Kaveri Engine

The Kaveri engine, an indigenous gas turbine engine developed by the Gas Turbine Research Establishment (GTRE) under DRDO, has been cleared for inflight testing.

Source:ET

- The Kaveri engine project began in the late 1980s with the goal of powering the Light Combat Aircraft (LCA) Tejas.
- It is developed **by the Gas Turbine Research Establishment** under the Defence Research and Development Organisation.
- **Features**
  - The current dry version of the Kaveri engine produces **approximately 49-51 kN of thrust.**
  - This thrust level is suitable for UAV applications like the Ghatak, India's stealth UCAV program. The DRDO plans to integrate an afterburner to increase the thrust to 73-75 kN for more demanding scenarios.
  - The Kaveri engine has undergone extensive ground testing, modifications, and enhancements over the years.
  - It has been **tested in high-altitude simulations in Russia** and ground trials in India. These tests demonstrated promising results in reliability, thrust output, and operational stability, meeting the required performance metrics for inflight testing.
- **India's stealth Unmanned Combat Aerial Vehicle (UCAV) program.**

Feature	Details
Thrust Capability	~49-51 kN, with plans to increase to 73-75 kN with afterburner
Engine Type	Turbofan engine
Applications	Designed for fighter jets like LCA Tejas, UAVs like Ghatak
Development Timeline	Over three decades of research and innovation.

Testing and Development Process

The Kaveri engine has undergone extensive ground testing, modifications and enhancements over the years.

It has been tested in high-altitude simulations in Russia and ground trials in India. These tests demonstrated promising results in reliability, thrust output and operational stability ensuring that the engine meets the required performance metrics for inflight testing.

Ghatak

- Ghatak, initially designated as Indian Unmanned Strike Air Vehicle, is an autonomous jet powered stealthy UCAV, being developed by Aeronautical Development Establishment of the DRDO for the Indian Air Force.
- The design work on the UCAV is to be carried out by Aeronautical Development Agency. Autonomous Unmanned Research Aircraft (AURA) was a tentative name for the UCAV.
- The Ghatak UCAV will have an internal weapons bay for carrying missiles, bombs and precision-guided munitions. Its design will be based on a flying-wing concept, and will be powered by a turbofan engine.
- The first flight of a scaled down testbed was carried out in July 2022, and that of a full scale prototype is expected in 2025.

Challenges

- The project has faced delays due to the complexity of jet engine technology.
- Collaborations with global aerospace players helped address technological gaps.
- Efforts to minimize production costs while maintaining performance.

Significance for Indian Aerospace

Strategic Autonomy

- Reduces dependency on foreign jet engine manufacturers.
- Enhances national security through indigenous capabilities.

Boost to Domestic Industry

- Encourages growth in India’s aerospace sector.
- Creates opportunities for local manufacturers and suppliers.

Global Competitiveness

- Positions India as a potential exporter of aerospace technology.
- Enhances the credibility of Indian defense research on the global stage.