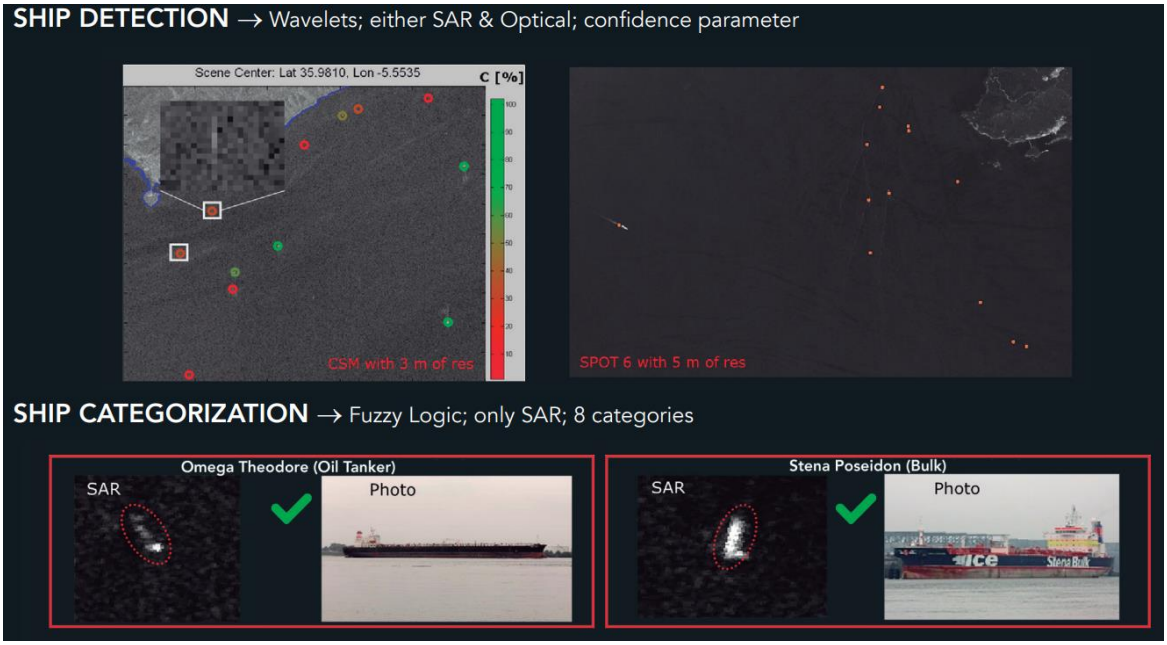
EO-FIN

Ship Detection and Categorization



Example of ship detection and categorization from SHIP MONITORING SUITE (SIMON) project (Source: GMV)

Product Category

☐ Land Use	☐ Natural Disaster	☐ Coast Management	☐ Earth's Surface Motion
☐ Land Cover	☐ Climate Change	■ Marine	

Financial Domain(s)

■ Investment management ☐ Risk analysis ☐ Insurance management ☐ Green finance

User requirements

UN17: Need near real-time tracking of marine vessels to understand their routes and estimate fuel usage

Description

Ships detection and categorization using EO data involves the use of satellite imagery to identify and classify ships on water bodies. This technology employs advanced image processing and machine learning techniques to distinguish between different types of vessels, such as cargo ships, fishing boats, or naval vessels, and track their movements. For investment management, this capability is invaluable as it offers real-time insights into maritime traffic, trade routes, and shipping activities, enabling investors to make data-driven decisions related to shipping and logistics sectors.

Spatial coverage target

Water bodies extent

Data throughput

Rapid tasking	■ High	☐ Low
Data availability	■ High	☐ Low

Product specifications	
Main processing steps	The process starts by obtaining various training samples from optical and SAR VHR imagery (≤ 3 m) to be used for training of machine learning models for ship detection and categorization. Then we apply the model for any type of ship over any type of water body to detect and categorize ships.
Input data sources	Optical: VHR based on the availability like Pleiades 1A/1B & NEO, WorldView2&3, and SPOT6/7 Radar: VHR images from different sources like ICEYE, Capella space, and TerraSAR-X Supporting data: AIS
Accessibility	Optical and SAR VHR imagery: commercially available on demand from EO service providers.
Spatial resolution	≤ 3 m
Frequency (Temporal resolution)	Daily
Latency	< 1 Day
Geographical scale coverage	Globally
Delivery/ output format	Data type: Raster File format: GeoTIFF
Accuracies	Thematic accuracy: 80-90% Spatial accuracy: 1.5-2 pixels of input data
Constraints and limitations	■ Smaller vessels and low-profile ships may be challenging to detect or classify. ■ Cloud presence but it can be overcome by using SAR imagery. ■ Challenging to separate individual vessels over-crowded ports or regions with high maritime traffic. ■ Cost of VHR imagery
Level of skills required by users to use the EO service	Skills: Essential Knowledge: Essential