

Chapter 4 Data Acquisition and Archives

4-1 Introduction.

a. USACE Image Acquisition Standard Operating Procedure. Image data should be acquired following the established protocol developed by ERDC's TEC Imaging Office (TIO)*. The protocol allows for efficient monitoring of image acquisition and archival practice. There are numerous advantages in using TIO's image procedure. The most significant advantage in using TIO's protocol is cost savings. This savings is the result of on-going contracts between satellite data vendors and the federal government. In addition to a reduced cost, TIO is able to broaden the image-share licensing allowing USACE full access to previously purchased data. The image-share licensing agreement is funded by NIMA who in turn allows all DoD and Title 50 Intelligence members full use of imagery data. In other words, once a USACE researcher has acquired imagery all other USACE districts can legally access these data at no charge. These data are also available to contractors working under a USACE contract.

b. SOP. The standard operating procedure (SOP) for acquiring new data is defined by the EM 1110-1-2909 (Appendix I), which states that no imagery shall be purchased from a commercial vendor without first coordinating with TIO (Appendix G). TIO has streamlined image data purchases and provides quick and efficient turn-around. The only exception to this SOP is in the case of acquiring free imagery downloaded from the Internet. A handful of governmental and commercial agencies (such as NASA and SpaceImaging) have made select satellite images available at no cost. These sites may require a login and can provide software for viewing data free of charge.

Ordering Commercial Satellite Imagery

“No imagery shall be purchased from a commercial vendor without first coordinating with the TIO. Any U.S. Army organization with commercial satellite imagery requirements must forward their commercial satellite imagery requirements to TEC for research, acquisition, and distribution of the data.”

Contact TEC's Imagery Office, using one of the following methods:

Web Site: WWW.tec.army.mil/tio/index.htm
Email: TIO@tec.army.mil

ERDC (Engineer Research and Development Center) includes the seven Corps of Engineers research laboratories.

TEC (Topographic Engineering Center) serves the Corps of Engineers and the Department of Defense. TIO (TEC Imaging Office) monitors and coordinates all USACE image requirements with commercial vendors and public data libraries.

c. Placing Image Orders. Commercial imagery and aerial photo requests can be placed via email, memorandum, fax, or phone. The following image requirements should be determined prior to contacting TIO.

1. Geographic area of interest in latitude/longitude coordinates in degrees and minutes (or path/row if known).
2. Acceptable date range for data coverage; cloud cover and quality restrictions.
3. Satellite system/sensor.
4. Desired end product (digital or hard copy and preferred media).
5. Mailing and electronic address and phone number.

Consider the timing requirements for the project. For projects not involving emergencies or hazards satellite data may be delivered by regular mail. TIO can also deliver data by FEDEX and FTP. The TIO performs an image data search through the CSIL (Commercial Satellite Image Library). When data is available in the CSIL, the TIO receives a CD of the data, and copies the data for the customer.

DO	DO NOT
Verify your geo-coordinates. Review imagery for accuracy and quality make sure the imagery covers your area of interest. You may call a commercial satellite vendor to discuss technical problems encountered after you receive the imagery from the TEC Imagery Office (i.e.: accuracy and quality problems).	Contact the vendors on your own without first communicating with the TIO. During the acquisition stage, do not consult the vendor's technical staff to have additional work done that is not stated in the written proposal.

d. Points of Contact (as of September 2003).

- Army Commercial Imagery Acquisition Program Manager—Mary Pat Santoro, 703-428-6903
- TIO Team Leader—Mary Brenke, 703-428-6909
- TIO Team Member—Alana Hubbard, 703-428-6717

4-2 Specifications for Image Acquisition. The TEC Imagery Office (TIO) is the first stop for obtaining imagery for the USACE, contact Mary Brenke (703-428-6909) or Alana Hubbard (703-428-6717). But, before contacting them, some basic information about what is wanted should be put together. A list follows:

- Geographic coordinates—upper left and lower right corner latitude–longitude coordinates or, if known, the path/row of a Landsat scene, the K/J of a SPOT scene; the orbit and frame number for a SAR image from ERS, Radarsat, JERS, or Envisat.
 - Acceptable coverage dates.
 - Acceptable percentage of cloud cover, image quality, and off nadir angle limit.
 - Satellite sensor or sensors.
 - Image format—digital tape, CDROM, projection wanted, projection parameters, tar (*tape archive retrieval* is a compression file format), satellite format, compression or uncompressed.
 - Your name, phone, FAX, e-mail, mailing address.
 - Payment—TIO will determine the correct cost for the imagery, which will be purchased for you by the USGS Eros Data Center (EDC). You will have to do a Military Interdepartmental Purchase Request (MIPR) of the money to EDC, EDC will send the imagery to the TIO for duplication and archiving in CSIL at NIMA, the original image will be forwarded to you.

4-3 Satellite Image Licensing. The license for satellite imagery is extended to a no cost duplication of the data for any DOD agencies and their contractors when the imagery is bought through the TEC-TIO contract with NIMA and the USGS EROS Data Center. Beyond that, the license specifically states that no other duplication of the unprocessed data is allowed.

4-4 Image Archive Search and Cost. The following is a compilation of archive search sources, along with web site addresses and the approximate cost of imagery. Data costs reflect new purchases and archive data rates at the time of the release of this manual.

<i>a. USGS EROS Data Center.</i>		http://earthexplorer.usgs.gov
LANDSAT (MSS, TM4 & 5)		\$ 425 - 2700.00
LANDSAT7 (ETM)		\$ 600
DOQQ		First Image \$ 45.00 Additional images: \$ 7.50 – Pan \$ 15.00 - Color
Full Orbit AVHRR		\$ 50
DEMs and DLGs		no cost
ALI (Landsat mimic 37km by 42km)		\$ 500 – 2800 http://eo1.usgs.gov/
Hyperion (hyperspectral 7.7km by 42km)		\$ 500 - 2800

- b. *Space Imaging Corp.* <http://www.spaceimaging.com>
IRS \$ 2700.00
IKONOS \$ 18 - 200.00 per sq km
- c. *SPOT Image Corp.* <http://www.spot.com>
SPOT Pan and Multi-spectral \$ 750.00 - 2500.00
RADARSAT and ERS \$ 1500.00 - 4500.00
- d. *RADARSAT INC.* <http://www.rsi.ca>
\$ 1500.00 - 3,000.0
- e. *NOAA—Satellite Active Archive.* <http://www.saa.noaa.gov>
AVHRR full swath limited Mbyte size no cost
- f. *Earth Satellite Corporation.* <http://www.geocover.com>
Landsat scenes & mosaics \$ 250 - see price list
- g. *Digital Chart of the World.* <http://www.maproom.psu.edu/dcw/>
Penn State University Library
GIS themes including DEMs no cost
- h. *AVIRIS Home Page.* <http://makalu.jpl.nasa.gov>
Archived or new AVIRIS scenes \$500.00 or \$ 30k to 60k new data
- i. *Eurimage Home Page.* <http://www.eurimage.com>
Europe Landsat TM 4, 5,7,
IKONOS, Quickbird, ERS, IRS
Radarsat, Envisat, Resurs-01 see price list
- j. *AIGLLC home page.* <http://www.aigllc.com>
HyMap hyperspectral (2.3km x 20km) \$ 5000
- k. *ESA Home Page.* <http://earthnet.esrin.esa.it>
Mideast Envisat, ERS, IRS, Landsat,
AVHRR SeaWiFs, MODIS see price list

- l. *ALOS Home Page.* <http://www.alos.nasda.go.jp>
PRISM, AVNIR-2, PALSAR see price list
- m. *DigitalGlobe home page.* <http://www.digitalglobe.com>
Quickbird \$6,000 - see price list
- n. *EOS DAAC.* <http://edcdaac.usgs.gov>
MODIS, ASTER, Landsat 7 free - \$600 - see price list
- o. *Geostationary Satellite Server.* <http://www.goes.noaa.gov>
GOES, Meteosat weather satellite data free
- p. *Espatial Home Page.* <http://www.espatialweb.com>
Emerge electronic camera \$11k for 50 sq mi mission
- q. *Positive Systems Home Page.* <http://www.possys.com>
ADAR digital camera quote on request
- r. *Flight Landata Inc.* <http://www.flidata.com>
DMSV, variable filter hyperspectral quote on request
- s. *Earth Search Sciences Inc (ESSI).* <http://www.earthsearch.com>
Probe-1 hyperspectral quote on request
- t. *EarthData.* <http://www.earthdata.com>
LIDAR elevation data quote on request
- u. *University of Florida.* <http://www.alsm.ufl.edu>
LIDAR elevation & airphoto data quote on request
(25km by 1km elev. and air photo) \$ 75k
- v. *SHOALS Home Page.* <http://shoals.sam.usace.army.mil>
LIDAR bathymetry quote on request

w. *Intermap.*

<http://www.intermaptechnologies.com>

IFSAR elevation quote on request
Archive tile (7.5min x 7.5min x 5m posting) \$2000

x. *Aeromap U.S.*

<http://www.aeromap.com>

Orthophotography, imagery, DEMs quote on request

y. *TerraSystems Inc.*

<http://www.terrasys.com>

TS-1 DMSV & TS-3 electronic quote on request

z. *DLR (German aerospace center).*

<http://www.dfd.dlr.de>

MOS ocean color data & others see price list

aa. *NASA Goddard DAAC.*

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

CZCS, MODIS, OCTS, SeaWiFs
Ocean color sensors & others see price list

bb. *ENVISAT home page.*

<http://envisat.esa.int>

MERIS ocean color data & others see price list
DESCW swath planner free

cc. *Alaska SAR Facility.*

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

Radarsat mosaic of Antarctica free
Alaska High Altitude Air Photo Program
(AHAP)

dd. *ITRES Research Limited.*

<http://www.itres.com>

CASI (hyperspectral) quote on request

4-5 Specifications for Airborne Acquisition. Maps must be provided to the contractor of the image acquisition area. They must be in the projection and datum required, for example Geographic and WGS84. The collection flight lines should be drawn on the maps with starting and ending coordinates for each straight-line segment. If an area is to be imaged, then the overlap between flight lines must be specified, usually 20%. If the collection technique is that of overlapping frames, then both the sidelap and endlap must be specified, between 20 and 30%.

4-6 Airborne Image Licensing. Licenses for data collected by aircraft vary. The contractor must read and agree to the terms. Some state that there are no conditions, some state that the data can be passed or resold to others after a certain period of time, some state the contractor is the sole owner of the data and that they can never be passed without their written permission.

4-7 St. Louis District Air-Photo Contracting. The St. Louis District has an extensive Geodesy, Cartography, and Photogrammetry (GC&P) Section. Photogrammetrists as certified by the American Society of Photogrammetry and Remote Sensing (ASPRS) have many years of experience in aerial photography, surveying, mapping and in the A-E Contracting of these services. The GC&P section is currently responsible for the technical management of all aerial photography and mapping projects within the St. Louis District. They provide contracting services for all photogrammetric mapping projects for other government agencies, as well as other Corps of Engineers Districts.

a. Their experts in photogrammetry can provide assistance in developing contracts, scopes of work, government estimates or negotiation assistance. Technical guidance is provided in the development, acquisition, accuracy, and utilization of base topographic and planimetric mapping. They also provide advice on remote sensing data, environmental data sets, and engineering data to be incorporated into Geographic Information Systems (GIS) to assist engineers and scientists in Corps of Engineers project work.

b. The Point of Contact at the St. Louis District is Dennis Morgan (314)-331-8373. Appendices H and I include example contracts of a Statement of Work (SOW) and a Memorandum of Understanding (MOU).