EO-FIN

Stock Changes in Oil Tanks with Floating Roof

(Left) Oil tanks with floating roof (Right) Floating oil tank roofs in the Port of Rotterdam, Netherlands using ICEYE's Daily Coherent Ground Track Repeat (GTR) imagery (0.5 m) (Source: ICEYE).

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 condition of crude oil reserves holds significant significance for the oil market and is a vital determinant in worldwide economic progress. Oil inventory reflects the balance between market supply and demand, directly impacting pricing Therefore, regular, and precise updates regarding the levels of reserves are of utmost importance. High frequent SAR VHR imagery (daily) can be utilized for daily assessments of oil production. SAR imagery is preferable as it provides a continuous time series regardless of weather conditions, day, and night. However, remote sensing sensors cannot penetrate walls and roofs. Therefore, they are only capable of measuring the volume of oil in storage tanks that are above ground and equipped with an external floating roof. The roof sits on the oil and goes up and down as the oil level changes in the tanks. This helps to make less space above the oil and reduce the vapour in that space. By measuring how tall and wide the floating tanks are, along with some other tank measurements, we can accurately figure out how much oil they can hold.

Spatial Coverage Target

Oil storage tanks with floating roof

Data Throughput

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

Product specifications	
Main processing steps	By using a time series of daily or weekly VHR SAR imagery for the same region, it becomes feasible to detect the change that is occurring in an object (floating roof oil tanks). Objects that haven't changed while being observed will appear identical every day. Objects that have undergone changes can be recognized and studied. With the VHR imagery, the change in height and area can be calculated enabling the volume of oil on a daily or weekly basis.
Input data sources	Optical: N.A Radar: VHR images from different sources like ICEYE and Capella space Supporting data: N.A
Accessibility	SAR VHR imagery: commercially available on demand from EO service providers.
Spatial resolution	SAR VHR: ≤ 0.5 m
Frequency (Temporal resolution)	SAR VHR: sub-daily to daily
Latency	≤ 1 day
Geographical scale coverage	Globally
Delivery/ output format	Data type: Raster File format: GeoTIFF
Accuracies	Thematic accuracy: 90% Spatial accuracy: 1.5-2 pixels of input data
Constraints and limitations	■ Cost of time series of VHR images ■ While VHR imagery provides detailed views, there might still be limitations in identifying very small details
User's level of knowledge and skills to extract information and perform further analysis on the EO products.	Skills: Ample Knowledge: Ample