LASH FIRE

LEGISLATIVE ASSESSMENT FOR SAFETY HAZARDS OF FIRE AND INNOVATIONS IN RO-RO SHIP ENVIRONMENT

LASH FIRE Information sheet

Assessing the use of drones for increased onboard safety

In critical situations like fires or man overboard, drones can be the decisive tool to save lives.

Drones, also known as unmanned aerial vehicles (UAVs), are becoming increasingly popular and finding new applications in various industries. In particular, they are being used in industrial settings that require reliability and safety, such as aerial surveying, inspections and deliveries. In LASH FIRE, the use of drones to assist in fire prevention and fire-fighting on ships as well as autonomous search and rescue operations were investigated. In these use cases, a drone equipped with a visible light and thermal camera can give the crew additional information through its unique point of view and be the deciding factor to save lives.

An open onboard drone system prototype

A drone system prototype was designed and evaluated during LASH FIRE. It targets the use cases of performing fire patrol, fire resource management as well as search and rescue missions in an automated fashion, e.g., by circling the ship periodically and scanning for abnormal temperatures. The prototype is a proof of concept that such an advanced system can be implemented with open standards, software and hardware for increased resilience against cybersecurity threats. Technical and legal feasibility were analysed and evaluated positively in general. Further development, tests and application for operational authorization are required to achieve a final product.

Maritime experts have shared their opinions

The drone system prototype was evaluated onboard the ro-ro ship DFDS M/S Petunia Seaways, where measurements were taken, and media recorded. The videos produced were used for an online questionnaire and are available online:

- Intro / Fire Patrol: https://youtu.be/ZsLoR8QqYMc
- Fire Resource Management: https://youtu.be/wPCA_L4ZX0E
- Search & Rescue: https://youtu.be/I1fvPJmlSQI

34 maritime experts were interviewed to share their opinions on the usefulness of a drone system on deck. All use cases were evaluated positively, with search and rescue missions being seen as the most promising. Two major challenges were identified: achieving a reasonable selling price and obtaining the ship operators' and crews' trust in the system.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 814975. The results reflect only the author's view and the Agency is not responsible for any use that may be made of the information it contains.

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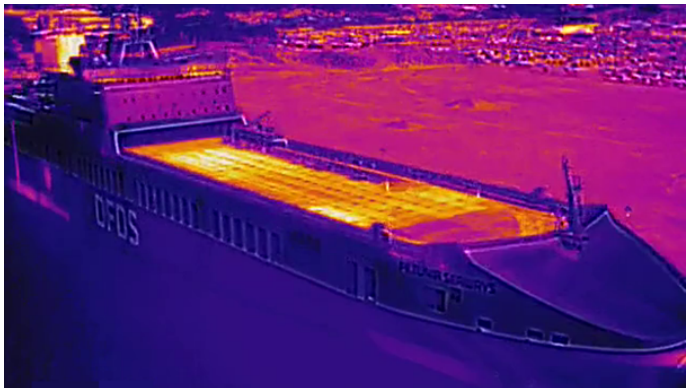
Strength, Weaknesses, Opportunities and Threats (SWOT) of drones on deck

All assessments were summarised in a SWOT analysis which provides input to the strategic business planning for a potential drone system provider.

Strengths	Weaknesses
• Bird's-eye view is a powerful feature • Speedup localising missing person, fire detection and situational understanding, thus, save lives and protect property • Avoid human error in existing procedures • Technically feasible with off-the-shelf components and open standards • Drone system maintenance to be combined with other scheduled maintenance • Once installed, other use cases supported: evacuation situations, inspections, supporting ship's navigation, … • The offshore context is challenging. Once "conquered", the system can support applications along or on shore	• Requires a considerable investment • Regulation and integration are challenging • Introduces safety risks itself (esp. take-off and landing operations, charging) • Subject to weather (cost factor) • Monitors open decks only • Flight times are a limiting factor • High usability requires training. Might be seen as a toy or distraction, otherwise • Required manual interaction needs to be kept low, as much automation as possible • False alarms need to be kept at a minimum
Opportunities	**Threats**
• Drone technology is a fast-growing market, leading to lower required investments and better products • Drone servicing and repair is a fast-growing market, helping to keep OPEX low • Airspace regulations and management are under development, clearly specifying the integration of drone-base services • Maritime industry is increasingly digitized and going towards automation in general	• Revised maritime regulations (e.g., SOLAS) may influence interest of ship operators • Trust in the system is crucial but can be harmed by external influence and single negative events (e.g., news about an autonomous drone crashing into people)



Both RGB and thermal video are streamed to an onboard computer for further processing. Note that the bunker tanks of DFDS M/S Petunia Seaways are clearly visible on the left end of the thermal image.

Read the full report here!
https://lashfire.eu/media/2023/03/LASH-FIRE_D07.7_Development-and-onboard-assessment-of-drone-for-assistance-in-fire-fighting-resource-management-and-rescue-operations_V03.pdf

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