



USDA Agricultural Research Service (ARS)

Project Highlights

Task Areas

- Application Development
- Data Pipelines
- Systems Engineering

Benefits to USDA

- Access to relevant meteorological surface data for USDA applications and climate science
- Increased density in meteorological data via data networks
- Development of derived parameters that tailor integration
- Access to hydrological data from precipitation networks
- Access to USGS stream data
- Improved USDA applications and decision support tools with the new datasets
- Expandable architecture for additional data access
- "GeoHub" interoperability among USDA agencies to access a data repository
- Scalability through use of cloud technology

Capabilities

- Highly specialized workforce of engineering, technical, and scientific experts
- Capabilities in software and systems engineering, scientific outreach, data access and archive, and data assimilation
- 30+ years building enterprise architecture at NOAA and NASA
- Data network domain expertise and experience

GST Support for ARS Data Pipelines and Applications

Data Pipelines: GST developed a new capability for USDA that brings meteorological and hydrological data sources into the USDA environment. This enhancement better serves USDA applications and allows stakeholders to obtain data more easily across USDA domains. This enhanced data access is particularly important as USDA provides critical information to stakeholders developing applications and decision support tools needed for climate mitigation and resilience. By offering simplified access to more high-quality data to USDA's researchers, scientists, and planners, these advances also support USDA's mission to support feeding 10 billion people around the globe by 2050.



GST developed a prototype of a data pipeline using NOAA's surface meteorological data into a USDA cloud-hosted environment. The NOAA data networks are crucial for increasing the spatial and temporal density of meteorological data in USDA applications. GST staff augmented the system with a second pipeline to acquire USGS hydrological data for dissemination to USDA stakeholders. GST worked with USDA to develop derived parameters, such as Growing Degree Days, from the meteorological data that would optimize integration

of such data into USDA applications. The "GeoHub" architecture creates meteorological data pipelines that break down data silos within USDA and allows for data interoperability across the organization. Data from one agency becomes accessible to other agencies, allowing researchers, decision makers, and the public to benefit from all USDA data sources, not just the agency where the application is hosted.

Applications: GST provides scientific and engineering services to USDA for their applications that need engineering functionality and optimization. One such application is the *Rangeland Analysis Platform (RAP)*, which can be seen at <https://rangelands.app/>. GST's work automates the back-end engineering of RAP to enable efficient data assimilation. This work demonstrates GST's ability to identify engineering optimization needs and then champion solutions that are cost saving to the client through workflow and automation.

