



US Army Corps
of Engineers®

Engineer Research and
Development Center

Facility

Remote Sensing/ Geographic Information Systems (RS/GIS) Center

Purpose

The RS/GIS Center, located at ERDC's Cold Regions Research and Engineering Laboratory, in Hanover, New Hampshire, is the Corps of Engineers Center of Expertise for Civil Works Remote Sensing and Geographic Information Systems. The Center provides mission-essential support to Corps Divisions and Districts, ERDC laboratories, DoD, States, and Regulatory Agencies, as well as non-governmental organizations and private industry in all Corps business practice areas: navigation, flood and coastal storm damage reduction, hydropower, regulatory, environment, emergency management, recreation, water supply, and work for others. Via technology transfer and application development, Center personnel maximize the benefits from new and emerging remote sensing and GIS technologies and deliver results to all customers. The Center also facilitates Proponent-Sponsored Engineer Corps Training (PROSPECT) courses in introductory and intermediate GIS technologies (http://pdsc.usace.army.mil/CourseListDetails1.asp?Cntrl_num=316) and in remote sensing (http://pdsc.usace.army.mil/CourseListDetails1.asp?Cntrl_num=196).

Specifications

To aid the Corps in technology transfer, R&D, program management, and applications development, the Center has assembled a state-of-the-art data and application storage and processing facility. The Center utilizes an 8-processor Sun Fire cluster running Oracle and ESRI applications with 2 TB of online storage. Web-application development and service are hosted on a 16-processor Linux cluster with 16 GB of RAM, linked by gigabit ether fiber optic backbone. There is a high-speed Defense Research and Engineering Network (DREN) link and high-speed satellite upload and download capability as well as gigabit connection to all desktops in the building. Critical applications and data are mirrored offsite for fail-over and continuity of operations.

To sponsor Corps PROSPECT courses (<http://pdsc.usace.army.mil/AboutUsProspect.asp>), the Center maintains a large training room equipped with 20 networked computers with flat-screen monitors and state-of-the-art conference and communication equipment. The Center staff use these technologies to provide essential background information and materials, Corps-specific case studies and examples, and hands-on experience with current remote sensing and GIS software and hardware. This room is also available for other training sessions, meetings, conferences, and functions.

Benefits

The resources available through the RS/GIS Center benefit customers by facilitating the development, management, and publication of tools to effectively and efficiently manage a wide variety of projects and programs. The beneficial functions of the Center are to

- Integrate existing and emerging technologies in image processing, computer software, and geospatial technologies to support the Corps and Army mission.
- Support one-stop service to Field Operating Agencies, including data analysis, software development, and distribution of nationwide data sets.
- Utilize sophisticated hardware, software, and technical expertise to develop environmental resource management software that supports analysis and decision making at multiple scales for technical users, managers, regulators, and the public.
- Evaluate and test in-situ, airborne, and satellite sensors; computer software; and systems-integration technologies to reduce time and money spent on field work.

- Conduct research on and develop solutions for the effects of ice on design, operation, and maintenance of Civil Works and Military Facilities.
- Provide RS/GIS support for emergency management and training for field personnel for timely disaster response.
- Evaluate geospatial environmental engineering and natural resources database requirements for the Corps, Army, and Nation, and conduct research at various ecoscales to assess interactions of projects on terrain and aquatic systems.

Success Stories

- The RS/GIS Center at CRREL developed a Formerly Used Defense Sites (FUDS) Program Web site in coordination with Information Technology Laboratory (ITL)-Vicksburg (<http://hq.environmental.usace.army.mil/programs/fuds/fuds.html>). The application displays basic information on 1,500 FUDS properties, including property name, location, property description, and a Corps District office telephone number where the public can obtain more information.
- In 1993, the flood of record occurred on Arizona's Gila River, depositing a large quantity of sediments in the Painted Rock Reservoir. The reservoir, used for flood control, is managed by Los Angeles District and the Corps of Engineers. After the flood, managers projected that as much as 20% of the reservoir's storage capacity might have been lost. To verify the loss, they needed to update 1985 storage capacity information. Because a ground survey would have been prohibitively expensive, the RS/GIS Center was tasked to employ remote sensing techniques using multi-temporal Landsat Thematic Mapper data. The cost of using remote sensing techniques was only about 12% of the cost of a ground survey.
- The RS/GIS Center is actively involved in wetland and watershed scale efforts to develop field indicators useful for delineating the extent of Federal jurisdictional limits under the Clean Water Act in the arid western United States. Delineation efforts are using Light Infrared Detection and Ranging (LIDAR) high-resolution topography to develop a quantitative method that accurately delineates various fluvial and playa morphology as coupled with HEC-RAS analysis. Likewise, research utilizing 20 years of historical satellite imagery, in combination with 59 years of precipitation records, is being used to analyze the ponding duration and frequency of playas in the western Mojave Desert, California. Vegetation mapping is being investigated using a Spectral Temporal Signature (STS) analysis. Because STS provides a three-dimensional signature of vegetation over the annual growing season, this technique can lead to development of algorithms useful in separation of plant communities via a classification routine and the ultimate mapping of different communities at the watershed scale. Examples of wetland efforts at the watershed scale can be found at: https://rsgis.crrel.usace.army.mil/vegmap/westriverside.watershedstart_pk

Point of Contact

Timothy Pangburn
 603-646-4296/DSN: 220-4296
 E-mail: Timothy.Pangburn@usace.army.mil