

The third of a four-part series traces the genesis of Tejas Mark 2, which is an improved version of the indigenous Tejas Light Combat Aircraft

Tejas Mark 2 challenge: An upgrade to elevate

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The order book of Hindustan Aeronautics Ltd (HAL) remains the envy of India's defence industry, standing at ₹94,000 crore at the end of the financial year 2023-24. That is more than three times the company's turnover of ₹29,810 crore last year.

The order book includes 83 Tejas Mark 1A fighters, contracted with the Indian Air Force (IAF) for ₹48,000 crore. However, it does not include the acquisition of 97 more Tejas Mark 1A, for an estimated ₹65,000 crore, which the Ministry of Defence (MoD) announced in April.

It also leaves out the procurement of 150-200 Tejas Mark 2 fighters — a larger, better-armed, and more sophisticated version of the Tejas Mark 1A fighter — that is being developed by HAL and the Defence R&D Organisation (DRDO).

HAL officials told *Business Standard* during a visit to Bengaluru last month that they expect the Indian Air Force (IAF) to procure 100-150 Tejas Mark 2 fighters.

The Tejas Mark 2 was conceived as a marginal improvement on the Tejas light combat aircraft (LCA). It has now evolved into a significantly larger and more capable fighter.

This change comes from replacing the Tejas Mark 1's General Electric F-404 power pack with GE's muscular F-414 engine. While the F-404's peak thrust is just 83 kilonewtons, the F-414 delivers a blazing 98 kilonewtons of thrust on full afterburners.

This power increment enables the Mark 2 to get aloft with an all-up weight of 16.5 tonnes, including the 10-tonne weight of the fighter and 6.5 tonnes of external payload. This easily outperforms the Mark 1, which has an external payload limit of just 3.5 per tonnes.

The Tejas Mark 2's increased payload gives mission planners many more options. For air-to-air combat, the Mark 2 will carry the indigenous Astra Mark 1 and Mark 2 missiles; wingtip-mounted ASRAAM missiles, and the DRDO's Rudram anti-radiation missiles.

The DRDO is also developing a range of bombs for the Tejas Mark 2. The Tara high speed, low-drag, glide bomb is mounted on the pylons; along with laser-guided bombs with laser-guidance kits. The SCALP missile, procured from European manufacturer MBDA, along with the Rafale fighters, will also be integrated with the Tejas Mark 2.

To carry this payload, the Tejas Mark 2 will have 11 hard points, including one on each wingtip for the ASRAAM advanced short-range air-to-air missile. There will be three under-wing pylons on each side, one wet station on each side for fuel drop tanks, while the other three hard points are for long-range missiles such as the Astra and the Rudram, which the DRDO successfully



TEJAS TIMELINE

Dec 2023: Preliminary design review

June 2026: First Mark II prototype complete

June 2028: Flight testing for about two years

June 2029: Delivery of production aircraft begins

2035-36: Building of Tejas Mark II fleet (will require at least 5 years)

tested on Wednesday.

"The fighter's Preliminary Design Review was completed in December 2023 and the design has been frozen. The manufacture of parts has begun and we expect the first Tejas Mark 2 prototype to be ready by June 2026," said CB Ananthkrishnan, HAL's chairman and managing director.

"The Mark 2 prototype will be ready by June 2026. After that, it will take about two years of flight testing to certify the various systems. By June 2029, we should start delivering the production aircraft," he said.

The Mark 2 fleet would require at least five years to build, starting from 2029-30. The numbers would initially be small, but from 2030-31 they would again pick up, because the LCA Mark 2 would again get over. So the five years would end by about 2035-36. PDR is the process of determining the degree to which the aircraft's design complies with the air staff qualitative requirements and determining that the aircraft meets those requirements.

This is followed by the Critical Design Review, which ensures the translation of the preliminary design into a detailed design.

"In the Tejas Mark 2, we have gone far beyond the PDR and begun building the aircraft. The design phase has almost been completed, except for some small changes that may be required," said Ananthkrishnan.

A key challenge in developing the Mark 2 fighter is increasing the capacity of its mission computer and flight software. A new mission computer has been developed and integrated into a Tejas Mark 1A for testing.

Next: HAL's future in building combat aircraft

