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NAVAL SHIPBORNE UNMANNED AERIAL SYSTEM

Captain HPS Sodhi
Senior Fellow, CAPS

Introduction

Indian Navy has recently made a 'Request For Information' (RFI) to global vendors for procurement of 50 Naval Ship borne Unmanned Aerial System (NSUAS) for Intelligence, Surveillance, Reconnaissance (ISR), SLOC monitoring and Coastal/ EEZ surveillance, anti-piracy and anti -terrorism, assistance in Search and Rescue and assistance in Maritime Domain Awareness using Automatic Identification System (AIS) inputs[1]. The requirement has generated considerable interest as it will be a big technological jump for the Navy to procure a ship borne surveillance UAV system. Although, the Navy has long been operating small ship borne Pilotless Target Aircraft (PTA), the experience and the expertise in this field cannot be matched with that of a tactical UAV. PTAs are short endurance ramp launched & parachute recovery UAVs, without any role equipment payloads.

Shore Based vs Ship Borne UAVs

The Navy has been operating traditional shore based Searcher Mk II and Heron tactical Unmanned Aerial Vehicles (UAVs) ex IAI, Israel for the last 12–13 years. The results have been very encouraging and certainly motivated the commanders at sea to develop confidence in these unmanned systems for ship borne operation. After a fruitful experience in operating the ground based UAVs, it is natural that the Navy wants to graduate further to the ship borne UAS. It would be better to have an aerial platform readily available at sea rather than requisitioning a UAV from ashore, which is available only within limited ROA of

the ground based squadrons. Further, it takes considerable time for the aircraft to be on task and has limited endurance left after transit distances. However, it may not be easy to design & develop an unmanned system having such ambitious mission capabilities and flexibility to operate from the confines of a warship.

In Indian Naval context, tactical mission UAVs have been performing the traditional task of a surveillance platform providing; valuable inputs for building the Maritime Domain Awareness (MDA) picture, and targeting data for carrying out surface engagements beyond the ship's radar horizon. Additionally, EW, radar and optical inputs received from a UAV help the commanders at sea/ ashore in planning their tactical moves. The maritime radar/ optical classification means available on board a UAV are of great help in identifying contacts at sea, especially in anti piracy/ terrorism missions. The proposed ship borne UAVs will also be expected to perform all these tasks.

In consonance with the operating philosophy of MR aircraft, the command and control of Heron / Searcher unmanned systems is kept with the authorities ashore, except during missions involving Advanced Ship Control Station (ASCS) operations. Availability of ship borne UAVs will not only provide a multitasking instrument at the disposal of the ship's Commanding Officer, but also extend the surveillance reach of the ship. An added advantage will be to have a capability to investigate contacts detected by ship's sensors. This will be a boon for the ships without a helicopter flight.

Desired Mission Payloads

In a maritime scenario, the role equipment package of a platform is of great importance to produce the desired output. A Naval Ship borne Unmanned Aerial System (NSUAS), as desired by the Navy, will require variety of payloads to meet the set tasks. In a typical package, it should have provisions to carry Synthetic Aperture Radar (SAR), day/night (EO/IR) camera, ESM/ ECM/ COMINT equipment, AIS and communication/ data

link equipment payloads in different mission configurations. The need to have integrated maritime radar is inescapable keeping in mind the requirement of providing targeting data for the ship's fire control systems. An EO/IR payload is an essential classification tool for a surveillance platform engaged in EEZ patrol, anti piracy, anti terrorism and SAR missions. Provision of an onboard Automatic Identification System (AIS) will be of immense value for building the maritime domain picture in a dense shipping environment or during SLOC monitoring. An EW payload on an airborne platform is always of great help in picking up enemy's transmissions at greater ranges due to wider radio horizon. With the added flexibility of fitment/removal of payload(s), based on mission profile and tactical situation, the system can have the much needed increase in endurance/ Radius of Action (ROA). With these payloads and ship launch/recovery capability, the NSUAS may turn out to be as good as an integrated ship borne flight of Seaking or Kamov helicopter, though without ASW/ASV roles.

The Challenges

A major challenge, however, is to design a vehicle for launch /recovery from a moving ship, without provision of a helicopter deck. Being a ship based UAV; its size is bound to be smaller than that of shore based Heron UAV, however the All Up Weight (AUW) should cater for the desired payloads. Further, it should have adequate fuel capacity to open out to at least 150 - 200 nm from the mother ship to provide 'Over The Horizon Target' (OTHT) data for ship launched Brahmos/ other long range SSMs. It will be a demanding task for the manufacturers to design/ develop a UAS capable of undertaking tasks similar to a Heron UAV, albeit with much lesser AUW and a size small enough to operate from a 50 m ship.

In this RFI, the Navy has not specified the type of UAV (fixed/ rotary wing) desired for ship borne operation. However, it is clearly stated that the required system should be

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capable of day/ night operation from even smaller ships (above 50 m length), with or without helo deck.[2] With these requirements in mind, it is evident that a rotary system may be better suited to fulfill the need. Further, the system will have to be robust and sea worthy with capability for launch and recovery under varying sea states and adverse weather conditions at sea. It will be interesting to see the response of the aircraft industry in this regard.

Available Options

Quiet a few unmanned systems have been developed all over the world to meet the growing demands of navies. However, very few have the capability to carry a SAR payload; and most of them have short endurance and cater for EO/IR payload only. The US DoD is making headway into design and development of a ship borne UAV to meets its ISR requirements. Tactically Exploited Reconnaissance Node (TERN) program envisions using smaller ships as mobile launch and recovery sites for medium-altitude long-endurance (MALE) unmanned aircraft. The proposed fixed wing UAV will be designed to carry a 600-pound payload and have an operational radius of 600 to 900 nautical miles from the mother ship. The system would operate without extensive, time-consuming and irreversible ship modifications[3]. This is an important factor which must be considered for installation/ fitment of Indian ship borne UAS system. It should be transportable, preferably in the form of shipping containers and should involve minimum structural modification on board ship. Other contenders in the field include; MQ-8 Fire scout from Northrop Grumman and Skeldar V-200 from SAAB, both rotary wing UAVs with 5-6 hrs endurance. The Indian DRDO has made considerable progress in the UAV field by developing Nishant, Panchi, and Rustom series of UAVs for the armed forces. However, none of the available options is designed for ship borne operations, as desired by the *IN.*

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Conclusion

For years, the Navy has been operating integrated helicopters flights from fleet ships to undertake these multifarious tasks. With the dwindling complement of ship borne helicopters it would be appropriate to consider other options. NSUAS could be the right choice to fill this capability gap. Also, the decision taken by the Indian Government to acquire ship borne UAVs is appropriately timed to meet the future requirements of a blue water navy. With the ever increasing responsibilities of the Indian maritime forces to counter the asymmetrical threats along with the traditional roles of SLOC & EEZ surveillance, the availability of NSUAS will certainly prove to be a force multiplier.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

End Notes

[1] "RFI", Indian Navy, February 05, 2015, http://tenders.gov.in/viewtenddoc.asp?tid=del718794&wno=1&td=TD, Accessed on February 20, 2015.

[2] Ibid

[3] "DARPA's new tern program aims for eyes in the sky from the sea", http://www.darpa.mil/NewsEvents/Releases/2013/03/01.aspx, 01 Mar 2013, accessed on 23 Feb 15.
