



NASA GSFC Hydrospheric and Biospheric Sciences (HBS) Support Contract

Services:

- ABOVE Project Science, Science Cloud, and Web Support
- Biospheric Applications, Carbon & Ecosystems Office
- Earth Science Education Support for NASA CAN, GLOBE, and ICESAT-2 Programs
- Earth Science Web Development, Web site management, standards, security, & maintenance
- GEDI Project Detector Assembly Hardware Development and Testing
- GOES-R, MODIS, VIIRS Image Geolocation
- High-End Computing Communications and Allocations Support
- LAADS and FIRMS Web Sites
- MODAPS, MODIS and VIIRS S/W Development, Product Generation, Data Distribution, Data Archiving, Near Real Time Data Delivery
- MODIS and VIIRS Calibration and Data Quality Assessment
- Office of Education Technical Support, Web Sites, and Special Events
- TERRA and ICESAT-2 Project Education, Communication, and Public Outreach
- Thermal Infrared Sensor (TIRS-2) Ground Support Equipment Software

Timeline: December 2014 to Present

Locations: Greenbelt and Lanham, Maryland; Wallops Island, Virginia; Portland, Oregon; Boise, Idaho

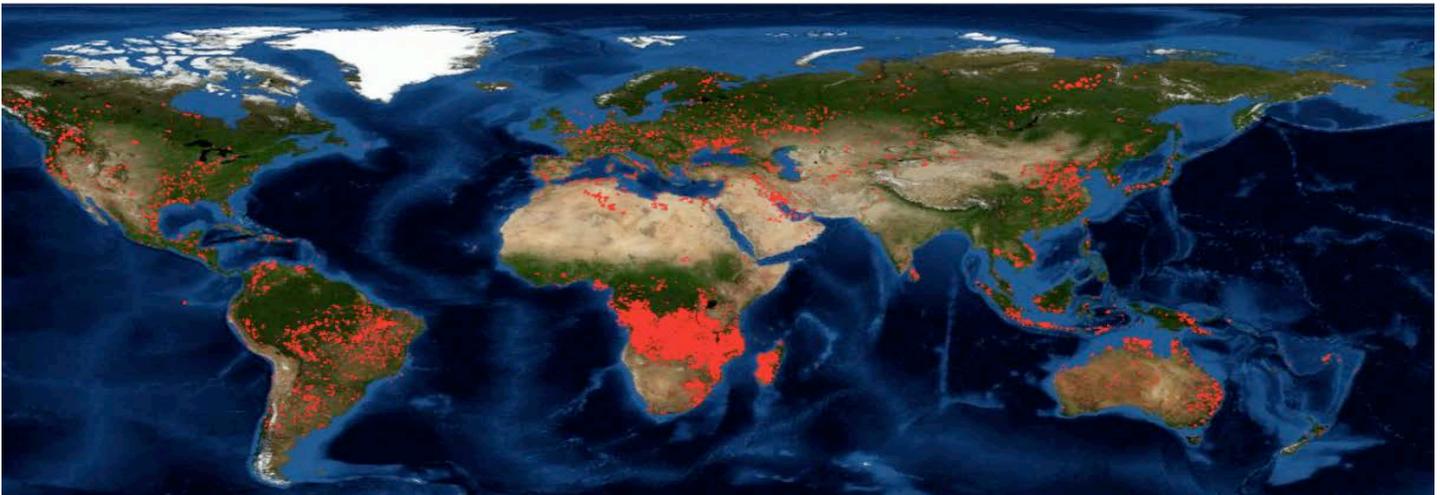
GST teams with Science Systems and Applications, Inc. (SSAI) and Fibertek, Inc. to support a variety of missions and projects at Goddard Space Flight Center (GSFC) under the HBS contract, a contract that is entering (as of December 2018) its fifth calendar year. The GST component consists of scientists, programmers, analysts, web developers, communicators, education and public outreach specialists, software and hardware engineers, and technical support specialists employed across some 20 separate tasks.

In general, GST plays support and, occasionally, leadership roles in the tasks and frequently works with SSAI task leads and directly with NASA personnel. Some tasks are supported by individual GST employees who work directly with the NASA task technical monitor for science, engineering, data analysis, and programming and are located on-site at NASA GSFC and Wallops Flight Facility. Other GST employees work in small teams under SSAI or their own task leadership. One group of 11 GST employees supports a variety of efforts in the large (~ 30-person) MODIS Adaptive Processing System (MODAPS) task at SSAI Headquarters. GST support personnel work on data operations and calibrations for MODIS, VIIRS (Visible Infrared Imaging Radiometer Suite), and other land and atmosphere imaging sensors and are quite involved in near real-time data delivery through websites. The multi-faceted activities of GST personnel can be grouped into the following principal categories:

- Programming for Earth-orbiting imager data operations, product processing, calibration, image geo-location, data product archiving, and data product delivery through specialized websites
- Website development of a very large number of Earth sciences public-facing project, institutional, and internal sites, including design, front-end, content, links, back-end, data delivery, standards, and maintenance
- Education, public outreach, and communication of Earth science projects, missions, high-end computing applications, and their data including representing NASA science in international forums and workshops
- Technical specialists and PhD-level science personnel working to facilitate Earth science data analysis, calibration, quality assurance, and field missions and providing science team and project cloud services
- Electrical, computer, systems, and software engineering in support of spacecraft instrument development and spacecraft operation



The Arctic-Boreal Vulnerability Experiment (ABOVE) is field campaign in Alaska and northwest Canada sponsored by NASA's Terrestrial Ecology Program. It is leading to a greater understanding of ecosystem vulnerability and resilience to environmental change through integrating field-based studies, modeling, and data from airborne and satellite remote sensing. GST has a leadership role in the creation of the ABOVE Science Cloud (ASC), a new approach to data management and analysis. The ASC combines high performance computing with emerging technologies and data management with tools for analyzing and processing geographic information to create an environment specifically designed for large-scale modeling, analysis of remote sensing data, and copious disk storage for "big data" with integrated data management.



The Fire Information for Resource Management System (FIRMS) distributes Near Real-Time active fire data within three hours of satellite overpass from both the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Visible Infrared Imaging Radiometer Suite (VIIRS). The figure (above) shows active fires on a global basis in mid-July 2018. GST personnel led the design, development, and operation of the FIRMS web site and its enhanced user interface that provides email alerts, data download solutions, and a flexible interactive map that enables users to annotate fire pixels by instrument and by time of day or night, view a range of Fire Radiative Power values and confidence values, and view current and historic fires as points or grids which highlight fire densities.

The Global Ecosystem Dynamics Investigation (GEDI) Project and its flight sensor are being developed to produce high resolution laser ranging observations of the 3D structure of the Earth's land surface. The three laser pulse transmitters of GEDI working together with a 0.8 meter telescope, six silicon avalanche photodiode detectors, star trackers and GPS receivers provide eight parallel tracks of laser footprints on the Earth's surface to sample vegetation canopies from the international Space Station. GEDI makes possible precise measurements of forest canopy height, canopy vertical structure, and surface elevation to characterize important carbon and water cycling processes, biodiversity, and habitat. GST personnel led the development of the laser detector subsystem under an HBS Contract task.

