Imagery Science

Analyzing and interpreting various views of Earth's surface

INTRODUCTION

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 to the right organization.

MISSION

The Imagery Science Group is dedicated to the comprehensive collection, advanced analysis, interpretation, and efficient management of visual data capturing Earth's surface. Experts harness the power of cutting-edge imagery technology and sophisticated analytical techniques to provide critical insights that support both national and global security applications.

IMPACT

- Improving DoD personnel health protection against dengue, chikungunya, Zika and other vector-borne diseases through Aedes vector risk mapping and forecasting novel machine learning system that synthesizes decades of biosurveillance data, satellite measurements, and environmental data

- Using photogrammetry technology to detect and characterize objects or areas from ground and airborne satellites for insights ranging from timely information to support natural disaster response to long-term analysis to understand population migration and water security

- Researching coastal bathymetry to analyze seafloor depth and landscape topography to map ocean geological formations for maritime safety, environmental management, and shoreline stability

Turbidity (mg/m3)

20,000

0

Depth (m)

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 15
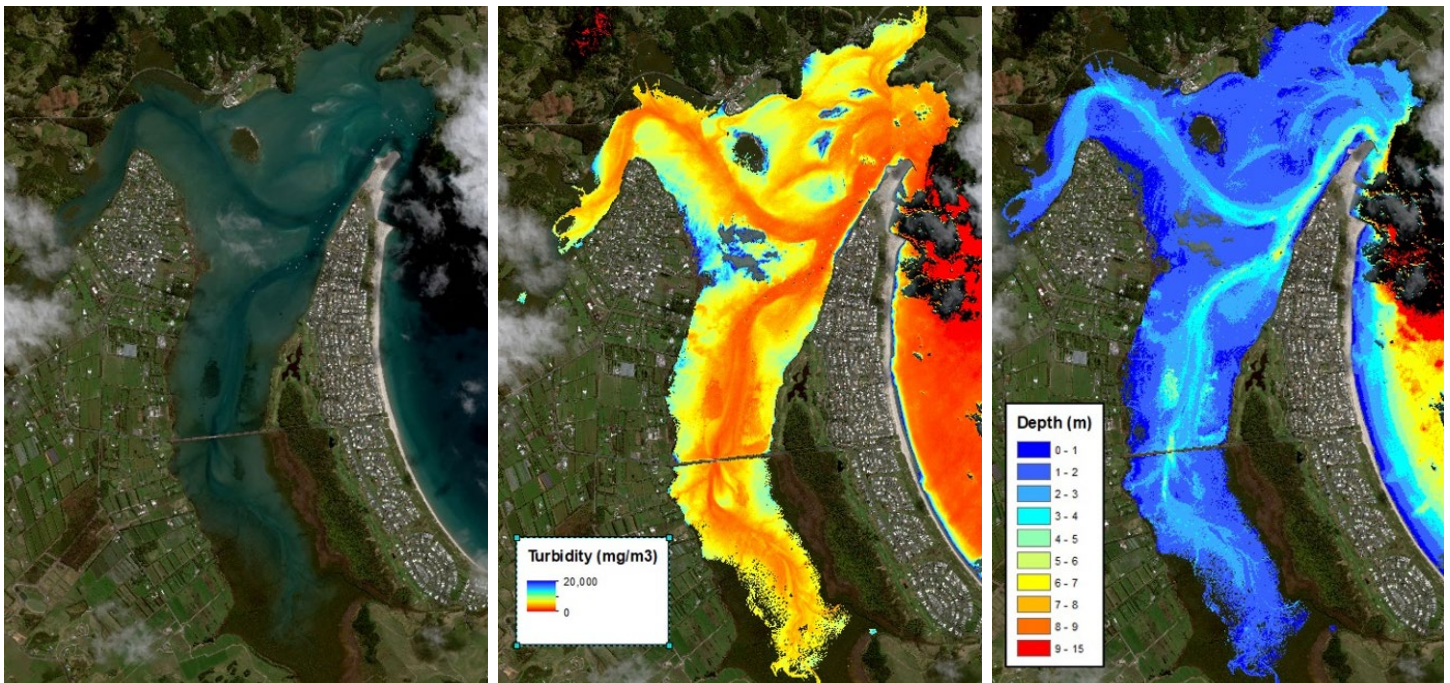
ORNL KEY DIFFERENTIATORS

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).
- Testing secure alternative timing required to harden our national infrastructure against satellite signal spoofing and jamming.

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, geology and more to address a broad portfolio of research topics related to national security, climate change, humanitarian missions, nuclear non-proliferation, disease modeling, and more.
- 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.

CONTACT

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