**ESA Polar Code Decision Support System**

The European Space Agency (ESA) has supported the development of a Polar Code Decision Support System (PCDSS) aimed at aiding ships and vessels implementing the IMO Polar Code. The operation of ships in the Polar Regions carry significant risks, such as:

* Loss of life
* Loss of property
* Damage to the delicate polar environment

To help address these risks, the International Maritime Organization[[1]](#footnote-1) (IMO) has approved the “International Code for Ships Operating in Polar Waters” (known as the Polar Code). The Polar Code was developed to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate the impact on people and the environment in the remote, vulnerable, and potentially harsh polar waters.

Among other things, the Polar Code specifies a range of information that ships travelling in polar waters will be required to access for planning and operations. The information is to be used for:

* Risk analysis and determination of safe operating regions,
* Application of operating procedures and risk mitigation,
* Determination of permissible areas for garbage disposal and sewage discharge,
* Avoidance of marine mammals, protected areas, and culturally sensitive areas, and
* Emergency planning for places of refuge, fuel depots, and search and rescue.

Much of this information is not currently available in a form accessible to ships. Where the information is available, it has not been brought together in an integrated fashion. Further, the information needs to be delivered to ships over low bandwidth communication channels.

The PCDSS solution consists of aggregated historical information obtained from earth observation data and some in situ measurements; near real time information obtained from earth observation data; forecasted information obtained from models to which earth observation data is an important input; the integration of other data types; and a data infrastructure that enables the processing and delivery of the information to land-based support systems and over low-bandwidth channels to ships. The information will be available either online from the cloud, or through a standalone application for use offline on a ship.

The PCDSS has been developed jointly by four organizations involved with Polar satellite remote sensing technologies: Polar View Earth Observation Ltd, Technical research Centre of Finland (VTT), British Antarctic Service and AWST.

The PCDSS user interface is now functional and communicating with the data server. Examples of all applicable data types have been tested. This includes Sentinel 1 images, vector ice charts, and GEOTIFF files of historical information. The interface was trialed onboard the RRS Ernest Shackleton in the Antarctic.

The Polaris algorithm has been implemented. It interprets an ice chart according to how safe it would be for ships of different classes to navigate in the ice. The calculations are modified by whether the ice is decaying and whether an icebreaker escorts the ship.

Work is now focused on completing the population of the platform with the necessary data feeds. Once the necessary data feeds are operational, two qualified ice pilots will undertake testing of the PCDSS.

1. As a specialized agency of the United Nations, the IMO is the global standard-setting authority for the safety, security and environmental performance of international shipping. Its main role is to create a regulatory framework for the shipping industry that is fair and effective, universally adopted and universally implemented. [↑](#footnote-ref-1)