TECHNICAL SUPPORT SERVICES CONTRACT
TECHNICAL REQUIREMENT DOCUMENT
For TSSC Solicitation

TRD NUMBER

15

PROJECT NAME

Land Cover Applications and Global Change

REVISION HISTORY

Version	Description of Change	Date
1.0	Base Year (April 2010 – March 2011)	
1.1		
1.2		
2.0		
2.1		
2.2		

1.0 SCOPE

This Technical Requirements Document (TRD) defines requirements for technical support for the Land Cover Applications, Landscape Dynamics, and Global Change Project at the USGS Center for Earth Resources and Observation (EROS) to be provided by the Contractor. In general the work activities include technical support for basic and applied research, analyses and interpretation of remote sensed data, spatial and biogeochemical modeling, and dynamic data access and delivery over the Internet Support beyond those identified in this TRD will be addressed by the USGS Project Manager as needed. The Contractor will provide minimal work management consistent with the support function of the TRD, although some reporting of work accomplished may be required, it is expected that the technical support role in this TRD provides input and preparation but not synthesis, completion, and submission. The remainder of this TRD outlines the project work requirements to be performed subject to available funding. The TRD will be updated to reflect major direction and priority changes throughout this contract period.

2.0 DELIVERABLES

This project emphasizes research and science which exploit the unique resources of EROS to understand and project the impacts of climate variability and change on land surface processes at local to global scales. Deliverables necessary for the successful completion of this project include some very specific items, e.g., posters, databases, web pages, etc. as well as higher level accomplishments including scientific networking both locally and nationally/internationally, participation in professional societies, and developing specific scientific leadership based on our remote sensing resources, modeling expertise, and effective collaborations within the DOI and internationally. Deliverables and accomplishments are to be seen as progressive milestones toward the establishment of clear and acknowledged scientific leadership in the areas of “Land Cover Applications, Landscape Modeling, and Global Change.”

The project consists of “tasks” which represent reasonably cohesive units of research, development, and application. Each has specific deliverables within the broad scope defined above. These are detailed in some of the funding sources, e.g., USAID, World Bank, and others within their agreements and supplement the inclusive SIR support from the USGS directly.

Task 23, BJHNB Sahel and West Africa Land Use

1. Provide support for the development of LULC maps as defined by task lead.
   - 1.1. Collect and process high resolution imagery for selected sites in West Africa
   - 1.2. Maintain Sahel & West Africa geospatial database
   - 1.3. Develop graphics to support Sahel & West Africa reports and web page
   - 1.4. Support construction of LULC maps of Guinea, Sierra Leone, Liberia and Ghana using medium resolution imagery
   - 1.5. Construct image-maps of forest and agricultural land use from imagery over targeted protected areas in Guinea, Sierra Leone, Liberia and Ghana

Task 39, BJHQ2 Ecosystem Performance & Permafrost Deformation

1. Build multi-year average L band backscatter mean images for mid-summer, excluding unburned pixels previous 20 years
2. Provide growing season JERS (post 1999), POLSAR and RADARSAT2 imagery in GIS ready format for biomass and moisture mapping.

3. Georegister 10-15 scanned aerial photos in Alaska
4. Collect training points from Landsat for water – nonwater for decision tree model development on 7-10 Landsat scenes
5. Incorporate USGS review comments on paper being reviewed for a USGS white paper entitled: “Multi-temporal L and C band Synthetic Aperture RADAR (SAR) to
6. highlight differences in water status among Boreal forest and wetlands
7. systems in the Yukon Flats, Interior Alaska” by Balser and Wylie until accepted

8. Process Radarsat2 quad polar imagery acquired for Boot and Canvasback Lakes in Yukon Flats for spring, summer, and fall and investigate seasonal differences.

9. Process ALOS images for Yukon Flats in 2009 focusing on polarimetric imagery which cover Canvasback and Boot Lakes and investigate seasonal dynamics and relationships to soil moisture. This would integrate with Landsat thermal spectral analysis being done at EROS.

10. Work with project collaborators to help define field measurement required for validation.

11. Contribute to a manuscript on the integration of radar and Landsat imagery to monitor soil moisture in Yukon Flats (in USGS review by Dec 2009)

12. Utilize decision tree tools to make water / non water maps
    a) collect rain data on water/non water across a scene (usually 1,000 to 1,500)
    b) extract ASCII values for spectral bands, indices, and possibly ancillary data
    c) develop C5 decision tree models to estimate water/non water
    d) use internal software to apply the C5 model to the scene and produce a water non water map
    e) add additional training points in problem areas (missed water bodies and tree shadows and dark conifer which sometimes is misclassified as water) and interactively refine the water / non water map
13. Areas with clouds and cloud shadows will be filled with water / non water maps for scenes from comparable dates
14. The number of scenes to be processed will be dependent on cloud filling from other scenes, but we expect a minimum of 30 – 40 scenes to be processed
15. Additional water mapping may be done using preprocessed radar backscatter (for cloudy time periods), ASTER, SPOT5, or Quickbird imagery.
16. Contribute to material for web pages and publications.

Task 40, BJHZH-2 Carbon Sequestration and Climate Change: C Flux in the Great Plains

1. Prepare climate data sets for carbon flux mapping 2007 to 2008
   1.1. Download daily maps of precipitation and temperature
   1.2. Summarize into periods matching eMODIS 7-day composite

Task 30, BJHUC, FGDC Metadata Support

1. Interface with USGS Headquarters (FGDC and related organizations to provide leadership needed and guide the technical support required in this task
2. Facilitate extension of SDI into international areanas
3. Provide user support for software used in registering, monitoring and accessing distributed National Geospatial Clearinghouse Network (NGDCN) participant services.
4. Develop and conduct the international capacity building of SDI technologies.
5. Collaborate with the Food and Agriculture Organization (FAO) to provide software development enhancements to the GeoNetwork open source portal toolkit and provide the toolkit back into the open source domain
6. provide software engineering to enhance the Service Status Checker (SSC) system, recently installed, according to list of enhancements requested and reviewable

Task 36, BJHJC, CAF (GeoSUR)

1. Organize and present a Capacity Building workshop at EROS
2. Develop selected SRTM derivative products for South America
3. Provide technical assistance to partner agencies
4. Develop Regional Map Service (RMS)
5. Assist with the development of SRTM IMS
6. Develop Google Earth Component
7. Provide technical assistance training on web services
8. Develop a GeoSUR geoportal
9. Provide assistance for the configuration of a CAF server

Task 1, CXD1A, Biology: ILM Prairie Potholes Pilot

1. Develop online modeling and visualization capacity for various ecosystem services
2. Preparation, processing and analysis of geospatial data layers to support ecosystem services modeling

Task 2 8836-CXD1B -- Prairie Pothole Model

1. Required LOE to evaluate the modeling requirements for greenhouse gas simulations in the Prairie Pothole Region in support of integrated work with the Northern Prairie Wildlife Research Center

2. Required LOE to provide technical assistance to augment model formulation.

Task # 13: Biodiversity Characterization

1. Download Landsat data of the area for different time periods from 1970s to 2009
2. Collect aerial photographs and high resolution satellite data such as IKONOS
3. Pre-processing of Landsat data including radiometric correction, cloud removal, image normalization, and sub-setting
4. Generate vegetation indices such as NDVI
5. Collect secondary data such as elevation, soil, and FIA data
6. Image classification and change analysis
7. In-depth analysis of “trends” in FIA data focusing on composition of species, and diameter
8. Conduct field trip together with PIs
9. Conduct extensive literature review related to ecosystem shifts and ecosystem modeling

10. Prepare a draft manuscript

3.0 SCHEDULE

Schedule for delivery of datasets, services and informational products shall be agreed upon between Project Manager and relevant work manager(s).

Schedule for delivery of report inputs shall be in accordance with USGS reporting schedule. Specifics will be provided to TSSC by Project Manager. These may include weekly, monthly, and quarterly inputs as well as responses to “on call” requests.

4.0 COMMUNICATION

The project manager and TSSC work manager will meet bi-weekly unless otherwise agreed upon to discuss expenditures and emerging requirements. The contractor shall keep the Government Project Manager informed of all activities, such as work success, problems, and potential problems as soon as they are known. Other communications required by the USGS in support of work may include quarterly briefings, special reviews and presentations at key events.

The contractor shall understand requirements of the project and ensure expectations are met by:

- Developing the associated work plan and monitoring its execution/progress
- Assisting in the coordination or facilitation of external, cooperative agreements
- Reporting expenses from ITS
- Identifying areas of overall or specific risk and participating in mitigation strategies
- Coordinating with finance staff to assist with income calls and updates

5.0 EVALUATION

The evaluation of performance shall be based on simple criteria. Quality of work performed shall be evaluated as one of three levels:

“Acceptable”
“Not Acceptable” (and the reason shall be given)
“Exceeds Expectations” The “Exceeds” evaluation may be a result ofsuperior quality, innovative enhancement of the product within cost constraints, early delivery, or lower cost,