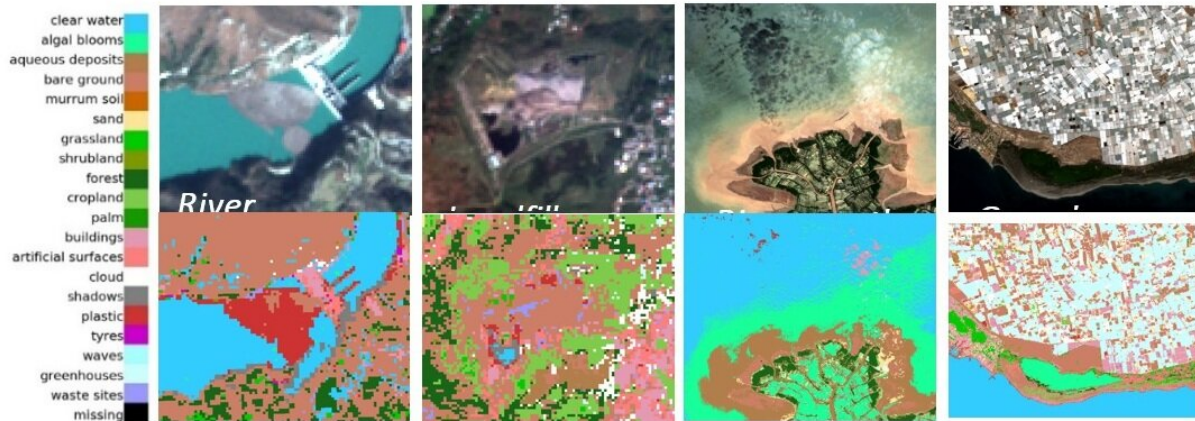


Tracking marine plastic drift from space

August 9 2022



MARLISAT partner Pixalytics [LINK: <https://www.pixalytics.com/>] in the UK has meanwhile been developing a machine learning algorithm able to detect plastic accumulation along beaches and ocean hotspots from satellite images. Credit: Pixalytics

Every 60 seconds the equivalent of a truckload of plastic enters the global ocean. Where does it end up? Right now, researchers simply don't know. But in a bid to help find out, an ESA-led project developed floating transmitters whose passage can be tracked over time, helping in turn to guide a sophisticated software model of marine plastic litter accumulation.

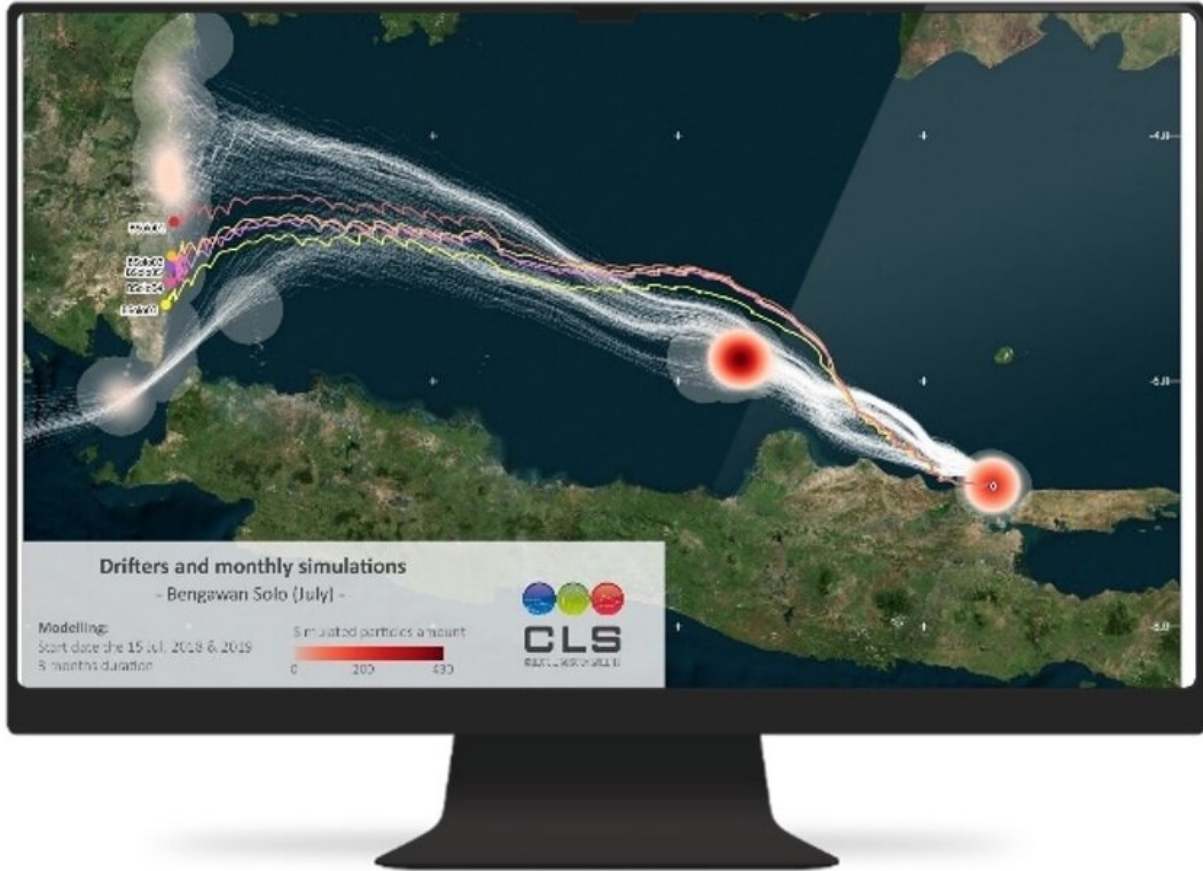
In a hi-tech version of throwing out messages in bottles, prototype trackable buoys were deployed in the waters off Indonesia, whose

myriad of islands results in some of the most complex, unpredictable currents on Earth.

Made from wood for maximum sustainability, the buoys were developed by French organization CLS, Collecte Localisation Satellites. A subsidiary of French space agency CNES, CLS is best known for overseeing the satellite-based tracking of tagged [marine animals](#), buoys and fishing fleets using its long-running Argos ge positioning system, which performs satellite navigation fixes and returns them to CLS via satellite link.

CLS made use of previous experience of marine plastic litter in Indonesia for the buoy deployments. It has previously teamed up with the Indonesian Ministry of Marine Affairs and Fisheries to help guide waste collection efforts—the country's national marine pollution plan pledges to reduce plastic waste by 70% by the end of 2025.

Together with the tracking buoys, the MARLISAT [project](#) also involves harnessing Earth observation imagery to detect plastic sources and forecast marine plastic litter's motion and areas of accumulation using an existing CLS ocean drift model called MOBIDRIFT.



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Project partner Pixalytics in the UK has meanwhile been developing a machine learning algorithm able to detect plastic accumulation along beaches and ocean hotspots from [satellite images](#).

"The strength of this project is the combination of satellite observations, in situ data and numerical modeling," comments Marc Lucas, Senior Oceanographer at CLS. "It is also great to have worked on a more

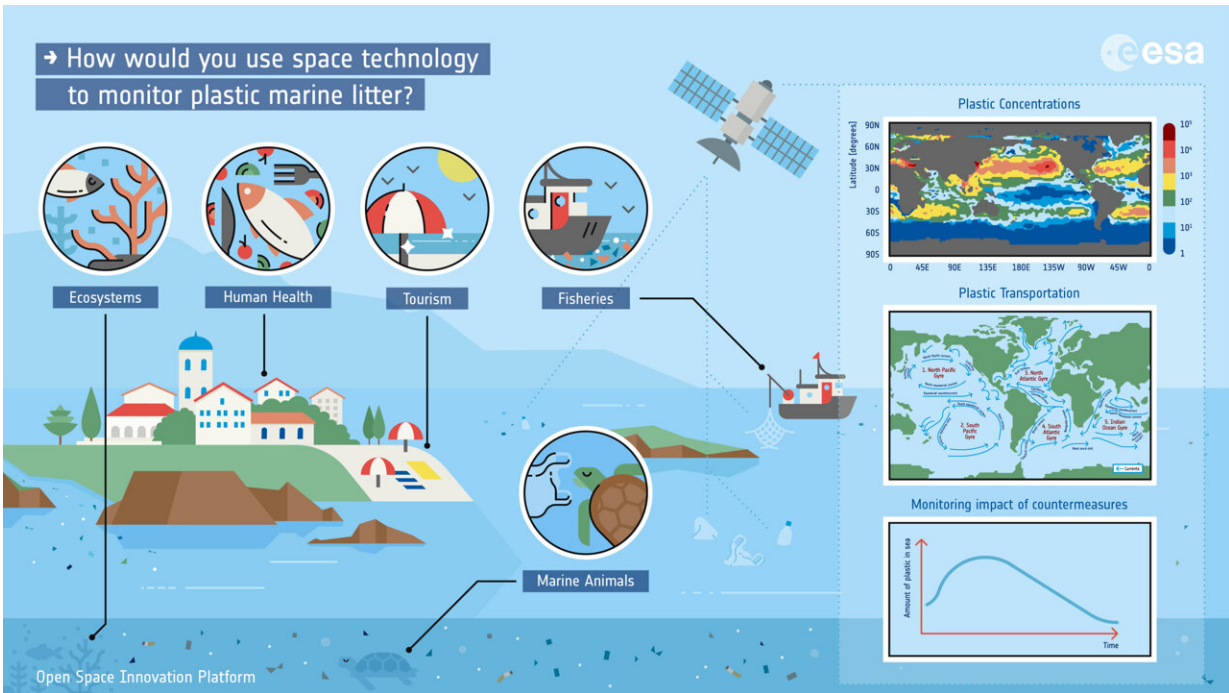
sustainable type of Argos beacons, with wood used for the casing. As scientists, we have a duty to work towards a more sustainable approach to science."

The buoys were released in late May, and tracked in real-time via a dedicated portal. Equipped with batteries for an approximately 100 day lifetime, their results are helping to optimize the drift model's parameters.

The MARLISAT project is being supported through the Discovery element of ESA's Basic Activities. CLS got involved through applying to an open call for ideas on marine plastic litter through the Agency's Open Space Innovation Platform (OSIP), which sources promising new ideas for research from academia, industry and the general public.



This plastic-free WoodMark buoy was designed for the MARLISAT project. Just 11cm by 7 cm in size, the wooden transmitter-housing buoy has a drag reducing shape and is designed to be tethered to objects of interest, such as plastic waste. Credit: CLS



Monitoring this plastic can be very difficult from Earth's surface, as it is impossible to see much of the ocean at once. But satellites with very high-resolution cameras and wide fields of view are changing our ability to monitor plastic waste, and ESA's Discovery & Preparation is supporting studies that investigate the best way of doing so. Credit: ESA - ScienceOffice.org

ESA antenna specialists also advised on the buoy design, notes Peter de Maagt, heading ESA's Antennas and Sub-Millimeter Waves section: "It is a privilege to work on projects that use space for the benefit of humankind and start addressing the problem of plastic waste in our oceans. The tag will provide valuable data to calibrate models and provide much needed ground truth."

MARLISAT is only one of a portfolio of marine [plastic](#) litter research projects initiated through OSIP and supported by ESA Discovery.

More information: CLS: www.cls.fr/en/

MOBIDRIFT: datastore.cls.fr/products/maritime-security/

Pixalytics: www.pixalytics.com/

Provided by European Space Agency

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