

# Satellites Guide Ships in Icy Waters through the Cloud



In late August, the 60m-long US Coast Guard Cutter '*Maple*' completed its navigation through the Arctic's ice-ridden Northwest Passage. While ships have taken this route before, this was the first time that the International Ice Patrol had provided iceberg information based exclusively on satellite imagery.

Established in 1914 in response to the sinking of the *Titanic*, the US Coast Guard International Ice Patrol (IIP) monitors iceberg danger in the North Atlantic Ocean for shipping safety.

When the *Maple* departed from Alaska in mid-July en route through the Arctic to Maryland, USA, the IIP was on guard to assist the crew to navigate through the notoriously icy waters. The IIP used data from the Copernicus Sentinel-1 satellite mission, among others, to create charts showing the risk of encountering icebergs after exiting from the Northwest Passage and during transit through the Baffin Bay, Davis Strait and Labrador Sea.

## Cloud cover

Sentinel-1 is equipped with radar that can detect icebergs through cloud cover, a capability particularly beneficial in the IIP's operating area. Sentinel-1 can also distinguish between the thinner, more navigable first-year ice and the hazardous, much thicker multiyear ice to help assure safe year-round navigation in ice-covered Arctic and sub-Arctic zones. These radar images are particularly suited to generating high-resolution ice charts, monitoring icebergs and forecasting ice conditions.

Scientists at the IIP used iceberg detection software available on ESA's online Polar Thematic Exploitation Platform (Polar TEP) to access satellite data to detect icebergs and analyse their densities and trajectories.

## Polar TEP

This experience using the Polar TEP cloud-based technology opens the door for future evaluations of a more robust version of the iceberg detection and iceberg trajectory processors, said Michael Hicks, chief scientist of the International Ice Patrol. Cloud-based technology such as that used by Polar TEP is expected to be an important tool for handling the ever-growing amount of data coming from space, he added.

Polar TEP is one of six Thematic Exploitation Platforms developed by ESA to serve data user communities. These cloud-based platforms provide an online environment to access information, processing tools and computing resources for collaboration. TEPs allow knowledge to be extracted from large environmental datasets produced through Europe's Copernicus programme and other Earth observation satellites.