



HAZRUNOFF

PROJECT

Near Real-Time Satellite Data in Operational Context

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boedinger@eomap.de

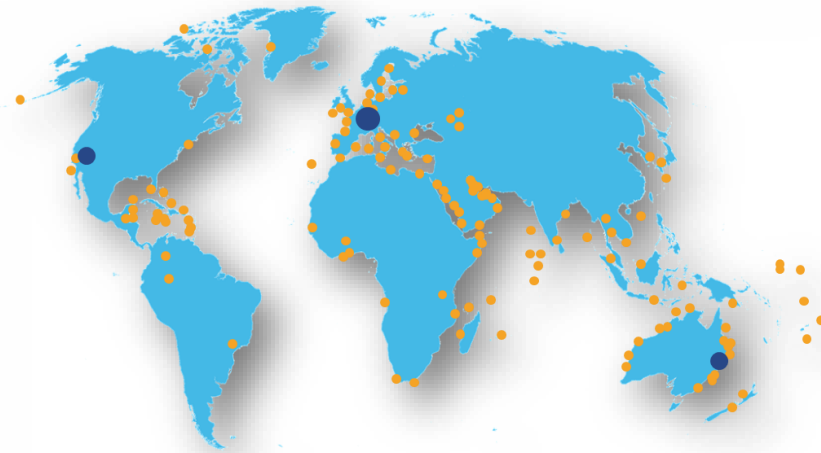
EOMAP



Funded by
European Union
Civil Protection
and Humanitarian Aid

About EOMAP

- Spin-Off of DLR since 2006
- Core services: EO mapping & monitoring of inland and coastal environments
- Headquarters: Seefeld near Munich/Germany, subsidiaries in Australia, US



28/05/2020 MEETING



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The Ocean...



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User Workshop

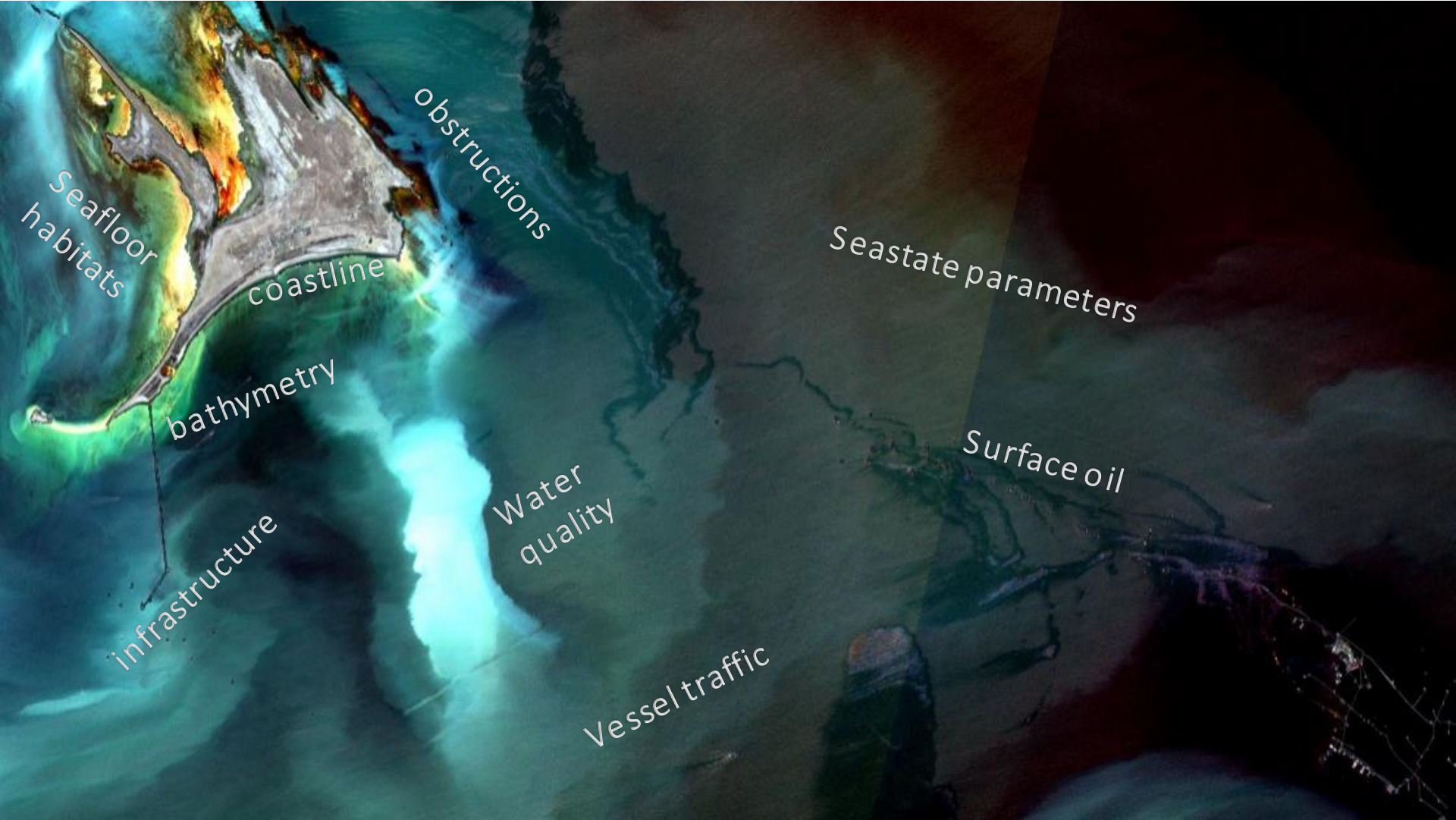


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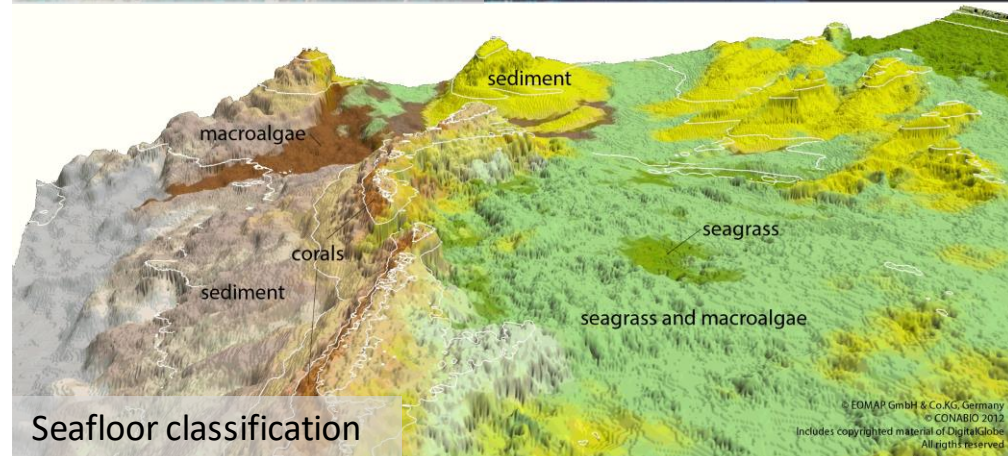
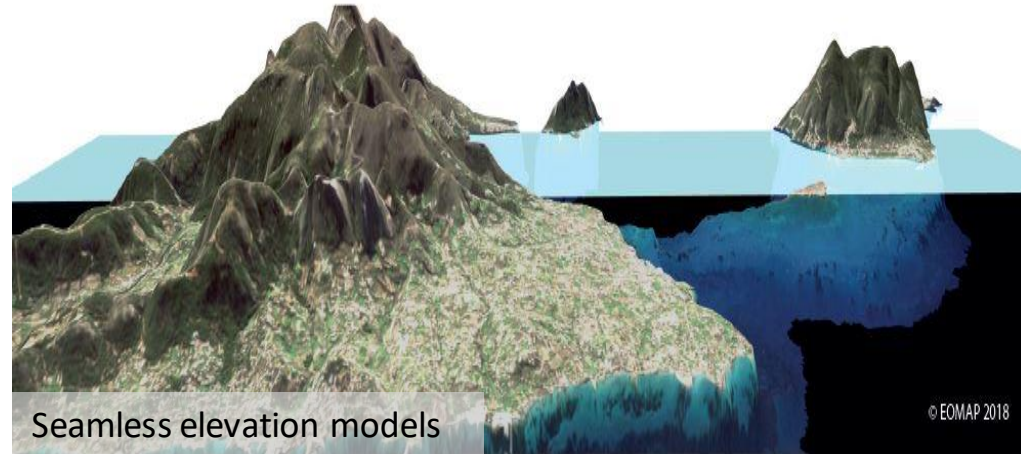
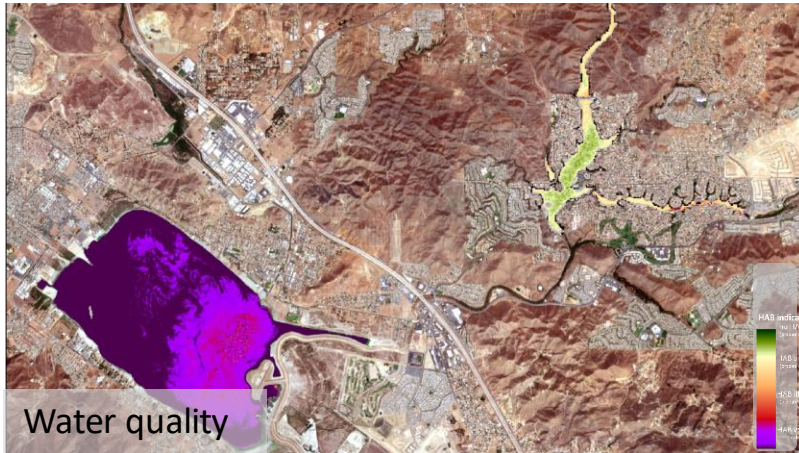


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... a sea of possibilities



On the water surface... ..and below



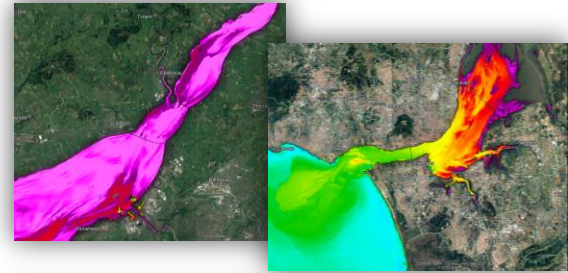
5 000 sqkm Mexican Maya Coast, EOMAP 2012 - 2014
Cerdeira-Estrada S. et al. (2012): Proc. IGARSS, p. 1-4



Our tasks in HazRunOff

I. Turbidity

Monitoring Turbidity in river estuaries



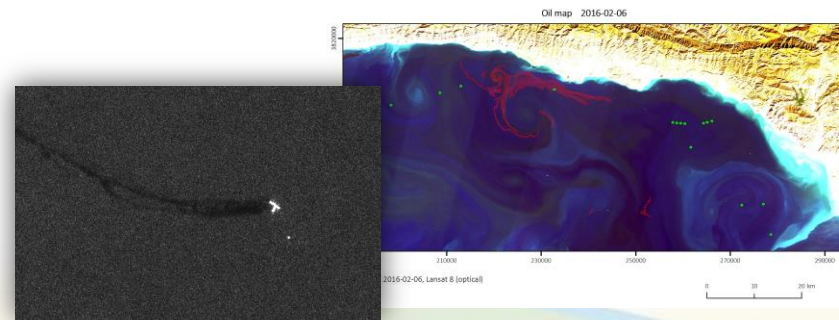
II. Water Level and Extent

Monitoring Water Level and Extent with both optical and radar satellites

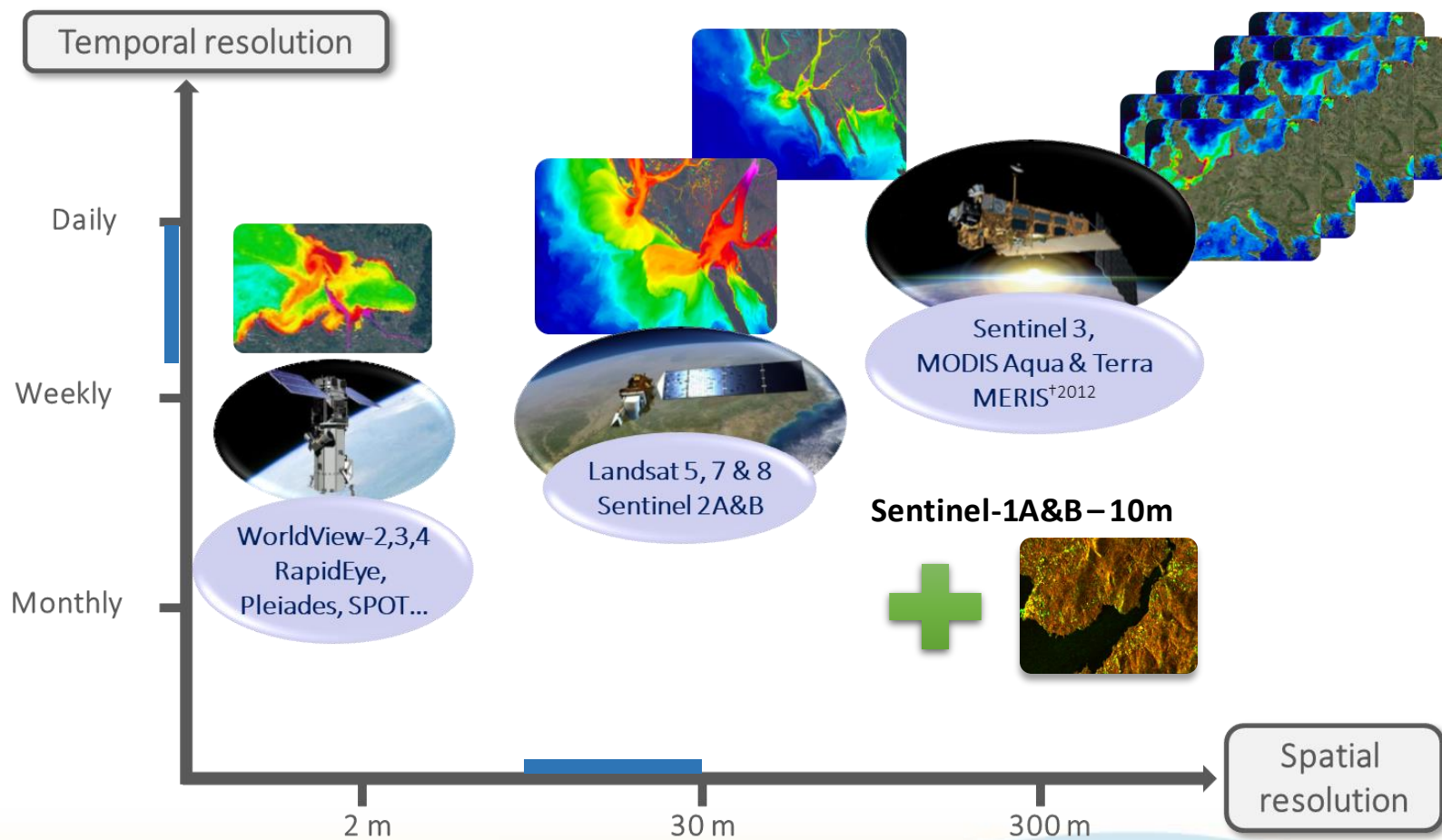


III. Oil and Chemical Spill

Working towards an improved Oil and Chemical detection system

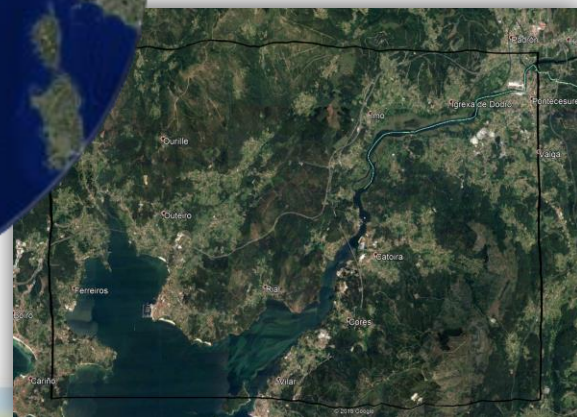
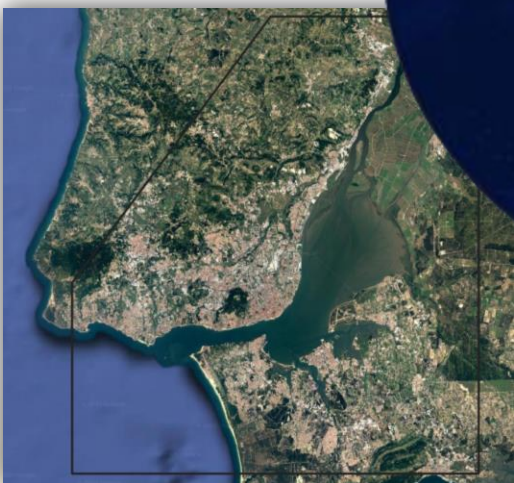
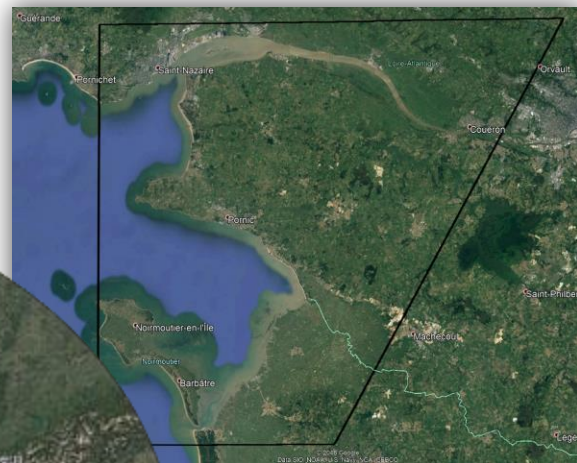
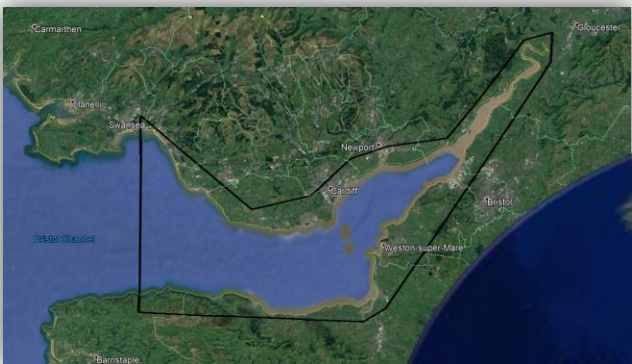


Satellite missions frequently used



■ = HazRunOff

Monitoring for HazRunOff



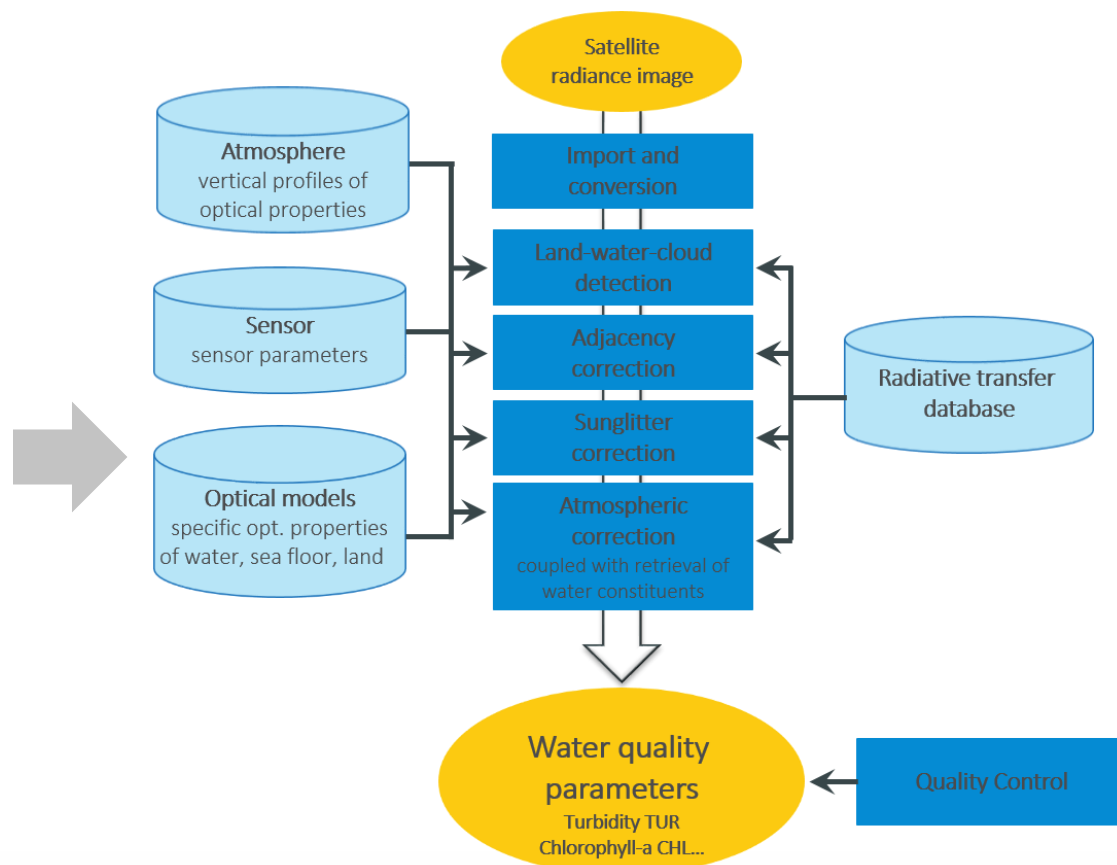
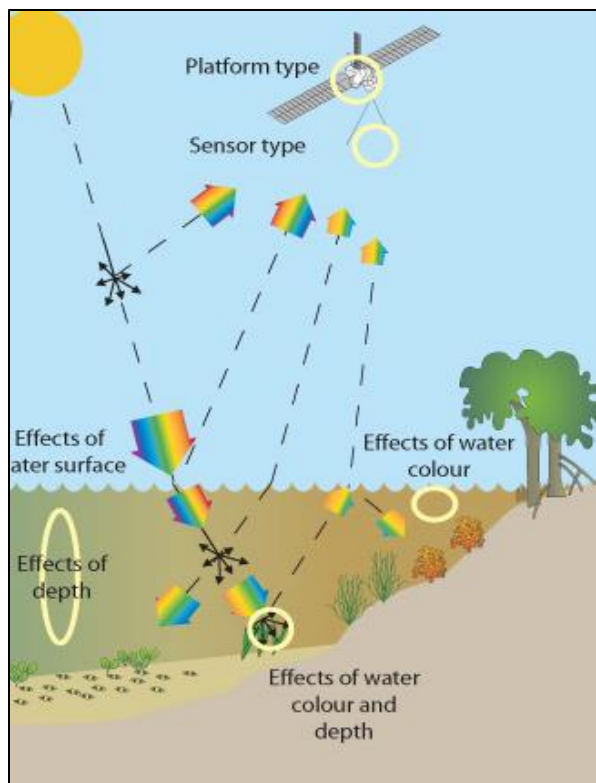
Satellite image frequency

Study area	Landsat 8 path/row	Sentinel-2 Tile	Images per year (max.)	
			Landsat 8	Sentinel-2 (A/B)
Severn	203/24	30UWC, 30UVC, 30UVB	23	438
Loire	201/27	30TWT	23	182
Tagus	204/33	29SMD, 29SND, 29SMC, 29SNC	23	584
Rio Ulla	204/30, 205/30	29TNH	23	146



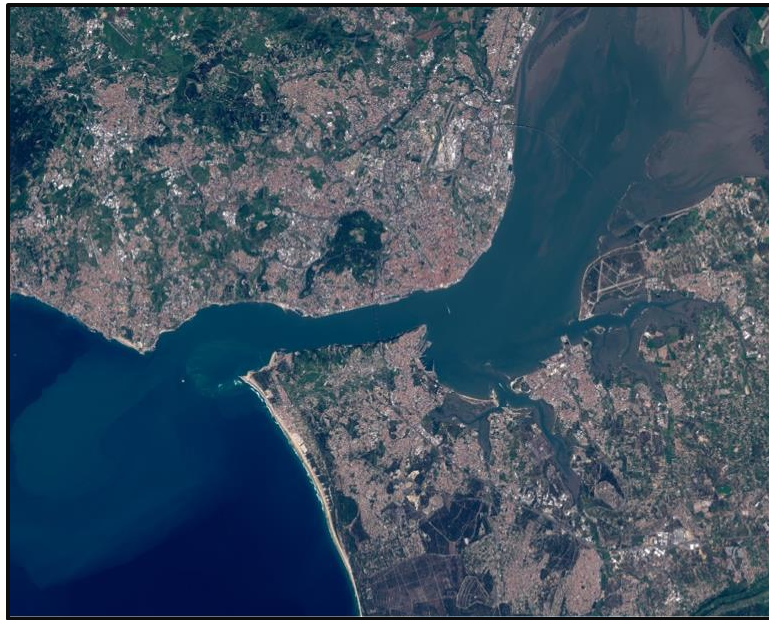
Revisit Time	
Landsat 8	16
Sentinel-2 (A/B)	2-3
Sentinel-1 (A/B) (radar)	2

Physics based models for Water Quality assessment

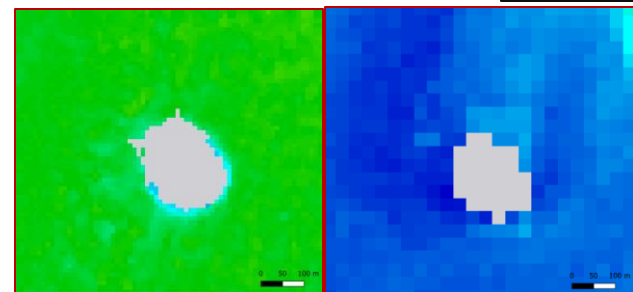
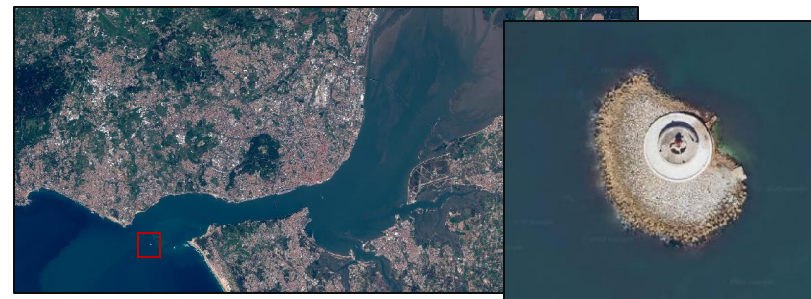
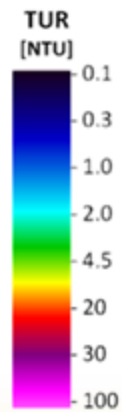


I. Monitoring Turbidity

- key parameter of water quality
- linearly related to the backward scattering of light (organic and inorganic particles)
- an indicator of potential pollution in a water body



Tagus River Estuary



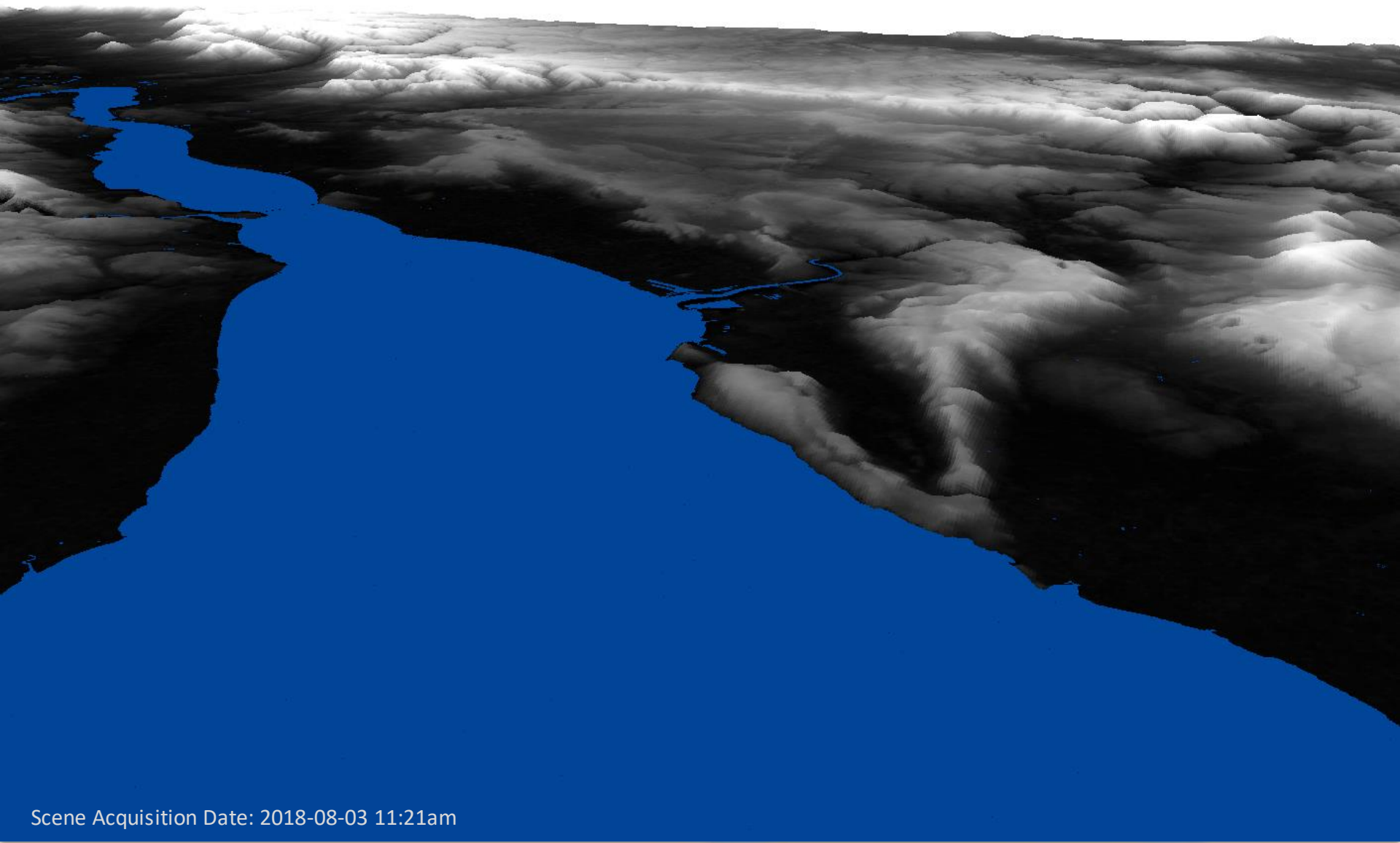
Sentinel-2 10m

Landsat 8 30m



II. Monitoring Water Extent

Tidal height: 10.2m (Station: Newport)



Scene Acquisition Date: 2018-08-03 11:21am

Severn Estuary – Close to Cardiff (Elevation model: STRM DEM)

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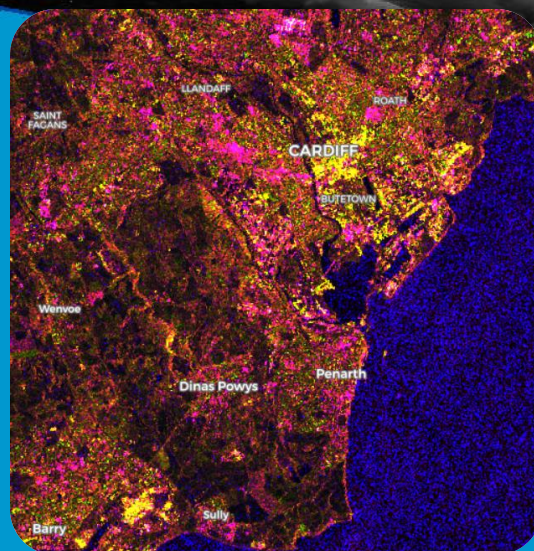
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II. Monitoring Water Extent

- Tidal height: 10.2m (Station: Newport)
- Tidal height: 7.7m (Station: Newport)



Optical Imagery



Sentinel-1 C-Band Radar

Scene Acquisition Date: 2018-07-21 11:09

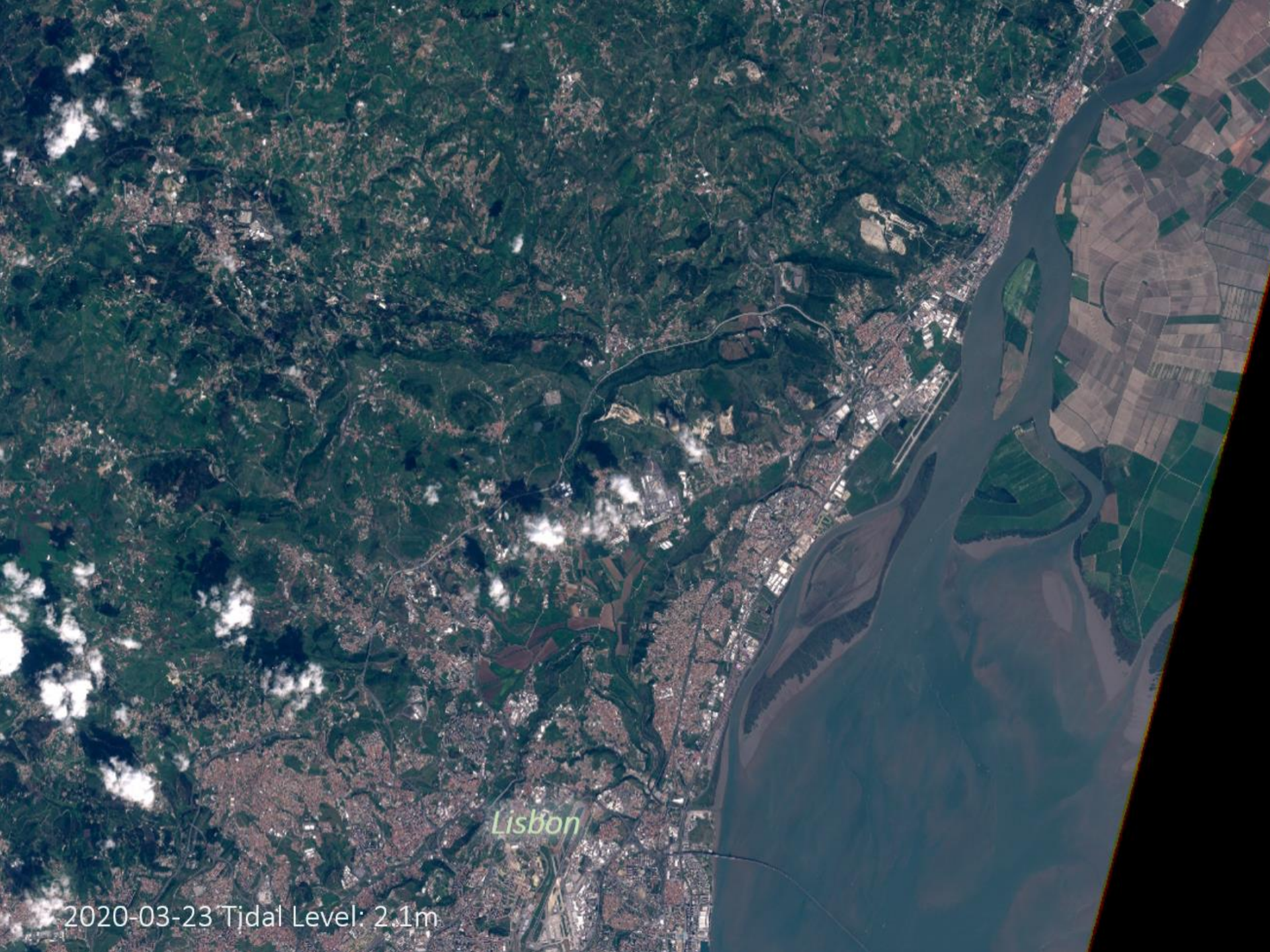
Severn Estuary – Close to Cardiff (Elevation model: STRM DEM)

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Lisbon

2020-03-23 Tidal Level: 2.1m

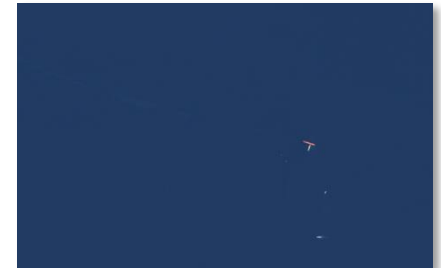
III. Oil Spill Detection – Motivation

- ❖ Existing systems focus on **Radar** imagery
- ❖ High number of false positives and false negatives
- ❖ High cost of determining **Chemical Substances**

Action:

Crossing optical + radar imagery

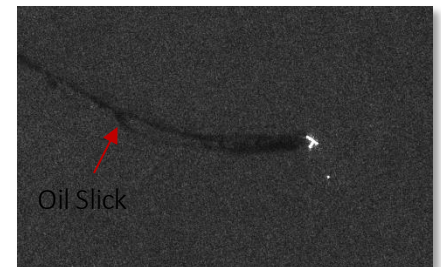
- Analyze spectral and polarimetric signatures
- Determine potential of combined usage to reduce false alerts



Raw Optical Image (True Color)

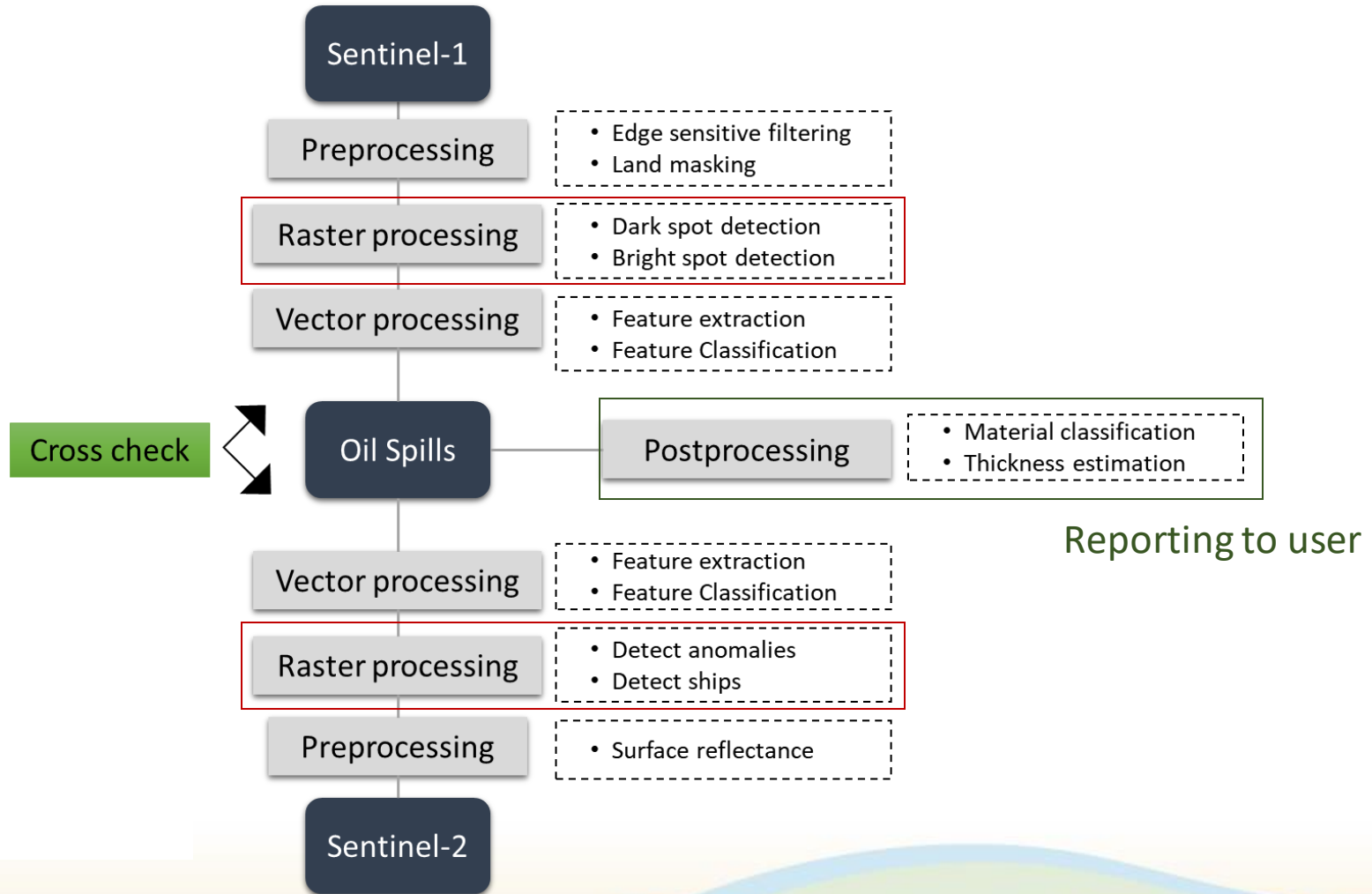


Processed Optical Image



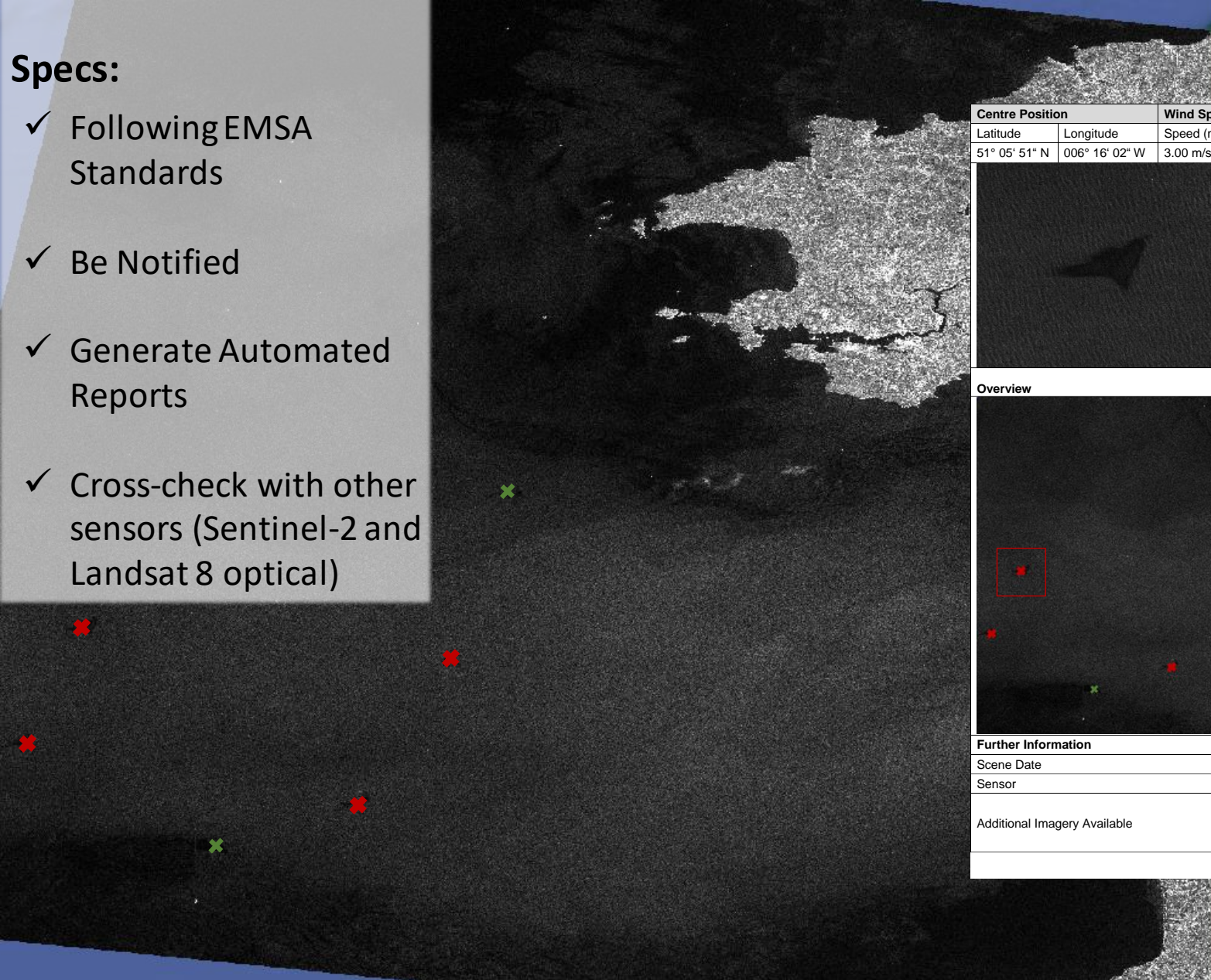
Radar Image

III. Oil Spill Detection – Technical Framework

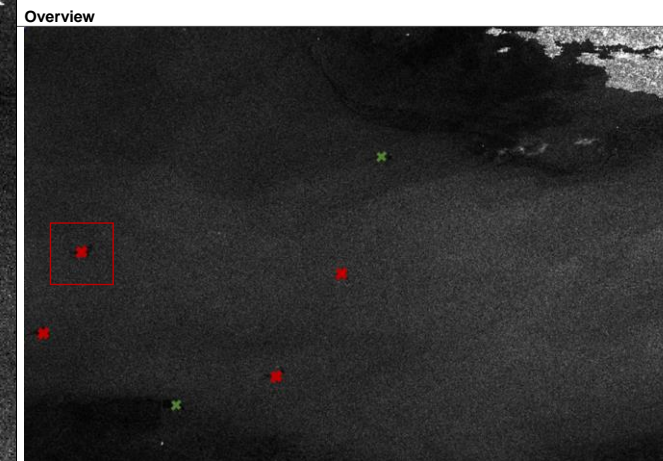


Specs:

- ✓ Following EMSA Standards
- ✓ Be Notified
- ✓ Generate Automated Reports
- ✓ Cross-check with other sensors (Sentinel-2 and Landsat 8 optical)

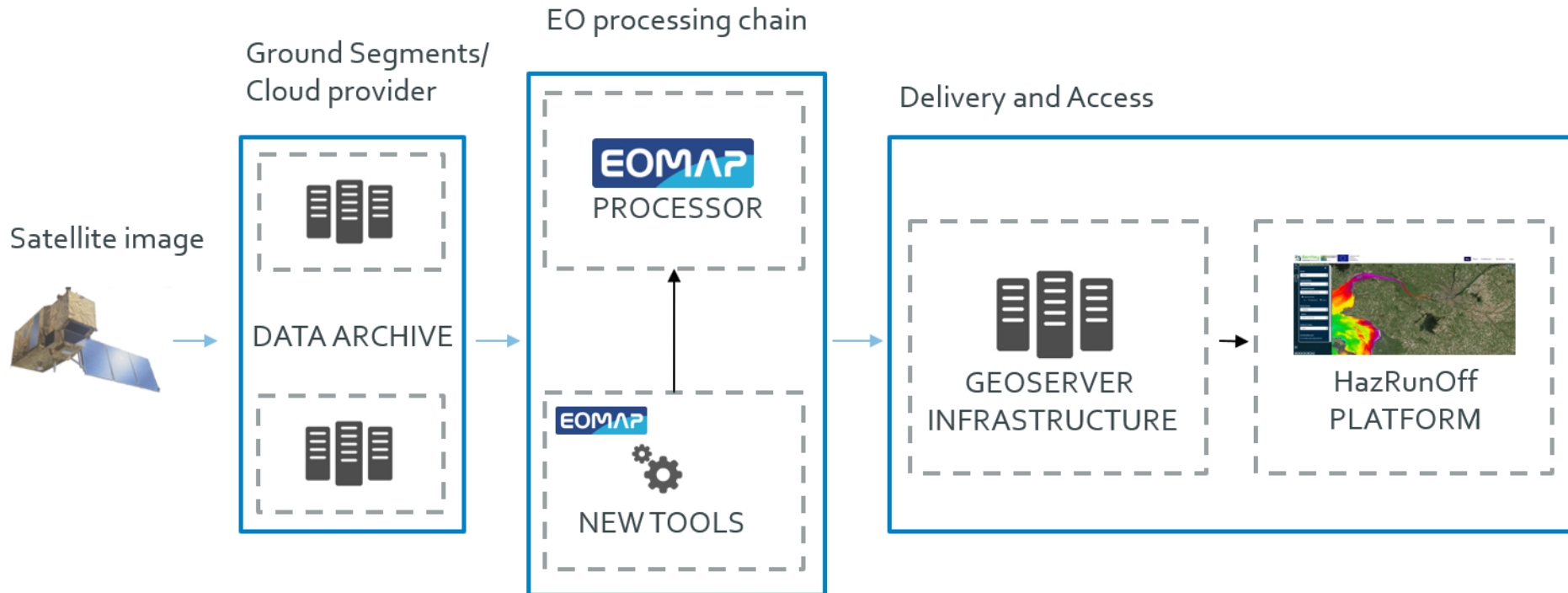


Centre Position		Wind Speed		Area (nm ²)	Length (nm)
Latitude	Longitude	Speed (m/s)	Class		
51° 05' 51" N	006° 16' 02" W	3.00 m/s	Low	0.61	1.80
					Spill Probability
					High
					Ships Detected
					Yes

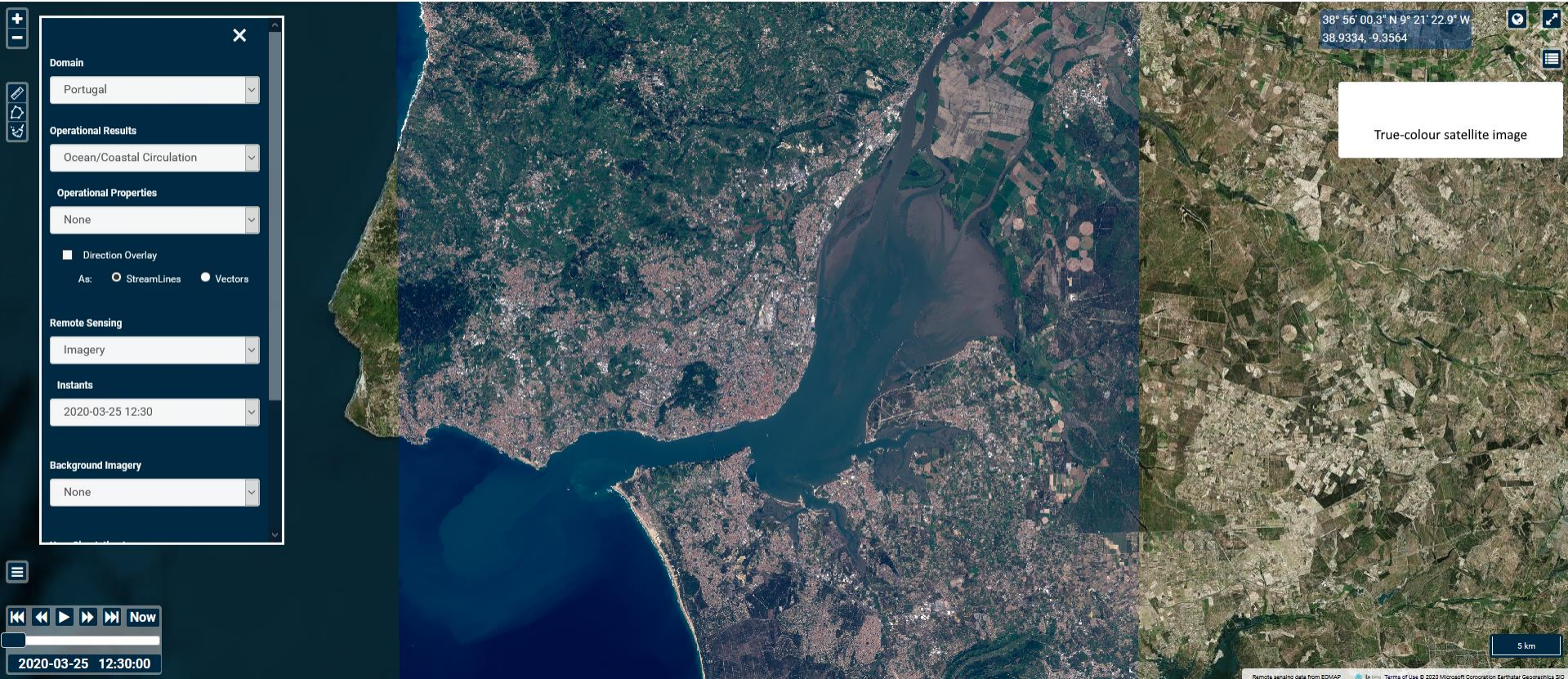


Further Information	
Scene Date	2018-10-24 06:31:37
Sensor	Sentinel-1
	Yes
Additional Imagery Available	Sentinel-2 2018-10-23 11:21:11
	No Spill Detected

Integration into the HazRunOff Platform



Integration into the HazRunOff Platform



The screenshot displays the HazRunOff platform interface. On the left, a settings panel is open, showing the following options:

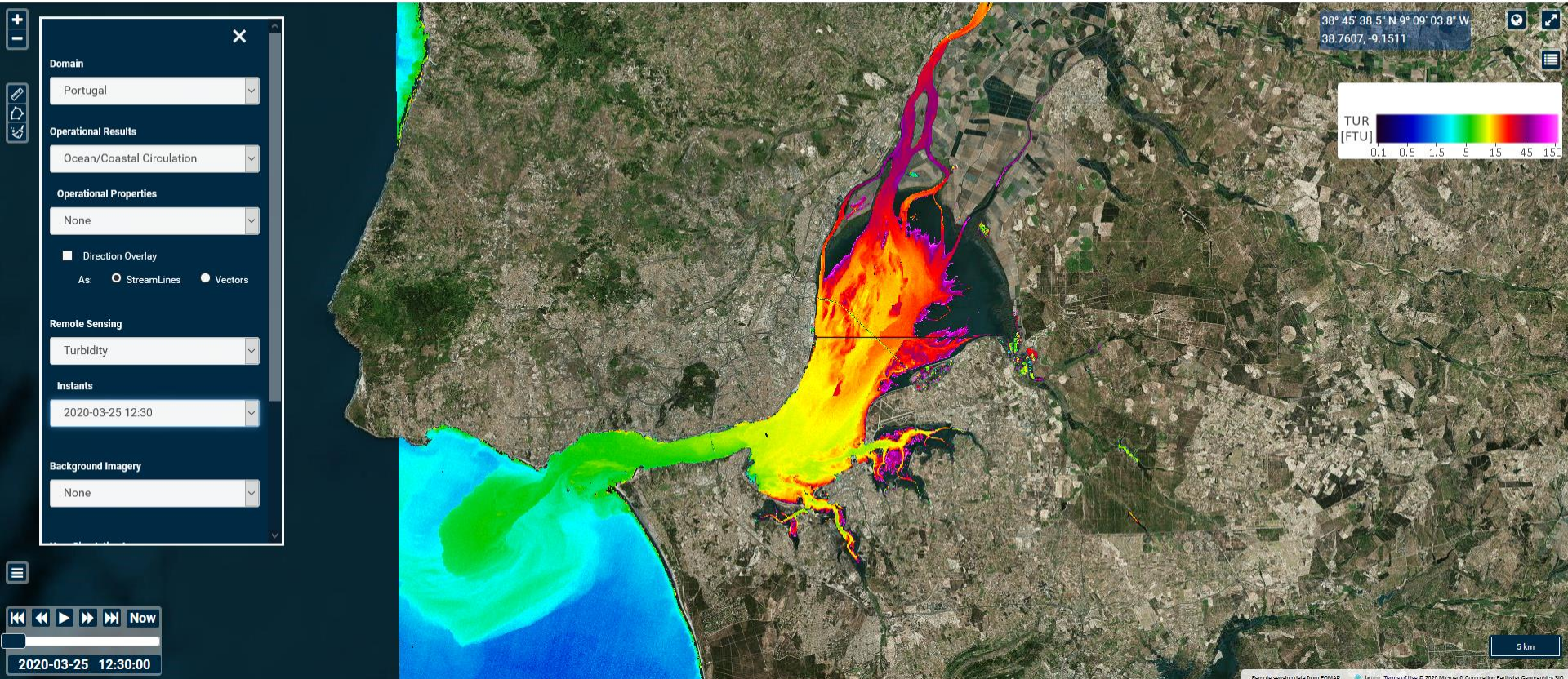
- Domain: Portugal
- Operational Results: Ocean/Coastal Circulation
- Operational Properties: None
- Direction Overlay: (unchecked)
- As: StreamLines (selected), Vectors
- Remote Sensing: Imagery
- Instants: 2020-03-25 12:30
- Background Imagery: None

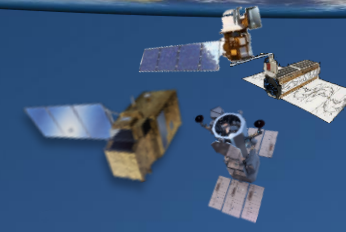
The main map area shows a satellite view of a coastal region in Portugal. A dark, semi-transparent simulation overlay is visible over the land, representing the HazRunOff model. A white box on the right side of the map contains the text "True-colour satellite image". The top right corner of the map displays coordinates: 38° 56' 00.3" N 9° 21' 22.9" W and 38.9334, -9.3564. A 5 km scale bar is located in the bottom right corner of the map area. At the bottom left, there is a playback control bar with buttons for "Now", "Previous", "Next", and "Stop", and a time display showing "2020-03-25 12:30:00".

Integration into the HazRunOff Platform



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