

## Rs 26k-crore order for building Tejas Mark 1A to open door for Mark 2

*The first of a two-part series focuses on how Tejas Mark 1A will act as a bridge between the Tejas Mark 1 and the Mark 2 fighter*

*By Ajai Shukla*

New Delhi: After months of negotiations, the Indian Air Force (IAF) and Hindustan Aeronautics Ltd (HAL) have fixed the price of the Tejas Mark 1A light combat aircraft (LCA) at about Rs 310 crore per fighter, say Ministry of Defence (MoD) sources involved in the negotiations.

Now HAL is awaiting a formal contract, worth some Rs 26,000 crore for building 83 Tejas Mark 1A fighters that the MoD has already green-lighted for purchase. According to the agreed schedule, delivery of the Mark 1A will begin 36 months after the contract date. If the order is placed at the start of 2020, Tejas Mark 1A deliveries will start in 2023. With 16 fighters to be delivered each year it would take another five years to deliver all 83 fighters – that is by 2028.



“We should be signing the contract very soon”, IAF boss, Air Chief Marshal RKS Bhadauria, had said on October 4. That is now imminent.

Girish Deodhare, Chief of the Aeronautical Development Agency (ADA) – the Defence R&D Organisation (DRDO) agency responsible for the Tejas programme – spoke exclusively to Business Standard about the Tejas Mark 1A fighter. He described it as a bridge between the current Tejas Mark 1 and the Mark 2 fighter that ADA is developing. He says the latter will be, from the standpoint of size, sophistication and capability, far superior to the Mark 1 fighter.

While the Mark 1A light fighter will have the same fuselage and General Electric (GE) F-404 engine as the Mark 1, the Mark 2 will be a significantly larger medium fighter with the more powerful GE F-414 engine.

“Initially the Tejas Mark 2 was planned to be just a re-engined Mark 1 (with a more powerful engine). However, with the advent of the Mark 1A, it was decided that Tejas Mark 2 would be configured with significantly higher capabilities. While the ‘all up weight’ (maximum take-off weight, with fuel and weapons) of Tejas Mark 1 is 13.5 tonnes, the Mark 2 will be 17.5 tonnes, taking it into the medium weight category. It will also carry an 85 per cent higher weapons load,” said Deodhare.

While ADA is developing the Mark 2 fighter, HAL is building the Mark 1A, with ADA contributing its expertise in avionics, flight controls, aerodynamics and structural analysis. While the Tejas Mark 2 will be almost a generation ahead of the Mark 1 fighter, even the interim Tejas Mark 1A will be far more capable.

The IAF has demanded five new capabilities in the Mark 1A, including “active electronic scanned array” (AESA) radar, with multi-tasking capability that would give it a clear combat edge over Pakistan’s entire fighter fleet, and most of China’s as well.

“The initial batches of the Tejas Mark 1A mayfield an imported AESA radar, but the DRDO is developing its indigenous Uttam AESA radar. As soon as it is proven, the Uttam will start equipping the Tejas Mark 1A,” said Deodhare.

The Uttam AESA radar is already flying on a Tejas prototype and has completed 11 successful test flights. “We need to do a couple of more years of flight testing before it is certified and ready for production. Thereafter, all Tejas Mark 1A will incorporate the indigenous radar”, he said.

This incremental approach is also evident in the “digital flight control computer” (DFCC) – a fighter aircraft’s brain – that ADA has designed and qualified for the Tejas Mark 2. The upgraded DFCC is ready and qualified, but it could not go into the Mark 1A because it was built bigger to allow easier maintenance access in the larger Mark 2 fighter.

“We took the upgraded cards from the Tejas Mark 2’s DFCC and installed them into the smaller Mark 1 DFCC chassis, effectively upgrading it for the Mark IA. The new Mark 1A DFCC will have significantly higher processing power allows us to add many more advanced capabilities in the FCS,” said Deodhare.

In addition, the Tejas Mark IA is being upgraded with a “self-protection jammer” (SPJ), also supplied by Elta, which the IAF has demanded in order to confuse incoming missiles. Each Mark 1A fighter will carry a SPJ on a pod under its wing, sharing a mounting station with an air-to-air missile.

Giving the Tejas Mark 2 the contemporary look of the Rafale and Eurofighter, it will be built with canards on the front of the fuselage. These fin-like structures serve to make the aircraft unstable, and therefore more manoeuvrable. Deodhare says ADA decided to fit canards after discovering that increasing the Mark 2’s internal fuel capacity to 3300 kilogrammes (from 2400 kg in the Mark1) made the fighter excessively stable. Designing canards near the nose of the aircraft regained its manoeuvrability.

“We are targeting the first flight of the Tejas Mark 2 by 2023. We are confident of this since most of the technologies that will go into it are already matured through LCA Mark 1,” said Deodhare.

#### **eaching new heights**

- Delivery of Tejas Mark 1A will begin 36 months after the contract date
- If the order is placed at the start of 2020, Mark IA deliveries will start in 2023
- Tejas Mark 2 fighter to fly by 2023
- First flight of the Mark 2 is being targeted by 2023: Girish Deodhare, ADA chief

[https://www.business-standard.com/article/economy-policy/rs-26k-cr-order-for-tejas-mark-1a-to-open-door-for-mark-2-119121600021\\_1.html](https://www.business-standard.com/article/economy-policy/rs-26k-cr-order-for-tejas-mark-1a-to-open-door-for-mark-2-119121600021_1.html)

## DRDO revives handheld device project

A DECADE ago, the Indian Army callously shelved a project to develop handheld computers for its soldiers.

Project Beta, in collaboration with Indian industry, had fielded prototypes of what was a breakthrough in the pre-smartphone era. A solar-powered Situational Awareness and Tactical Handheld Interface (SATHI) handset (*In photo*) plotted a soldier's position on a GIS map, and allowed him to securely communicate through voice and text with other soldiers. Over the last few weeks, meetings between the original project team and the DRDO's Centre for Artificial Intelligence and Robotics have seen the project stirring to life. Its original developers from Bengaluru's IT industry are confident they can rapidly develop a 'Sathi 2.0'.

A project report submitted recently calls for a handset equipped with a range of features not available 15 years ago. These will be powered by the indigenous Shakti micro-processor developed last year by IIT-Madras. The prototypes will go for user trials by mid-2020. The only dark cloud is that this project is not being driven by the Indian Army. Judging by history that might not be such a bad thing.

