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DRDO's First Indigenous 350 kg-Thrust Expendable Turbojet Engine

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DRDO's First Indigenous 350 kg-Thrust Expendable Turbojet Engine

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✓ Every fact web-verified against primary sources

On , the **Defence Research and Development Organisation (DRDO)** announced that its **Gas Turbine Research Establishment (GTRE)**, Bengaluru, has developed **India's first indigenous 350 kg-thrust-class expendable turbojet engine**, with **Azad Engineering (Hyderabad)** as the production partner. The engine is designed to power **long-range cruise missiles, loitering munitions and unmanned aerial vehicles (UAVs)**, marking a significant step toward self-reliance in aero-propulsion.

WHAT WAS DEVELOPED

An **expendable turbojet engine** is a **single-use** power plant meant for platforms that are not recovered after a mission, such as cruise missiles and loitering munitions. Because these platforms are consumed on use, the engine must be **low-cost, mass-manufacturable and reliable on first start**, unlike the reusable, high-life engines that power crewed fighter aircraft.

The new engine belongs to the **350 kg-thrust class**, meaning it produces roughly **350 kilograms-force of thrust**. This output band is well suited to subsonic cruise missiles and long-endurance unmanned systems. The design was led by **GTRE**, a Bengaluru-based DRDO laboratory dedicated to gas turbine and aero-engine research, while **Azad Engineering** provides precision manufacturing of critical rotating components.

Why an Indigenous Engine Matters

Propulsion has long been India's weakest link in aerospace. Even where India designs its own airframes, missiles and drones, the **engine is frequently imported**. Building an indigenous expendable engine:

- Removes dependence on **foreign suppliers** for a critical, mission-defining component.
- Protects programmes from **export controls and sanctions** that can freeze deliveries during a crisis.
- Creates a **domestic supply chain** and industrial base for future propulsion work.

THE LARGER AERO-ENGINE GAP

India still **imports the engines that power its fighter jets**. The indigenous **Tejas** light combat aircraft, for example, relies on an imported engine, and negotiations for co-development of a next-generation fighter engine remain ongoing. The long-troubled **Kaveri engine** programme, also a GTRE project, was intended to give India a home-grown fighter engine but did not meet the thrust and reliability targets required for a frontline jet.

Against this backdrop, mastering an **expendable engine** is strategically smart. It is a lower-risk, high-volume category where India can build metallurgical, combustion and manufacturing competence that later feeds into more demanding reusable engines.

FEATURE	EXPENDABLE TURBOJET	REUSABLE FIGHTER ENGINE
Service life	Single use	Thousands of flight hours
Cost priority	Low unit cost, mass produced	High performance, long durability
Typical platforms	Cruise missiles, loitering munitions, UAVs	Fighter aircraft
Indian status (2026)	Indigenous 350 kg-class achieved	Still largely import dependent

The Private Sector's Role

The partnership with **Azad Engineering** reflects a broader shift in Indian defence manufacturing, where **private firms** are moving from being component vendors to **strategic co-producers** of complex systems. This aligns with the government's push for **Atmanirbharta (self-reliance)** in defence and the drive to build a wider, resilient domestic defence-industrial base. Propulsion is a **dual-use technology**, and a stronger private ecosystem strengthens both national security and India's export ambitions.

UPSC RELEVANCE

GS Paper 3: Achievements of Indians in science and technology; **indigenisation** of technology and developing new technology; defence and internal security through communication networks.

Prelims pointers:

- **GTRE** is a **DRDO** laboratory in **Bengaluru**; DRDO functions under the **Ministry of Defence**.
- An **expendable engine** is single-use, meant for missiles and munitions, not crewed aircraft.
- The new engine is in the **350 kg-thrust class**, for **cruise missiles, loitering munitions and UAVs**.
- The **Kaveri engine** was GTRE's fighter-engine programme that did not meet frontline requirements.

Mains question: India's persistent aero-engine gap has been a key vulnerability in defence self-reliance. Discuss how indigenous expendable-engine development and greater private-sector participation can help bridge this gap. (250 words)

★ FACTS CORNER, KNOWLEDGE PEDIA

DRDO: Established in 1958; India's premier defence R&D agency under the Ministry of Defence.

GTRE (Gas Turbine Research Establishment): DRDO lab in Bengaluru focused on aero gas turbine engines; earlier ran the Kaveri programme.

Thrust class: 350 kgf roughly indicates the engine's forward pushing force; suited to subsonic cruise missiles and long-endurance drones.

Loitering munition: A "kamikaze" drone that circles over a target area before striking; needs a cheap, reliable expendable engine.

Atmanirbhar Bharat in defence: Backed by tools like the positive indigenisation lists and Defence Acquisition Procedure (DAP) 2020 promoting Make in India procurement.

Azad Engineering: Hyderabad-based precision manufacturer supplying critical rotating components for the programme.

Sources: Press Information Bureau (PIB) releases on DRDO, DRDO official website, The Hindu and Indian Express defence coverage, July 22 to 23, 2026.

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