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## Advanced Medium Combat Aircraft

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India is expected to launch its indigenous fighter Advanced Medium Combat Aircraft (AMCA) by 2032. The AMCA will feature geometric stealth and will initially fly with two GE-414 engines. The engines will be replaced by the indigenous engines.

- There are two major ways of making a military platform stealthier.
  - **Geometric stealth:** the shape of the aircraft is designed at such angles so as to deflect away maximum radar waves thereby minimising its radar cross-section.
  - **Material stealth:** radar-absorbing materials are used in making the aircraft which will absorb the radio waves thus reducing the radar footprint.
- The AMCA will initially be based on geometric stealth, the material stealth shall be focussed upon at a later stage.
- The plan is to build on the capabilities and expertise developed during the development of the light combat aircraft (LCA) and produce a medium fifth generation fighter aircraft. AMCA is being conceived as a progression from the LCA Tejas.
- Apart from the technologies developed from the LCA project, the new fighter programme is important as technologies coming in through that will flow into the AMCA project.
- India had expressed its unwillingness to go ahead with the joint development of a fifth-generation fighter aircraft (FGFA) with Russia primarily due to the high cost involved in the project. This is India's only fifth-generation aircraft programme after the decision.

### Specifications of AMCA

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- The aircraft will incorporate advanced technologies like super maneuverability, supercruise, stealth, state of the art sensor suite with fusion.

- It is being developed by an aerospace industry team which consist of Aeronautical Development Agency as a design firm and to be manufactured by Hindustan Aeronautics Limited (HAL).
- The AMCA is being designed as a stealth, medium weight, twin-engine, fifth generation multi-mission aircraft with the capability to swing roles.
- The stealth mission features the Suppression of Enemy Air Defense (SEAD), precision strike and maritime operations.

## Light Combat Aircraft (LCA)

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- LCA is an advanced technology, single seat, single engine, supersonic, light-weight, all-weather, multi-role, air superiority fighter designed for air-to-air, air-to-ground and air-to-sea combat roles.
- The LCA programme was conceived in 1983. The project definition phase was completed in 1989 and the full scale engineering development (FSED) phase-I was sanctioned in 1993.
- Aeronautical Development Agency (ADA) was established by the government in 1984 to manage the LCA programme. Hindustan Aeronautics Limited, (HAL) is the principal partner with the participation of various DRDO & CSIR Laboratories.

## Different Generations of Jet Fighters

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- Subsonic fighter planes built during the mid-1940s to mid-1950s are classified as **first generation fighters**. These planes had a basic avionic system (electronic systems used on aircraft) with no radar or self-protection system.
- **Radar-connected second generation planes** were made between the mid1950s and early 1960s. These jets could reach supersonic speed and were equipped with semi-guided missiles, unlike the earlier generation that used cannons, machine guns and unguided bombs and rockets for the attack. MiG-21 is perhaps the best known second-generation fighter.
- **Third generation planes** manufactured between the early 1960s and 1970 had advanced maneuverability and weapons systems. These planes, that included the MiG-23 and Mirage III, were capable of shooting at targets beyond the pilot's visible range.
- **Fourth generation fighters** were conceived in the 1970s and became operational in the early 1980s. These planes were also equipped with flyby-wire systems, which meant replacement of manual fight control with electronic devices. Notable fighters of this generation are the American F15, F16, French Mirage 2000 and the Soviet MiG29.

- **Fifth-generation multi-role fighters** have features that are generally taken to include all-aspect stealth even when armed, Low Probability of Intercept Radar (LPIR), high-performance airframe, a high-performance engine capable of supercruise (supersonic cruise without afterburner), advanced avionics with long-range sensors and networked data fusion providing full battle-space situational awareness. In 2005, the Lockheed Martin F-22 Raptor entered service with the United States Air Force (USAF), becoming the world's first combat-ready fifth-generation fighter.

## Tejas

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- It is India's first domestically designed and produced light fighter aircraft. It is a supersonic, single-seat, single-engine multirole light fighter aircraft.
- Tejas is a light combat aircraft (LCA) that uses fourth-generation technology. It has a configuration optimised primarily for maneuverability and agility.
- The plane is equipped with a digital fly-by-wire flight control system to ease handling. This helps the pilot do more head down activities (especially mission-critical activities) without worrying about the aircraft deviating from its flight path.