VAJIRAM & RAVI
Institute for IAS Examination

The Analyst

CURRENT AFFAIRS Handout

27th January 2026

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27th January 2026

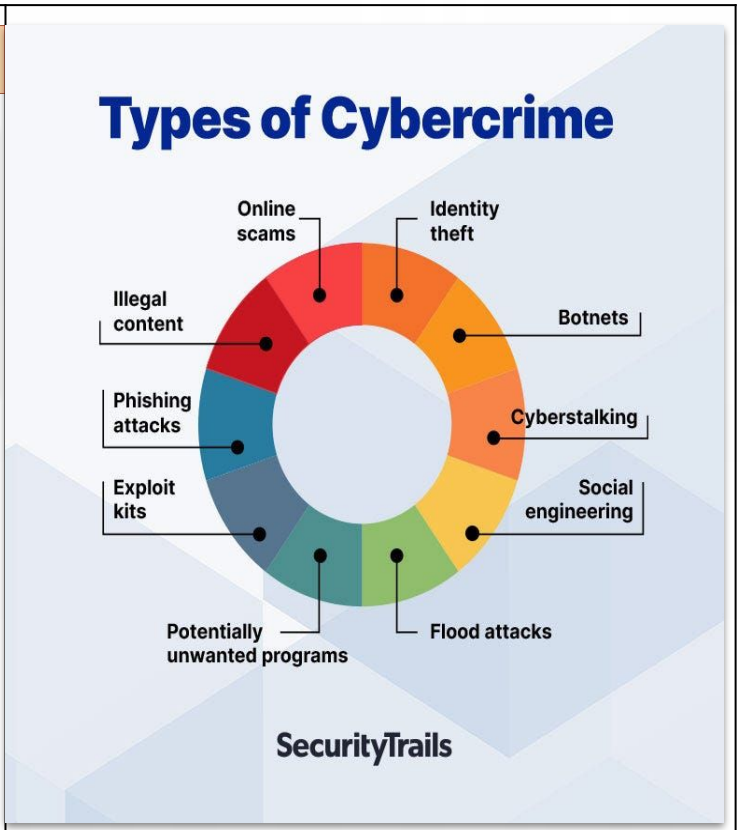
Cybercrimes: The New Invisible Threat

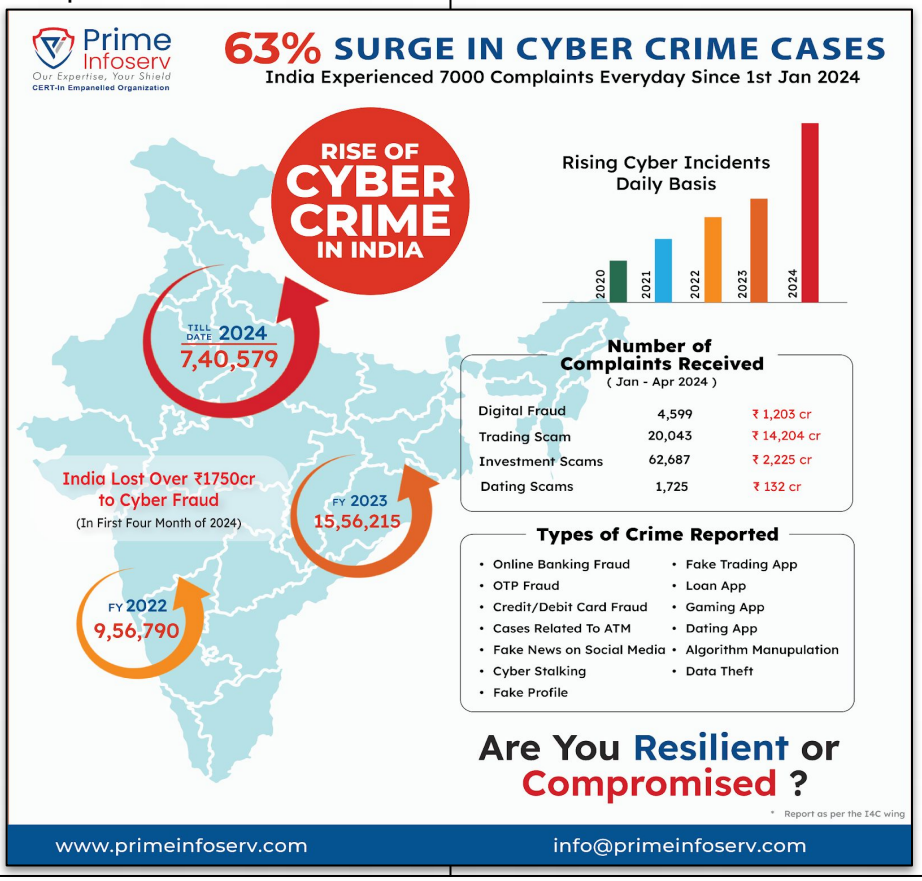
CONTEXT: In addition to the various challenges posed by Cybercrimes, its global governance also faces serious issues

Cybercrimes: The New Invisible Threat

Why is Cybersecurity important for India?

- Ever growing population - Internet Users
  - ~ 60% of the population
  - 2nd largest - Online
  - 1 bn - 2025
- Rapidly expanding Digital Economy
  - Varied Sectors
  - Government's target
- Dominance of Service sector
  - Software Exports, BPOs, KPOs





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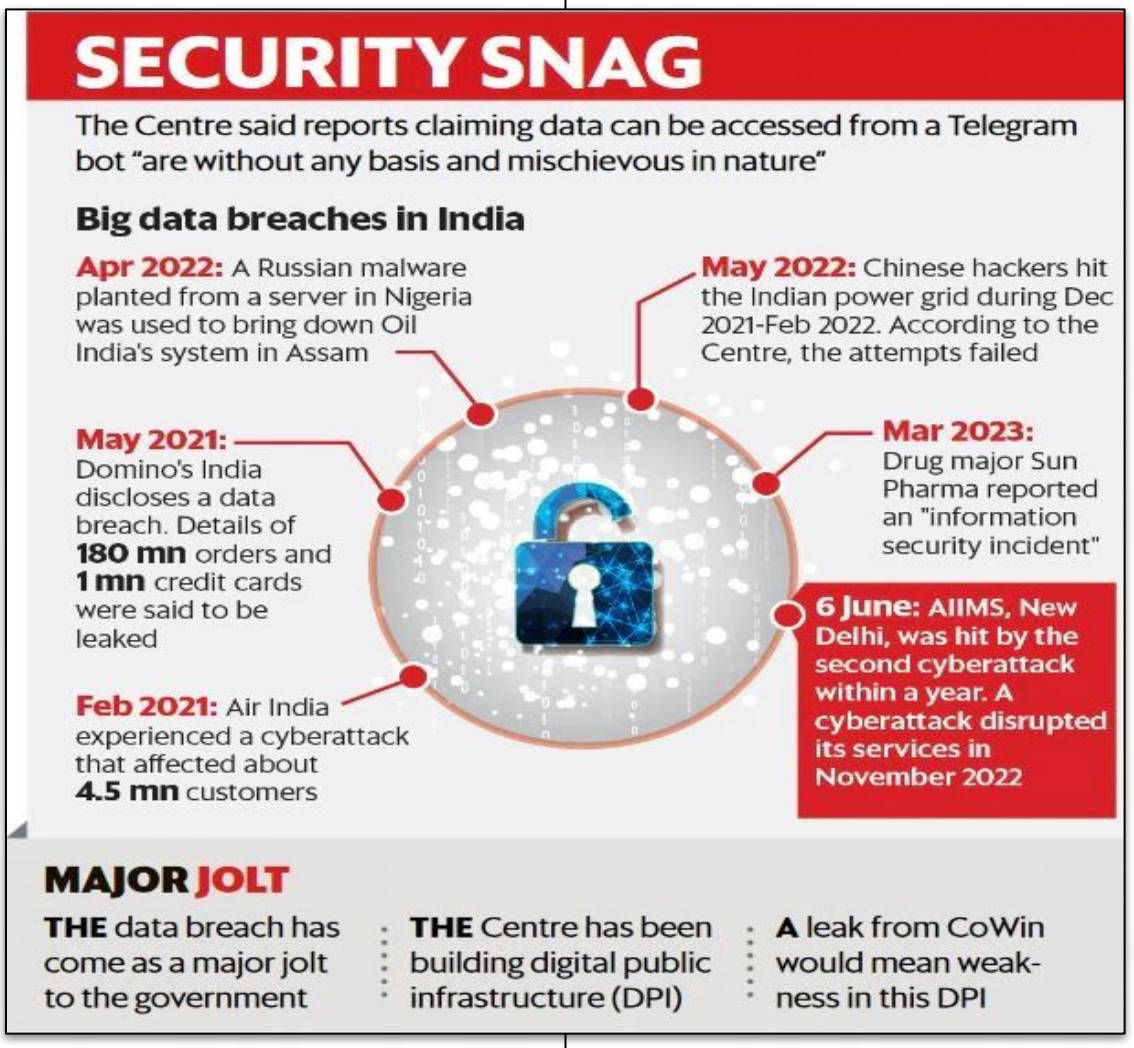
What are India's Cybersecurity Challenges?

- **Critical Infrastructure Vulnerability**
  - Disrupt Essential Services & Endanger National Security
  - Kudankulam, MSEB
- **Financial Sector Threats**
  - Financial Losses, Identity Theft, Erosion of Trust
  - City Union Bank's SWIFT system
- **Data Breaches and Privacy Concerns**
  - *Resecurity* - Indians' personal data on the dark web
  - Serious consequences - Privacy and Security
  - PII of ~2 lakh CAT-2020 Candidates
- **Cyber Espionage**
  - Affects security, foreign policy & economic development
  - Operation SideCopy



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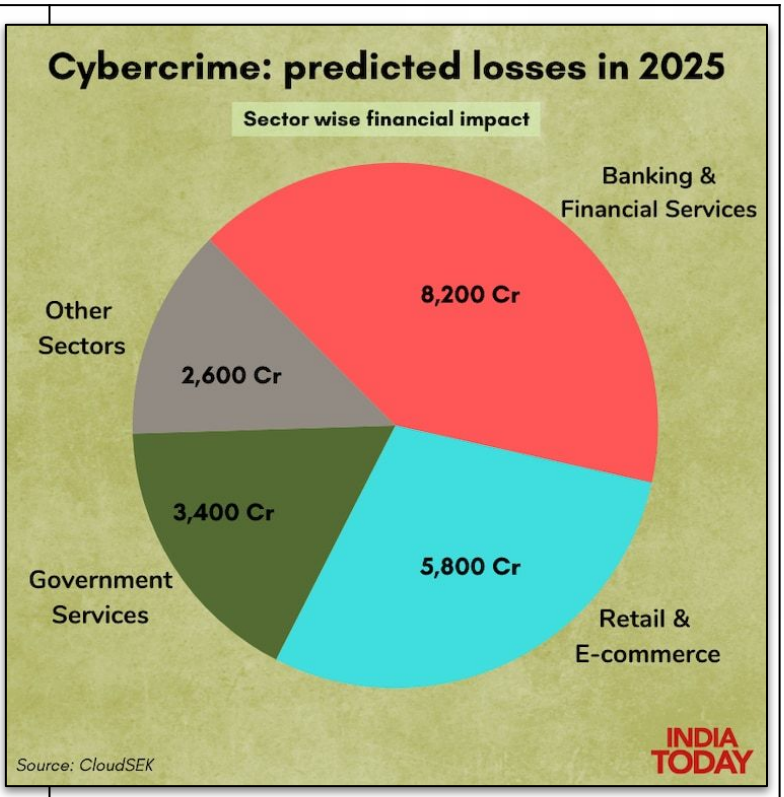
- **Advanced Persistent Threats**
  - Designed - infiltrate & remain hidden in the network
  - RedEcho - Chinese hackers
- **Supply Chain Vulnerabilities**
  - Compromise - Systems and Services
  - Cyberattack on SolarWinds



Initiatives to tackle Cybersecurity issues?

- National Cyber Security Policy
- Cyber Surakshit Bharat Initiative
- I4C
- Cyber Swachhta Kendra
- CERT-In
- NCIIPC
- DCyA

Year	Phishing incidents	Network scanning and probing	Virus/Malware incidents	Website hacking incidents	Cyber Security incidents
2021	215	86585	9203	18	122764
2022	1145	10220	2559	57	27482
2023	401	12330	1185	39	23158

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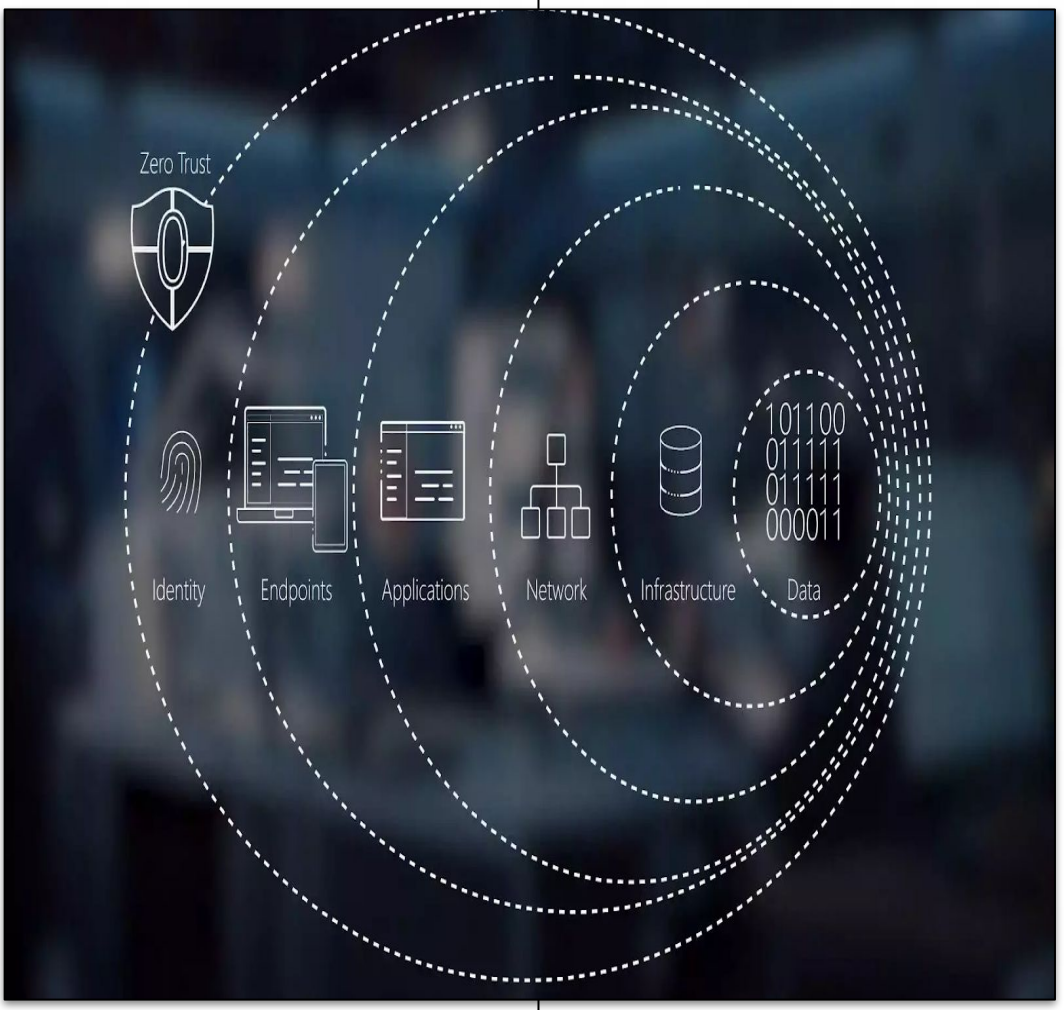
What should be the Way Forward?

- **Enhancing Cyber Security Capabilities**
  - shortage - technical staff, cyber forensics facilities, cyber security standards, coordination issues
  - Cybersecurity CoE, adopting best practices & standards
- **Cyber Security Board**
  - *Zero-Trust Architecture*
- **Strengthening Existing Legal Framework**
  - IT Act - gaps and limitations
  - enact comprehensive law - all aspects of cyber security
- **Expanding International Cooperation**
  - cyber attacks - transcend national boundaries
  - UN, ITU, INTERPOL, etc.
  - Regional & Bilateral dialogues & initiatives



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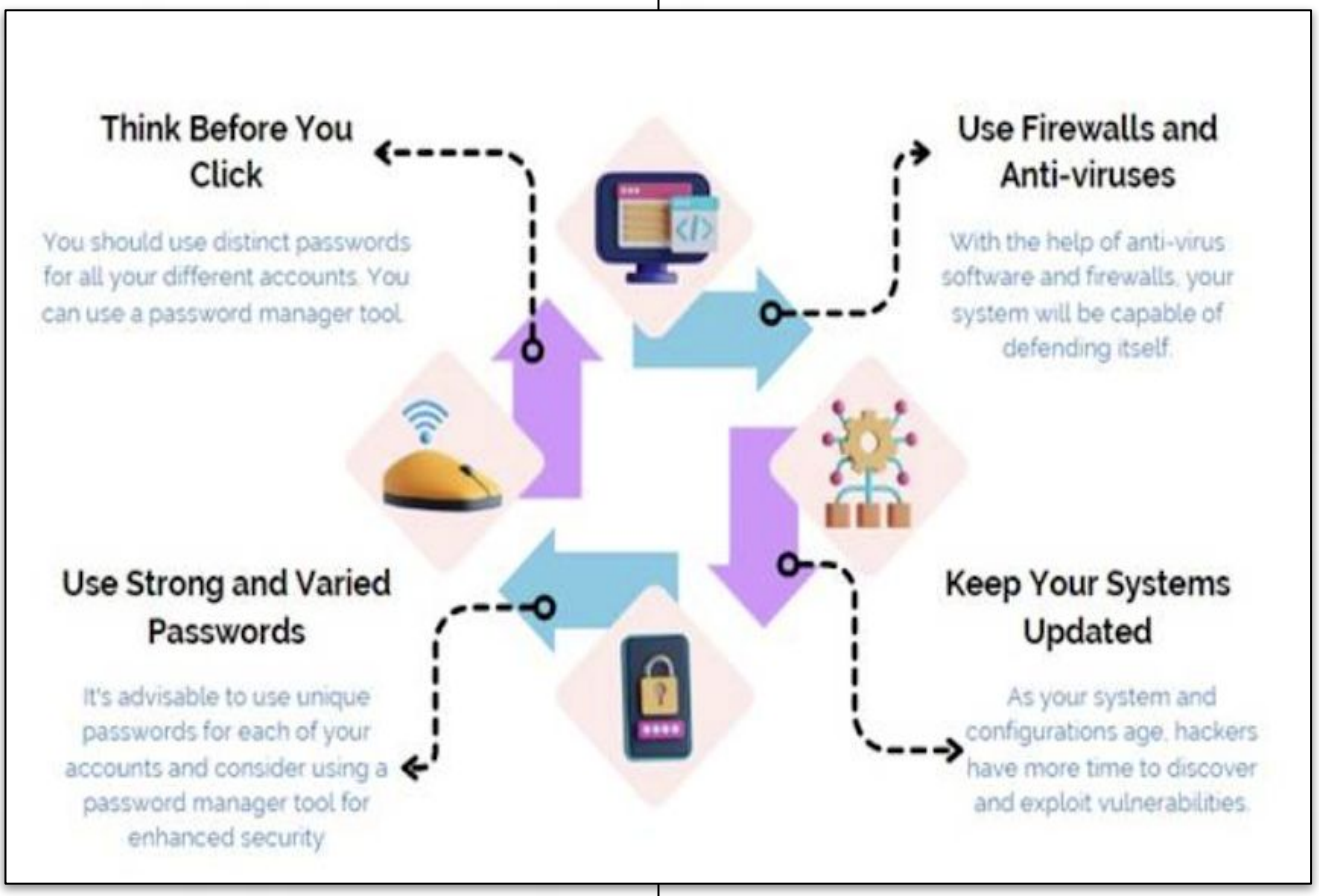
Cybercrimes: The New Invisible Threat

CONTEXT: In addition to the various challenges posed by Cybercrimes, its global governance also faces serious issues

India has emerged as a global leader in the digital landscape, with a staggering 936 million Internet subscribers (Till Dec 2023, TRAI), transforming it into one of the largest connected nations worldwide. Termed as 'Digital Nagriks', Indians are increasingly integrating the internet into their daily lives, relying on it for essential needs such as business transactions, education, financial activities, and accessing government services digitally.

Recognizing the critical importance of a secure digital environment, the Government of India has been implementing robust policies aimed at safeguarding its vast online community. These measures are designed to ensure a safe, trusted, and secure cyberspace amidst the growing prevalence of cyber threats and attacks in today's interconnected world.



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Cybercrimes: The New Invisible Threat

CONTEXT: In addition to the various challenges posed by Cybercrimes, its global governance also faces serious issues

Mains Practise Question

The cyber security architecture in India suffers from various vulnerabilities and threats. Elaborate upon the need of strengthening the Government's efforts to realise the vision of safe and secure cyberspace.

(15 Marks, 250 words)

Q19. साइबर सुरक्षा के विभिन्न तत्त्व क्या हैं ? साइबर सुरक्षा की चुनौतियों को ध्यान में रखते हुए समीक्षा कीजिए कि भारत ने किस हद तक एक व्यापक राष्ट्रीय साइबर सुरक्षा रणनीति सफलतापूर्वक विकसित की है । (250 शब्दों में उत्तर दीजिए)

What are the different elements of cyber security ? Keeping in view the challenges in cyber security, examine the extent to which India has successfully developed a comprehensive National Cyber Security Strategy. *15*

(Answer in 250 words)

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Fire Crisis: Who Is Responsible?

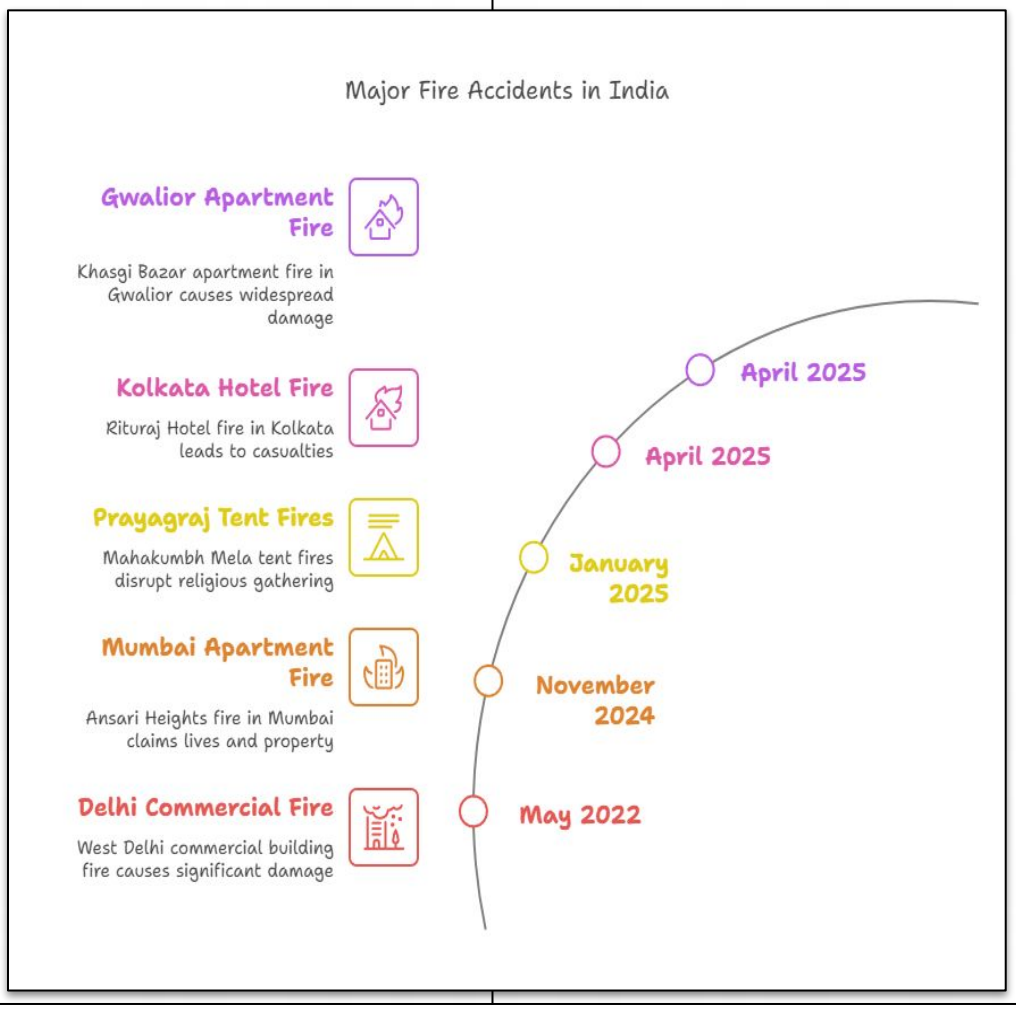
CONTEXT: More than 20 people feared trapped inside when the fire spread rapidly

Fire Crisis: Who Is Responsible?

- According to ADSI Report by **NCRB** - **7435 people - 2022**
- **Fire Service -** State Subject **- Municipal Function -** 12th Schedule

Why Are Urban Areas Prone to Deadly Fires?

- **Urbanisation and Infrastructure Issues**
  - Illegal Constructions - Rules flouted, non-fire-resistant materials, etc.
  - Poor Urban Planning - Congested and narrow lanes; NBC - 2016
- **Governance Challenges**
  - Political Interference - Populism
  - Lack of Public Awareness - ignore fire drills; illegal factories
- **Industrial and Commercial Oversights**
  - Faulty Machinery and Poor Maintenance - Overheated equipment; HVAC Load
  - Unsafe Handling of Hazardous Materials
- **Climate-Driven Threats**
  - Severe heat - Aggravated by CC



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Fire Crisis: Who Is Responsible?

CONTEXT: More than 20 people feared trapped inside when the fire spread rapidly

What are the Key Fire Safety Regulations in India?

- **National Building Code:** By the BIS - 1970, 3rd edition in 2016.
  - primary standard for fire safety in India
  - State governments - integrate - local bylaws.
- **Model Building Bye Laws 2016**: Use of fire-resistant materials for construction, installation of fire alarms and detection systems, etc.
- **Fire Prevention and Fire Safety Act, 2005**: fire safety in buildings and must be upheld by all states
- **Model Bill to Provide for the Maintenance of Fire and Emergency Service for the State, 2019**
- **Scheme for Expansion and Modernization of Fire Services in the States 2023**
- **Fire Safety Week:** Union Health Ministry - 'Fire Safety Week' from 21st to 25th April' - raise awareness
- **NDMA Guidelines:** homes, schools, and hospitals.

What should be the way forward?

- **Infrastructure Modernization:** Smart Infrastructure; Retractable Staircases; Retrofitting F.R. Materials
- **Overhauling Firefighting:** Robust PPE kits
- **Safe Industrial Practices**: Phase-out - Hazardous Materials; Proper Storage
- **Climate Resilience**: Green Belts; Water Recycling Systems; Predictive Analysis

Mains Practise Question

India has been witnessing increasing number of fire accidents lately. Discuss the causes and suggest way forward for handling this crisis effectively.

(10 Marks, 150 words)

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The Future of ISA

SYLLABUS : **GS 2** International Relations
Newspaper The Hindu **Page Number :** 08

How will U.S. exit affect solar alliance?

When was the International Solar Alliance first set up? Where is it based? Will U.S. actions affect India's solar module manufacturing capacity? What about investments in solar power projects? How will it affect African nations and other poorer developing countries?

EXPLAINER

Kunal Shankar
Shikha Kumari. A

The story so far:

On January 7, the U.S. government announced that it would withdraw from 66 international organisations. The reason given was that these bodies no longer served American interests. Among them were major climate platforms, including the International Solar Alliance (ISA), an organisation headquartered in India and jointly led by India and France.

What is the ISA?

The ISA was set up in 2015 to make solar power cheaper and easier to adopt, especially in developing countries. While it doesn't build solar plants itself, it helps countries access finance, reduce risk for investors, and speed up solar adoption. Today, the Alliance has over 120 member countries and works across Africa, Asia, and island nations. The U.S. joined fairly late, in 2021. Over three years, it has contributed around $2.1 million.

How will U.S. exit affect the ISA?

The U.S. exit will not really harm the alliance financially. U.S. contribution made up only about 1% of the Alliance's total funds. Indian officials have already said that the ISA's day-to-day work will continue, and that ongoing programmes will not be shut down. Moreover, training and capacity-building efforts are still in place.

But economics is not only about budgets, it's also about confidence. And that's where the ripple effects begin.

What about India's solar industry?

As India does not depend on the U.S. for solar panels or key equipment, solar power will not become more expensive. In fact, India now makes a large share of solar components on its own. As of late 2025, India's solar module manufacturing capacity was close to 144 gigawatts. Solar cell manufacturing was around 25 gigawatts and is growing fast, with Indian companies investing across the entire supply chain.

A stress factor: President Droupadi Murmu addresses the inaugural session of the Eighth International Solar Alliance Assembly, in New Delhi on October 28, 2025. ANI

Moreover, China is by far the largest producer of high-efficiency mass market solar modules and cells, with 70% of the global cell producing capacity. In fact, India imported about $1.7 billon worth of Photovoltaic (PV) modules from China in FY25, as per a Ministry of New and Renewal Energy (MNRE) report in Parliament.

This makes it clear that the recent U.S. decision does not push up project costs in India. It does not affect electricity tariffs either. For consumers, nothing changes.

Will investments slow down?

Again, unlikely. Most solar projects in India are driven by domestic demand. They are backed by long-term contracts with state utilities and central agencies. Investors look at India's power demand, policy stability, and growth potential.

The U.S. is not the main source of funding for Indian solar projects. Indian banks, global funds, and development institutions continue to invest based on India's market fundamentals. So the pipeline of projects inside India remains intact. Even with respect to jobs, India is relatively well-protected. Solar jobs in India come mainly from manufacturing, installation, and operations within the country. Since India is rapidly building a strong local manufacturing capacity, these jobs are not affected by U.S. climate policy. There is even a possible upside. As the U.S. becomes more inward-looking and slows renewable approvals at home, it may still need clean energy equipment. With the U.S. having supply tensions with China and Mexico, Indian manufacturers could find openings, either through exports or by setting up units that meet U.S. standards. A lot however, hinges on the ongoing talks for a bilateral trade agreement between New Delhi and Washington.

Where is the real economic risk?

Mostly outside India. The ISA works extensively in Africa and poorer developing countries. These regions depend heavily on cheap loans and international cooperation to build solar projects. When a large economy like the U.S. steps back from climate engagement, lenders can turn cautious; projects can slow down; and decisions can take longer. If solar growth slows in these regions, Indian companies looking to expand abroad may feel the impact.

The ISA is also one of India's key tools for climate leadership and diplomacy in the Global South. It helps India build influence, open markets, and support Indian companies overseas. While the U.S. exit removes one influential partner and some technical expertise, it does not change who leads the alliance. India still does. That leadership now comes with more responsibility.

What next?

Solar power in India does not become costlier, domestic projects are not threatened, and jobs inside India remain secure. The real challenge then is a more divided global climate landscape, where cooperation is harder and emerging markets need to work harder to attract finance. For India's solar industry, this is not a shock. It is a stress test. And compared with where it stood a few years ago, India appears to be better prepared to handle it.

THE GIST

- The U.S. exit will not really harm the alliance financially. U.S. contribution made up only about 1% of the Alliance's total funds.
- Most solar projects in India are driven by domestic demand. They are backed by long-term contracts with state utilities and central agencies.
- The ISA works extensively in Africa and poorer developing countries. When a large economy like the U.S. steps back from climate engagement, lenders can turn cautious

Prelims Booster

INTERNATIONAL SOLAR ALLIANCE

About US | Our Work | Outreach | Data | Get Involved | Our Impact

The ISA is a **global intergovernmental organization** dedicated to advancing solar power adoption for a **carbon-neutral future**

The ISA is a collaborative initiative between India and France aimed at uniting efforts to combat climate change by implementing solar energy solutions. It was conceptualized on the side lines of COP21 in Paris in 2015. Following a 2020 amendment to its Framework Agreement, all UN member states are now eligible to join the Alliance. Currently, 100+ countries are signatories, with 90+ countries having ratified to become full members. Its mission is to unlock $1 trillion in solar investments by 2030 while reducing technology and financing costs.

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The Future of ISA

SYLLABUS : **GS 2** International Relations
Newspaper The Hindu **Page Number :** 08

As a platform for international solar energy cooperation, the ISA supports Member Countries across various sectors

- Through its Analytics & Advocacy focus, spreads awareness and champions the adoption of solar-friendly policies and practices in its Member Countries.
- Aids governments in creating solar-friendly energy policies through Ease of Doing Solar analytics and advice
- Develops, tests and implements new business models for solar projects and aggregates demand for solar technology across nations.
- Enhances financial access by mitigating risks and attracting private investments
- Provides access to solar training, data, and insights for professionals and policymakers in the energy sector

Vision

Let us together make the sun brighter

The ISA strives to develop and deploy cost-effective and transformational energy solutions powered by the sun to help Member Countries develop low-carbon growth trajectories, with particular focus on delivering impact in countries categorized as Least Developed Countries (LDCs) and the Small Island Developing States (SIDS).

Mission

Every home no matter how far away, will have a light at home

The ISA is guided by its "Towards 1000' strategy, which aims to mobilise USD 1,000 billion of investments in solar energy solutions by 2030 while delivering energy access to 1,000 million people using clean energy solutions and resulting in the installation of 1,000 GW of solar energy capacity. This would help mitigate global solar emissions to the tune of 1,000 million tonnes of CO, annually. To meet these goals, the ISA takes a programmatic approach. Currently, the ISA has nine comprehensive programmes, each focusing on a specific application that could help scale the deployment of solar

Analytics & Advocacy

ISA seeks to support Member Countries in formulating policies and regulations by publishing reports annually on technology, investments, and markets in the solar industry.

Capacity Building

Through its critical capacity-building initiative, Solar Technology and Application Resource Centres (STAR-C), ISA will provide tailored capacity-building support adapted to the local context. Under this programme, ISA aims to set standards and strengthen the solar ecosystems in all developing countries through solar training for all stakeholders.

Programmatic Support

ISA's programmes will focus on setting up sustainable solar projects in countries most impacted by climate change, specifically in the Least Developed Countries (LDCs) and Small Island Developing States (SIDS). ISA aims to do so in Member Countries by aggregating demand for Innovative and scalable solar solutions and facilitating access to funding with risk mitigation mechanisms.

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China's Antarctic Ambitions

SYLLABUS : GS 2 International Relations
Newspaper The Hindu **Page Number :** 08

How is China framing its Antarctic ambitions?

What is the proposed Antarctic Activities and Environmental Protection Law?

Lekshmi M.K.

The story so far:

On December 23, 2025, media houses reported that China was proposing a draft legislation titled the 'Antarctic Activities and Environmental Protection Law'. The draft has been submitted for first reading to the Standing Committee of the National People's Congress. The proposed legislation seeks to regulate China's activities in Antarctica.

What does the draft legislation say?

The draft legislation consists of seven chapters and 57 articles. It seeks to establish a comprehensive domestic legal framework governing all Chinese-related activities in Antarctica. It applies not only to Chinese citizens and organisations but also to foreign entities that organise Antarctic activities from within China or depart from Chinese ports. It also drafts rules aimed at regulating expeditions, scientific research, fisheries, tourism, and shipping. A central feature of the draft is its emphasis on peaceful use and environmental protection in line with the Antarctic Treaty System (a collection of international agreements which govern the southern continent). The draft prohibits military activities, and only allows its limited use if it is to support peaceful objectives. It does not permit combat operations, weapons testing, troop deployment, or strategic military activities. Mineral resource exploitation is banned except for scientific research. The draft also introduces environmental impact assessments, supervision mechanisms, and post-incident accountability. Governance challenges on Antarctic tourism, waste management, and marine pollution are also addressed.

What about China's presence in the Antarctic?

In 1984, China conducted its first scientific expedition to Antarctica. Later it became a consultative party to the Antarctic Treaty in 1985. It has since then expanded its scientific and logistical footprint in the continent over 40 years. Currently, China operates five research stations in the Antarctic, namely the Great Wall Station, the Ongshan Station, the Taishan Station, the Kunlun Station, and the Qinling Station. This well-established network of research stations in different parts of the Antarctic allows China to conduct year-long scientific research. It can conduct research across key climatic, glaciological, atmospheric, and astronomical zones. China also operates advanced polar icebreakers such as the Xuelong and Xuelong 2, strengthening its logistical capacity.

What are China's Antarctic goals?

China's official statements emphasise scientific research, climate studies, environmental protection, and international cooperation. Antarctic research supports China's understanding of the global climate challenge, seal-level rise and polar-atmospheric interactions. This has implications for domestic environmental planning as well. Its ambitions are framed around science, governance, participation, and long-term strategic presence rather than territorial claims. At the governance level, China seeks to move from being a participant to a rule-shaping actor within the Antarctic Treaty System. Moreover, sustained polar operations contribute to advancement in ice-breaking, satellite navigation and extreme-environment engineering.

What does it mean for the Antarctic treaty?

China's draft Antarctic law signals its move towards formalising and strengthening its Antarctic presence. It places Antarctic activities within a clear domestic legal and regulatory framework rather than relying only on policy guidelines. It also reflects a broader pattern among major consultative parties using national legislation to ensure better compliance with Antarctic Treaty obligations. China's legislative initiative reinforces the need to monitor how major powers organise and regulate their Antarctic engagement, as domestic laws increasingly shape behaviour within a treaty-based governance system.

Lekshmi M.K. is pursuing a postgraduate degree at Madras Christian College, Chennai and is a Research Assistant at NIAS, Bengaluru.

THE GIST

- The draft legislation seeks to establish a comprehensive domestic legal framework governing all Chinese-related activities in Antarctica.
- China's ambitions are framed around science, governance, participation, and long-term strategic presence rather than territorial claims.
- Currently, China operates five research stations in the Antarctic, namely the Great Wall Station, the Ongshan Station, the Taishan Station, the Kunlun Station, and the Qinling Station.

The Antarctic Treaty came into force on 23 June 1961 after ratification by the twelve countries then active in Antarctic science. The Treaty covers the area south of 60°S latitude. Its objectives are simple yet unique in international relations. They are:

- to demilitarize Antarctica, to establish it as a zone free of nuclear tests and the disposal of radioactive waste, and to ensure that it is used for peaceful purposes only;
- to promote international scientific cooperation in Antarctica;
- to set aside disputes over territorial sovereignty.

The treaty remains in force indefinitely. The success of the treaty has been the growth in membership. Forty six countries, comprising around 80% of the world's population, have acceded to it. Consultative (voting) status is open to all countries who have demonstrated their commitment to the Antarctic by conducting significant research.

Twenty eight nations, including the UK, have Consultative status. The Treaty parties meet each year at the Antarctic Treaty Consultative Meeting. They have adopted over 300 recommendations and negotiated separate international agreements, of which three are still in use. These, together with the original Treaty provide the rules which govern activities in Antarctica. Collectively they are known as the Antarctic Treaty System (ATS).

The three international agreements are:

- Convention for the Conservation of Antarctic Seals (1972)
- Convention on the Conservation of Antarctic Marine Living Resources (1980)
- Protocol on Environmental Protection to the Antarctic Treaty (1991)

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Flags of the Antarctic Treaty Nations, as at June 2015

Some important provisions of the Treaty:

> Antarctica shall be used for peaceful purposes only
> **Art. I**
>
> Freedom of scientific investigation in Antarctica and cooperation toward that end... shall continue
> **Art. II**
>
> Scientific observations and results from Antarctica shall be exchanged and made freely available
> **Art. III**

Among the signatories of the Treaty were seven countries - Argentina, Australia, Chile, France, New Zealand, Norway and the United Kingdom - with territorial claims , sometimes overlapping. Other countries do not recognize any claims. The US and Russia maintain a "basis of claim". All positions are explicitly protected in Article IV, which preserves the status quo:

> No acts or activities taking place while the present Treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim, or enlargement of an existing claim to territorial sovereignty in Antarctica shall be asserted while the present Treaty is in force.

To promote the objectives and ensure the observance of the provisions of the Treaty, "All areas of Antarctica, including all stations, installations and equipment within those areas ... shall be open at all times to inspection " (Art. VII).

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LR-AShM Missile

SYLLABUS : Prelims Defence
Newspaper Indian Express **Page Number :** 12

ONE OF the many highlights of the 77th Republic Day Parade was the Defence Research and Development Organisation's (DRDO) Long Range Anti-Ship Hypersonic Missile (LR-AShM), showcased for the first time. We explain the features and capabilities of this hypersonic glide missile, and also what other hypersonic missiles India is developing.

LR-AShM: The hypersonic glide missile

The missile system is designed to meet the coastal battery requirements of the Indian Navy. The LR-AShM is capable of engaging static and moving targets and is designed to carry various payloads to a range of around 1,500 km.

This missile follows a quasi-ballistic trajectory with hypersonic speeds starting at Mach 10 (multiples of speed of sound) and maintaining average Mach 5 with multiple skips. Ballistic missiles are boost-powered initially and then travel unpowered on a high, arched trajectory. Quasi-ballistic missiles begin ballistically but fly lower and manoeuvre in flight to change course and evade interception. As this missile flies at low altitudes with high speed and manoeuvrability, enemy ground and ship-based radars cannot detect it. The LR-AShM is configured with a two-stage solid propulsion rocket motor system. These propulsion systems boost the missile to the required hypersonic velocities. Stage-1 of the vehicle is separated after it is spent. After Stage-II burnout, the vehicle performs an unpowered glide with required manoeuvres in the atmosphere before engaging the target, the DRDO has said.

DIFFICULT TO DETECT

- The missile can't be detected by enemy radars, as it flies at low altitudes with high speed and manoeuvrability.
- The missile has a range of up to 1,500 km, which it can cover in 15 minutes.

Its significance

The obvious advantages of the hypersonic speed is it makes it difficult for missiles to be detected. It can cover its range around 1,500 kilometers in 15 minutes. Versions with higher ranges upto 3,500 kilometers are currently at various stages of development. A senior DRDO scientist said, "All classes of warships can be neutralised with the missile. This variant and the upcoming ranges will be a key asset for sea denial operations, which prevent an adversary from using a maritime area for military or commercial purposes. This capability will be crucial for the strategically significant Indian Ocean region. Army and Air Force versions of these missile and ship-fired versions for the Navy are also said to be either under consideration or under development. With its versatility, it could well place India in the hypersonic arms domain."

One of the known successful tests of the missile was done by DRDO on November 16, 2024 off the coast of Odisha. As part of the further development cycle, the missile warhead and sensor mechanisms will be integrated soon, before its induction into the Navy in two to three years.

Other hypersonic cruise missiles

Amidst cutthroat global competition in hypersonic weapons, DRDO is working on two key hypersonic technologies. One is hypersonic glide and another is hypersonic cruise. LR-AShM is a hypersonic glide vehicle and includes in itself major achievements in indigenous technologies like materials and control systems needed for sustained hypersonic flight. Hypersonic cruise missiles fly within the atmosphere at hypersonic speeds using scramjet engines for sustained powered flight and manoeuvrability.

Ramjets are air-breathing engines that compress incoming air using forward motion, with fuel igniting in a combustion chamber; they require an assisted take-off and work best around Mach 3, losing efficiency at hypersonic speeds. Scramjets improve on ramjets by keeping airflow supersonic in the combustion chamber, enabling efficient operation above Mach 5, but are far more complex to design and operate.

What is "Mach"?

Mach number = speed of an object ÷ speed of sound

- Speed of sound ≈ **343 m/s** (≈ 1,235 km/h at sea level)
- Mach changes with **altitude & temperature**

Subsonic Missiles (Below Mach 1)

- Fly **slower than sound**

Key Features

- Quiet flight (no sonic boom)
- Easier to detect and intercept
- High accuracy, long range

Examples

- **Tomahawk (USA)**
- **Nirbhay (India)**

Use

- Precision strikes
- Long-range conventional warfare

Mach	Meaning
Mach 1	Speed of sound
Mach 2	Twice the speed of sound
Mach 5	Five times the speed of sound

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LR-AShM Missile

SYLLABUS : Prelims Defence
Newspaper Indian Express **Page Number :** 12

Supersonic Missiles (Mach 1 – Mach 5)

- Fly **faster than sound**

Key Features

- Produce **sonic boom**
- Reduced enemy reaction time
- Harder to intercept than subsonic

Examples

- **BrahMos (India–Russia)** – ~Mach 2.8
- **Moskit (Russia)**

Use

- Anti-ship and land-attack roles

Hypersonic Missiles (Mach 5 and Above)

- Fly at **5 times the speed of sound or more**

Key Features

- Extremely high speed
- Manoeuvrable
- Very difficult to detect and intercept

Types

1. **Hypersonic Glide Vehicles (HGVs)** – ballistic launch + glide
2. **Hypersonic Cruise Missiles (HCMs)** – scramjet powered

Examples

- **Avangard (Russia)** – HGV
- **Zircon (Russia)** – HCM
- **HSTDV (India)** – tech demonstrator

Hypersonic Glide Missiles (HGVs)

What are they?

- Launched using a **ballistic missile booster**
- After reaching high altitude, the **glide vehicle detaches** and glides towards the target at hypersonic speeds

Key Features

- Follow a **non-ballistic, unpredictable glide path**
- Can manoeuvre laterally and vertically
- Fly at **lower altitudes** than traditional ballistic missiles

Examples

- China: **DF-ZF**
- Russia: **Avangard**
- India: **Hypersonic Technology Demonstrator Vehicle (HSTDV – glide vehicle component)**

Hypersonic Cruise Missiles (HCMs)

What are they?

- Powered throughout their flight by **scramjet engines**
- Do **not require a ballistic booster for full trajectory**

Hypersonic Glide Missiles (HGVs)

What are they?

- Launched using a **ballistic missile booster**
- After reaching high altitude, the **glide vehicle detaches** and glides towards the target at hypersonic speeds

Key Features

- Follow a **non-ballistic, unpredictable glide path**
- Can manoeuvre laterally and vertically
- Fly at **lower altitudes** than traditional ballistic missiles

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LR-AShM Missile

SYLLABUS : Prelims Defence
Newspaper Indian Express **Page Number :** 12

Examples

- China: **DF-ZF**
- Russia: **Avangard**
- India: **Hypersonic Technology Demonstrator Vehicle (HSTDV – glide vehicle component)**

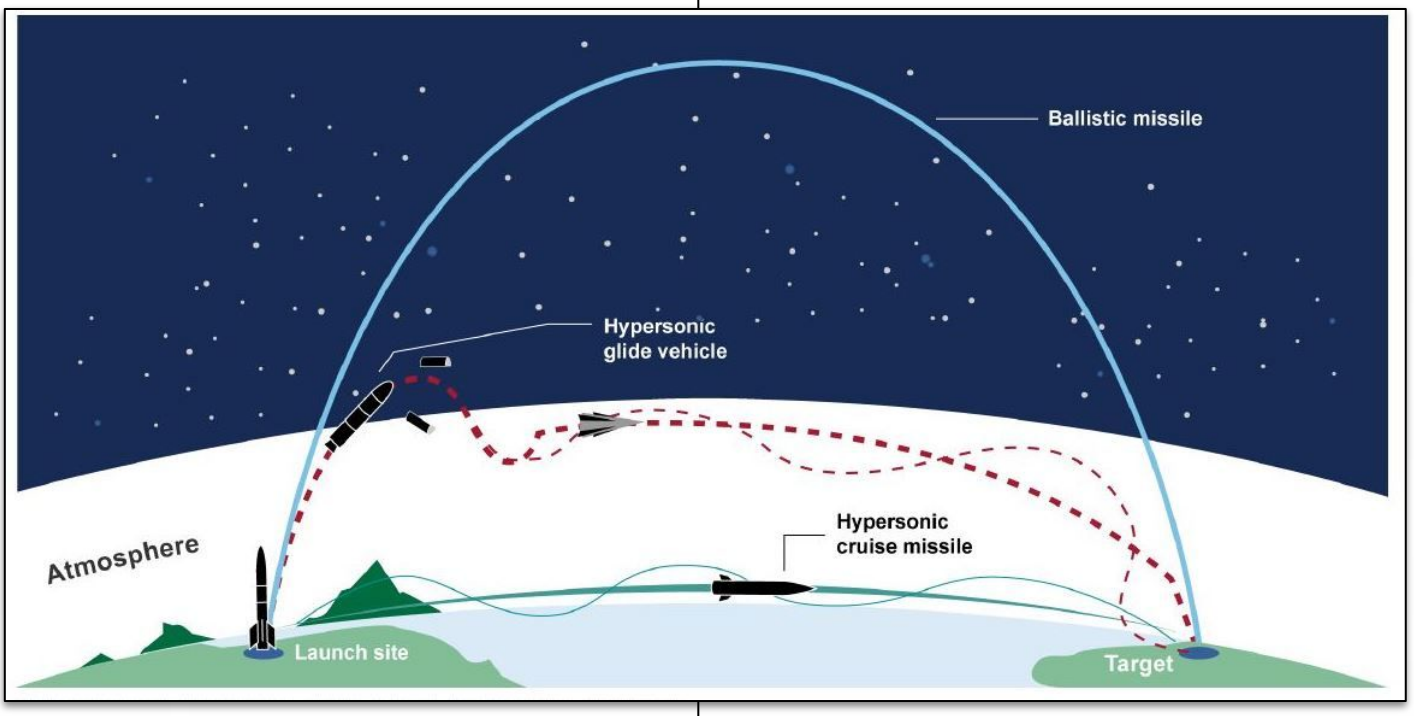
Key Differences at a Glance

Feature	Hypersonic Glide Missile	Hypersonic Cruise Missile
Launch method	Ballistic missile booster	Conventional launch
Propulsion	Unpowered glide phase	Scramjet-powered
Flight path	Glide, highly manoeuvrable	Powered atmospheric flight
Altitude	Near-space → atmosphere	Atmosphere
Detection	Extremely difficult	Very difficult

Hypersonic Cruise Missiles (HCMs)

What are they?

- Powered throughout their flight by **scramjet engines**
- Do **not require a ballistic booster for full trajectory**



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V2V Safety Systems

SYLLABUS : GS 3 Science and Technology
Newspaper The Indian express **Page Number :** 12

TRANSPORT

India has most road accident deaths in the world. Can 'talking cars' curb these?

Dheeraj Mishra
New Delhi, January 26

THE UNION government is planning to launch a "vehicle-to-vehicle (V2V)" safety system to prevent road accident deaths and reduce traffic.

V2V communication is a wireless technology that enables vehicles to communicate, or "talk", with one another. This essentially means that vehicles can share real-time information such as speed, location, acceleration and braking with each other.

At a meeting of the Parliamentary consultative committee on January 22, Union Minister Nitin Gadkari said the Department of Telecommunications has allocated the 30 GHz radio frequency for the development of such communication systems.

The V2V system is similar to the aviation sector technology where aircraft broadcast their position, speed, altitude, and the nearby aircraft and ground stations receive it. This system has been a crucial part of the aviation sector across the world. In the roads sector, however, it is still a work in progress. The V2V system is in place in only a few countries, mostly developed ones.

How will the system work?

According to officials from the Ministry of Road Transport & Highways (MoRTH), an On-Board Unit (OBU) will be installed in cars so that they can exchange information with nearby vehicles wirelessly. This unit will alert the driver about black spots, obstacles, parked vehicles on roadsides, fog or any potential threats.

Usually, V2V systems can detect vehicles in a 300-metre range. For instance, if a car applies brakes suddenly, nearby vehicles will get an alert to slow down. This could help in reducing crashes.

India ranks first in the world in total road accident fatalities, far ahead of second- and third-ranked countries: China accounts for just 36%, and the US 25%, of India's road deaths. MoRTH Secretary V Umashankar said the OBUs will cost between Rs 5,000 and Rs 7,000. These will be first installed in new vehicles. "This will have a significant impact on road safety. Many times, trucks and cars are parked on the roadside, and the speeding vehicles collide with them, which leads to casualties. We will be able to reduce such accidents, since OBU will automatically issue the warning," said Umashankar at a press conference on January 8.

Usually, V2V systems can detect vehicles in a 300-metre range. PTI FILE

When will it be rolled out?

The government has not yet announced a specific date for rolling out this system. However, it is the ministry's key initiative as part of its road safety programme for the year. The secretary said the ministry is setting standards for it in collaboration with original equipment manufacturers (OEMs). A joint task force has also been constituted with the telecom department.

"After the decision on the standards, we will issue a notification. Initially, the new vehicles will be required to install these on-board units. After that, the old vehicles will be fitted with this. Under the National Frequency Allocation Plan, the Department of Telecommunications will provide free spectrum. So the OEMs would be able to use this spectrum and get it installed in the vehicle. Our aim is to get it implemented this year," said the MoRTH secretary.

What are the challenges?

The V2V system has some limitations and privacy concerns. The frequency band allocated for the system might not support all vehicles. This means that incorrect information can lead to accidents and deaths.

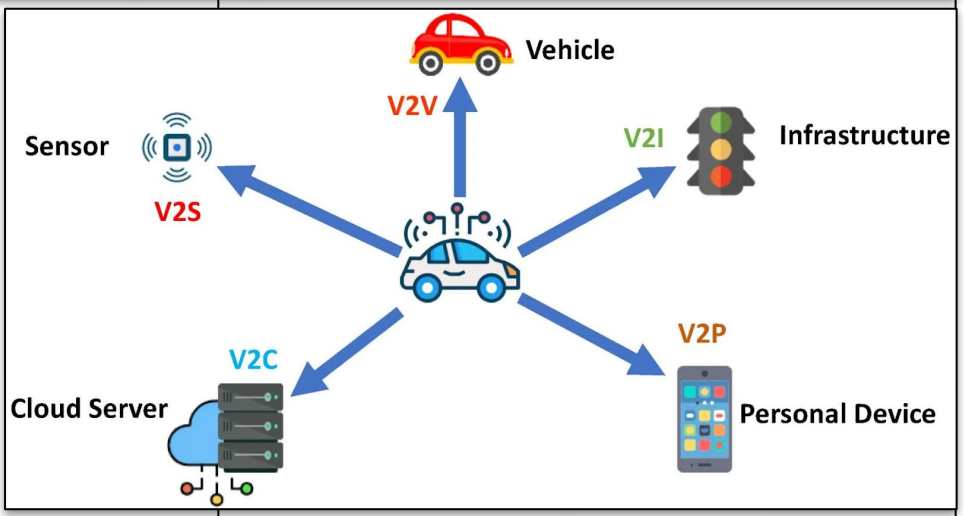
The other issue is that it will store a large amount of data — about the vehicles, their location, details about the driver, etc. This puts the whole intelligent transport infrastructure at potential risk of being misused. It would certainly require government regulations and rules to implement. Cyber attacks are another concern for this system.

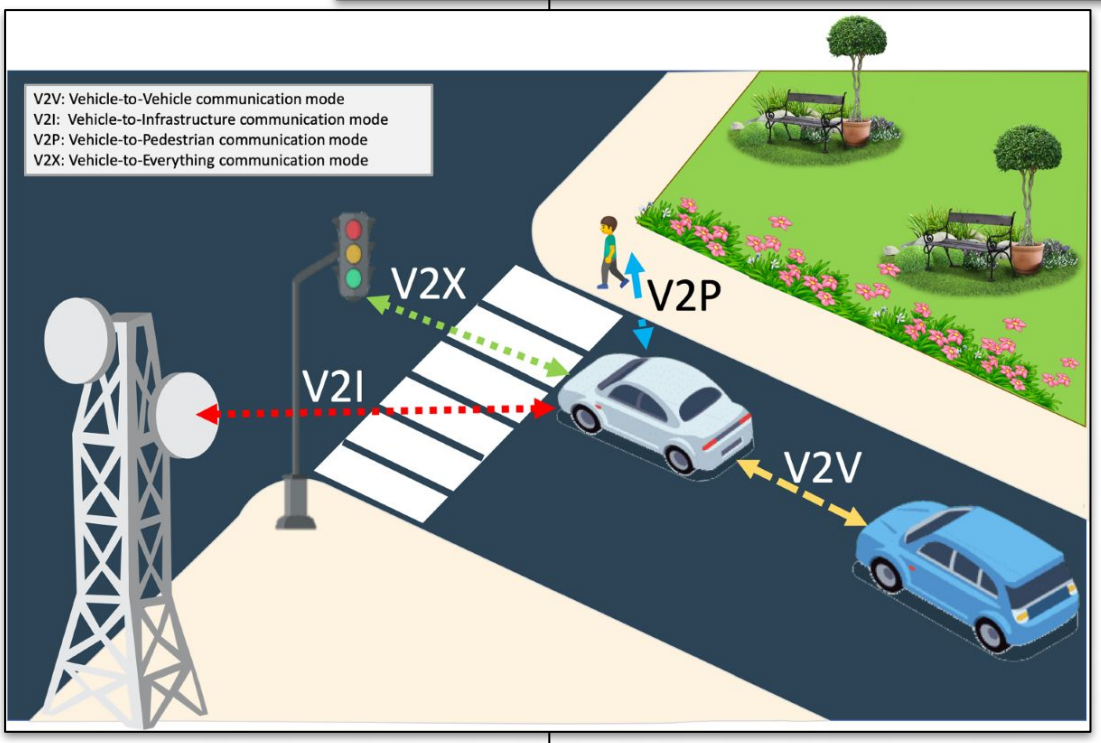
Which countries use V2V?

The US is the leader in V2V communication systems research and its implementation, with strong regulation. Models like the Volkswagen Golf 8 and the Cadillac models in the US come with this tech.

European countries such as Germany, France and the UK, too, are incorporating V2V into new vehicles and smart city projects. China is another major adopter of V2V. Countries such as the UAE, Saudi Arabia, Brazil and Mexico are in early pilot stages to roll out V2V systems.

Prelims Booster





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West Asia Mapping

SYLLABUS : Prelims Mapping
Newspaper The Hindu **Page Number :** 14

U.S. aircraft carrier arrives in West Asia amid high tensions with Iran

FILE

The U.S aircraft carrier *USS Abraham Lincoln* and three warships have arrived in West Asia, bringing a renewed potential that President Donald Trump could opt to order air strikes on Iran over its crackdown on protesters. The squadron "is deployed to promote regional security and stability", U.S. Central Command said. AP

Prelims Booster

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West Asia Mapping

SYLLABUS : Prelims Mapping
Newspaper The Hindu **Page Number :** 14

Prelims Booster

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Daily Quiz

Q1. With reference to the International Solar Alliance (ISA), consider the following statements:

1. ISA is a global intergovernmental organisation initiated jointly by India and France to promote solar energy deployment and address climate change.
2. Only the countries located between the Tropic of Cancer and the Tropic of Capricorn are eligible for full membership of ISA.

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Answer: a

Q2. With reference to the Antarctic Treaty and the Antarctic Treaty System (ATS), consider the following statements:

1. It applies to the area south of 60° South latitude and mandates the use of Antarctica exclusively for peaceful purposes.
2. Consultative status under the treaty is granted to all countries that demonstrate their commitment through significant research.
3. The treaty includes, among others, the Convention on the Conservation of Antarctic seals (1972).

How many of the statements given above is/are correct?

a) Only One
b) Only Two
c) All Three
d) None

Answer: c

Q3. Consider the following statements:

1. Hypersonic glide vehicles are launched using ballistic missiles and glide unpowered through the atmosphere at hypersonic speeds.
2. Hypersonic cruise missiles generally follow predictable ballistic trajectories similar to intercontinental ballistic missiles.

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Answer: a

Q4. Which of the following best defines Vehicle-to-Vehicle (V2V) technology?

a) A satellite-based traffic monitoring system used exclusively by traffic authorities to manage congestion.
b) A wireless communication system that allows vehicles to exchange safety-related data with nearby vehicles to prevent accidents.
c) An automated vehicle control system that eliminates the need for human drivers.
d) A centralised database that stores driver and vehicle information for law enforcement purposes.

Answer: b

Q5. The Strait of Hormuz connects which of the following water bodies?

a) Mediterranean Sea and Red Sea
b) Red Sea and Gulf of Aden
c) Persian Gulf and Gulf of Oman
d) Arabian Sea and Bay of Bengal

Answer: c

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