

Contents

<b>1. Indian Army</b> .....	2
Missile Types.....	2
MIRV Technologies in Ballistic Missiles.....	2
Integrated Guided Missile Development Programme (IGMDP).....	3
Missiles of India.....	3
Intermediate Range Missile .....	4
Intercontinental Ballistic Missile.....	4
Submarine Launched Ballistic Missile.....	5
Surface to Air Missile .....	5
Air-to-Air Missile .....	6
Anti-Guided Tank Missile .....	6
Cruise Missile System .....	6
India's Ballistic missile defence system .....	7
Hypersonic Missiles .....	7
Artillery system of India .....	7
<b>2. Naval Power of India</b> .....	8
Aircraft Carrier .....	8
Indian Submarines.....	8
Conventional Submarines.....	8
Nuclear Submarine.....	9
<b>3. Indian Air Force</b> .....	9
AIRCRAFTS .....	9
Different Generations of Aircraft.....	9
Fighter Jets of India .....	10
Helicopters.....	10
Indian Drones .....	11
<b>4. India's Nuclear weapon programme &amp; Policy</b> .....	12
No First Use Policy .....	12
<b>5. Treaties &amp; Conventions Dealing with Disarmament</b> .....	13
Chemical Weapon Convention .....	13
Biological Weapon Convention.....	13
Missile Technology Control Regime (MTCR).....	13
Australia Group .....	14

Wassenaar Arrangement.....14

**6. Conventions Related to nuclear weapons .....14**

Non-Proliferation Treaty .....14

Comprehensive Test Ban Treaty .....14

Nuclear Supplier Group .....15

Pelindaba Treaty (African nuclear weapon Free Zone Treaty) .....16

**1. Indian Army**

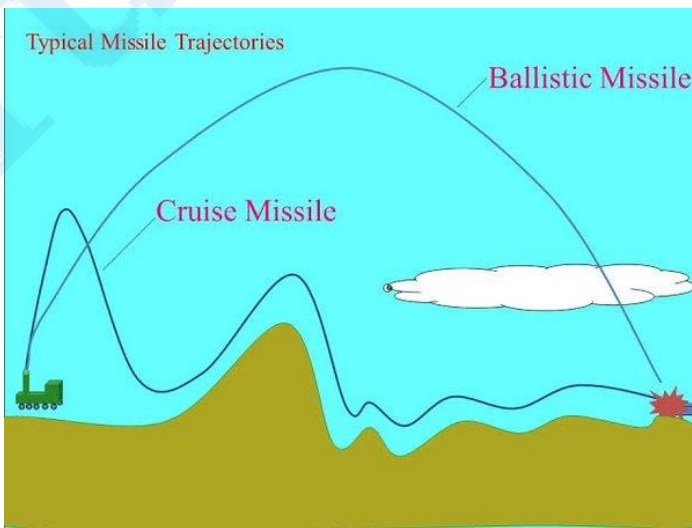
**Missile Types**

❖ **Cruise Missile:**

- Cruise missiles are unmanned self-propelled guided missiles which can carry large payloads with high precision. The missile is guided entirely to the target under its own power.
- These are known for their low-level flight, closer and horizontal to the surface which helps them to avoid detection from anti- missile systems.
- On basis of speed they can be categorized as
  - **Subsonic** cruise missile: Speed around 0.8 Mach
  - **Supersonic** Cruise missile: Speed around 2-3 Mach
  - **Hypersonic** Cruise Missile: Speed is more than 5 Mach

❖ **Ballistic Missile:**

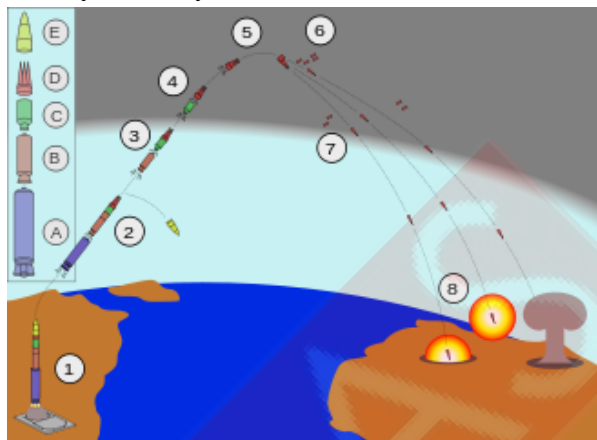
- A ballistic missile follows ballistic trajectory (projectile trajectory) over most of its flightpath.
- Unlike cruise missiles which remain in the same atmosphere, a ballistic missile changes their atmosphere. It can travel well outside the atmosphere and then warhead detaches and falls back to the earth.
- It depends upon gravity to reach its target.
- With high terminal speed of around 5000m/sec, ballistic missiles have shorter time available making them harder to intercept than cruise missiles.
- Ballistic missiles flying over the atmosphere have much longer range than possible for cruise missiles of the same size.



**MIRV Technologies in Ballistic Missiles**

- The multiple independently targeted reentry vehicle (MIRV) is a type of payload fitted on long-range guided missiles.

- An MIRV payload allows a single missile to carry several nuclear warheads and attack several targets in quick succession in the enemy territory.
- An MIRV payload separates from an ICBM/SLBM as the missile reaches the top, or apex, of the ballistic arc. The individual warheads can then be directed to a number of different targets as the warheads fall toward earth.
- The use of MIRV makes it much more difficult to defend against a ballistic missile attack.



**Integrated Guided Missile Development Programme (IGMDP)**

- It was conceived by renowned scientist Dr APJ Abdul Kalam to enable India to attain self-sufficiency in the field of Missile technology.
- The missiles developed under this programme were:
  - **Prithvi**- Short range surface to surface ballistic missile Variants of Prithvi:
    - Prithvi I
    - Prithvi II
    - Prithvi III
  - **Agni**- Intermediate-range-surface to surface ballistic missile Variants of Agni:
    - Agni I
    - Agni II
    - Agni III
    - Agni IV
    - Agni V
  - **Trishul**- Short-Range low-level surface to air missile
  - **Akash**- Medium range surface to air missile
  - **Nag**- Third generation anti-tank missile
- After achieving the goal of making India self-reliant in missile technology, DRDO in 2008 formally announced successful completion of IGMDP.

**Missiles of India**

- Surface to Surface Missiles of India
  - A Surface-to-surface missile is a guided projectile launched from a hand held, vehicle mounted, trailer mounted or fixed installation.
- Short Range

Missile Name	Characteristics
Agni I	<ul style="list-style-type: none"> <li>• single stage solid propellant; Range:700-1200km</li> <li>• Speed: 7.5 mach; Payload: 1000kg</li> </ul>
Prithvi I	<ul style="list-style-type: none"> <li>• Range: 150Km; Payload Capacity: 1000Kg; Single-stage liquid-fueled</li> </ul>
Prithvi II	<ul style="list-style-type: none"> <li>• Single stage liquid propellant; Range:350km</li> </ul>

	<ul style="list-style-type: none"> <li>• Payload capacity: 500kg</li> </ul>
Prithvi III	<ul style="list-style-type: none"> <li>• Two-stage, solid propellant motor; Range :350Km</li> <li>• Payload: 1000kg; Nuclear capable missile</li> </ul>
Dhanush	<ul style="list-style-type: none"> <li>• Single-stage, Liquid-propelled; Naval Variant of Prithvi-II</li> <li>• Range: 350Km; Payload capacity: 1000Kg</li> </ul>
Shaurya	<ul style="list-style-type: none"> <li>• Hypersonic land-based variant of the nuclear capable K-15 submarine launched ballistic missile.</li> <li>• Capable of maneuvering like a cruise missile and utilizing its air fins to cruise at sustained hypersonic speeds.</li> <li>•</li> </ul>
Prahaar	<ul style="list-style-type: none"> <li>• It is a surface-to-surface short-range tactical ballistic missile developed by DRDO; It will replace Prithvi-I</li> <li>• It has a strike range is 150 km; It can carry warhead up to 200 kg.</li> </ul>
Pranash Ballistic Missile	<ul style="list-style-type: none"> <li>• Range : 200 Km; Advanced version of Prahaar; Being developed by DRDO;</li> </ul>
Pralay	<ul style="list-style-type: none"> <li>• Canisterized short range, tactical, surface to surface missile;</li> <li>• With payload of 1000 kg, it can travel a distance of 350 km.</li> <li>• If the payload is halved, the missile will be able to hit a target as far as 500 km.</li> <li>• The missile is a derivative of Prithvi Defence Vehicle (PDV) exo-atmospheric interceptor missile, capable of destroying enemy weapons at high altitudes.</li> <li>• It will have unconventional flight profile and will have the ability to change directions to make it more unpredictable and raise difficulty level for Air Defence Systems.</li> </ul>

### Intermediate Range Missile

Missile Name	Characteristics
Agni II	<ul style="list-style-type: none"> <li>• Two stage, solid fueled missile; Range: 2000-3,500 Km; Payload capacity: 1000kg</li> </ul>
Agni III	<ul style="list-style-type: none"> <li>• Two stage solid propellant; Range: 3000-3500 km</li> <li>• Payload capacity: 1.5 tonnes;</li> </ul>
Agni IV	<ul style="list-style-type: none"> <li>• Two stage solid propellant; Range: 3500-4000Km</li> </ul>

### Intercontinental Ballistic Missile

Missile Name	Characteristics
Agni V	<ul style="list-style-type: none"> <li>• Three stage solid propellant; Range: 5000 Km+</li> <li>• Speed: 24 Mach; Payload: 1500Kg</li> </ul>

	<ul style="list-style-type: none"> <li>• Multiple Independently Targetable Re-entry Vehicles (MITRV) capability.</li> <li>• Nuclear capable</li> <li>• Only the five permanent members of the United Nations Security Council – China, France, Russia, the United States and Britain, along with Israel, India joins them.</li> </ul>
Agni VI	<ul style="list-style-type: none"> <li>• It will be a Three stage solid propellant missile</li> <li>• Expected Range: 6000-12000km</li> <li>• Multiple Independently Targetable Re-entry Vehicles (MITRV) capability</li> <li>• Payload: 1000kg</li> <li>• Nuclear capable missile currently under development</li> </ul>

**Submarine Launched Ballistic Missile**

K4 Missile System	<ul style="list-style-type: none"> <li>• Range: 3500Km</li> <li>• It will support the Arihant class of nuclear submarines.</li> <li>• Provides capability to launch nuclear weapons from underwater.</li> </ul>
K15 Sagarika	<ul style="list-style-type: none"> <li>• Its SLBM version of land-based Shaurya Missile</li> <li>• Solid rocket Motor; Range: 750Km</li> <li>• It is to be integrated with Arihant class submarine.</li> </ul> <p><b>Second Attack Capability:</b> It is country's assured ability to respond to a nuclear attack with powerful nuclear retaliation against the attacker</p>

**Surface to Air Missile**

Trishul	<ul style="list-style-type: none"> <li>• All-weather surface-to-air-missile; Supersonic Speed</li> <li>• Range: 9 Km; Payload: 5.5 Kg</li> </ul>
Akash	<ul style="list-style-type: none"> <li>• Short range surface to air missile; Capability to neutralize aerial targets such as fighter jets, cruise missiles, ballistic missiles and air-to-surface missiles.</li> <li>• Supported by 'Rajendra', an indigenously developed radar system, that has the capability to lock-on to multiple targets in group or autonomous mode.</li> <li>• Range:30Km; Payload: 30Kg; Supersonic Speed</li> </ul>
MAITRI	<ul style="list-style-type: none"> <li>• Next generation Quick-reaction surface-to-air missile (QRSAM); Joint project of India &amp; France</li> <li>• Range: 25-30Km</li> </ul>
BARAK 8	<ul style="list-style-type: none"> <li>• Jointly developed by DRDO &amp; Israeli Aerospace Industry.</li> <li>• Range: 100Km.</li> </ul>
IGLA-S	<ul style="list-style-type: none"> <li>• It is a man-portable air-defence system (MANPADS), also known as SA- 24.</li> <li>• Developed by Russian firm IGLA-S</li> <li>• Maximum Range: 6Km; Altitude: 3Km</li> </ul>



**Air-to-Air Missile**

ASTRA	<ul style="list-style-type: none"> <li>• 1st indigenously developed Beyond Visual Range Air to Air Missile (BVRAAM)</li> <li>• Range: 80 Km; Speed: Mach 0.2 – Mach 2</li> <li>• ASTRA Mk-I Weapon System is integrated with SU-30 Mk-I aircraft and is being inducted into the Indian Air Force (IAF).</li> </ul>
-------	--

**Anti-Guided Tank Missile**

NAG	<ul style="list-style-type: none"> <li>• Range: 500m- 20Km; Fire and Forget, lock on before launch missile</li> </ul> <p><u>3 variants of NAG</u></p> <ul style="list-style-type: none"> <li>• <b>HeliNa</b> (7-10Km): Helicopter Launched version. Launch system is mounted on HAL Rudra</li> <li>• <b>NAMICA</b>- land version meant for infantry; mounted on a light infantry vehicle BMP-2 and carries up to six missiles.</li> <li>• Man Portable Anti-tank Guided Missile (<b>MPATGM</b>): This version is lighter (14.5 kg) in comparison to other variants and can be launched from the shoulder.</li> </ul>
SPIKE	<ul style="list-style-type: none"> <li>• Israeli fourth generation anti tank guided missile fire &amp; forget system</li> <li>• Range: 4km; Ability to switch to a different target mid-flight.</li> <li>• Hit percentage is more than 95 per cent.</li> </ul>
MILAN-2T	<ul style="list-style-type: none"> <li>• It is a portable medium-range, anti-tank weapon manufactured in France.</li> <li>• Defense Acquisition Council has approved the acquisition of the Rs 1,200 crore Milan-2T anti-tank missile.</li> </ul>
Strum Ataka	<ul style="list-style-type: none"> <li>• It is a long-range anti-tank guided missile system developed by Russia.</li> <li>• India signed Rs 200 crore deal with Russia to sign Strum Ataka Anti tank missile;</li> </ul>

**Cruise Missile System**

Brahmos	<ul style="list-style-type: none"> <li>• Joint project of Russia &amp; India; Medium range ramjet supersonic missile; It is a two-stage (solid propellant engine in the first stage and liquid ramjet in second)</li> <li>• Range: 300 Km; Speed: 2.8 Mach</li> <li>• Can be launched from land, air, water-operational with army, air force &amp; navy.</li> </ul>
Brahmos II	<ul style="list-style-type: none"> <li>• It's a joint project of India and Russia;</li> <li>• It is a hypersonic version of Brahmos and is being under development (scramjet engine)</li> <li>• It is expected have a speed around 7 Mach.</li> <li>• It is expected to have range up to 600Km</li> </ul>

	<ul style="list-style-type: none"> <li>It will give India a major strategic advantage in mountain warfare against China and Pakistan.</li> </ul>
Nirbhay	<ul style="list-style-type: none"> <li>Long range, all-weather subsonic cruise missile</li> <li>Range- 1000km; Speed:0.7 Mach</li> </ul>

**India’s Ballistic missile defence system**

**Multilayered Missile Shield**

- Designed to track & destroy ballistic missiles both inside(endo)&outside(exo) the atmosphere at altitude from 15-20km to 80-100km
- 2 tier Missile defence system: Advanced air defence (AAD) Prithvi Air Defence (PAD)
- Phase 1:( endo)
  - Interceptor missile with 4.5 Mach speed meant for 2000 Km range enemy missiles
- Phase 2: (exo)
  - Interceptor missiles with 6-7 Mach speed will be for 5000 km class missiles

**Hypersonic Missiles**

- Hypersonic missiles have speeds above Mach 5.
- Two Types of Hypersonic Missiles:-
  - Boost Glide: It is boosted by ballistic missiles at a particular level & then glides towards the target.
  - Scramjets: Scramjet propulsion enables high speed.
- DRDO launched a Hypersonic Technology Development Vehicle (HSTDV).
- HSTDV is an unmanned scramjet demonstration vehicle that can cruise up to Mach 6 and rise up to an altitude of 32Km in 20 seconds.
- India is also developing Brahmos-II with Russia

**Artillery system of India**

- Artillery is a class of heavy military ranged weapons built to launch munitions far beyond the range and power of infantry firearms Artilleries can be classified into:
  - Medium (130mm-155mm calibre): Dhanush, M777, Howitzers, K9 Vajra, Bofors
  - Light (120mm mortars)

Dhanush	<ul style="list-style-type: none"> <li>It is the first indigenous artillery gun of 55x45mm calibre.</li> <li>It is also the first long-range artillery gun to be produced in India, having a range of 38 km.</li> <li>The self-propulsion unit allows the gun to deploy itself in mountainous terrains with ease.</li> </ul>
K9 Vajra-T	<ul style="list-style-type: none"> <li>Designed &amp; developed by South Korea; Acquired by India; locally manufactured by L&amp;T;</li> </ul>
M-77 Ultra Light Howitzers	<ul style="list-style-type: none"> <li>Procured from US; Range: 30Km</li> <li>Can be carried easily over land, air and sea. It can be airlifted by Chinook</li> </ul>

**2. Naval Power of India**

**Aircraft Carrier**

Ships	Characteristics
INS Vikramaditya	<ul style="list-style-type: none"> <li>Acquired from Russia</li> </ul>
INS Vikrant	<ul style="list-style-type: none"> <li>India's indigenous aircraft carrier; Recently commissioned;</li> <li>Can accommodate 30 fighters &amp; helicopters including Mig-29K &amp; Ka-31 helicopters.</li> </ul>
INS Vishal	<ul style="list-style-type: none"> <li>To be 2nd indigenous aircraft carrier; It is under design phase;</li> <li>It would be a 65,000-70,000 tonne,</li> <li>EMALS uses electro-magnetic energy to catapult aircraft to launch speed.</li> </ul>

**Indian Submarines**

**Conventional Submarines**

Sindhughosh Class	<ul style="list-style-type: none"> <li>Sindhughosh-class submarines are Kilo-class diesel-electric submarines in active service with the Indian Navy.</li> <li>The submarines have a displacement of 3000 tones and the maximum diving depth of 300 meters.</li> <li>Ships under this class                             <ul style="list-style-type: none"> <li>INS Sindhughosh; INS Sindhudhvaj</li> <li>INS Sindhuraj; INS Sindhuvir</li> <li>INS Sindhuratna; INS Sindhukesari</li> <li>INS Sindhukirti; INS Sindhuvijay</li> <li>INS Sindhurakshak; INS Sindhurashtra</li> </ul> </li> </ul>
Kalvari Class	<ul style="list-style-type: none"> <li>Based on scorpene class submarine designed by French naval defence and Energy Company DCNS.</li> <li>It has been built under Project 75 in which Mazagaon Dock Limited will manufacture six Scorpene class submarines (which are next generation diesel submarines) for Indian Navy under technology transfer from Naval Group of France.</li> <li>These submarines have superior stealth capabilities</li> <li>It can undertake missions such as anti-submarine warfare, antisurface warfare, area surveillance, intelligence gathering, mine laying and can launch crippling attacks on surface and underwater enemy targets.</li> <li>The attack can be carried out with torpedoes as well as tube-launched anti-ship missiles underwater or from the surface.</li> <li>List of Submarines under project 75                             <ul style="list-style-type: none"> <li>INS Kalvari- 1st in this series already commissioned.</li> <li>INS Kandheri</li> <li>INS Karanj</li> <li>INS Vela- recently launched</li> <li>INS Vagir</li> <li>INS Vagsheer</li> </ul> </li> </ul>



**Nuclear Submarine**

Class	Ships
Arihant Class	<p>INS Arihant</p> <ul style="list-style-type: none"> <li>Indigenously developed by India</li> <li>India's 1st nuclear ballistic missile submarine</li> <li>Its successful deployment completed India's nuclear triad</li> </ul> <p>INS Arighat</p> <ul style="list-style-type: none"> <li>2<sup>nd</sup> Arihant class submarine under construction.</li> </ul>
Chakra Class/Akula II class	<p>INS Chakra</p> <ul style="list-style-type: none"> <li>Leased from Russia in 1988 for 3 years.</li> </ul> <p>INS Chakra II</p> <ul style="list-style-type: none"> <li>Leased from Russia in 2012 for 10 years.</li> <li>One of the quietest submarines in the world.</li> </ul> <p>INS Chakra III</p> <ul style="list-style-type: none"> <li>India signed a USD 3 billion deal with Russia for leasing nuclear powered submarines. Russian will deliver it by 2025.</li> </ul>

**3. Indian Air Force**

**AIRCRAFTS**

**Different Generations of Aircraft**

1 <sup>st</sup> Generation	<ul style="list-style-type: none"> <li>Subsonic speed, straight wings, unguided bombs, machine gun, lack of radar e.g. Canberra</li> </ul>
2 <sup>nd</sup> Generation	<ul style="list-style-type: none"> <li>Radar present, air to air missiles, supersonic speed. E.g. Mig -21</li> </ul>
3 <sup>rd</sup> Generation	<ul style="list-style-type: none"> <li>Advanced Avionics, air guide missiles, air to air missiles, radar system</li> </ul>
4 <sup>th</sup> Generation	<ul style="list-style-type: none"> <li>Fly-by-wire: It replaces manual flight control with electronic devices.</li> <li>Thrust vector Control: Allows aircraft to manipulate the direction of thrust from its engine or motor. e.g. Mig 29, Mig 27, Mirage 2000</li> </ul>
4.5 <sup>th</sup> Generation	<p>Additional features like:</p> <ul style="list-style-type: none"> <li>greater weapon carriage,</li> <li>Some stealth features- less easily detectable</li> <li>Enhanced avionics</li> </ul> <p>e.g. Dassault Rafale</p>
5 <sup>th</sup> Generation	<ul style="list-style-type: none"> <li>Stealth features</li> <li>Low probability of intercept radar</li> <li>High performance airframes</li> <li>Advanced avionics features</li> </ul>

	<ul style="list-style-type: none"> <li>Highly integrated computer system e.g. US F22 Raptor</li> </ul>
--	--

**Fighter Jets of India**

Sukhoi-MKI	<ul style="list-style-type: none"> <li>Developed by Russia; Build under license by HAL</li> <li>Maximum Speed: Mach 2</li> </ul>
Mirage-2000	<ul style="list-style-type: none"> <li>4<sup>th</sup> generation; Single engine aircraft; Speed: Mach 2.2</li> <li>Used in Balakot Strike</li> </ul>
Mig 29	<ul style="list-style-type: none"> <li>4<sup>th</sup> Generation; Designed by Russian company Mikoyan.</li> <li>Multi role fighter</li> </ul>
Rafael	<ul style="list-style-type: none"> <li>4.5<sup>th</sup> generation; Twin-engine, multirole combat aircraft</li> <li>Capable of carrying all combat missions such as air defence, close air support, in-depth strikes etc.</li> <li>Capable of carrying nuclear weapons, deploying long range air to air missiles, laser guided bombs.</li> <li>Will carry <b>Meteor</b> BVRAAM</li> </ul>
Tejas	<ul style="list-style-type: none"> <li>Single Seat, single engine, multirole light aircraft.</li> <li>Developed by Aeronautical Development Agency</li> <li>Astra missile will be integrated as a standard long range weapon for Tejas.</li> <li>Presently there is no Tejas Squadron. Srinagar Airbase will get its squadron of Tejas in 2022.</li> </ul>

**Helicopters**

Rudra	<ul style="list-style-type: none"> <li>Attack helicopter; Armed version of HAL Dhruv</li> <li>First armed helicopter to be indigenously produced in India.</li> <li>Its roles include Anti-tank, Scout, Fire support, Armed reconnaissance and surveillance, Escort, EW platform</li> </ul>
ALH Dhruv	<ul style="list-style-type: none"> <li>Indigenously designed and developed Advanced Light Helicopter</li> <li>It is a twin engine, multi-role, multi-mission new generation helicopter</li> </ul>
Chinook	<ul style="list-style-type: none"> <li>Acquired from USA; Heavy lift helicopter-Payload capacity of 10 tonnes; Twin engine, multi role, vertical lift platform.</li> <li>Contra rotating tandem rotors- both rotors rotate in opposite direction.</li> </ul>
Apache	<ul style="list-style-type: none"> <li>Acquired from USA; One of the world's most advanced multi role combat helicopter</li> <li>Can deliver variety of weapons e.g. Hellfire missiles (surface to ground), Stinger Missiles (air to air)</li> </ul>
MH-60 Romeos	<ul style="list-style-type: none"> <li>Capable of anti-surface, anti-submarine warfare, search &amp; rescue missions</li> <li>Have ranges of radars &amp; sensors to detect submarines.</li> </ul>

	<ul style="list-style-type: none"> <li>India to acquire 34 Romeo helicopters from US firm Lockheed Martin</li> </ul>
KAMOV Ka-226T	<ul style="list-style-type: none"> <li>Twin engine Russian utility helicopter</li> <li>Will replace Cheetah &amp; Chetak helicopter</li> <li>To be manufactured in India- has 72% Russian components, 28% Indian components.</li> </ul>

**Indian Drones**

Name	Features
Lakshya	<ul style="list-style-type: none"> <li>It is reclaimable aerial target system designed to train gun and missile crews and air defence pilots in engaging targets.</li> </ul>
Nishant	<ul style="list-style-type: none"> <li>It is used for battlefield surveillance and reconnaissance, target tracking &amp; localization, and artillery fire correction.</li> <li>Nishant has been inducted in Indian Army.</li> </ul>
Panchi	<ul style="list-style-type: none"> <li>It is a variant of Nishant; It has capability of conventional take-off and landing</li> <li>It has state of art systems, capable of                             <ul style="list-style-type: none"> <li>surveillance,</li> <li>reconnaissance,</li> <li>target location detection and</li> <li>artillery fire correction</li> </ul> </li> </ul>
Rustom 1	<ul style="list-style-type: none"> <li>It is an all composite, 800 kg class Short Range Remotely Piloted Aircraft</li> </ul>
Rustom 2 (TAPAS201)	<ul style="list-style-type: none"> <li>It is indigenously developed; It has the capability to operate on the line-of-sight range of 250 km. The drone has a maximum flight of 35,000 feet above sea level.</li> <li>The UAV's tri-cycle landing gear allows it to make safe take-off and landing manoeuvres on hard surfaces.</li> <li>It can fly in autonomous or manual mode.</li> </ul>
GHATAK	<ul style="list-style-type: none"> <li>Under development; It will be India's first autonomous stealthy unmanned combat air vehicle</li> <li>It will be capable of releasing missiles, bombs &amp; precision guided munitions.</li> </ul> <p>Note: Autonomous Unmanned Research Aircraft (AURA) was a tentative name for an Indian UCAV project, which will eventually be called the Ghatak UCAV</p>
Predator B	<ul style="list-style-type: none"> <li>Indian Navy is in process of acquiring Predator B drones from USA</li> <li>It can carry up to 1.7 tonnes of external stores including sensors, anti tank missiles and guided bombs weighing up to 230kg each.</li> <li>It is capable of reaching maximum altitudes up to 50,000ft and has a maximum speed of 240k and endurance of 27 hour.</li> <li>It is capable of carrying multi-mission payloads such as EO/IR systems, Lynx multi-mode radar, multi-mode maritime surveillance radar, electronic support measures (ESM), laser designators.</li> </ul>

Heron	<ul style="list-style-type: none"> <li>• It is a medium-altitude long-endurance UAV.</li> <li>• designed and manufactured by Israel Aerospace Industries.</li> <li>• Government of India had cleared \$400-million proposal for buying missile armed Heron TP drones from Israel</li> </ul>
-------	---

**4. India’s Nuclear weapon programme & Policy**

**History:**

- 1947-1960: India was inclined towards Nuclear Non-proliferation
- Atomic Energy Act 1948- focuses on peaceful development
- 1954: Establishment of Trombay Atomic Energy Establishment & Department of Atomic energy.
- 1962 Indo China war: India was determined to create a nuclear deterrent against China aggression.
- 1974: Pokhran-1: India’s first successful nuclear bomb test. (Code name: Smiling Buddha).
- 1998: Pokhran-II: India’s 2nd successful nuclear bomb test. India conducted a series of 5 nuclear bomb explosions.

**India’s nuclear triad:**

- A nuclear triad is a defence system which comprises a three-pronged Military Force. India completed its nuclear triad as:
  - Land Launched Nuclear missiles. E.g. Agni series, Brahmos.
  - Strategic aircrafts with nuclear capable missiles & bombs. E.g. Jaguar, Sukhoi- 30 MkI, Mirage
  - Nuclear missile armed submarine. e.g. INS Arihant

**India’s Nuclear Doctrine:**

- ♣ No First Use Policy . According to this policy, nuclear weapons will only be used in retaliation against a nuclear attack on the Indian Territory or on Indian forces anywhere.
- ♣ Credible minimum deterrence which includes:
  - ◆ Sufficient & survival nuclear forces to inflict unacceptable damage to the enemy.
  - ◆ Nuclear forces should be operationally prepared all times.
  - ◆ Effective intelligence & warning capabilities.
- ♣ Retaliation will be this much massive and terrible i.e. the enemy will experience unacceptable damage and will not recover easily.
- ♣ Not to be used against non – nuclear state.
- ♣ Nuclear retaliatory attacks to be authorized only by civilian political leadership through the Nuclear Command Authority.

**No First Use Policy**

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Strengthen India’s bid for Nuclear Supplier Group &amp; United Nation Security Council.</li> </ul>	<ul style="list-style-type: none"> <li>• Restricts India’s military options.</li> <li>• First nuclear attack on India would cause huge loss of life &amp; property.</li> <li>• India has been unable to match China in terms of military power &amp;</li> </ul>

<ul style="list-style-type: none"> <li>• Minimises probability of nuclear use.</li> <li>• Projects India as a responsible nuclear power reflected in form of Indo-US nuclear deal, NSG waiver.</li> </ul>	<p>technology. First use policy can deter Chinese advancements against India.</p>
---	---

Note: Only India & China has no first use policy

### 5. Treaties & Conventions Dealing with Disarmament

#### Chemical Weapon Convention

- Started in the UN conference on disarmament in 1980 and entered into force in 1997.
- Prohibit the development, production, acquisition, stockpiling, retention, transfer or use of chemical weapons by States Parties.
- State parties have to destroy all current chemical weapons. – all destruction must take under OPCW verification.
- Incorporates ‘challenge inspection’,- any State Party in doubt about another State Party’s compliance can request a surprise inspection.
- India has ratified the convention.
- Implementing body: Organisation for Prohibition of Chemical Weapons.(OPCW)

#### About OPCW

- Headquarter: The Hague
- Inspects & monitors state parties facilities and activities in order to ensure compliance.
- Was awarded the Nobel peace prize in 2013.

#### Biological Weapon Convention

- Legal Binding treaties that outlaw all biological arms; Entered into force in 1975.
- It bans development, stockpiling, acquisition, retention & production of:
  - Biological agents & toxins made for hostile purposes in armed conflict.
  - Weapons, equipment & delivery vehicles for use of such agents & toxins.
  - Transfer of or assistance with acquiring agents, toxins, weapons, equipment delivery Vehicles etc.
- India has ratified the convention

#### Missile Technology Control Regime (MTCR)

- Informal association of governments. It was established by G7 nations (US, UK, France, Germany, Canada, Italy, Japan) in 1987.
- It was created to prevent the proliferation of missile & unmanned aerial vehicles capable of carrying payload above 500kg for more than 300Km.
- It is a non-legal binding treaty. India became the 35th member of MTCR.
- China , Israel & Pakistan are not members of MTCR.



### Australia Group

- It is an informal group of countries. It was established in 1985 after use of Chemical weapons by Iraq in 1984.
- It seeks to ensure that exports do not contribute to development of chemical & biological weapons.
- It has now 43 members with India becoming its latest member in 2018.
- China, Israel & Pakistan are not members of this group.

### Wassenaar Arrangement

- It is a multilateral export regime of 42 nations.
- It was established to promote transparency & greater responsibility in transfers of conventional arms & dual use of goods & technologies.
- India became the 42nd member of the group in 2017.

## 6. Conventions Related to nuclear weapons

### Non-Proliferation Treaty

- It entered into force in 1970.
- It is the only binding commitment in a multilateral treaty to the goal of disarmament by the nuclear-weapon States.
- Objective:
  - to prevent the spread of nuclear weapons and weapons technology,
  - to promote cooperation in the peaceful uses of nuclear technology and access of this technology by all states.
  - to further the goal of achieving nuclear disarmament and general and complete disarmament
- Provisions of the Treaty envisage a review of the operation of the Treaty every five year.
- Treaty establishes a safeguards system under the responsibility of the International Atomic Energy Agency. (IAEA).
- Recognizes only 5 states as Nuclear weapons power states: US, Russia UK, France , China. All these parts of UN security council
- Non-nuclear weapon states cannot receive or manufacture nuclear weapons.
- India , Pakistan, Israel, South Sudan has not signed NPT.

### Comprehensive Test Ban Treaty

- CTBT prohibits nuclear explosions by everyone everywhere—i.e. surface, underwater, underground, atmosphere.
- Has a unique verification regime to ensure that no nuclear explosion goes undetected.
- Relies on 3 pillars:
  - International Monitoring System: 337 monitoring facilities worldwide. Relies on 4 technologies i.e. Seismic, Hydro acoustic, Infrasound, Radionuclide.
  - On site inspections
  - International data center
- It has been signed by 184 nations. Of these 168 have ratified including the UK, France & Russia.

- In order to become a law it must be signed by 44 specific nuclear technology holder nations.
- Of these 8 nations are yet to sign CTBT. India, China, US, Pakistan, Egypt, Israel, Iran, North Korea.
- Reasons for India not signing NPT & CTBT
  - Discriminatory provisions
    - As per NPT only those recognized 5 recognized Nuclear weapon power states have the right to possess nuclear weapons while Other nations can join NPT as non –nuclear weapon power states.
    - CTBT- It allows nuclear weapon states to maintain their existing arsenals while others irrespective of their security reasons or nuclear capabilities cannot build such weapons.
  - India's position is either those 5 too denuclearise or else let everyone share the same right to possess nuclear weapons.
  - Security reason for India- Bounded by two nuclear powers on either side with whom it had earlier fought wars.

### Nuclear Supplier Group

- NSG is a group of nuclear suppliers which was formed In 1974 in response to the Pokhran I test conducted by India. It was formerly known as London Club. It currently has 48 members.
- It aims to promote nuclear trade for peaceful purposes and prevent nuclear proliferation by controlling export of materials, technology & equipment that could be used to manufacture nuclear weapons.
- It is not a formal organization, and its guidelines are not binding
- India has been trying to join NSG since 2008.
- However, its entry has been blocked by China & China backed nations on grounds that:
  - India is a non-signatory of NPT
  - China wants a transparent & non-discriminatory formula for granting membership to all non-NPT members instead of granting waivers to specific countries.
- Benefits for India joining NSG
  - Access to state of art technology from other members of the group.
  - Access to technology will supplement make in India by boosting innovation & manufacturing of nuclear power equipment.
  - India's commitment to reducing dependence on fossil fuel- NSG access will help in upscaling nuclear power production.
  - NSG membership would put India on a firmer footing to propose the idea of plutonium trade for its thorium programme.
  - India currently not getting assured supply of nuclear fuel because it's not the member of NSG. Joining NSG will ensure assured supply
- Why India do not need NSG?
  - The 2008 waiver ensures India's access to technology; and, no foreign reactor supplier is actually waiting for India's NSG membership.
  - NSG membership is not necessary to sustain any of India's ongoing nuclear project. It has little or nothing to do with India's nuclear programme.
  - Also, NSG membership does not matter in terms of uranium supply.

- With regime change in US , the priorities of US govt. have changed. So India's membership for NSG will not happen anytime soon.

**Pelindaba Treaty (African nuclear weapon Free Zone Treaty)**

- It establishes a Nuclear-Weapon-Free Zone in Africa.
- The treaty was signed in 1996 and came into effect in July 2009.
- It aims at preventing nuclear proliferation and preventing strategic minerals of Africa from being exported freely.
- This treaty prohibits member parties to come into bilateral agreement with countries who are non-signatories of NPT.
- In 2016, Namibia criticized the Treaty of Pelindaba for disallowing Namibia to trade uranium to India because India is not a member of the NPT.

