CleanAtlantic

Tackling marine litter in the Atlantic Area

CleanAtlantic workshop
Vigo, Spain. 9th May 2019

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European Regional Development Fund

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Marine Litter: a growing concern, a global problem

Dead whale washed up in Philippines had 40kg of plastic bags in its stomach

Marine biologists horrified to find 16 rice sacks and multiple shopping bags inside Cuvier's beaked whale

▲ Darrell Blatchley pulling plastic out of the juvenile male Cuvier's beaked whale. Photograph: Darrell Blatchley/D' Bone Collector Museum Inc.

Billions of pieces of plastic on coral reefs send disease soaring, research reveals

A major new study estimates 11bn pieces of plastic contaminate vital reefs and result in infections: 'It's like getting gangrene,' scientists warn

Bulgaria : river pollution blocking Vacha Dam, April 2000.
Source : AFP PHOTO / DIMITAR DILKOFF

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Marine Litter: knowledge gaps

Where?

Can we enhance/improve current methods to detect and map ML?

What Kind? And How Much?

Can we improve characterization methods and efficiency

What impacts?

Can we identify and assess unforeseen and compound impacts?

"HOW CAN I HELP?"

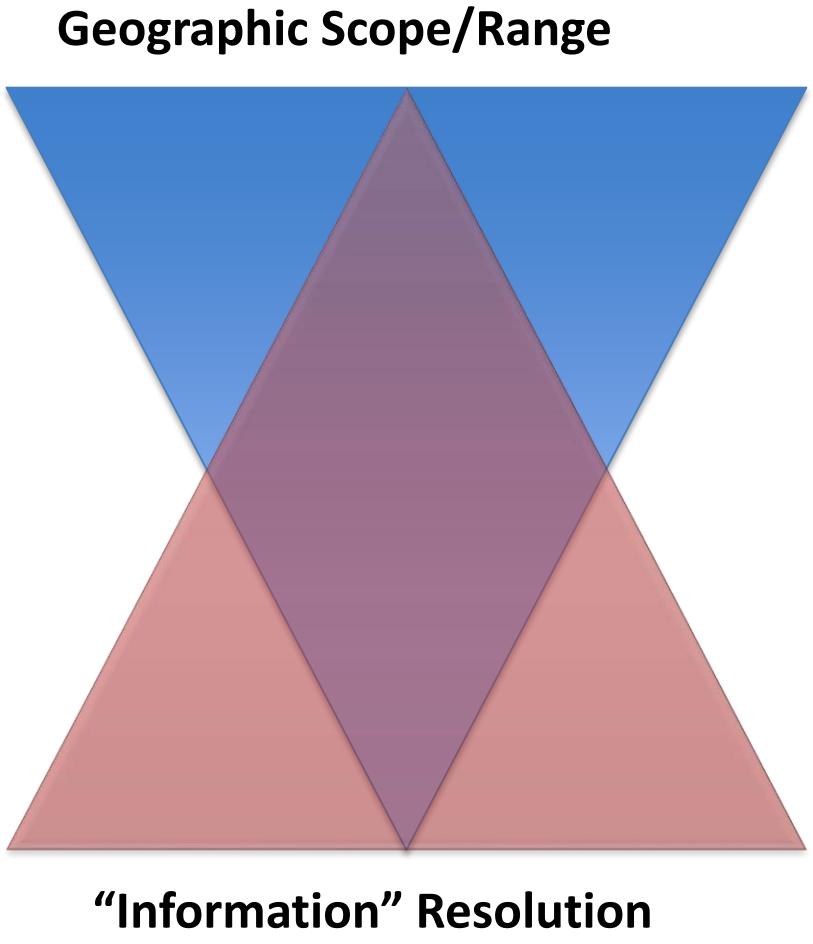
Assessing coastal habitat with UAVs Survey

Georeferenced Ortho-mosaic Imagery

Research tools in the marine environment

Surveys

Satellite Imagery Analysis
Aerial Surveys
Semi-quantitative Surveys
Mosaicing
Photo-quadrats
Quadrats
Sampling - Taxonomic ID
Sampling - Genetics



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arditi agência regional para o desenvolvimento da investigação tecnologia e inovação
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UAV multispectral reflectance profiling for litter detection

Imagery acquisition

- Pix4D Capture
- Manual Flight
- 5-10 m altitude

Object Detection

- Red, RedEdge and NIR bands
- eCognition multiresolution segmentation

Classification

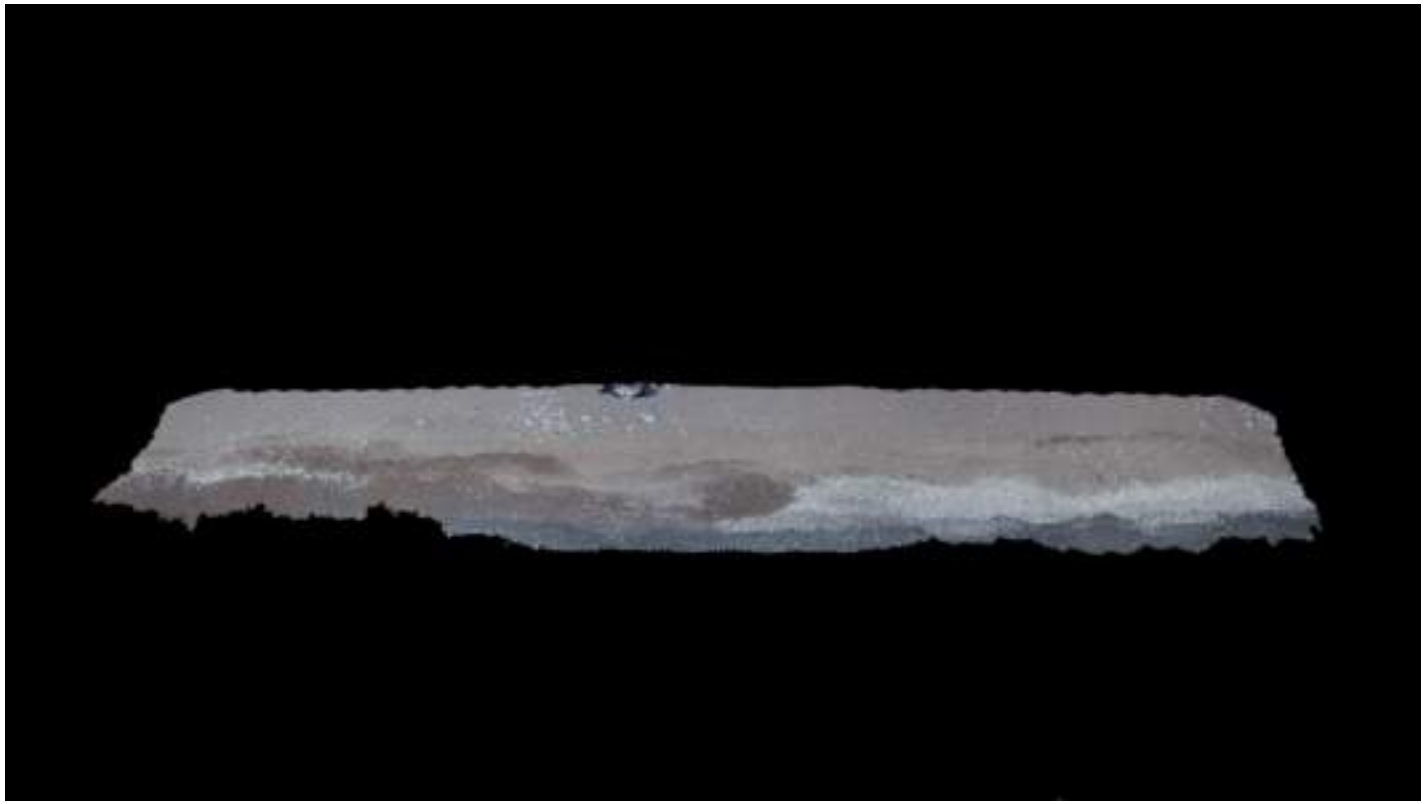
- eCognition object and multi band classification within constraint analysis area (detected objects)
- YOLO v3*

New tools for the monitoring of marine litter

Issues with AI classification of beached Marine Litter

Supervised classification or neural networks are not able to provide accurate results for all the categories… **is it worthwhile to use Drones instead of on site surveys?**

It can for detection accumulation areas and raked based contamination by marine debris




Google Earth
Image © 2019 DigitalGlobe
90 m
N

New tools for the monitoring of marine litter

Floating:

Aerial Surveys: Initial tests finished. Field Protocol in final optimization

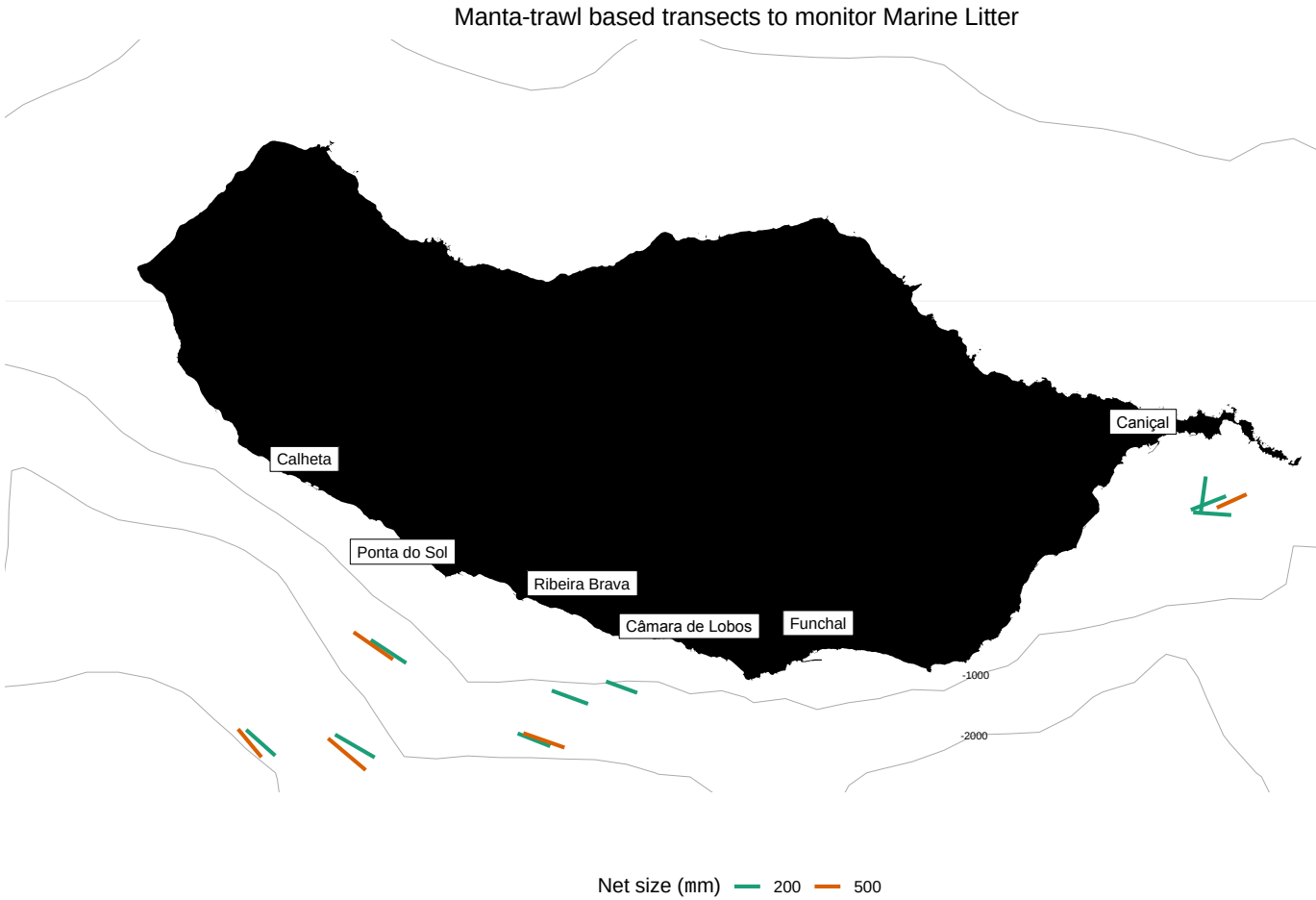
- 1 Km transects from land
- Ready for deployment on Large and small Vessels

Manta Trawl: Ongoing analysis of samples

- Manual vs Imagery analysis

Floating Litter Detection APP

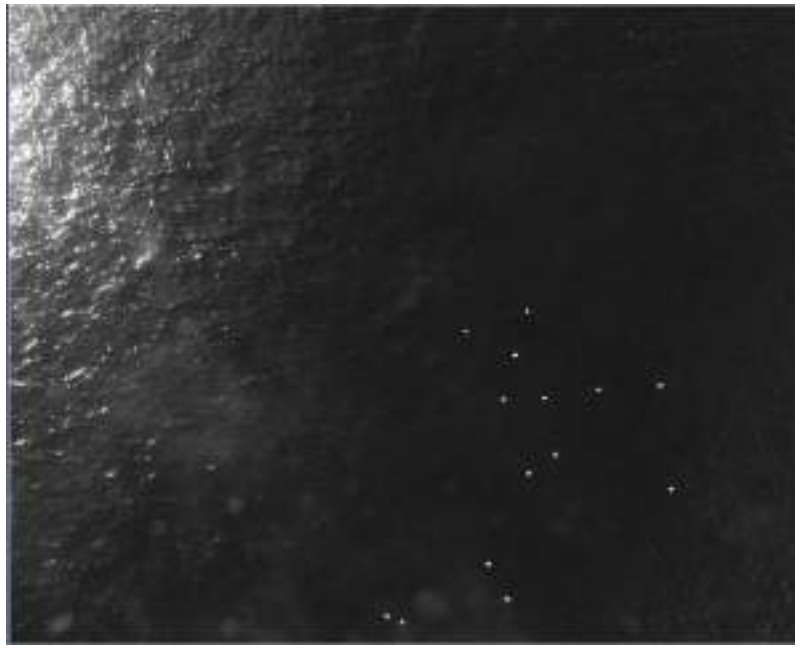
- Harvesting citizen-based information on floating ML



New tools for the monitoring of marine litter

Floating Litter:

- Initial testing is finished -> Imagery acquisition requires manual piloting and imagery stack collection;
- Progress in ML detection from RGB imagery has been done by selecting RGB Band 1 for floating object detection;

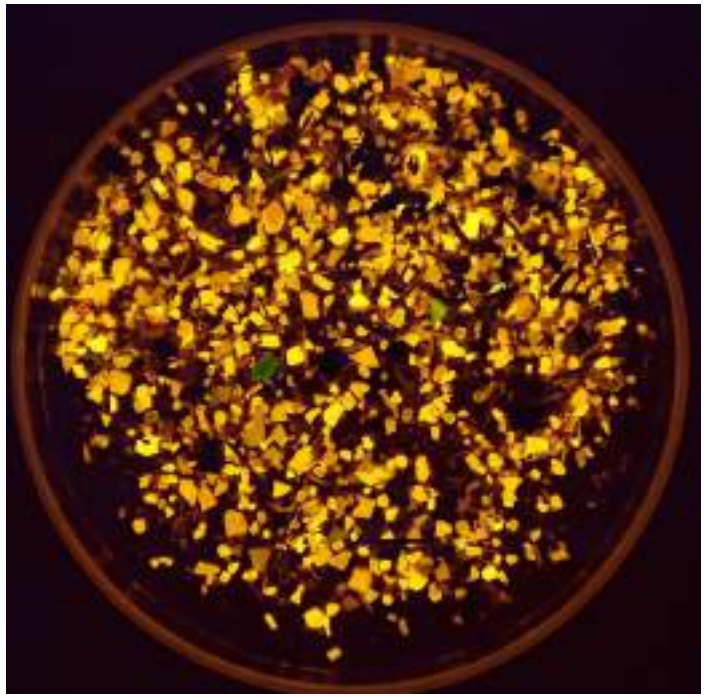


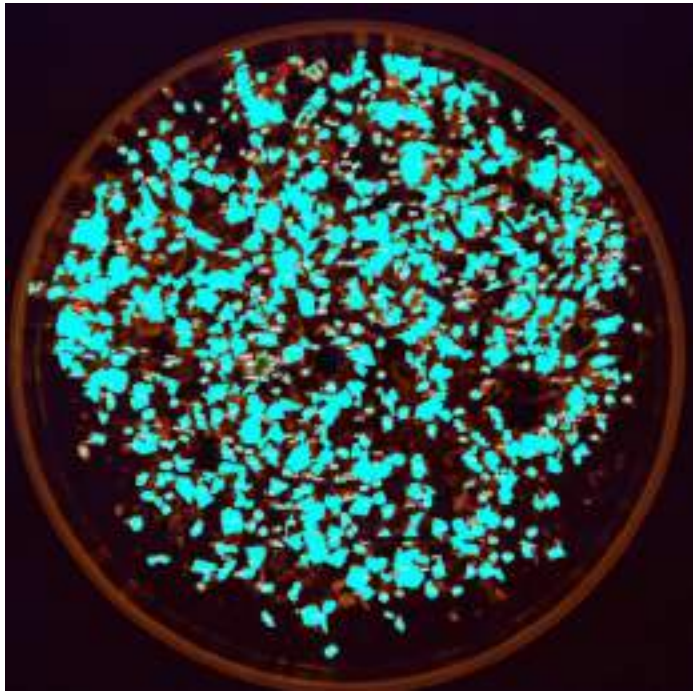
RGB Image RED Band Detection

New tools for the monitoring of marine litter

Floating Litter:

- Automated counting for meso-plastic samples is also being explored by making use of fluorescence and imagery analysis to reduce time, increase sampling size and geographic range of monitoring.





RGB Image → RED Band → Detection

New tools for the monitoring of marine litter

Can boat users and nautic enthusiasts help filling the gap in information on floating Marine Litter?

Boat Users

Take Picture

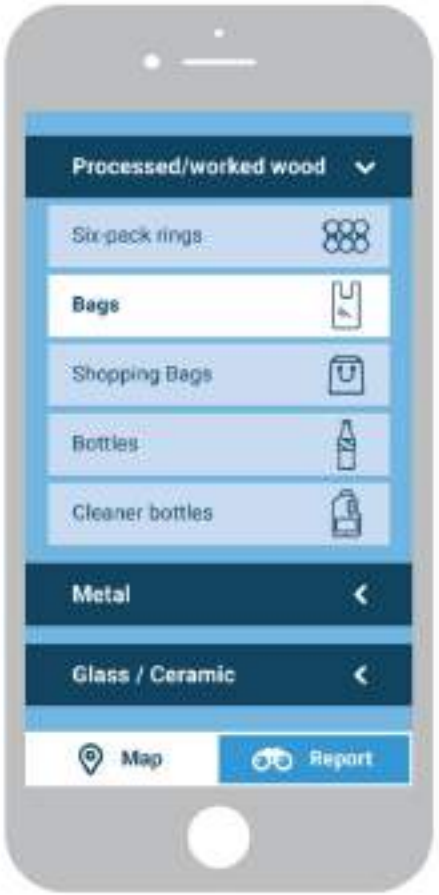
Detect Litter

Harvest Data

New tools for the monitoring of marine litter

LEVEL 1

LEVEL 2



LEVEL 3

REPORTING

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New tools for the monitoring of marine litter

Seabed Litter:

- Dive clubs are happy to collaborate but limited *nº* of activities throughout the year
- Collaborating with M-ITI to develop apps for citizen science based data collection
- Operational limitations in small (Stinger) and large (Luso) ROV have lead to the exclusion of these for dedicated monitoring within CA

Upcoming months:

Seabed:

- App development; CleanUp Surveys; UW Surveys

Floating:

- Aerial Surveys: Field Protocol in final optimization; Imagery Surveys Analysis
- Protocol optimization over the next 4 months; acquisition of dark reader and camera;
- Additional Sampling;

Beached:

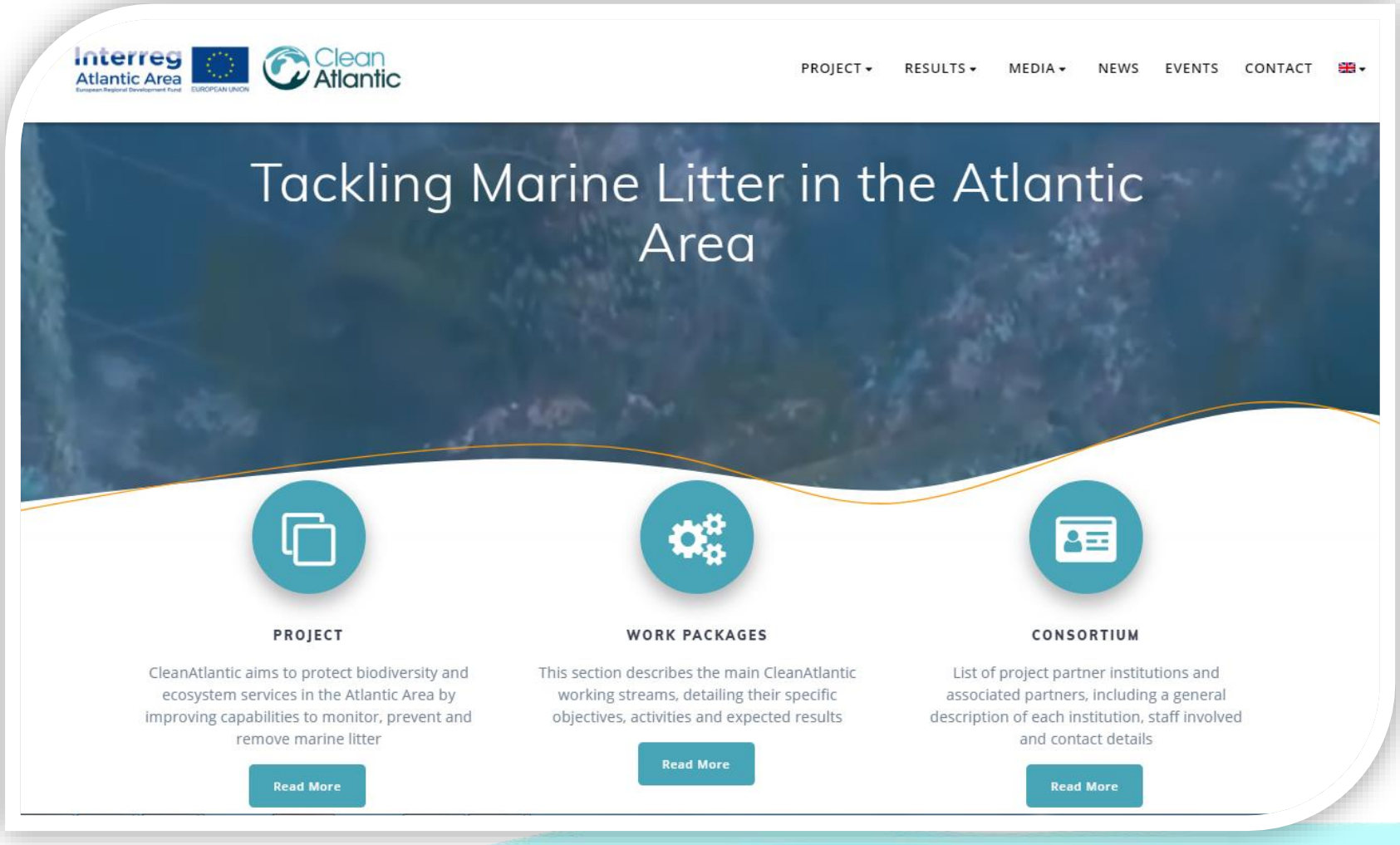
- Aerial Surveys: UAV flight and imagery analysis optimization in progress; Protocol development over the next 8 months.
- Collaboration with stakeholder and cleanups to enhance ML detection

Find out more about CleanAtlantic…

Follow us:

- www.cleanatlantic.eu
- @Clean_Atlantic
- @Cleanatlanticproject
- @CleanAtlantic project
- Newsletters;

- 8 Workshops;
- Final Conference: Vigo 2020.



Thank you very much!

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