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Astra missile, IAF's most potent weapon system for combat aircraft, is a big leg up for the defence industry. Here's how

The successful completion of final development trials of 'Astra' missile not only paves way for its induction in Indian Air Force but also signifies the beginning of a new era for the domestic defence industry.

By Ravi Gupta

The successful completion of final development trials of 'Astra' missile not only paves way for its induction in Indian Air Force but also signifies the beginning of a new era for the domestic defence industry. Astra, the indigenously developed state of the art Beyond Visual Range Air-to-Air Missile (BVRAAM) has been developed by DRDO, with Defence Research and Development Laboratory (DRDL) as the lead laboratory.

Recently evaluated by operating from Su30 aircraft, Astra is planned to be operated from various present and future generation combat aircraft including our own LCA Tejas. Such missiles are the fangs of the combat aircraft during a dogfight. They form the most potent weapon systems for such aircraft in modern aerial warfare and are needed in large numbers by any Air Force. IAF being among the world's top five Air Forces, the domestic market itself is gigantic, offering mega business opportunities to the participating industries besides the potential for exploring exports globally. The fifty or so industries that include many Medium Small and Micro Enterprises – MSMEs, contributing to development and production of Astra will need to gear up to the challenge of meeting requirements in terms of quantities and quality.

Some advanced features that make Astra – the first ever BVRAAM developed within Bharat – a state-of-the-art weapon system comparable with the best include its long range of over a hundred kilometers and its smokeless propulsion that lets the missile kill its target without giving any clue about the location of the launching aircraft. Astra is an "All Aspect", "All Weather" weapon, hence making it all the more versatile. This enables the missile to be launched irrespective of the relative position of the target with respect to the missile.

Astra is equipped with an indigenous RF seeker based active radar terminal guidance system. This is thanks to the vision of Dr APJ Abdul Kalam in setting up and nurturing RCI, the "Research Center Imarat", a unique establishment of DRDO, as part of its missile complex in Hyderabad, for the indigenous development of cutting-edge defence technologies, especially in field of Avionics, Navigation and Missile Guidance.

Astra also has advanced ECCM (Electronic Counter-Countermeasures) features. In simple terms, it means that the missile has the capability to overcome defensive measures attempted by the enemy. Further, Astra also has high effectiveness in a multi-target scenario. Another important feature of Astra is the option to choose between "Lock on Before Launch – LOBL" and "Lock on After Launch – LOAL" , the latter allowing the combat aircraft to shoot and scoot to safety after launching the missile in the direction of the target.

The superb maneuverability of Astra is yet another significant factor that will make it a valuable asset. Modern generations of supersonic combat aircraft are capable of carrying out such evasive maneuvers that are limited only by the endurance of pilot and not that of machines. Maneuvers resulting in up to 9g forces (positive, vertical) are common. A missile needs to be far more agile in order to be able to beat such modern combat aircraft. Thus the missile and all its subsystems and components including sensitive sensors and circuits must be able to withstand the forces involved in such maneuvers. Astra has been designed to carry out maneuvers involving forces exceeding 30g. Astra BVRAAM, therefore, offers high overall reliability and a high "Single Shot Kill Probability – SSKP".

The successful completion of the development phase of Astra confirms the capabilities of this formidable weapon under various modes of operation. It is a reaffirmation of the R&D competence of our defence scientists. Even more significantly, this is also a testimony to the maturity of the participating industries, their advanced levels of competence and skills in manufacturing such complex and delicate components with high standards of quality and their potential for making much more advanced versions of such weapons.

Certainly, the Scientific Advisor to Raksha Mantri and the Director General, Missiles and Strategic Systems Dr G Satheesh Reddy must have had the near term and long term developments in his mind when he stated, "The technologies

developed under the programme will be the building blocks for development of more variants of Air-to-Air and Surface-to-Air Missiles".

The bright future for domestic defence industry is just beginning to unfold with more and more indigenously developed defence systems getting inducted by our armed forces, combined with increasing emphasis on "Make in India" by the government. It's now the turn of our domestic industry to take up the challenges and scale new heights.

(The author of this article is a former DRDO scientist. Views expressed are personal)

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DRDO completes development trials of Astra BVRAAM

India's state-owned Defence Research and Development Organisation (DRDO) has completed development trials of the Astra beyond-visual range air-to-air missile (BVRAAM).

The final flight tests of the locally developed weapon system were conducted from 11–14 September over the Bay of Bengal, the Indian government's Press Information Bureau (PIB) reported on 15 September, pointing out that a total of seven trials were successfully carried out against pilotless target aircraft.

The missions included the engagement of targets at very long range, the engagement of high-manoeuvring targets at medium range, and multiple launches of missiles in salvo to engage multiple targets.

"All the sub-systems, including the indigenous RF [radio frequency] seeker, performed accurately, meeting all the mission parameters and objectives," stated the PIB, adding that the development phase of the system has been completed.

Jane's 360

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India's DRDO successfully tests 'Trawl' mine clearance system

India's Defence Research and Development Organisation (DRDO) has recently conducted trials of the 'Trawl' mine clearance system being developed for the Indian Army (IA), according to a 15 September statement by the Indian government's Press Information Bureau (PIB).

The locally developed system, which is capable of breaching minefields featuring a variety of mine types, successfully carried out tests that demonstrated the survivability of the equipment when subjected to a series of successive blasts directly underneath it, stated the PIB.

A fieldable prototype of the system, which consists of a roller, a track width mine plough and an electro-magnetic device, is "in the final stage of realisation", and will shortly be ready for user evaluation trails with the IA, stated the PIB, adding that this development represents "an important step towards achieving self-reliance" under the Indian government's 'Make in India' initiative.