

Solid Fuel Ducted Ramjet (SFDR)

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In News: Defence Research and Development Organisation (DRDO) successfully flight tested the second indigenously developed 'Solid Fuel Ducted Ramjet (SFDR)' propulsion based missile system.

About Solid Fuel Ducted Ramjet (SFDR) Technology:

- Developed by: Defence Research and Development Organization (DRDO)
- SFDR technology is a missile propulsion system based on the concept of Ramjet Engine principle.
- The system utilises a solid fuelled air-breathing ramjet engine.
- DRDO began developing SFDR first in 2017 and had conducted successful tests in 2018 and 2019 as well.

Significance Of SFDR Technology

- Successful demonstration of SFDR technology will enable DRDO to develop indigenous long range air-to-air missiles.
- At present, such technology is available only with a handful of countries in the world.
- The missile based on SFDR fly at supersonic speeds and high manoeuvrability ensures the target aircraft cannot get away.

Ramjet

- A ramjet is a form of air-breathing jet engine that takes up oxygen from the atmosphere during flight. Thus, it doesn't require an oxidizer as part of the solid motor.

- However, ramjet-powered vehicles require an assisted take-off like a rocket. It assists to accelerate it to a speed where it begins to produce thrust.
- Further, ramjets work efficiently at supersonic speeds around Mach 3 (three times the speed of sound) and can operate up to speeds of Mach 6. But the ramjet efficiency starts to drop when the vehicle reaches hypersonic speeds.

Scramjet

- The scramjet engine is an improvement over the ramjet engine. It efficiently operates at hypersonic speeds and allows supersonic combustion. Thus, it is known as Supersonic Combustion Ramjet or Scramjet.