

SAMPLE TASK ORDER #3
CoNED - LCMAP
STATEMENT OF OBJECTIVES (SOO)

I. Purpose:

The purpose of this statement of objectives (SOO) is to ensure continued research and application support at the United States Geological Survey (USGS) Center for Earth Resources Observation and Science (EROS).

II. Scope or Mission:

The scope of work for this SOO includes research and development on two science related activities, the Coastal National Elevation Database (CoNED) and the Land Change Monitoring, Assessment and Projection (LCMAP).

The Coastal National Elevation Database (CoNED) is the integration of many disparate lidar and bathymetric data sources into a common database aligned both vertically and horizontally to common reference systems. CoNED is a multi-temporal, multi-scale, and multi-resolution database that permits easy portability to geomorphological and hazard vulnerability applications but at the same time extends the framework of the National Elevation Dataset (NED) offshore into the intertidal, submarine estuarine and littoral zones.

The five-year-old free and open data policy brought Landsat data to new users, new research domains, and new decision-support applications. The Land Change Monitoring, Assessment and Projection (LCMAP) will continue to improve access and usability and further increase the value of EROS deep archives by providing land-change science information and knowledge to the United States and the World. The LCMAP will provide analysis ready products to enable continuous pixel-level monitoring and characterization. The LCMAP will enable assessments and projections of land cover use and conditions.

Customers supported include the USGS Climate and Land Use Change Program (CLU), the USGS National Geospatial Program (NGP), the USGS Coastal Marine and Geology Program (CMGP), the USGS Land Remote Sensing Program (LRS), but also includes many external partners and collaborators.

III. Period and Place of Performance:

- A. The period of performance is Start of task plus 12 months.
- B. All work will occur on-site at the USGS EROS Center located near Sioux Falls, South Dakota; however, the government will entertain exceptions for proposed offsite performance.

IV. **Background:**

Topobathymetric models provide a required seamless elevation product for several science application studies such as shoreline delineation, coastal inundation mapping, sediment-transport, sea level rise, storm surge models, tsunami impact assessment, and also to analyze the impact of various climate change scenarios on coastal regions.

Key LCMAP objectives include:

- Provide documentation and understanding of historical land change and contemporary land change as it occurs. Provision ongoing answers to questions on where, how, and why the landscape is changing.
- Explain how past, present, and future land change affects society, natural systems, and the functioning of the planet. What are the impacts of land change locally, regionally, and globally? Topical emphases include land-change impacts on weather and climate, the carbon cycle, water resources, and ecosystem functioning.
- Alert relevant stakeholders to important or emerging land-change events in their jurisdictions.
- Support others in the use of land-change data, information, and science results. This includes a state-of-the-art applications support capability, aggressive communications and outreach, and web-based capabilities for accessing all products. Provide “webinars” to explain and share land-change products and information.

The analysis ready data component (ARD) is the foundation for the LCMAP system. The concept of ARD is to prepare data into a format that is readily accessible and of immediate use to the science community. To accomplish this, science user review of the methods (algorithms) used for construction of the analysis ready data is vital. It is important for the LCMAP team to analyze alternatives and involve data users early to enable science users to verify that the Analysis Ready Data products meet their research and project requirements.

V. **Performance Objectives:**

A. General Objectives

1. Provide a written weekly status report tracking the projects due not later than COB on Wednesday of each week. Weekly report shall include, at a minimum, travel conducted and outcome, action items and status, project progress, planned activities, data activities, web portal updates, customer service interactions, and performance metrics
2. Provide a travel plan NTE \$2500

3. As required and needed, provide media services support
4. Provide work management support

B. Specific Objectives

a) CoNED Elevation Project:

a. Establish a Sandy Region Coastal National Elevation Database (CoNED)

- i. Assist in the development of the Sandy-related topobathymetric elevation models that encompass the following regions: a.) New Jersey-Delaware, Chesapeake Bay, New England, and North Carolina. The tentative due date for the Sandy regional models is Start of Task + 4 months.
- ii. Assist in the reprocessing of pre and post Hurricane Sandy lidar datasets for the development of topobathymetric models in the four regional areas. General procedures for reprocessing include data verification, classification, land-water boundary mask generation, regridding data from lidar point-cloud to grid, building pyramids and statistics, and constructing shaded relief images. A tentative deliverable date for the lidar reprocessing by End of Task period of performance. The number of lidar datasets to process is between 45 and 70, with the size of the lidar projects varying in size.
- iii. As required by the CoNED project, develop metadata files and documents.

b. Hydrologic Enforcement Model Development in the Sandy Region

Hydrologic enforcement is the processing of mapped water bodies so that lakes, reservoirs, and man-made structures (culverts) flow downstream.

- i. Assist in the development of hydrologically-enforced elevation models for subset-catchments in the Delaware, Susquehanna, and Toms River-Barnegat river basins. These models have a tentative due date of Start of Task + 4 months.
- ii. Deliverables:
 - a. Complete enforcement of 100% of currently identified Delaware River Basin (DRB) sinks (depressions) by Start of Task + 6 months
 - b. Complete identification of enforceable sinks (depressions) in the Susquehanna River Basin (SRB) by the tentative date of Start of Task + 10 months

- c. Complete enforcement of 50% of identified SRB sinks (total number dependent upon the total identified as enforceable) by End of Task period of performance
 - c. North Carolina Outer Banks Multi-temporal Database Framework
 - i. Assist with the development of a multi-temporal (time series) elevation database framework for the North Carolina Outer Banks. This new database framework has an overall tentative due date of Start of Task + 4 months.
 - ii. Research developing a new multi-temporal elevation framework using potentially ESRI Mosaic Datasets or image band stacks
 - iii. Assist with reprocessing 8 to 20 (the lidar projects varying in size), data verification, classification, land-water boundary mask generation, re-gridding data from lidar point-cloud to grid, building pyramids and statistics, and constructing shaded relief images of pre and post Hurricane Sandy lidar datasets.
 - iv. Deliverables
 - a. Reprocessed datasets and shaded relief images by Start of Task + 7 months
 - b. Processing procedural and time-series conceptual documentation by Start of Task + 8 months
 - c. Time series database framework prototype by End of Task period of performance
 - d. Stage completed datasets on the EROS anonymous FTP server
 - e. Maintain project python programming scripts and technical documentation
 - f. Assist with the preparation of the conference, workshop, technical meeting materials, and participate in technical meetings as required.
2. LCMAP: Prototype Analysis Ready Data Component (ARD) Algorithms & Refine ARD Design
- a) Develop an agile/iterative prototype that allows Scientists to refine the ARD definition and assess the suitability of ARDs for current and future project requirements. Concurrently, this allows engineers to determine what modifications are necessary to existing production systems and to begin to understand what underlying systems and data requirements might be.
 - b) This prototype will consist of 4 - 6 iterations, with the first iteration targeting 2 - 3 target subset areas over the conterminous United States (not path/row based) and ideally concluding with a wall-to-wall prototype dataset of the entire conterminous US by the end of the fiscal year (the extent of which depends on available system resources). Note that these prototypes will be done with a minimum of existing production system modification and access

to the data will be via manual retrieval from a server. These data will feed algorithm development in the continuous monitoring section.

- c) The implementation of the prototype will allow scientists to refine the definition of ARD and peer-review the results while giving system engineers insight into how to effectively design a system to produce ARDs in a production environment.
- d) Deliverables:
 - a. Generate an Analysis Ready Data Specification Document by Start of Task + 9 months
 - b. Draft an Algorithm Description Document (ADD) by End of Task period of performance
 - c. Develop test datasets for ARD implementation by End of Task period of performance

VI. Operating Constraints:

- A. The Government will provide all property necessary for the execution of work performed on-site at the EROS Center. The Government may, on an exception basis, provide property for work performed off-site. “Provide” and “Property” are as defined in Federal Acquisition Regulation 45.101.
- B. The TSSC contractor shall interact/interface with other program offices within the USGS, EROS, and other federal, state, and local agencies. The TSSC contractor shall interact/interface with other support contractors.
- C. Applicable documentation, e.g., agreements such as Memorandums of Understanding/Memorandums of Agreement for either external or internal project support, will be made available on electronic media (DVD) or website.
- D. The TSSC contractor shall comply with the USGS EROS Acceptance of Data Collections by the USGS Operational Procedure (as amended) for all matters related to the consideration, acceptance, and retention of remotely sensed, cartographic, and Earth science data from other agencies and organizations for long-term preservation and access from the USGS EROS Center.
- E. The TSSC contractor shall comply with the USGS Manual Fundamental Science Practices (<http://www.usgs.gov/usgs-manual>), which govern how scientific investigations, research, and activities are planned and conducted and how information products are reviewed and approved for release and dissemination. Information products, as defined by the aforementioned Manual, shall be subject to peer-review and subsequent approval by a Government Approving Official for official release.