

A Space-Based Maritime Surveillance System for Fisheries Monitoring and Anomaly Detection by Surrey Space Centre



The Surrey Space Centre (SSC) at the University of Surrey, and the Mauritius Research and Innovation Council (MRIC) are partnering in this project to design, develop and validate a nearly real-time satellite-based application able to detect Illegal, Unreported and Unregulated (IUU) fishing activities in the Mauritius Exclusive Economic Zone, with characteristics of automation and high scalability to the rest of the world. The

project team will develop an innovative sensor fusion framework that accepts multiple heterogeneous data sources, including spaceborne Synthetic Aperture Radar (SAR) as well as Ship Reporting Systems (SRSs) such as the Automatic Identification System (AIS) and Vessel Monitoring System (VMS). These complementary sensors provide the potential for effective space-based maritime surveillance. Additionally, other data sources such as high-resolution thermal infrared imagery have been trailed and demonstrated certain advantages compared to SAR, including the detection of small ships constructed from fiberglass that are particularly difficult to detect in SAR imagery.

The project started in July 2022 and is planned to be completed by end of June 2024.

Current status and achievements

- Developed a technical report describing the Case study area in Mauritius where the project will be implemented
- Developed a report on the Satellite Data sources and the Acquisition Plan
- Developed a literature review on the Purse seine analysis document
- Developed a literature review on the Long liners analysis document
- Developed the AIS-based maps of purse-seine vessels and the long liners vessels

Target outputs and outcomes by end of project

- Quantify the extent of legal and IUU fishing in the Mauritius EEZ and MPAs and evaluate its economic impact.
- Improve the support to the local government in stopping IUU activities in the EEZ and prosecuting responsible parties.
- Support the restoration of marine life and fish stocks in the Mauritius EEZ.
- Understand and support the economic recovery from fishery practices in Mauritius

The monitoring tool for anomalies will enable short-term economic, environmental, and societal impact in the region. The evidence produced will be used at national level in two different ways to produce medium term impact: to influence policies and regulations in the field (for example by informing and advising the Indian Ocean Tuna Committee on how to adapt current regulations in the Indian Ocean) and to support Mauritius Institute business case for the establishment of the Mauritius Space Agency. Moreover, the technological solution will be



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designed in a way it can be easily transferred, with minimum adaptation, to other fishing areas and geographical regions elsewhere in the world thus moving towards impact at global scale.

As for the sustainability, the project team started already frequent conversations with Mauritius authorities to ensure local buy-in and to identify the best ways to ensure the project developed tools will be adopted by the local government. The project team aims at geographical and thematical scale-up to transfer of the project outcomes to other countries (Seychelles and Maldives are first options) and adaptation of the tool to serve other end-users (financial and insurance sectors are the first to be considering at the moment).