

IAF SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)
Integrated Applications End-to-End Solutions (2)

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SAVING LIVES BY INTEGRATING SPACE-BASED SOLUTIONS

Abstract

In the U.S. alone, approximately 100 people - with estimations of thousands worldwide - are killed by rip currents annually (NOAA, 2023). This paper discovered the integration of earth observation solutions and artificial intelligence (AI) with drone technology addresses specific user-and stakeholder-needs at the coast, with a particular focus on rescue workers who require consistent risk models as rip-currents move continuously.

The study directly addresses the gaps between space and non-space coastal technology through comprehensive market analysis and technological innovation. To understand the user-and stakeholder-needs, the paper investigates the Dutch coast as a case study, entailing collaboration with a diverse array of coastal users from lifeguards, investors, drone operators, naval personnel and regional authorities. As a result of analysis, lives can be saved by improving the efficiency of rescue workers when tackling rip currents through AI-derived modelled risk maps, in addition to addressing other stakeholder-needs whether it be coastal defence management or insurance. As well as socio-economic study, the integrated space-based technological solution is developed. At present, drone technology is advancing for coastal rescue applications providing high resolution imagery. But when it comes to user-and stakeholder-requirements, integrating models from satellite observation (study methods use Copernicus services) reveals a service for multiple coastal stakeholders. With reduced operational costs in comparison to in-situ monitoring, satellite imagery can also be used worldwide, building historical datasets for coastal safety education. The research also approaches the matter in question of the economic value of saving lives, which should not be overlooked during technological innovation. Accordingly, integrating advancing technology, AI and space-based solutions addresses multiple needs of coastal users by providing a spatial-temporally, and economically feasible, advantageous risk model.