OAK RIDGE National Laboratory



IMAGERY SCIENCE

Analyzing and interpreting various views of Earth's surface

MISSION

Derive actionable intelligence from imagery data to provide insights for national and global security applications.

As a global leader in high-performance computing and geographic information science, Oak Ridge National Laboratory is at the forefront of research and development in imagery science. Our teams develop algorithms that work across multimodal sensors and platforms using photogrammetry and remote sensing to discover changes to our world and provide critical information.

IMPACT

- Contributing to the security of the US electrical grid by leveraging multispectral commercial satellite imagery and open-source, space-based LiDAR to identify where forest intersects transmission power lines and requires clearing to prevent power outages
- Automated fusion of historical and novel satellite imagery to achieve unprecedented accuracy, closing the gap between data acquisition and actionable intelligence
- Detection and geolocation of damaged utility poles in the aftermath of natural disasters such as hurricanes though an edge computing system

ORNL KEY DIFFERENTIATORS

Unmatched data processing techniques and access to world-class technology, including high performance computing

- ORNL imagery science researchers developed the **fastest-known stereo image matching algorithm** which can produce up to 1.7 million square kilometers of 2m elevation data per day (approximately the area of Alaska).
- Teams created an automated and GPU-accelerated pipeline process to atmospherically correct, orthorectify, and pansharpen images from the global repository of ultra-high-resolution commercial satellite imagery for large-scale remote sensing science.
- ORNL combines data, compute, and imagery science with leading oceanographic research to develop automated algorithms that map coastal bathymetry in areas where turbid water precludes mapping with traditional methods.

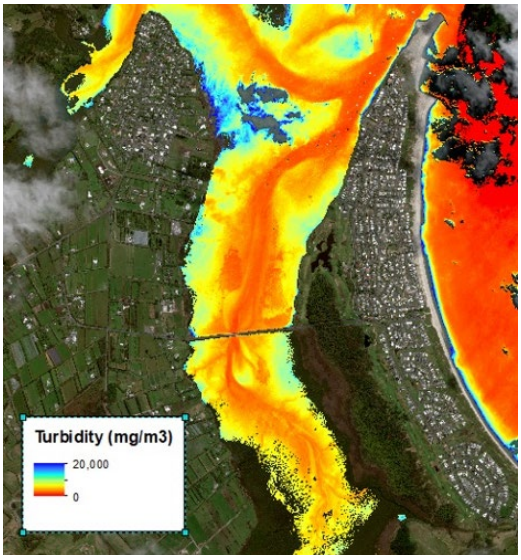
Multidisciplinary teams answering questions about the Earth's surface faster and more completely than ever before

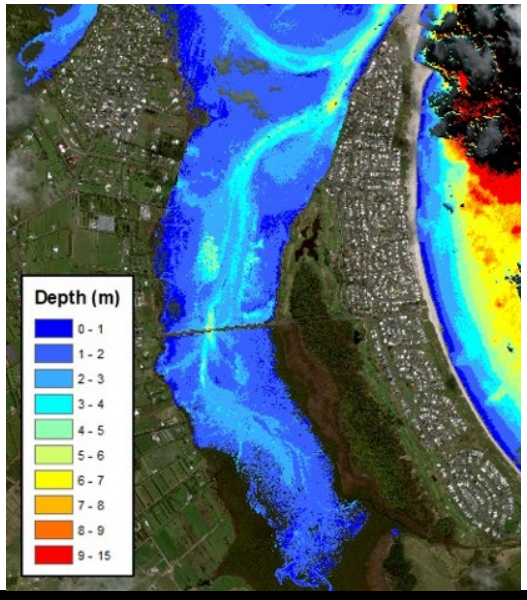
- The **Remote Sensing Group** leverages backgrounds in physics, oceanography, computer science, and geology to address a broad portfolio of research topics, including national security, nuclear non-proliferation, and disease modeling.
- The **Geomatics Group** specializes in sciences and technical expertise required to measure, process, and present geographic data critical to global navigation and national defense. Group skillsets include geodesy, photogrammetry, global positioning, navigation, and timing.

Access to unparalleled national laboratory resources

- High performance computing
- Autonomous systems and artificial intelligence
- Leading multidisciplinary teams across a wide variety of science fields, including national security, cyber resilience, and nuclear nonproliferation.







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