

Guest Editorial

*Ajey Lele**

The field of Unmanned Systems, be it for use on land, air or sea, has seen substantial progress in the past decade with significant research and development in both civil and defence sectors. Unmanned Ground Vehicles (UGVs) are being developed to carry out multiple missions like reconnaissance, detection of threats, combat operations, acquisition of targets, delivery of supplies and medication in remote areas, mine clearance and rescue operations. The research on Unmanned Surface Vehicles (USVs), Remotely Operated Vehicles (ROVs), and Autonomous Underwater Vehicles (AUVs) of maritime unmanned systems (MUS) has also gained momentum with navies across the world trying to augment their capabilities by deploying unmanned systems in seas. However, the sectors that have gained the greatest importance in both civil and military uses are the Unmanned Aircraft Systems (UAS), commonly denoted as Unmanned Aerial Vehicles (UAVs), Remotely Piloted Aircraft (RPA) and Drones.

With the rapid advances in technology and emerging scientific capabilities, like artificial intelligence, machine learning, big data analysis and mining, solar energy, advanced battery developments, nano technology and robotics, the potential military applications of unmanned systems are finding great traction. Considering how unmanned systems have been used in contemporary conflicts like the ongoing Russia–Ukraine War, it would not be wrong to say that unmanned systems have

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emerged as the new face of a technologically oriented warfare today, and have reduced the risk to human lives to a great extent.

It is certain that the role of Unmanned Ground Vehicles (UGVs), Maritime Unmanned Systems (MUS) and Unmanned Aircraft Systems (UAS) in the defence sector, will be intensified further in the coming times. Hence, there is a need to develop a deeper understanding on future of military unmanned systems in India including aspects of their development and employment in future wars.

This special issue of the *Journal of Defence Studies*, consisting of 11 articles and 6 commentaries, is an attempt to provide latest perspectives on the future of military unmanned systems in India. In doing so, the focus has been on the role of unmanned systems in future wars, global developments made in the field of UAVs, UGVs and MUS, their operational aspects, challenges in deployment and legal issues and the need for framing policy regulations and doctrines for optimal use of unmanned systems.

An attempt has also been made to identify key areas for development, for instance, critical technologies, air space management, maintenance ecosystem, refining procurement processes, while also touching upon other important aspects such as identification of counter UAV/Drone/Drone Swarms technologies to mitigate threat, nuclear role of drones, and the need to establish or modify the drones or arms control regimes to limit the proliferation of drones without endangering national security. The commercial aspect of the UAS industry has also been covered well, keeping into consideration India's vision of becoming the drone manufacturing hub by 2030, and the vigorous push being given by the Government of India towards self-reliance in the defence sector through indigenous design, development and manufacture.

The future of military unmanned systems in India will also depend on how extensively and rigorously this area is researched upon in the coming years. It is hoped that this special issue will be a valuable contribution to the existing literature on unmanned systems and would encourage further research in this area.