India’s jet engine deal with the U.S.

Why in news?

A landmark agreement to facilitate the transfer of at least 11 critical jet engine technologies is likely to be announced during Prime Minister Narendra Modi’s ongoing official State Visit to the United States.

What is the background of the issue?

- India and the U.S. have almost finalised details and the White House is set to sign off on the deal.
- **GEA & HAL –** The deal will allow American manufacturing company General Electric (GE) Aerospace to share critical technology with Hindustan Aeronautics Limited (HAL).
- **Tejas Mk-II –** The deal will felicitate for the joint production of GE-F414 jet engines that will power indigenous Light Combat Aircraft (LCA) Tejas Mk-II.
- The proposed agreement has evoked considerable interest in India and beyond.
- Experts have termed it a significant step for bilateral defence and high-tech cooperation amid China’s growing influence and global technological dominance.

When did India’s quest for indigenous aero-engines begin?

- India’s pursuit of self-reliance and technological transformation in the defence sector stems from the necessity to deal with the dual threat along its borders.
- India needs to self-sustain in defence sector in order to maintain strategic autonomy in the emerging world order.
- India has designed and built a fighter jet but hasn’t achieved much success in producing engines to power these aircraft.
- **HF-24 Marut –** The quest began in the 1960s with the country’s first indigenous fighter, HF-24 Marut.

  The aircraft was envisioned as a supersonic jet, but failed to achieve its potential for want of a suitable engine and was eventually phased out.

- **Kaveri programme –** A few decades later, India sanctioned the Kaveri programme to develop an indigenous military gas turbine engine for the ambitious LCA project.
- With Kaveri still a work in progress, India shortlisted American GE-F404 engines for LCA Tejas Mark-1 as an interim measure.
- **F414 engines –** In 2010, the Aeronautical Development Agency (ADA) selected the more powerful variant, F414 engines, to power Tejas Mark-2.
- The deal, however, did not materialise due to U.S. domestic legislation and regulatory

hindrances and remained on the back burner for over a decade.
- **GE-HAL deal –** A new framework pushed by PM Modi and President Joe Biden last year put the focus back on the GE-HAL deal.

What will the deal include?

- **Co-production of F414 –** While there has been no official confirmation yet, senior officials have hinted at a possible collaboration on the co-production of F414 jet engines.
- **Tech transfer –** Media reports claim that the U.S. has agreed to transfer around 80% transfer of the tech value to India.
- **Know-how to a non-ally –** This is unprecedented considering that America maintains strict controls over domestic military technology and has never handed over such critical technological know-how to a non-ally in the past.
- The agreement will require final approval from the U.S. Congress before it is inked by the two leaders.

What are the features of the F414 engine?

- **F414-INS6 –** India has shortlisted the F414-INS6 model for LCA Mk-II for the IAF, and the export market in the future.
- An advanced and more efficient version of the F404 engines conceived in the early '90s, F414 engines currently power the LCA Tejas.
- **Specifications –** The engine's main specifications are:
    1. An afterburner turbofan 154-inch long engine in the 22,000-pound (98 kilo newtons) thrust class, 35% more thrust than the F404 engines.
    2. A thrust-to-weight ratio of 9:1, which is an indicator of aircraft propulsion.
    3. Has low maintenance costs and boasts of unrestricted engine performance on demand with more than five million engine flight hours.
    4. The engine is designed to maximise time on wings, which is a measure of the operational reliability of an engine.

How crucial is the deal for India?

- **5th Country –** India will become the 5th country in the world to produce jet engines once the deal is sealed, joining the U.S., Russia, France and the U.K.
- **Russia-Ukraine conflict –** It helps India in boosting its military capabilities and growing defence manufacturing at a time when the world is reeling due to the impact of the Russia-Ukraine conflict.
- **Ageing Russian fighters –** The agreement will help replace the fleet of ageing Russian fighters.
- **Powerful engines –** The deal would bolster India's capacity to field indigenously produced fighters with powerful and reliable engines, saving decades of research and development costs.

What is the way forward?

- Expanding the type and sophistication of the arms the U.S. is willing to sell to India

may elevate the U.S. as an alternative to India's traditional dependence on Russian hardware.
- This is particularly important, amid rising concerns about Russia's strategic embrace of China.
- Also there is a growing questions about the quality, reliability, and capacity of a Russian defence industrial base increasingly strained by the Ukraine conflict.

References

1. The Hindu │What is India's jet engine deal with the U.S.?
2. The Indian Express │India's jet engine deal with the US

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