GLOBAL SCIENCE & TECHNOLOGY, INC.

# NOAA NESDIS National Centers for Environmental Information (NCEI)

Project Highlights

- Developed "Value of Data" studies to demonstrate how NOAA's data helps the nation's economy

- Developed CRM solution that documented nearly 30,000 customer interactions, capturing information to identify the highest priority products and services

- Reengineered legacy software to make it more efficient and maintainable

- Led initiatives to develop the next generation of scientists, engineers, and data managers through NOAA and NASA DEVELOP internships with over 45 participating organizations:
  - More than 65 interns on 26 projects
  - Interns developed 3 operational products, completed 2 intensive UN vulnerability analyses, and produced multiple analyses on topics ranging from water resource availability to disaster response
  - Interns supported the NASA MODIS, NPP-VIIRS, and AMSR-E missions and USGS Landsat Missions

- Provided program and portfolio management expertise, helping manage 186 products and services across 15 product areas (portfolios) and garnering recognition by NESDIS leadership

GST Support for NCEI

Through its NCEI Center Support contract, GST partnered with NOAA across the NCEI organization in the areas of user access and engagement, systems engineering, technical support for scientific software, and science center data product support.

User Access, Engagement, and Applications – GST led the effort to develop a center-wide engagement strategy and implementation program designed to help NCEI better understand its users and their needs. GST's User Engagement Implementation Plan focused on identifying and then translating user requirements into improvements to NCEI products and services that are valued by stakeholders in a broad array of industry sectors. As part of this effort, GST developed and maintained the Customer Engagement Requirements Exchange (CEREx) Salesforce Customer Relations Management (CRM) solution. This tool serves as a customer information repository for collecting and documenting all user engagement data and facilitated the successful documentation of nearly 30,000 customer interactions. The user feedback within CEREx was analyzed and mined to validate billions of dollars of national economic value that comes from NCEI products and services. GST developed success stories and business cases that further justify the important work and investments being pursued across NCEI. The stories are documented in nine in-depth case studies (Value of the Data - Success Stories) that demonstrate the value NCEI's data provides to key sectors using this service and to society at large.
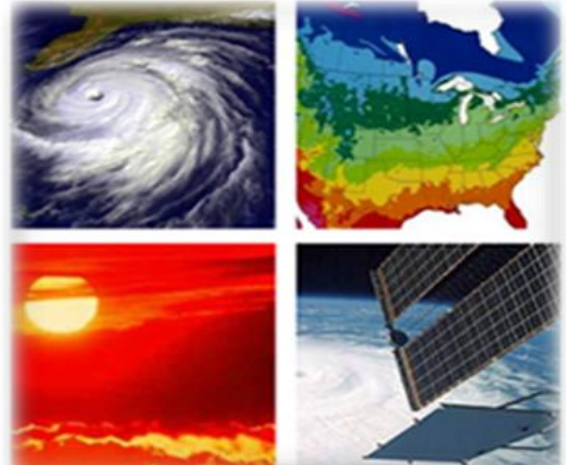
NCEI Data in Use around the World

Systems Engineering – GST's systems engineering expertise improved the consistency of systems engineering practices across the organization. We provided consulting, training, and integration support in Configuration Management (CM). Additionally, we developed, documented, and implemented systems engineering best practices by defining processes, conducting reviews of products/processes/services, mentoring and training NCEI staff, and offering support to resolve scientific software engineering issues. GST also helped develop an end-to-end NCEI product lifecycle process that spans development, transition, operations & maintenance, sustainment, and retirement. GST provided technical support to Reference Environmental Data Records (REDRs), achieving the following outcomes: (1) increased availability of satellite weather data, (2) REDR Coding Standards applicable to all scientific software, (3) a technical assessment of new algorithms to identify noncompliance with REDR Coding Standards, (4) the successful rewrite of high-value algorithm code to achieve compliance with REDR Coding Standards, and (5) a PMO to develop and maintain Capability Maturity Model Integration (CMMI) Level 2 process areas.

Technical Support for Scientific Software – GST was at the forefront of NCEI's software evolution through its technical support for their scientific software reengineering efforts. GST evaluated each candidate method and executed the reengineering efforts using state-of-the-art programming languages and documentation within NCEI's three-tiered IT architecture (development, testing, and production). We also designed and captured quality assurance artifacts in order to duplicate results of the legacy code. These efforts improved automation and reliability and reduced cost and maintenance by developing easy-to-use and easy-to-maintain scripts. In one example, our refactoring of the Pairwise Homogeneity Algorithm (PHA) reduced the complexity of the code by 75%, cut the number of global variables from 108 to 4, and reduced the executable lines of code from 7,050 to 3,970, making the code far more maintainable and portable.

Portfolio Management – GST initiated and developed the Center for Weather and Climate (CWC) PMO for improving the management and tracking of NCEI products and services. GST's PMO team assisted in the management of 186 products and services diversified across 15 CWC Products Areas (Portfolios), garnering recognition by NESDIS leadership. This effort led to the successful integration of 147 management recommendations and aided in budgetary buildup and resource allocation activities. We led the way in developing and expanding the best practices of the DOC Gold Medal award-winning Climate Data Records (CDR) Program through tailoring project, program, and portfolio management best practices across the CWC.