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Missiles of India

Cruise Missile and Ballistic Missile

Cruise Missile	Ballistic Missile
Guided towards preset land target using navigation system	Projectile shot up in atmosphere
Known for low altitude flight and high mobility	Warheads detach outside atmosphere, hit target using Earth's gravity (parabolic path)
Range: 300 to 1000 km	Long range: up to 1000 km+ (ICBMs)
Examples: BrahMos (290–450 km), Nirbhay (700–1000 km)	Example: Agni V – 5000 km
High precision due to navigation	Low precision
Cheaper, suitable for conventional warheads	Expensive, suitable for nuclear warheads
Easy to intercept	Difficult to intercept (5000 m/s terminal speed)

Short-Range Ballistic Missiles

Name	Range	Payload	Characteristics
Prithvi-I	150 km	1000 kg	Tactical surface-to-surface
Prithvi-II	350 km	500 kg	Air Force version
Dhanush (Prithvi-III)	350 km	1000 kg	Naval version
Shaurya	600–700 km	1000 kg	Hypersonic, canister-launched, nuclear & conventional
Prahaar	150 km	250 kg	To replace Prithvi-I

More Short-Range Missiles

- **Agni-I**: 700–1200 km, 1000 kg, single-stage solid-fuel, nuclear-capable
- **Pralay**: 150–500 km, 500–1000 kg, quasi-ballistic, tactical, hard to intercept, conventional warhead, DRDO-developed

Intermediate-Range Ballistic Missiles

Name	Range	Payload	Characteristics
Agni-II	2000–3000 km	1000 kg	Two-and-half stage solid fuel
Agni-III	3200 km	2000–2500 kg	Two-stage solid propulsion
Agni-IV	3500 km	1000 kg	Two-stage, solid propellant

INTERCONTINENTAL BALLISTIC MISSILES (ICBMs)

Name	Range	Payload	Characteristics
Agni-V (Mission Divyastra)	> 5000 km	1500 kg	MIRV (Multiple Independently Targetable Reentry Vehicle) warheads. Can defeat missile defence systems.
Agni-VI (Under development)	11,000–12,000 km	3 tonnes nuclear	4-stage missile with MIRV capability.

SUBMARINE-LAUNCHED BALLISTIC MISSILES (SLBMs)

Name	Range	Payload	Characteristics
K-15 Sagarika	750 km	500 kg	Based on Shaurya missile. Uses IRNSS. K-series missiles are faster than Agni missiles.
K-4	3500 km	1000 kg	For Arihant class submarines. Solid-fuel, underwater launched, withstands 50N water pressure.
K-5 *(Under development)*	5000 km	—	—
K-6 *(Under development)*	6000 km	—	—

CRUISE MISSILES

Name	Range	Payload	Characteristics
Nirbhay (Subsonic)	750–1000 km	500 kg	Indigenous, low-altitude (down to 10 m), subsonic (0.7 Mach), nuclear-capable (200–300 kg), 2-stage solid-fuel. Radar-evading.
BrahMos (Supersonic)	290 km (now 450 km post-MTCR)	300 kg	Indo-Russian joint venture. Speed: 2.8 Mach. Fire-and-forget. Can be launched from land, air, sea.
BrahMos-NG (Air-launched)	—	—	Lightweight version for Tejas LCA. Speed: 3.5 Mach.
BrahMos II (Hypersonic)	1000 km	300 kg	Speed: Over 7 Mach.
RudraM-II	300–350 km	—	Solid-propelled air-to-surface, anti-radiation, supersonic missile. Indigenous.

HYPERSONIC MISSILES

- Developed by DRDO.
- **Peak speed**: Mach 5.5 (5.5x speed of sound).
- Payload: Up to 200 kg.
- Launch height: 3–15 km.
- **Internal guidance system** allows self-direction post-launch.
- Target: Aircraft hangars, bunkers, enemy radars, communication stations (SEAD missions).

SHORT-RANGE SURFACE-TO-AIR MISSILES (SAMs)

Name	Range	Payload	Key Features
Trishul	9–12 km	5 kg	Short-range, low-level surface-to-air missile
Akash	30 km	50 kg	Supersonic (Mach 2.5), medium-range SAM, engages multiple targets, indigenous seeker, ECCM features
Maitri (QRSAM)	25–30 km	10 kg	Developed by DRDO-BEL-BDL, combats low-flying aerial threats (drones, cruise missiles, attack helicopters), truck-mounted, high mobility

Additional Notes:

- **QR-SAM**: Targets from 30 m to 6 km altitude, 700–800 m/s speed, RF seeker for terminal guidance.
- **Lightweight**, **mobile**, and **faster reaction time** than Akash SAM.

NAVAL & AIR FORCE VERSIONS

Variant	Range	Payload	Use Case
Revati	25–30 km	10 kg	Naval version of Maitri
Rohini	25–30 km	10 kg	Air Force version of Maitri

BARAK-8

- Range: 70–100 km
- Payload: 60 kg
- Indo-Israeli Medium Range Surface-to-Air Missile (MRSAM)
- Part of **naval air defence** (e.g., INS Vikrant)
- Speed: Up to Mach 2

IGLA-S (VSHORAD)

- Russian **Very Short Range Air Defence System**
- Range: Up to 6 km, Altitude: 3 km
- **Man-portable**, shoulder-launched
- Capable of targeting enemy aircraft and **resistant to jammers**

AIR-TO-AIR MISSILE

Name	Type	Key Characteristics
ASTRA	BvRAAM (Beyond Visual Range Air-to-Air Missile)	- 1st air-to-air missile developed by India- Capable of engaging targets at various ranges and altitudes- Range: 20 km (short-range) to 80–110 km (long-range)- Indigenous development

ANTI-TANK GUIDED MISSILES (ATGMs)

Name	Range	Payload	Platform / Variant	Key Characteristics
NAG	3–7 km	8 kg	- Vehicle-launched from BMP-2 (NAMICA)	- 3rd generation- Fire-and-forget- Imaging Infrared (IIR) seeker- Day & night capability- Weight of missile: 48 kg
NAG MK-2	7–10 km	8 kg	—	- All-weather- Fire-and-forget- Lock-on after launch- Indigenous development
HELINA	7 km	8 kg	Helicopter-launched (Rudra, Dhruv, LCH)	- Variant of NAG- Fire-and-forget- Advanced seeker
SPIKE	—	—	- Man-portable- Vehicle-launched- Helicopter-launched	- Israeli 4th generation ATGM- Fire-and-forget- Dual seeker allows mid-flight target change- 95% kill probability- Better performance than Nag in high-temperature environments
MILAN	—	—	—	- To be acquired from France- Anti-tank guided missile for Army
SPICE 2000	—	—	Air Force	- Israeli guided bomb- Precision long-range air-to-ground weapon

INDIA'S MISSILE DEFENCE SYSTEMS

BALLISTIC MISSILE DEFENCE SYSTEM

- 2-tier missile defence system
- Aimed at intercepting aerial threats from ballistic missiles that have ranges up to 5000 km at altitudes both outside (exo) and inside (endo) the atmosphere.

1st layer: Endo

- The single stage solid rocket-propelled Advanced Air Defence (AAD) low-altitude interceptor missile. (Ashwin)
- The AAD interceptor missile is primarily designed to intercept enemy missiles in the endo-atmosphere at altitudes of 20-40 kilometres.

2nd layer: Exo

- Prithvi Air Defense Vehicle known as Pradyumna Ballistic Missile Interceptor is designed to destroy missiles with ranges 300-2000 km at exo-atmosphere (about 80 km altitude).
- For higher altitudes up to 150 km, Agni-V-based ballistic interceptors would be used. (because of 5000 km range)

MULTI-LAYERED AIR DEFENCE SYSTEM: S-400

- India has signed a deal with Russia to acquire five S-400 Triumf multi-layered air defence systems.
- S-400 is a surface-to-air missile system; one of the most advanced anti-aircraft systems developed by Russia.
- Capable of firing four types of missiles to create a layered defence.
- The layered defence system can intercept all types of aerial targets including aircraft, unmanned aerial vehicles (UAV), and ballistic and cruise missiles up to the range of 400 km, at an altitude of up to 30 km.
- Note: USA had offered THAAD and Patriot as alternatives to S-400 to India. Israel has Iron Dome: Israeli SHORT RANGE AIR DEFENCE System.

BARAK-8 LONG AND MEDIUM RANGE SAM

- Medium-range surface-to-air missile system being developed jointly by India and Israel.
- It will have an interception range of 70-100 km.
- Part of naval air defence system To be used aboard INS Vikrant (under construction)
- Maximum speed of Mach 2.

AKASH MEDIUM-RANGE SURFACE TO AIR MISSILE SYSTEM

- India has 2 regiments of the indigenous Akash systems which are capable of multi-target engagement.
- It can strike targets up to a range of 25 km and altitude of 18,000m.

MULTI-LAYERED AIR DEFENCE SYSTEM FOR DELHI

- India is developing a multi-layered air defence system for its cities besides air defence systems for tactical battle areas.
- **1st layer:** 2-tier Ballistic Missile Defence System
- **2nd Layer:** S-400 layered defence system
- **3rd Layer:** Barak-8 long and medium range SAM
- **4th Layer:** Akash medium-range surface to air missile system

HYPERSONIC MISSILES

- Travels at Mach 5 or higher (more than one mile per second).
- They typically consist of a Supersonic Combustion Ramjet or Scramjet propulsion system to enable such high speeds.
- A scramjet engine collects oxygen from the atmosphere as it is travelling and mixes the oxygen with its hydrogen fuel, creating the combustion needed for hypersonic travel.
- DRDO is developing Hypersonic Technology Demonstrator Vehicle (HSTDV). It is an unmanned scramjet (allowing supersonic combustion) demonstration vehicle that can cruise to a speed of Mach 6 (or six times the speed of sound) and rise up to an altitude of over 30 km in 20 seconds. HSTDV successfully demonstrated supersonic combustion in September 2020.
- There are 2 types of Hypersonic Weapon Delivery Systems
    1. Hypersonic Cruise Missiles (HCM)
    2. Hypersonic Glide Vehicle (HGV)

SIGNIFICANCE

- They are a mix of the speed of a ballistic missile and manoeuvring capabilities of a cruise missile.
- While cruise missiles achieve speeds of 550 miles per hour, the hypersonic missiles aircrafts can reach speeds more than 3500 miles per hour.
- Capable of penetrating any anti missile defence system currently available that are designed to intercept cruise and ballistic missiles.
- Specifically designed for increased survivability against modern ballistic missile defence systems.

IMPORTANT HYPERSONIC MISSILES

- DRDO conducted a successful flight-trial of India's first long-range hypersonic missile off the coast of Odisha late in November 2024.
- It can carry both conventional and nuclear warheads to a distance exceeding 1,500 km at a speed of nearly 3 km per second.
- Presently, the US, Russia and China have hypersonic missiles.
- US: Possesses hypersonic missiles, specific details are classified.
- Russia:
    - Avangard: Nuclear-capable hypersonic boost-glide vehicle (Mach 20, 6000+ km range).
    - Kinzhal: Nuclear-capable air-launched ballistic missile (Mach 10, 2000+ km range).
- China:
    - DF-17: medium-range ballistic missile equipped with a hypersonic glide vehicle (Range around 1600 km)

AIRCRAFT CARRIERS OF INDIAN NAVY

- INS VIKRANT: 1st aircraft carrier of India. Decommissioned in 1997 after serving for 37 years.
- INS VIRAAT: 2nd and the longest serving aircraft carrier of India. Decommissioned in 2017 after serving for 56 years. (26 years as HMS Hermes and 30 as INS Vikrant)
- INS VIKRAMADITYA: India and Russia signed $1.5 billion for the acquisition of the warship INS Vikramaditya inducted to the Indian Navy in 2013.
- INS VIKRANT: India's 1st indigenous Aircraft Carrier, inducted into the Indian Navy in 2022.
- INS VISHAL: A 65000 tonne Naval supercarrier on the lines of HMS Elizabeth is planned to be built by India.

SUBMARINE ARM OF INDIA

MAIN CLASSES OF SUBMARINES WITH INDIAN NAVY

1. Sindhughosh-class: Variant of the Russian Kilo-class submarines. E.g., INS Sindhurakshak, INS Sindhuvir, INS Sindhuratna.
2. Shishumar-class: Based on the German Type 209 design, these are diesel-electric submarines equipped with advanced systems. E.g., INS Shishumar, INS Shankush, INS Shalki, and INS Shankul.
3. Kalvari-class (Scorpène-class): Diesel attack submarines based on the Scorpène design developed by Naval Group (France). E.g., INS Kalvari, INS Khanderi, INS Karanj, INS Vela, INS Vagir, and INS Vagsheer (commissioned in Jan 2025).
4. Arihant-class (SSBN): India's indigenous nuclear-powered ballistic missile submarines (SSBNs). These submarines are equipped with nuclear propulsion and are capable of carrying ballistic missiles. Currently, INS Arihant (S2) is the operational submarine of this class. The second submarine INS Arighat (S3) was commissioned in August 2024. Two more submarines (S4 Aridhaman & S4* are launched but yet to be commissioned).
5. Chakra-class (SSN): Nuclear-powered attack submarines leased from Russia. Currently, INS Chakra-II (S1) is in service with the Indian Navy. Chakra-III is expected to be delivered by 2026 or later.

PROJECT 75

- 6 Scorpene-class submarines are constructed indigenously with Transfer of Technology from France.
- The 6 Scorpene class submarines are the core of India’s conventional attack submarine arm. These include:
    - INS Kalvari: Inducted in 2017
    - INS Kandheri: Inducted in 2019
    - INS Karanj: Inducted in 2021
    - INS Vela: Inducted 2021
    - INS Vagir: Inducted 2023
    - INS Vagsheer: Inducted 2025
- The submarines built under the project are capable of:
    - anti-surface warfare and anti-submarine warfare
    - Intelligence, Surveillance and Reconnaissance missions
    - underwater mining operations and naval mine laying.
- The submarines have Diesel Electric transmission systems.
- Can be upgraded with the Air Independent Propulsion (AIP) system in order to stay underwater for longer duration and thus increase their operational range and stealth capabilities.

Project 75-I (India)

- Project 75-I is a follow-up to Project 75. It improves upon the design and technology of its predecessor (P-75). The project is yet to begin.
- Indian Navy aims to acquire six conventional, diesel-electric attack advanced submarines equipped with fuel cells and an Air-Independent Propulsion System (AIP).

NUCLEAR-POWERED SUBMARINES

Nuclear submarines can be classified into two categories namely SSN and SSBN:

19. SSN (SUBMERSIBLE SHIP NUCLEAR)

- SSNs are fast attack submarines. They are propelled by nuclear power.
- Primarily designed for offensive operations (short-range assailant attacks), such as anti-submarine warfare and anti-surface warfare. They also carry out surveillance and intelligence missions.
- They are capable of launching conventional weapons like torpedoes and cruise missiles.

20. SSBN (SUBMERSIBLE SHIP BALLISTIC NUCLEAR)

- SSBNs are also propelled by nuclear power.
- They are usually equipped with nuclear weapons like ballistic missiles.
- Therefore they are usually used as deterrents and not as attack submarines.

NUCLEAR-POWERED SUBMARINE FLEET OF INDIA

SSN FLEET

CHAKRA-I

- 1st nuclear-powered submarine to be inducted into the Indian Navy. Served until 2021.

CHAKRA-II

- 2nd nuclear submarine to be inducted into Indian Navy. It was inducted in 2012.
- It is an advanced version of Chakra I with following features:
    - Higher operating depths (up to 600 metres).
    - Higher speed exceeding 30 knots. Powered by a 190 MW nuclear reactor.
    - Equipped with an advanced weapon system including tube-launched missiles.
    - Chakra II is deployed with the Eastern Naval Command.

CHAKRA-III

- In 2019, India and Russia signed an agreement for leasing of the Akula-class nuclear-powered submarine Chakra III for $3 billion for at least 10 years.
- Powered by a 190 MW nuclear reactor. Expected to be delivered in 2026 or later.

SSBN FLEET

ARIHANT

- Under the Advanced Technology Vehicle programme, India has indigenously-built Arihant, SSBN.
- India's 1st nuclear-powered ballistic missile submarine. Displacement capacity of 6,000 tons.
- Powered by an 83 MW pressurised light-water reactor with enriched uranium.
- Formally inducted in 2019 marking the Nuclear Triad capability of India.
- Capable of launching K-15 Missile with a range of 750 km and K-4 ICBM with a range of 3,500 km.

ARIGHAT

- 2nd Arihant-class submarine built under Advanced Technology Vessel Program.
- Powered by a pressurised water reactor.
- Maximum speed of 12–15 knots (22–28 km/h) when on surface and 24 knots (44 km/h) when submerged.
- 4 launch tubes can carry up to 12 K-15 Sagarika missiles or 4 of the under-development K-4 missiles.

ARIDHAMAN

- Launched in 2021 (expected to be commissioned in 2025).
- Slightly larger than INS Arihant. Measures 125.4 metres and has a displacement of 7000 tons.
- Equipped with K-4 ICBM. Powered by a 83-MW pressurised light-water reactor with enriched uranium.

S4* *(YET TO BE NAMED)*

- Launched in October 2024 (yet to be commissioned). Has nearly 75% indigenous content.
- Measures 125.4 metres and has a displacement of 7000 tons.
- Equipped with K-4 ICBM. Powered by a 83-MW pressurised light-water reactor with enriched uranium.

*After S4**, the next class of Indian SSBNs will be double the 6000 ton displacement of Arihant class and will be carrying nuclear missiles upwards of the range of 5000 kilometres and beyond.*

P-81 POSEIDON AIRCRAFT

- Anti Submarine Warfare (ASW) aircraft which India has acquired from the US. It is a boost to maritime ISR capabilities (intelligence, surveillance and reconnaissance).
- Long-range maritime patrol aircraft capable of undersea surveillance from a height of up to 41,000 ft.
- Has an operational speed of 490 knots (564 mph), range over 2,222 kilometres with on-station time of four hours.
- Equipped with Active Electronically Scanned Array (AESA) radars capable of engaging multiple targets simultaneously. Magnetic Anomaly Detection radar will help locate submarines in deep seas.

IMPORTANT FIGHTER JETS OF INDIA

MIG 29

- Twin-engine, light-weight, air-superiority fighter aircraft developed by the Soviet Union.
- Developed by the Soviet Union. Inducted into the Indian Air Force in 1987.
- With about 110 Mig-29s operated by the Indian Air Force and Indian Navy combined, India is the second biggest operator of Mig-29s in the world after Russia.
- Played an important role during the Kargil War of 1999.
- Three squadrons of MiG-29s aircrafts are deployed in the strategically important Adampur Air Force Station, Punjab, which is around 100 km from Pakistan and 250 km away from China borders.
- Capacity to launch Beyond Visual Range BVR missiles.

SUKHOI-30 MKI

- Twin-engine, multirole combat fighter aircraft jointly developed by Russia and India.
- India’s answer to Pakistan's F-16.
- Top speed of 2120 km/h (Mach 2).
- Capable of launching air-to-air, air-to-surface missiles, laser guided bombs and cluster bombs.
- Provided significant strategic deterrence against China and Pakistan in multi-mission roles, including precision strikes on terror camps across the LoC.
- Su-30MKI has been integrated with BrahMos supersonic cruise missile providing capability to engage high-value naval targets, including aircraft carriers.

TEJAS LCA

- 4th generation supersonic, single-seat, single-engine multirole light fighter aircraft.
- Conceived in the early 1980s to replace the Russian-made MIG 21 of the Indian Air Force.

- Indigenously designed and developed by Aeronautical Development Agency.
- The combat-ready version comprises battle-time requirements such as mid-air refuelling, AESA radar, electronic warfare suites, bombs and weapons etc.
- All 32 single-seat Tejas Mk 1 aircraft have been delivered to the IAF.

LCA-Mk2 (Tejas 2)

- 4.5 generation Advanced Medium Combat Aircraft.
- IAF plans to have about six squadrons of Tejas Mk2. Estimated induction: 2028-29.
- Powered by GE-414 engine (a high-performance afterburning turbofan engine).
- Combat Range: 1500 kms. Maximum Speed: 1.8 Mach
- With a weight of 17.5 tonnes, it can carry 6.5 tonnes of weapons. It has all indigenous weapons and about 11 weapon stations.
- Designed to carry a range of air-to-air, air-to-surface and precision-guided weapons.
- Capable of carrying 8 Beyond-Visual-Range (BVR) missiles at once.

RAFALE

- 4.5 generation twin-engine multirole combat aircraft manufactured by French Dassault Aviation.
- France completed the delivery of all 36 Rafale jets to the IAF in December 2022.
- Main roles include missions including Air-defence/air-superiority, reconnaissance, close air support, dynamic targeting, air-to-ground precision strike/interdiction, anti-ship attacks, and nuclear deterrence, buddy-buddy refuelling.
- Capable of carrying over 9 tonnes of weapons, including air-to-air, air-to-ground, and air-to-ship missiles.
- Maximum speed of 1.8 Mach. Combat range of more than 3700 km.
- Weapon systems include SCALP and METEOR missiles.
    - SCALP: Precision long range ground attack missile that can take out targets with extreme accuracy. Has a range of 300 km, capped by the missile technology control regime.
    - METEOR: Beyond visual range air to air missile that is possibly the best in its class. Can take out enemy aircraft at a range of over 100 km.

ADVANCED MEDIUM COMBAT AIRCRAFT (AMCA)

- 5th-generation fighter aircraft. Currently the only 5th generation fighter under development in India.
- Indigenously designed by: Aeronautical Development Agency under DRDO.
- Full-stealth AMCA aircraft programme sanctioned in 2024. Estimated induction: 2034
- AMCA is a 25-tonne twin-engine aircraft.
- Max speed: Nearly 2,600 kilometres per hour (Mach 2.15). Combat range: 1,620 km

- Designed for multi-role missions, including air-to-air and air-to-ground operations, suppression of enemy air defenses (SEAD) and electronic warfare.
- Stealth aircraft (capable of avoiding enemy radars and air defence mechanisms).
- AMCA will be based on the 'first look, first kill' concept, where an AMCA pilot would see an enemy plane first, fire a missile and destroy it before the latter can react.
- AMCA will carry: BrahMos-NG (next generation) air-to-ground missiles; Astra air-to-air missiles; Rudram air-to-ground anti-radiation missiles:

AIRBORNE EARLY WARNING & CONTROL SYSTEM (AWACS)

- Known as 'eyes in the sky', AWACS are Air-borne radar systems mounted on aircrafts for scanning and surveillance.
- With a 360-degree coverage, they are deployed to carry out surveillance on enemy Air Defence systems and to prepare an Air Situation Picture useful in aerial combats.
- **PHALCON**: AWACS procured by India from Israel. Detects aircraft at ranges exceeding 400 kilometres.

NETRA

- Netra Airborne Early Warning & Control System (AWACS) aircraft is a multi-sensor platform indigenously developed by DRDO.
- Netra has an indigenously developed Active Electronically Scanned Array (AESA) radar system mounted on the Embraer ERJ 145 twin-engine aircraft.
- The AESA radar is an airborne surveillance system with detection and tracking capabilities. It can track and find aircraft, missiles, ships and vehicles.
- Netra provides 240-degree coverage of airspace. Detects aircraft at ranges exceeding 400 kilometres.

AKASHTEER

- Akashteer (Sky Arrow) is an Indian Air Defence Control & Reporting System developed by Bharat Electronics Limited.
- It is designed to automate air defence control and reporting processes by digitising them.
- The Akastheer system is being integrated with the Integrated Air Command and Control System (IACCS) of the Indian Air Force to increase jointness of the Armed Forces for air defence.
- By integrating radar and communication systems at all levels into a unified network, 'Akashteer' aims to deliver an unprecedented level of situational awareness and control.
- This allows for effective monitoring of low-level airspace in battle zones and efficient management of Ground-Based Air Defence Weapon Systems.

INDRAJAAL

- Hyderabad-based Grene Robotics has launched Indrajaal, India's first AI-powered anti-drone system.
- Provides a 360-degree coverage/defence against all types and intensities of unmanned autonomous threats across regions up to 4000 square kilometres.
- Can quickly and accurately identify, categorise, track, and eliminate threats in real time.
- Offers protection from all kinds of autonomous drones, including low Radar Cross Section (RCS) threats, medium-altitude long-endurance (MALE) and high-altitude long-endurance (HALE) UAVs.
- Can also be used for loitering munitions, smart bombs, rocket showers, nano and micro drones, and even

MAN PORTABLE AIR DEFENCE SYSTEM (MANPADS)

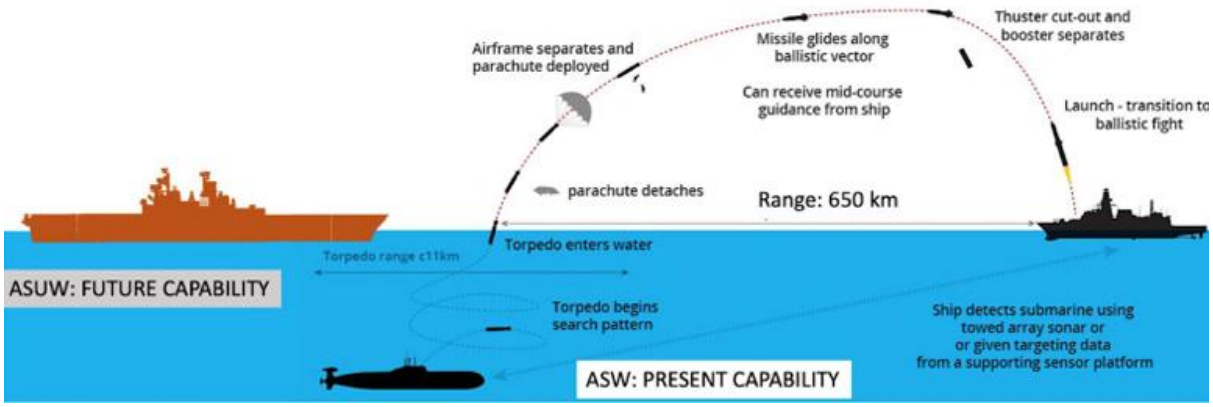
- MANPADS are short-range, lightweight and portable surface-to-air missiles.
- Can be fired by individuals or small groups to destroy aircraft or helicopters.
- Fitted with infrared (IR) seekers to identify and target the airborne vehicle through heat radiation being emitted by the latter.
- Have ‘fire-and-forget’ guidance systems. Target low-flying aircraft and shield troops from aerial attacks.
- **Note**: India has contracted 48 Igla-S launchers (MANPADS) from Russia. It will enhance Army’s Very Short Range Air Defence (VSHORAD) capabilities.

VERY SHORT-RANGE AIR DEFENCE SYSTEM (VSHORADS)

- DRDO has successfully conducted three successive flight-trials of the VSHORAD system from Chandipur off the coast of Odisha.
- VSHORADS is a fourth generation technically-advanced miniaturised MANPAD.
- Indigenously developed by: DRDO’s Hyderabad-based premier facility Research Centre Imarat.
- Interception Range: up to 6 kms.
- Limiting altitude of effective target destruction: 3.5 km
- Maximum speed: Mach 1.5
- Can neutralise low altitude aerial threats like drones and high-speed targets at short range.

SUPERSONIC MISSILE-ASSISTED RELEASE OF TORPEDO (SMART) SYSTEM

- DRDO tested a next-generation SMART system to boost the Navy's anti-submarine warfare capabilities.
- SMART is a missile-based system designed to significantly extend the range of lightweight torpedoes that can target submarines hundreds of kilometres away far beyond the conventional range of lightweight torpedoes (around 20-40 km).



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