

IAF EARTH OBSERVATION SYMPOSIUM (B1)  
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UEIKAP: PRELIMINARY RESULTS OF A SHIP WAKE DETECTION FRAMEWORK FOR REMOTE  
SENSING IMAGERY

**Abstract**

The current international laws regarding the Automatic Identification System (AIS) allow vessels smaller than 300 tons to not turn on their on-board transponder. The ability to monitor uncooperative vessels is of key strategic importance from a civil perspective, as it represents a big step against other-

wise undetectable maritime criminal activities, and, even more clearly, from a military perspective. Ship detection from spaceborne remote sensing has gathered a lot of interest for decades, with recent developments of applications based on deep learning (DL) successfully achieving very high accuracies in complex environmental conditions. However, successful hull detection is often not enough to obtain full situational awareness. To solve this limitation, UEIKAP project (Unveil and Explore the In-depth Knowledge of earth observation data for maritime Applications) shifts the object of interest from the ship itself to the wake it generates through its movement. The project has been funded under the Research Projects of National Interest (PRIN) by Italian Ministry of University and Research. In fact, given a complete understanding of local meteo-marine conditions, the wake contains information on the ship (instantaneous position, vessel size, hull type) and its current and past movements (velocity, heading, trajectory). UEIKAP aims to integrate comprehensive contextual knowledge of local marine phenomena, weather information such as local wind conditions, and an in-depth model of the mechanism behind wake generation, with a DL-based detection model specifically developed and trained for wake detection in remote sensing products. The focus is on both multispectral and Synthetic Aperture Radar (SAR) satellite data, with the former being characterized by easier interpretability, and the latter by all-weather all-times capabilities. Preliminary results show the feasibility of the application, with specific focus on sea and wake modelling in order to develop the AI architecture for wake detection model.