

Future of Unmanned Systems

Seminar Report

General

A seminar was held on 23 August 2012 at the CLAWS seminar hall on “The Future of Unmanned Systems”. The session was chaired by Maj Gen G D Bakshi, SM, VSM (Retd). The panel consisted of AVM A K Tiwary, VSM (Retd), Rear Adm Kulshreshtha (Retd) and Brig R K Bhonsle, SM (Retd). Eminent personalities from the military, diplomatic, government and strategic community attended the seminar.

Welcome remarks: Col Vivek Verma, Deputy Director, CLAWS

The Deputy Director welcomed all present. He thereafter briefly gave out the importance of Unmanned Systems and the bearing these systems will have on future conflict. He stated that India needs to take measure of these developments and induct Unmanned Systems according to its specific threat perception.

Opening Remarks: Maj Gen GD Bakshi, SM, VSM (Retd)

The study on “Future of Unmanned Systems” was conducted under the aegis of HQ IDS and a report regarding the same has been submitted. During the course of research for the project, the team visited Northern Command, DRDO Bangalore and HQ DRDO at New Delhi. The purpose of the field visits was to make the study report more meaningful, factual, up to date and rich for the three services.

Unmanned Systems will play an ever increasingly important role in the wars of future, both conventional and CI/CT ops. The RMA heralded by the developments in the field of Unmanned Systems especially the air wing is at the heart of future modernisation of armed forces around the world. The significance of Unmanned Systems particularly UAVs can be gauged from the fact that the advanced defence forces around the world are working to have a near 1:1 ratio of manned to unmanned aerial vehicles, as is evident from the examples of USA and Israel. In the current scenario USA has nearly thousands of UAVs in its service and close to 40 per cent of Israeli missions will be unmanned in nature by 2030. The role of UAVs can be divided into the following sections:

- a) Dull Env/Ops - Sustained Alertness
- b) Dangerous Env/Ops- SEAD and targeting key enemy assets
- c) Dirty Env/Ops- Radioactive and Contaminated Environment

d) Deception Ops/Env- Generation of full scaled signatures of manned planes

The level of attrition of UAVs is heavily dependent on the level of Air Defence afforded by the enemy. The level of Air Defence fielded by an adversary has a direct bearing on the operational effectiveness of UAVs. Thus UAVs operate much better in asymmetric environments. In the short to medium term UAVs will be the core of Unmanned Systems, with the ground systems being the most intricate and operating in the most complex environment. The water arm of Unmanned Systems has its own limitations particularly in terms of space constraints on the carrying ship, both surface and submerged.

AVM A K Tiwary, VSM (Retd): Unmanned Aerial Systems

The deployment of UAVs by advanced nations of the world is an indication of the trend of the shifting focus from Manned to Unmanned Systems in future conflicts. The case in point is that of Israel which went on an accelerated Unmanned Systems development drive after the spectacular success of UAVs in the Beqaa Valley conflict of 1982. There are nearly over 500 designs of UAVs in existence around the world but only a small set of 10 designs mainly Israeli and American have extensive operational experience. The enhancement in Situational Awareness (SA) of UAVs has become so significant that in the 1991 Gulf War the data transmission/bandwidth requirement was 100 Mbps which has gone to 4.2 Gbps in the current Afghan War. This level of data availability to the commander greatly enhances his ability to make correct, timely and effective decisions.

The need of the hour is not only designing and manufacturing of Unmanned Systems, but equally important is the training and hiring of Operators/Intelligence Officers to control these systems. The pilot and the intelligence officer work in tandem to accomplish tasks assigned to the Unmanned System. Another very critical factor is the availability of cutting edge sensors which are attached to Unmanned Systems as payloads. The technology of these sensors and the ability of Unmanned Systems especially UAVs to carry them will determine the SA, strike and logistic capability of these systems. Extensive software automation to derive actionable intelligence from immense information provided by these systems will be critical to the functioning of these systems and in their utility to the commanders on ground.

Brig Rahul Bhonsle: UAVs for the Land Forces, Unmanned Ground Systems

Indian Army will have to take the lead in the developments of Unmanned Ground Vehicles (UGVs) as in the Indian context the conflicts of future will be largely land based at least in the near to short term. US forces are developing Unmanned Systems more in the context of air and water environments because of their specific requirements.

UGVs have extensively been employed in Iraq and Afghanistan for Explosive Ordnance Disposal (EOD) and mine clearance roles. The limited development in the field of UGVs has afforded only support capability to ground forces as compared to UAVs which can take lead roles. UGVs operate in a very complex environment and need very high end sensors and artificial intelligence just to navigate within its surroundings. UAVs overcome key challenges of the land warriors such as over the horizon look.

The employment of UAVs in the Indian Army started nearly 14 years back but only limited comprehension of their roles in future conflicts has been perceived. Currently, Northern Command is overcoming range limitations of the Herons by using UAV airborne relay and an offset of the Ground Control Stations. Ranges of upto 630 km have been achieved through modifications. Further range enhancements will be made possible by satellite communications. Weather will always constrain UAV operations. Indian Army should make greater use of tactical and micro UAVs in larger number to enhance their Situational Awareness exponentially.

Rear Adm (Retd) S Kulshreshta: UAVs in the Marine Environment, Unmanned Marine Systems and Indigenous Developments

The requirements of the Indian Navy are very different from that of the Army and Air Force even in terms of UAVs. One of the critical factors in the designing of UAVs and Unmanned Vehicles for the marine environment is the limited space availability on the carrying vessel whether surface or submerged.

Unmanned Marine Systems are broadly of three types:-

- Autonomous Undersea Vehicles (AUVs)
- Unmanned Surface vehicles (USVs)
- Remotely Operated Vehicles (ROVs)

Most of the UMSs are used for:-

- Mine Counter Measures (MCM)/clearance
- Port defence
- ISR
- Support of Special Operations and other naval operations

The primary problem on ships is that of space. Introduction of UAVs or UMSs on ships entails the need for additional space for the equipment, personnel and communication gear.

Our Navy currently has three squadrons of shore based MALE UAVs (Searchers/Hérons). The Chinese Navy has acquired 18 x Austrian S-100 cam copters

and has a Pioneer type fixed wing UAV (ASN-209 Silver Hawk). The Pak Navy has been carrying out trials of S-100 and may soon induct it.

Maj Gen G D Bakshi: Synergies, Coordination and Overall Recommendations

Following is a list of recommendations put forward by the team to all the three services for development, employment and training of crew to integrate Unmanned Systems:

- IAF be the coordination agency. Coordination areas are: airspace, tasking- peace & war, training-ground & flying, special maintenance, exercises, operational SOPs, flight safety-peace & war, future developments.
- Dangerous tasks like SEAD and high value targets must be assigned to Unmanned Systems. Fielding such systems en masse would create a paradigm shift in the levels of Situational Awareness
- We must leverage our skills in software development and field more sophisticated sensor packages on legacy UAVs and employ better algorithms to convert the mass of data into actionable intelligence
- UAVs serve as ideal platforms for EW and cyber attacks designed to disable/ hijack enemy information systems
- An overarching umbrella of an intelligence grid should be formed by fusing the inputs of all sensor systems, ranging from surveillance satellites to AWACS, AeroStats and UAVs. All inputs should be tagged/ annotated and put on a global information grid based on a fibre optic circuit
- Although space constraints restrict fielding of unmanned systems on naval platforms, we urgently need to field US Fire Scout/Austrian Schibbel class of cam copters for all our naval platforms to enhance Situational Awareness
- The location of Pakistan's ARN and ARS and where they are headed would be the most critical/ essential element of information. This is where Aero-Stat fixed radars of MTI system could virtually act as JSTARS and do for the land battle what AWACS does for the air battle.