## **Intertidal Bathymetry and Shoreline Mapping**

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Image shows 6 month composite of intertidal heights for Portsmouth Harbour (Nov 2015- May 2016) using on Portsmouth Tide Gauge

- Efforts have focused on **intertidal topography mapping** using SAR (Temporal Waterline mapping or TWL)
- Service development has been user driven through regular meetings with the Channel Coastal Observatory EO Working Group (c. 20 members from coastal authorities, environmental agency and survey specialists)
- **Validation study** conducted using Portsmouth Harbour comparing LIDAR surveys from 2016, 2018 and 2020 against 6 month composites of SAR processed data

Table shows validation results in terms of Mean Average Error, Root-Mean-Square Error and R-squared

	MAE	RMSE	R2
2016	0.21	0.37	0.63
2018	0.30	0.42	0.65
2020	0.26	0.36	0.72

- To date UK applications have relied on 'flat tide' approximation (i.e. water levels from nearest tide gauge are assumed flat across survey area) this oversimplification is being addressed by integrating spatially varying tides e.g. POLPRED & FES
- In parallel team are developing `**confidence layer**' that quantifies the uncertainties and limitations tailored to user needs

# **GNSS-Interferometric Reflectometry**



**Original 2018 Loctips Project:** low cost Sirfstar IV GPS L1 receiver deployed at Sligo Bay Lifeboat Station in Ireland – **Still operational after 3 years**.

Max of 2-4 satellites available for water level detection, but occasionally **no** satellites in a good configuration. GPS Broadcast Ephemeris obtained direct from receiver for real time processing

**BLUECO Update:** New low cost uBlox 9 Receivers implemented with GPS, GLONASS, GALILEO & BEIDOU constellations. Always some satellites in useful configuration, sometimes 15+ satellites in a configuration useful for water level (& wave height) detection. All Broadcast Ephemeris obtained direct from receiver.

*Bottom Right*: Pre-EMEC deployment configuration testing with a laptop & receiver at Alfred Dock on the Mersey Estuary (local site with ground truth data)









## **Marine Litter Detection service**



### A Sentinel 2 based service chain to detect floating marine plastics



Plastics detection analysis performed in Vigo River estuary



Plastics detection analysis in Front of the El Rincón estuary

Feature		Value
· 20200	)821_high [4]	
▼ ID		0
•	(Derived)	
•	(Actions)	
	Туре	LDPE
	MinFrac	0.1
	MaxFrac	0.15
	ConfLev	High
	PosErr	3 pixels
	ID	0
	Lon	-60.901315092239862
	Lat	-39.188067167818780
	Date	20200821
	layer	S2B_MSIL2A_20200821T135119_N0214_R
	path	C:/GMV/Projects/On-going/ATIN-BLUECO/10
► ID		1
► ID		2
→ ID		3
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#### Test performed in the Areas of Interest identified by project users

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