Underwater Search and Recovery in the Waters of the Indian Ocean

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5 MONTHS AGO

UWSAR essentially means search, recovery and salvage of high value objects that have been lost to the bottom of the sea. PC: NOAA Source: Unsplash.

Increasing maritime activities in the Indian Ocean Region (IOR), thanks to its strategic and geopolitical importance, exposes us to vulnerabilities related to accidents and losses at sea. In this

scenario, it is critical we build capability and capacity in the Underwater Search and Recovery (UWSAR) domain.

UWSAR essentially means search, recovery and salvage of high value objects that have been lost to the bottom of the sea. Rescue by and large pertains to human survivors, but human survivors may not last long underwater and mobilizing SAR assets for a meaningful operation takes time, so such operations are mostly conducted for recovering aircraft black boxes, underwater vehicles, and other types of objects.

Traditionally, UWSAR handles emergencies in the offshore and shallow water areas several hundred metres deep. Studies show that more than 84% of the ocean is more than 2000 kms deep. With increasing human activities in the oceans, emergencies in these deeper regions are only going to increase and will need special efforts. Underwater search and recovery are very expensive, but still pursued as the inputs have critical scientific significance and practical engineering value for improving their safety and reliability.

> *The disappearance of the Malaysian Airlines flight MH370 in 2014 in the Indian Ocean generated a lot of debate on UWSAR, particularly the collective SAR capabilities that exist in the IOR. The Indian Ocean Rim Association (IORA), has emphasized on a regional model for building SAR capability and capacity to deal with maritime and aviation-related incidents.*

The Perth Communiqué in October 2014 encouraged a dialogue between the IORA and the Indian Ocean Naval Symposium (IONS). IORA is considered as a political/diplomatic forum where member states formulate regional arrangements and policies, and the IONS could complement the IORA as a platform for executing the agreed national commitments.

This is particularly important because many such forums and platforms have remained limited to dialogues, conferences and workshops but haven’t evolved infrastructures and protocols to respond effectively in the case of an accident. With IONS on board, IORA would be able to develop SAR concepts and conduct real-world exercises, including submarine rescue.

In a 2016 address to the IONS, Vice Admiral Tim Barrett, AO, CSC Chief of Navy, Royal Australian Navy highlighted the importance of cooperative maritime search and rescue in the IOR with the MH370 incident as a case study. He noted that the entire UWSAR operations included deployment of various air, surface maritime and underwater assets and the involvement of scientists,

researchers and experts in logistics, deployment and communications; the sheer scale could overwhelm any single nation, no matter how developed and well-resourced.

In the same year, an AN-32 aircraft of the Indian Airforce carrying 29 people disappeared while flying over the Bay of Bengal. Radar contact with the plane was lost when it was 280 kms east of Chennai. The SAR operation for the An-32 was the biggest search operation for please missing at sea in India's history.

The Indian Navy and the Indian Coast Guard launched a large SAR operation with a submarine, 12 surface ships and five aircrafts. Three days after the disappearance, 16 ships, another submarine and six aircrafts followed. Finally, about two months later, the SAR operation was called off. The 29 people were presumed dead and their families were notified.

This tragedy highlighted multiple limitations in India's SAR capability, including absence of certain fitted equipment such as the Underwater Locator Beacon, Automatic Dependent Surveillance – Broadcast. While the loss is tragic, the inability to retrieve bodies of the people on-board has deepened the pain of the victims' families. Most critical is the disappearance of the wreckage, including the flight recorder which would have given us clues about the cause of the accident. That would have brought closure.

UWSAR is far more complex than conventional, on-the-surface SAR and hence it needs a very different set of acoustic capability and capacity building. IOR has tropical waters which present unique challenges to the performance of sonars deployed for acoustic surveys. Random fluctuations in the acoustic propagation characteristics in the underwater medium are another major reason. Importing underwater hardware from the West hasn't helped us as it is not backed with local efforts to customize algorithms for local ground realities.

To enhance sonar performance, we need massive field experiments to map underwater characteristics which can be done through Modelling & Simulation (M&S) efforts and Shallow Waters Acoustic Measurements (SWAMs). However, most countries in the IOR are developing, have pre-modern governance structures, and are too caught up in day-to-day socio-economic crises to develop a futuristic, strategic vision. This reality limits the allocation of massive resources to R&D in these areas. Extra-regional powers take advantage of this situation and supply expensive hardware to IOR nations which don't have much applicability locally.

UWSAR processes are multi-dimensioned. As soon as any maritime accident requiring UWSAR is reported, first and foremost the requirement of human rescue (or absence of it) must be established,

as that will determine the urgency and details of operation. If there is no such requirement, UWSAR operations can be carried out in six steps –

First, marking the last known position of the platform and continuous recording of oceanographic parameters from the time of the incident.

Second, monitoring the platform till it stabilizes in its final resting location through modelling (which provides the framework to estimate platform movement) and extensive simulation to generate possible movement of the platform.

Third, collecting ground information such as bathymetry, sediment type and macro underwater features in the search area are critical to plan the operation.

Fourth, finalizing search infrastructure and tools – sensors, platform for mounting sensors, data processing equipment etc. – on the basis of the inputs from previous three steps.

Fifth, actually mobilizing the search operation based on previous four steps, as well as tropical littoral conditions, proximity to search area, resource availability and other factors. M&S optimizes the entire effort based on precise inputs of local site-specific conditions.

Sixth, actually salvaging/recovering the objects. It is a completely different, highly specialized operation requiring unique equipment which very few countries/organizations globally possess. These factors need to be ascertained right at the beginning.

Maritime Research Center, Pune is working on multiple fronts to highlight the challenges and opportunities of UWSAR in the IOR. It has analysed in detail the entire process and each module of it with a multi-disciplinary approach combining geopolitics, science & tech, HRD and strategic vision. It proposes a unique Underwater Domain Awareness (UDA) framework for multiple stakeholders in the IOR for economic progress, nation building, and safe, secure and sustainable growth for all, and in the case of India, for leading IOR nations in the maritime domain, keeping extra-regional powers at bay.

CATEGORIES: NEIGHBOURHOOD, SOCIETY, SOUTH ASIA & CHINA

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