# NAVIGATING WITH ICESAT-2

The Ice, Cloud, and land Elevation Satellite-2 (ICESat-2) measures the height of ice, vegetation, land, and water on Earth's surface.

The Advanced Topographic Laser Altimeter System (ATLAS) operates a green laser split into six beams that collect precise height measurements.

With ICESat-2 data on the height of ice above the water, scientists can estimate sea ice thickness.
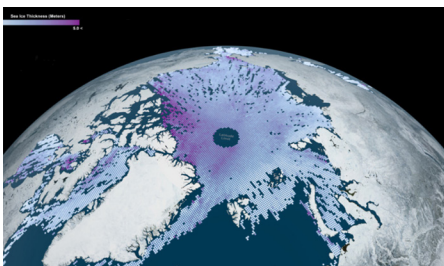
ICESat-2
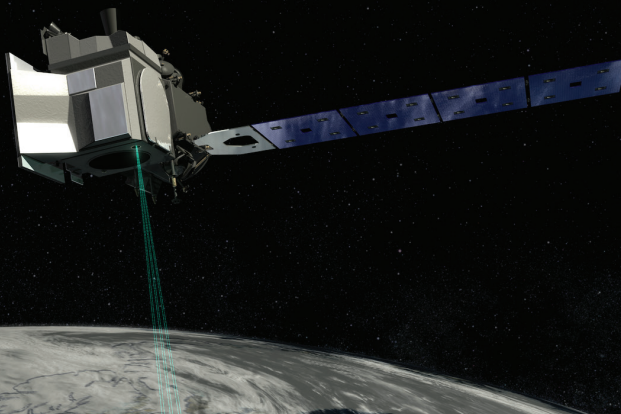
SEA ICE FORECASTING

Forecasting sea ice conditions is important for safe and efficient travel through icy waters of the changing Arctic. Rick Allard from the U.S. Navy uses ICESat-2 data products to validate the models that feed these forecasts.

MONITORING SEA ICE THICKNESS

Knowledge of sea ice thickness is also important for ship navigation. Sea ice freeboard, the height of ice above the water surface, can provide information about sea ice thickness and melting rates. ICESat-2 freeboard data is used to forecast sea ice thickness for ship navigation.

SOCIETAL BENEFITS AND IMPACT OF ICESAT-2: NAVIGATION

Data Visualization of sea ice thickness measured by ICESat-2 in March 2022.

Sea ice concentration and thickness can vary annually and seasonally. Knowledge of sea ice conditions is vital for military and commercial shipping navigation. Estimates of snow depth on top of the ice are also important to forecast sea ice thickness. With diminishing sea ice in the Arctic, there will likely be a rise in shipping routes and tourism. Navigation challenges may arise due to sea ice pressure ridges and extremely thick sea ice if the vessel is not designed to handle such ice thickness. Timely updates on sea ice conditions using ICESat-2's data products are crucial for maritime safety.

FS-2024-12-398-GSFC