

Application Title: Establishing a CyberGIS Facility for Knowledge Discovery, Scientific Breakthroughs, and National/International Hazard and Security Issues

Lead contact for RDF Application:

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Key Participating Units:

- **TAMU:** Center for Geospatial Sciences, Applications and Technology (GEOSAT), High Performance Research Computing (HPRC), Soil and Crop Sciences, Aerospace Engineering, Civil Engineering, Computer Science
- **AgriLife Research**
- **TAMUG**
- **TAMUCC**
- **TEES**

Anticipated Request Amount (\$): 1,500,000

Executive summary of the intended application to utilize Research Development Funds.

Multidisciplinary research, technology development, numerous hazard and security issues require collaborative, interactive, scalable knowledge discovery and information synthesis, at unprecedented spatial and temporal scales. This will require the integration of geographic information systems (GIS), advanced computing and new cyberinfrastructure (CI), collectively referred to as CyberGIS. Processing, numerical modeling and visualizing massive amounts of complex geospatial data have become essential to enable research, education and applied problem solving across a broad swath of academic disciplines, and to provide critical solutions in genomics and bioinformatics, precision agriculture, food security, hazards assessments and mitigation, navigation, computation, data management and resource exploration and management. Only one other institution in the country has these capabilities, and the current TAMU CI resources are not able to enable such synergistic solutions to effectively address scalable grand-challenge issues. Consequently, the objective of this project is to establish a CyberGIS facility, by purchasing a CyberGIS supercomputer with high-performance data access, storage, and input/output (I/O) bandwidth that supports cutting-edge computing using advanced graphics processing units and dynamically provisioned cloud-computing resources. This project will significantly advance TAMU research cyber-infrastructure and comprehensively support faculty and students in Agriculture, Engineering, Geosciences, Science, Business, Liberal Arts and Architecture, who require an operational CyberGIS system to provide unique solutions to complex genotyping, phenotyping and food security issues, natural hazard and resource management and planning issues, spatial prediction, “big data” issues, and engineering technology development from local to national and international scales. Such a system with new capabilities will enhance research competitiveness and external funding. This project will also contribute to the national CyberGIS community as an advanced CI resource through the NSF Extreme Science and Engineering Discovery Environment (XSEDE) program to establish TAMU as a national leader in a multitude of disciplines.