AGNI - 5

Why in news?

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The Agni-5 intermediate range ballistic missile (IRBM) was successfully test-fired on Monday morning from APJ Abdul Kalam Island, off the Odisha coast.

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What are its specifications?

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- It is indigenously-developed surface-to-surface missile.
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- Range of more than 5,000 km.
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- Can carry a nuclear warhead of more than one tonne.
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How it works?

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- Ballistic missiles work on the same principle as lobbing a stone at a target.
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- The launch starts with the “boost phase”, when the missile is propelled into space.
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- Canister is a container that protects the deployed missiles, allowing them to be stored for years
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- A powerful gas generation system in the canister rapidly builds up 300 tonnes of pressure, popping the missile out, like a bullet.
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- When the missile is 10-15 metres above the canister, the first stage ignites, accelerating the missile upwards. Within 30 seconds, it goes supersonic and, within 90 seconds, when the first stage burns out, the Agni-5 moves upwards at 1.5km/s.
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- The second stage, which burns for 80 seconds, takes the missile 170 kilometres above earth; and the third stage, which separates after a minute, carries the payload up to 260 kilometres.
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- With all three propulsion stages separated, all that is left is the payload --- the tip of the missile.
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- With the “boost phase” over, the missile enters its “ballistic phase”. Like a lobbed stone, it is carried towards the target purely on momentum.
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- Ten minutes after launch, it reaches the top of its parabolic path, about 580 kilometres above earth. Then gravity begins pulling it down towards the impact point.
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- Course correction is done with small “side-thruster rockets”, to correct any errors that crept in during the launch.
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- It comes downwards at about 5-6 kilometres per second.
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- As the missile comes in contact with the atmosphere, friction heats its outer surface to 4,000°C, while the payload inside must be maintained at 50 degrees Centigrade. This is done by building the re-entry vehicle from a thick block of carbon composite material, compressing it with pressures of up to 1,000 atmospheres.
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- At the target end radar-equipped naval warships are pre-positioned to monitor where the missile strikes. There is no scope for error beyond a few hundred metres.
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What is its significance?

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- It is the fourth successive Agni-5 test launch that has gone to plan since the first launch on April 19, 2012.
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- Today’s test was the second in full operational mode, with the missile launched from its storage canister.
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- **Nuclear deterrence -** Its 5,000-kilometre range allows it to deliver a nuclear payload anywhere in China. Therefore it is ready to enter service with the Strategic Forces Command (SFC) as the backbone of India’s China-specific nuclear deterrence.
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- **Second Strike Capability -** For a nation sworn to no-first-use of nuclear weapons, a reliable second-strike capability is an absolute necessity. In the worst-case scenario, the country should have the ability to withstand an enemy nuclear strike on its key locations and launch a successful second strike.
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- With this test and the recent commissioning of the indigenously built nuclear submarine INS Arihant, India is inching towards creating a robust and world-class second-strike capability.
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What is a nuclear triad?

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- A nuclear triad refers to the nuclear weapons delivery via land, air and sea i.e. land-based intercontinental ballistic missiles (ICBMs), strategic bombers, and submarine-launched ballistic missiles (SLBMs).
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- The purpose of having a three-branched nuclear capability is to significantly reduce the possibility that an enemy could destroy all of a nation's nuclear forces in a first-strike attack and ensures a credible threat of a second strike, and thus increases a nation's nuclear deterrence.
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What should be done?

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- There is still a long way to go before becoming a competent nuclear triad. E.g The Nirbhay land attack cruise missile meant to carry nuclear warheads failed for the fourth time during a test.
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- A credible second-strike capability should also be complemented by a modern, powerful military. The Indian military is in crying need of modernisation across its three arms.
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- In a complex global strategic environment, where nations issue nuclear threats based on fake news and global powers threaten to add to their already bulky arsenal, it is important to be recognised as a responsible democracy beyond no-first-strike policy.
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