Climate, Geophysics, Oceans, and Coasts:

1. National Climate Data Center

<http://www.ncdc.noaa.gov/oa/ncdc.html>

NCDC archives weather data obtained by the National Weather Service, Military Services, Federal Aviation Administration, and the Coast Guard, as well as data from voluntary cooperative observers. NCDC has increased data acquisition capabilities to ingest new data streams such as NEXRAD and ASOS.

Data are received from a wide variety of sources, including satellites, radar, remote sensing systems, NWS cooperative observers, aircraft, ships, radiosonde, wind profiler, rocketsonde, solar radiation networks, and NWS Forecast/Warnings/Analyses Products. NCDC supports many forms of data and information dissemination such as paper copies of original records, publications, atlases, computer printouts, microfiche, microfilm, movie loops, photographs, magnetic tape, floppy disks, CD-ROM, electronic mail, on-line dial-up, telephone, facsimile and personal visit.

The US National Archives and Records Administration (NARA) has designated NCDC as the Commerce Department's only Agency Records Center.

2. National Geophysical Data Center

<http://www.ngdc.noaa.gov/>

GDC provides stewardship, products and services for geophysical data describing the solid earth, marine, and solar-terrestrial environment, as well as earth observations from space.

NGDC's data holdings currently contain more than 300 digital and analog databases, some of which are very large. As technology advances, so does the search for more efficient ways of preserving these data.

NGDC works closely with contributors of scientific data to prepare documented, reliable data sets. We welcome cooperative projects with other government agencies, nonprofit organizations, and universities, and encourage data exchange.

3. National Oceanographic Data Center

<http://www.nodc.noaa.gov/>

The National Oceanographic Data Center (NODC) manages the acquisition, ingest processing, quality control and long-term preservation of oceanographic data. The NODC archive holdings include all the data acquired in its original form, as well as project and product files of data extractions.

Every data acquisition is assigned a unique identification number to be used as a lifetime reference to that data. All data are passed through context verification prior to entry into the NODC data holdings. Also, checksum and byte count values are computed to tag to the data for continuous validation and verification processes used to maintain the integrity of the data. Metadata describing each acquisition are appended to new data for internal record management. Each unique data set referenced in the NOAA and NNDC server systems contains a metadata description, to aid in search and discovery processes.

4. National Coastal Data Development Center

<http://www.ncddc.noaa.gov/>

The NCDDC mission is to support ecosystem stewardship by providing access to the nation's coastal data resources. NCDDC achieves this capability through the integration of diverse coastal data distributed in multiple repositories and provides these data to users via the Internet using established and emerging technologies. We accomplish this by maintaining a searchable metadata catalog of coastal data, developing gateways to data repositories and using middleware technology that provides data in user specified formats.

US Academic Institutions

A. Arizona Regional Image Archive

<http://aria.arizona.edu/>

The Arizona Regional Image Archive is an interdisciplinary resource system for digital image and map data for the Sonoran desert region, including the US Southwest and northern Mexico.

B. University of Alaska Fairbanks: The Alaska Satellite Facility

http://www.asf.alaska.edu/about_asf/about_asf.html

The Alaska Satellite Facility, located in the Geophysical Institute at the University of Alaska Fairbanks, downlinks, processes, archives, and distributes SAR data from the European Space Agency's ERS-1 and ERS-2 satellites, NASDA's JERS-1 satellite, and the Canadian Space Agency's RADARSAT-1 satellite.

C. University of Alaska: Geographic Information Network of Alaska (GINA)

<http://www.gina.alaska.edu/>

GINA is the University of Alaska's mechanism for organizing and sharing its diverse data and technological capabilities among the Alaskan, arctic, and world communities. Established in 2001 as an initiative by the University of Alaska's President, GINA operates at all three of the university's main residential campuses. It also works with agency, NGO, and private sector organizations to serve geospatial data needs for Alaska.

Data holdings that are available include:

- MODIS images
- Landsat images
- Topographic and bathymetric data for Alaska.

D. California Spatial Information Library (CaSIL)

<http://gis.ca.gov/index.epl>

This is a web portal to digital imagery and map data for California State. Information about specific holdings can be accessed through <http://gis.ca.gov/data.epl>

E. University of California Santa Barbara & Stanford University: National Geospatial Digital Archive

<http://www.ngda.org/>

The University Libraries of UCSB and Stanford are leading the formation of the National Geospatial Digital Archive (NGDA), a collecting network for the archiving of geospatial images and data. The digital archive is being developed under a grant from the Library of Congress. The Library of Congress is partnering with eight institutions to build a nationwide digital collection and preservation system. The National Geospatial Digital Archive initiative is being financed under the auspices of the program with the goal of carrying out collaborative research and development work associated with creating a technical architecture concept of the 'Archive' and its data administration.

F. University of California Santa Barbara: Alexandria Digital Library

<http://www.alexandria.ucsb.edu/adl/>

The Alexandria Digital Library (ADL) is a consortium of researchers, developers, and educators, spanning the academic, public, and private sectors. The library is headquartered at the University of California at Santa Barbara and is hosted by the Davidson Library's Map & Imagery Lab (MIL) <http://www.sdc.ucsb.edu/>.

MIL's collection of maps, aerial photography, satellite imagery and other spatial data exceed 5 million information objects. The imagery collection consists of 4 million items and is composed of 2.8 million air photos, and 1.2 million Landsat MSS satellite images. The latter collection represents world archival coverage for the time period 1972-1978.

The map collection of about 500,000 sheets is principally medium and large-scale topographic sheets of physical science data. A collection of more than 5,000 atlases and reference books rounds out the map collection.

The digital data collection is growing at about one terabyte per year and is composed predominantly of physical sciences datasets, satellite imagery, and digital mapping data of the United States and other Earth locations. Thousands of scanned aerial photographs are also part of this collection.

G. Colorado State University: Climate Rainfall Data Center

http://rain.atmos.colostate.edu/CRDC/frame_oview.html

The Climate Rainfall Data Center (CRDC) is an experiment designed to assess if overall data access and usage from NASA data centers can be improved by adding a layer of service that is discipline specific (rainfall in our case). While the task of distributing standard rainfall products is left to the NASA data centers, CRDC is staffed by research personnel with knowledge of the products and the flexibility to address individual user needs.

This site attempts to provide the necessary information, tools, and expertise to help users determine which dataset(s) to use for their particular application. Descriptions of the most common publicly available products are provided under the Rainfall Products link. The Center does not provide the actual data, but does provide details on where to go to access the data.

H. University of Illinois: WW2010 Archives

[http://ww2010.atmos.uiuc.edu/\(Gh\)/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/home.rxml)

The WW2010 Archives includes a growing library of data and products from memorable weather events. Each case contains archived data including:

- satellite images,
- surface images,
- NEXRAD (when available),
- Plus some additional explanatory resources to aid with the interpretation of the weather images.

I. Louisiana State University: Earth Science Laboratory

<http://www.esl.lsu.edu/home/>

The mission of the Earth Scan Laboratory is to support research, education, and public service/emergency response with near real time or archival remotely sensed satellite data, its processing, analysis, interpretation, and dissemination.

From its central location, the ESL can capture satellite data covering the entire Gulf of Mexico, most of the Western Atlantic, the extreme Eastern Pacific, and the land mass from the Hudson Bay to the northern most part of South America. This data is permanently archived creating a growing record of environmental data for education, research, economic, and forensic applications.

The Earth Scan Laboratory is primarily involved in capturing **remote sensing oceanographic and atmospheric data** about the Gulf of Mexico and archiving it for research and commercial clients. It has data holdings from the following satellites:

- GEOS
- Terra-1/Aqua-1 (EOS)
- Orbview
- Oceansat
- POES

J. University of Maryland: Global Land Cover Facility

<http://glcf.umiacs.umd.edu/index.shtml>

The GLCF mission is to encourage the use of remotely sensed imagery, derived products and applications within a broad range of science communities in a manner that improves comprehension of the nature and causes of land cover change and its impact on the Earth.

The GLCF Goal is to provide free access to an integrated collection of **critical land cover and Earth science data** through systems that are designed to maximize user outreach and promote development of novel tools for ordering, visualizing and manipulating spatial data.

Primary satellite imagery sources include:

- MDA Federal
- Quickbird (Digital Globe)
- Orbview, (GeoEye)
- Terra-1/Aqua-1 (EOS)
- Landsat
- GOES

K. Michigan Technological University: Great Lakes Imagery Archives

http://www.geo.mtu.edu/great_lakes/icegroup/index.html

The Great Lakes Imagery Archives (GLIA) is designed to allow users to access the daily SeaWiFS and AVHRR data processed and archived at Michigan Technological University for Great Lakes and African Great Lakes. Images of satellite-derived lake surface temperatures, sediment (as Rrs555) and chlorophyll concentration are available. General information about AVHRR, SeaWiFS, CZCS and MODIS can also be reached from these sites.

L. University of New Mexico; Earth Data Analysis Center

<http://edac.unm.edu/>

The Earth Data Analysis Center (EDAC) is a service organization of the **University of New Mexico**. EDAC provides services in geospatial technologies and has been a leader in technical assistance for a wide range of uses since 1964. Our goal is to assist industry, government, and the general public in applications of spatial and spectral technology.

The Clearinghouse provides users with metadata and data ranging from:

- Aerial Photography
- Space Shuttle Imagery
- Satellite Imagery

- Topographic Maps
- Spatial Digital Data

M. University of Rhode Island: Sea Surface Temperature Satellite Image Archive

<http://dcz.gso.uri.edu/avhrr-archive/archive.html>

The University of Rhode Island, Graduate School of Oceanography's archive of sea surface temperature satellite images includes processed Advanced Very High Resolution Radiometer (AVHRR) data from NOAA satellites. The archive contains in excess of 20,000 images from April 1979 to the present. New images are added to the archive every day at 10:30 GMT.

N. Rutgers State University of New Jersey: IMCS Marine Remote Sensing

http://marine.rutgers.edu/mrs/sat_data/?nothumbs=1

The Rutgers University satellite data image archive offers satellite data products for research, industry, education and the general public. Satellite data are collected with SeaSpace L-Band and X-Band satellite dishes, both of which are on the top of the Institute of Marine and Coastal Sciences building on Cook Campus within the New Brunswick Campus.

Data are processed into various products:

- Sea Surface Temperature: Sea surface temperature imagery collected from NOAA AVHRR satellites
- Chlorophyll Concentration imagery collected from India's Oceansat - Ocean Color Monitor (OCM) satellite as well as an ocean color product produced by a simple channel ratio of data collected from China's FY1-D satellite
- Sea Surface Temperature Codar Overlays: Sea Surface Temperature imagery with CODAR surface current overlays
- Sea Surface Temperature Daily Composite: Daily mean composite imagery of data collected from NOAA AVHRR satellites

O. Smithsonian National Air and Space Museum: Regional Planetary Image Facility

<http://www.nasm.si.edu/research/ceps/>

The Regional Planetary Image Facility is a NASA supported reference library containing image data obtained from planetary missions. This collection of over 300,000 photographs and images covers the planets and their satellites.

Earth-looking imagery is available from early manned missions and the Space Shuttle Photograph collection. The Space Shuttle Photograph collection is maintained in cooperation with NASA's Johnson Space Center, and contains images from STS-41C up to STS-84 which flew in May of 1997.

P. University of Wisconsin-Madison; Space Science and Engineering Center (SSEC)

<http://www.ssec.wisc.edu/data/>

The mission of the Space Science and Engineering Center is to conduct atmospheric, oceanic, environmental and astronomical research using space-age techniques to discover and apply the physical properties of our universe for the benefit of humanity.

As further explanation of this general mission statement, we consider it our mission to:

- Lead development of space-based and space-age instrumentation for observing the earth's atmosphere, oceans and land surface, other planetary atmospheres, and astrophysical phenomena,
- Lead and conduct research programs that advance our understanding of atmospheric, oceanic, environmental and astronomical sciences,
- Facilitate the transfer of knowledge to operational observing and forecast systems,
- Support campus research initiatives with technical and management expertise, and
- Support the UW educational mission by involving undergraduate and graduate students in the research process.

1. SSEC Data Center Archive:

<http://www.ssec.wisc.edu/datacenter/>

The Data Center at the University of Wisconsin-Madison Space Science and Engineering Center (SSEC) is responsible for the access, maintenance and distribution of real-time and archive **weather satellite data**.

The Space Science and Engineering Center (SSEC) currently archives research-quality data from six different geostationary satellites:

- GEOS
- GMS-5
- Meteosat
- MTSAT-1R
- FY-2C
- Kalpana

SSEC also archives conventional point, grid and text data from the NOAA-port broadcast.

Data from the SSEC Data Center is available in many different delivery formats.