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# MANNED-UNMANNED TEAMING (MUM-T): THE FUTURE OF AERIAL WARFARE

BY
WG CDR VISHAL JAIN

ORGANISED BY CENJOWS
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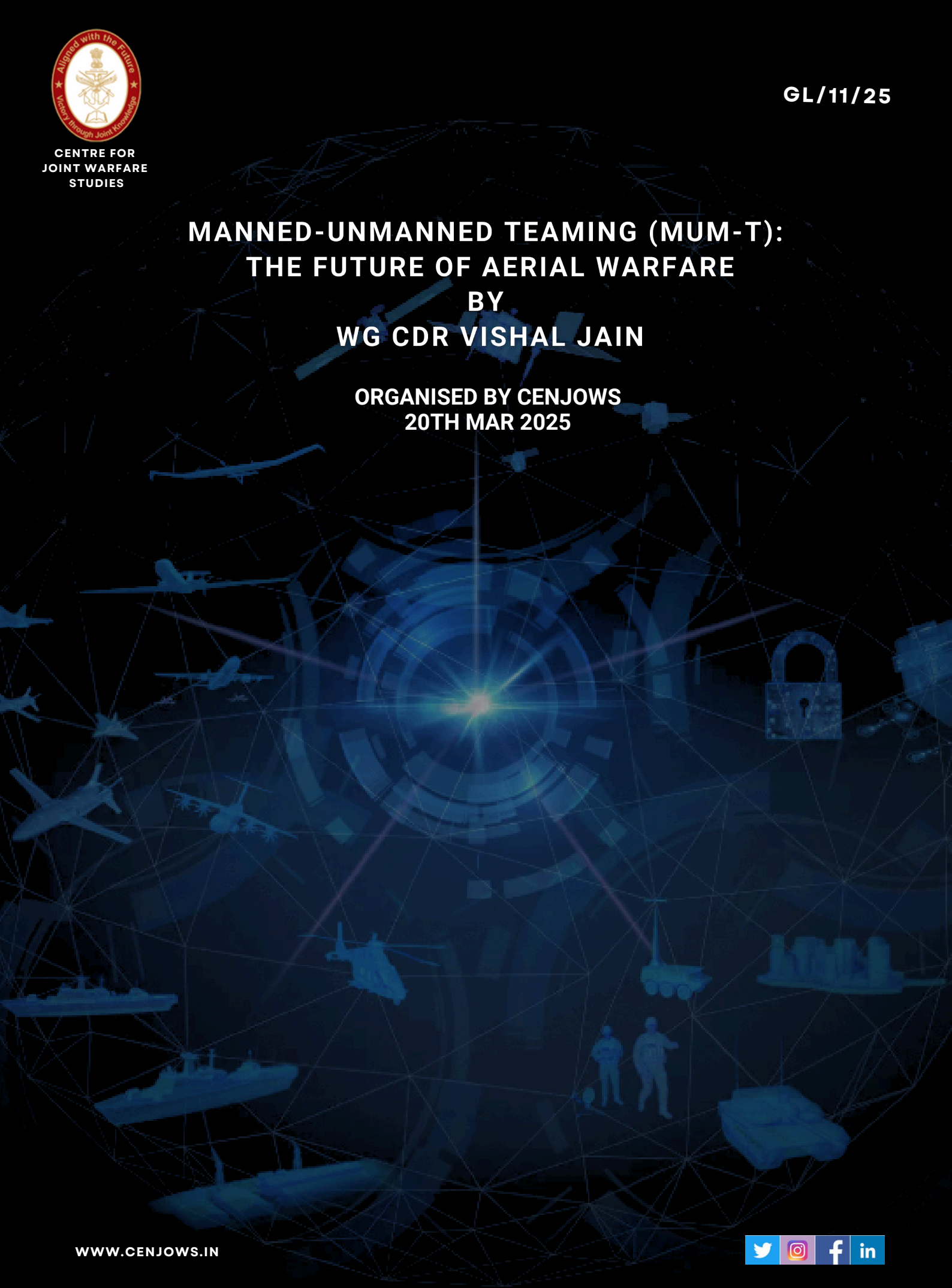

**MANNED - UNMANNED TEAMING (MUM-T):**
**THE FUTURE OF AERIAL WARFARE**
**BY WG CDR VISHAL JAIN**
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The concept of Manned-Unmanned Teaming (MUM-T) involves collaboration between manned and unmanned platforms wherein the latter are used for purposes like ISR, battle damage assessment, kinetic action, etc. with the aim to leverage the strengths of manned and unmanned systems to improve the efficiency and effectiveness of the operations and enhance the situational awareness, survivability, lethality, and sensor & weapon penetration, and thus enhancing the chances of mission success. The integration of technologies in MUM-T allows its elements to undertake roles and tasks, which were earlier the domain of human beings, with better precision, in a heavily contested battlespace with more risk absorbing ability, from extended ranges and with better safety for the human operator. MUM-T systems can be utilised for following applications:

- **Coordinated Strikes** with manned and unmanned air and ground systems working in tandem to locate, track and hit targets with speed, precision, lethality and reduced exposure of human operators to risk, on enemy's air assets on ground, offensive ground or maritime forces elements, C2 centres, airfields, logistics nodes, and air interdiction targets.

- **ISR** missions with extended ranges and endurance deeper into the enemy territory against heavily defended targets to provide real-time intelligence, enhance situational awareness, speedy battle damage assessment and allow making time-critical decisions.

- **EW** wherein multiple unmanned elements equipped with ECM equipment like jammers flying as escorts to counter threats from airborne platforms and SAGW.

- **Decoys** to create distraction or absorb fire in case of threat to the mothership.

- **Suppression of Enemy Air Defence (SEAD)** to undertake kinetic strikes or EW operations against ground AD elements to soften the battlespace for further operations.

- **Counter-terrorism and Counter-insurgency** for persistence surveillance and precision targeting in areas that have not been sanitised.

- **Air Logistics** to supply ammunition and material to troops in hostile AD environment which is too risky for manned aircraft operations or to places restrictive for landing of manned aircraft with the use of MUM-T with swarm of smaller logistics drones.

- **Search and Rescue** multiple unmanned platforms in unison over hazardous and challenging terrain to search for casualties over large areas providing real-time information making the effort more coordinated, reducing the time to respond and rescuing the survivors increasing their chances of survival drastically.

- **Civil Applications** for disaster management, firefighting, policing, radiation/ chemical-poisoning incident management, etc to reduce the exposure of human beings to risk and ensure continuous and all-weather conduct of operations.

**The Way Ahead**

The complex challenges in the path to realise the concept, like technological advancements needed, human factors and making the system more and more resilient, need to be addressed. More R&D needs to go into adapting the 'Loyal Wingman' for air-to-air role graduating its capability to near-manned aircraft while keeping the costs low as that is the significant advantage of the system. More needs to be done in exploring the ways that MUM-T can be exploited in and working out a Concept of Operations (CONOPS) for it. In India, more focus needs to be given on hastening the development of CATS and becoming as much self-reliant as possible in MUM-T related technologies - communication datalink and combat algorithm being

two significant areas. Efforts should be made to adapt the existing platforms to 'MAX' capabilities by reconfiguring the cockpits with advanced avionics and other systems required. More and more private industry participation must be sought to develop the required solutions. Early realisation of the concept could be able to partially address the fighter squadron deficiency in the Indian Air Force (IAF). Unmanned Ground Vehicles (UGV) and Unmanned Surface Vehicles (USV) for integration with CATS and Air Force, Naval and Army systems must be developed to eventually lead to an integrated system of systems in the true sense leading to ultimate synergy and co-ordination in integrated operations. MUM-T should also be developed for rotary wing platforms on the lines of the Apache Longbow/ Guardian programme of the US which should also involve integration of armed helicopters that are available in much larger numbers in the IAF.

MUM-T is going to become an indispensable part of every modern and future ready force and is poised to govern the manner in which they are going to tackle future conflicts and fight future wars. It is, in fact, going to revolutionise the conduct of military operations, reshape the strategic landscape and redefine the nature of aerial warfare.