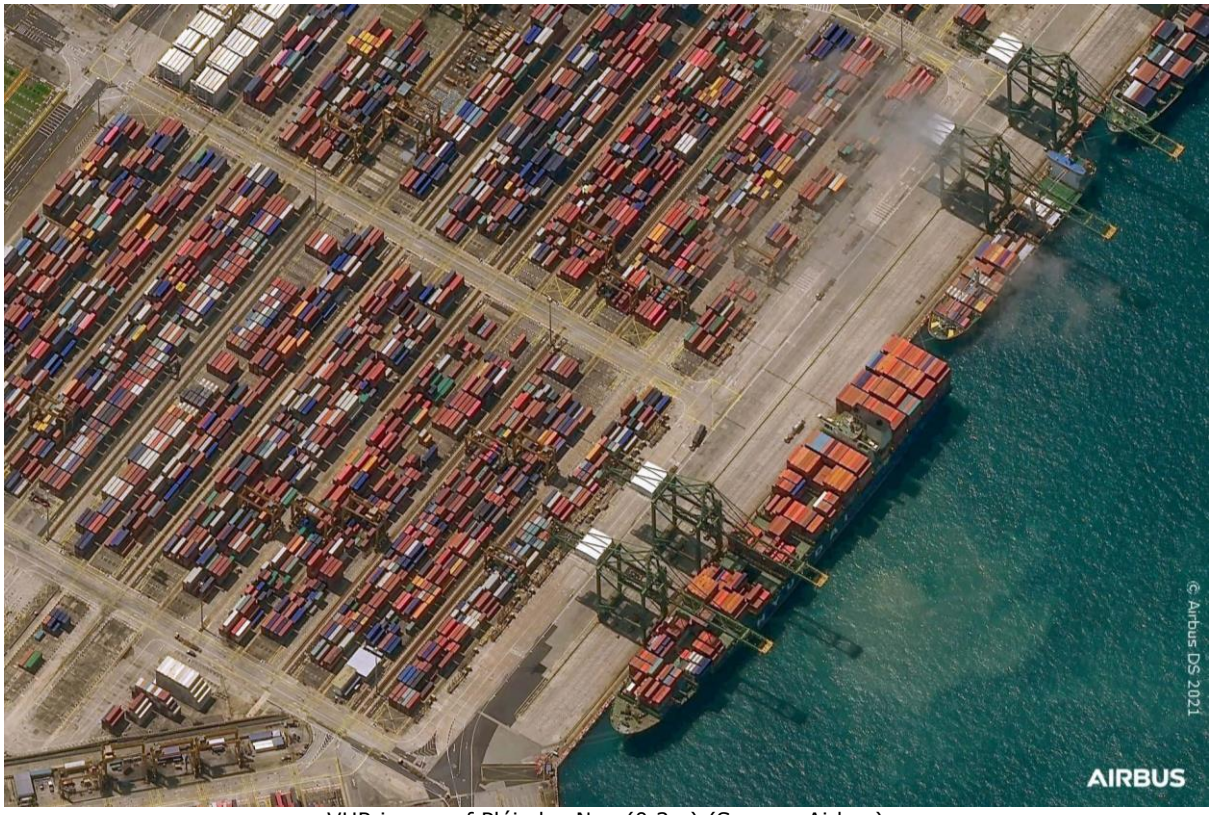
EO-FIN

Monitoring Changes in Port Activity Patterns



VHR image of Pléiades Neo (0.3m) (Source: Airbus)

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

UN9: Understanding stock levels and monitoring supply chains.

Description

The EO data enables the financial management sector to regularly track changes in port activity patterns including cargo volumes, vessel traffic, and infrastructure development. By analysing these changes, financial managers can make informed investment decisions, assess the financial health of companies engaged in port operations, and identify emerging market trends.

Spatial Coverage Target

Ports

Data Throughput

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

Product specifications	
Main processing steps	Monitoring changes in port activities over time is applicable by using VHR images with suitable temporal frequency. Then we can perform change detection analysis on the acquired satellite images to identify and quantify changes in the port's infrastructure, cargo volume, vessel traffic, and other relevant parameters. This analysis involves comparing two or more images taken at different times and highlighting the differences between them. The change detection analysis becomes more informative when we possess labelled data of the port. In addition to conventional change detection techniques, automated change detection methods using machine learning algorithms can be advantageous in this context.
Input data sources	Optical: VHR based on the availability like Pleiades 1A/1B & NEO, WorldView2&3, and SPOT6/7 Radar: N.A Satellite-based products: N.A Supporting data: AIS
Accessibility	Optical VHR imagery: commercially available on demand from EO service providers.
Spatial resolution	Optical VHR: ≤ 0.5 m
Frequency (Temporal resolution)	Optical VHR: Sub-daily to 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	■ Cloud presence near large water bodies ■ Limited available labelled data of port activities. ■ Temporal resolution and Cloud presence of the satellite data can limit the frequency of monitoring and timely detection of rapid changes in port activities. ■ Discerning fine-scale details of port activities. ■ Access to high-quality EO data, especially from commercial satellite providers, can be costly. ■ Limited nighttime observations
User's level of knowledge and skills to extract information and perform further analysis on the EO products.	Skills: Essential Knowledge: Essential