India’s Light Combat Aircraft

Indian Light Combat Aircraft (LCA), christened ‘Tejas’, is the smallest, light weight, single engine, single seat, supersonic, multirole, combat aircraft and is considered as one of the best in its class in the world. It got its Initial Operational Clearance (IOC) for Induction into Indian Air Force on 20th December 2013 after completing more more than 2450 sorties, marking the fruition of a long and difficult journey of three decades of efforts to make a fighter aircraft of international standards.

The Light Combat Aircraft (LCA) programme was launched in the country in early eighties for two primary purposes. The principal goal was the development of a replacement aircraft for India's ageing MiG-21 fighters. The MiG-21 had been the mainstay of the Indian Air Force since the 1970s. The other main objective was to give an impetus for an across-the-board advancement of India's domestic aviation capability.

In the early eighties, it was realised that no organization existed which had the total capability to develop such an aircraft all on its own. The last time an indigenous fighter aircraft, the HF 24 flew was in 1961. Since then, the HF 24 assembly line had been shut down and the design team had been wound up. Hence in 1984, Government of India decided to establish the Aeronautical Development Agency (ADA) to manage the LCA programme. Hindustan Aeronautics Limited, (HAL) was to be the principal partner with participation of various DRDO & CSIR Laboratories, Public & private sector industries and academic institutions.

The LCA design was finalised in 1990 as a small tail-less delta winged machine with Relaxed Static Stability (RSS) to enhance manoeuvrability performance and a host of other advanced features. It was decided that the Full-Scale Engineering Development (FSED) stage of the programme would proceed in two stages namely technological demonstration stage and additional testing phase. Phase 1 would focus on "proof of concept" and would comprise the design, development and testing of two technology demonstrator aircraft (TD-1 and TD-2) and fabrication of a structural test specimen (STS) airframe. After successful testing of the TD aircraft the government would give its full support to the LCA design. This would be followed by the production of two Prototype Vehicles (PV-1 and PV-2), and creation of the necessary basic infrastructure and test facilities for the aircraft would begin.

Phase 2 would consist of the manufacturing of three more prototype vehicles (PV-3 as the production variant, PV-4 as the naval variant, and PV-5 as the trainer variant) and the construction of further development and test facilities at various work centres. On 4th January 2001, the historic first flight of the Technology Demonstrator TD-1 marked a new era in the aviation history of India. In 2003, Tejas crossed the sonic barrier for the first time.

The Initial Operational Clearance-1 (IOC-I) for ‘Tejas’ was achieved on 10 Jan 2011. In IOC-I, the Aircraft had a few limitations in terms of Combat performance, turnaround time and its weaponisation which had to be refined and improved through Research & Development process. The notable features which have been achieved in IOC-2 include safe flying up to High angle of Attack as mandated by the users. This has

considerably enhanced the combat performance of the aircraft. The Flight control system evaluation has also been completed. The time for initial built-in test has been reduced considerably which enables faster turn around and enhanced operational readiness of aircraft. The Brake system has been improved significantly in terms of energy absorption capability during landing, thus ensuring prompt turn-around of the aircraft. Significant improvement in cockpit ergonomic and lighting system has been accomplished for improved night flying. In-flight re-light capability was demonstrated to ensure enhanced safety and reliability of the aircraft. This is a major achievement. Avionics and Weapon system of the aircraft have been revamped for effective mission superiority. Helmet Mounted Display Sight (HMDS) has been fully integrated in Tejas and R73E missile firing has been successfully demonstrated using HMDS.

Multi-Mode Weapon multirole capability of Tejas was seen at Jaisalmer and the missile firing at Goa. The reliability of the aircraft and serviceability has also been enhanced. Operating at IAF bases namely, Jamnagar, Jaisalmer, Uttarlai, Gwaliar, Goa, Leh, Pathankot demonstrate the aircraft capability to operate from Air Force bases. There have also been occasions when the same aircraft has flown thrice on the same day, indicating the operational reliability of this fighter aircraft.

LCA Tejas is capable of flying non- stop to destinations over 1700 km away (Ferry Range). It`s Radius of Action is upto 500 km depending upon the nature and duration of actual combat. It is powered by the F404/IN20- a well proven turbofan engine, designed and manufactured by General Electric Aircraft Engines, USA. The Engine is modular in construction, consisting of six modules, ensuring easy maintenance. The F404-GE-IN20 is a low bypass turbofan engine, with augmented thrust provided by the afterburner.

IOC-2 shall enable Air Force to carry out air superiority and offensive air support missions, forward air field operations, all weather multi role operations, Electronic counter measures and night flying operations.

The production facilities have been set up at HAL and the aircraft delivery is expected to commence from 2014. After the achievement of IOC II, HAL will go ahead with the Series Production of LCA Tejas. The Company has already established the structural assembly hangar and the assembly lines to meet the stringent quality standards.

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