



The Hindu Important News Articles & Editorial For UPSC CSE

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The Israeli Defense Forces (IDF) attacked a UNIFIL facility in southern Lebanon, escalating tensions as peacekeepers faced ongoing assaults.

- ➔ Israel's Prime Minister urged the UN to withdraw UNIFIL from Hezbollah areas, citing safety concerns for peacekeepers and soldiers.

Israeli tanks ram gate of UN facility in Lebanon

Prime Minister Netanyahu, in a video message to UN Secretary-General Antonio Guterres, says the 'time has come' to withdraw UNIFIL from Hezbollah strongholds and from combat zones; the IDF says the tank entered the UNIFIL premises as its forces were facing a barrage of anti-tank missiles and UN forces faced no threat during the operation

Dinakar Peri
NEW DELHI

Israel Defence Forces (IDF) tanks destroyed the main gate of a facility of the UN peacekeeping forces at Ramyah in south Lebanon on Sunday, the United Nations Interim Force in Lebanon (UNIFIL) said. The UN forces are coming under attack for the fourth consecutive day.

Smoke that entered the camp following several rounds fired nearby left 15 peacekeepers with skin irritation and gastrointestinal reactions, UNIFIL said. IDF soldiers also stopped a critical logistical movement on Saturday, it said.

In a video message to UN Secretary-General Antonio Guterres, Israeli Prime Minister Benjamin Netanyahu made an "appeal" that the "time has

come" to withdraw UNIFIL from "Hezbollah strongholds and from the combat zones". "Mr. Secretary-General, get the UNIFIL forces out of harm's way. It should be done right now, immediately," he said. "Your refusal to evacuate UNIFIL soldiers has turned them into hostages of Hezbollah. This endangers both them and the lives of our soldiers," he said.

Early on Sunday, peacekeepers at a UN position in Ramyah observed three platoons of IDF soldiers crossing the Blue Line into Lebanon, UNIFIL said, and around 4.30 a.m., while peacekeepers were in shelters, two IDF Merkava tanks destroyed the position's main gate and forcibly entered the position.

The IDF said the tank entered the premises as its troops faced a barrage of



Pushing on: An Israeli tank entering Lebanon at the southern Lebanese border point of Naqoura on Sunday. UN peacekeepers say tanks broke through a gate to enter a Blue Helmet position. AFP

anti-tank missiles in southern Lebanon and that a smoke screen was used to provide cover for the evacuation of injured soldiers. "Throughout the entirety of the incident, no danger was posed to UNIFIL forces

by the IDF activity," IDF said, adding its soldiers maintained coordination with UNIFIL throughout.

Further, around 6.40 a.m., peacekeepers at the same position reported the firing of several rounds 100

metres north, which emitted smoke. "Despite putting on protective masks, 15 peacekeepers suffered effects, including skin irritation and gastrointestinal reactions, after the smoke entered the camp," accord-

ing to UNIFIL. The peacekeepers are receiving treatment.

In addition, on Saturday, IDF soldiers stopped a critical UNIFIL logistical movement near Meiss ej Jebel, denying it passage, the statement said, and the critical movement "could not be completed".

"Breaching and entering a UN position is a further flagrant violation of international law and Security Council resolution 1701 (2006)," UNIFIL reiterated. "Any deliberate attack on peacekeepers is a grave violation of international humanitarian law and Resolution 1701. UNIFIL's mandate provides for its freedom of movement in its area of operations, and any restriction on this is a violation of Resolution 1701."

"We have requested an

explanation from the IDF from these shocking violations," it added.

There are more than 10,000 peacekeepers from 50 countries under UNIFIL, under the Security Council. India is the third largest contributor to the force with 903 soldiers. According to defence officials, the Indian Battalion has no presence at Ramyah.

On Saturday, a joint statement was issued, initially by 34 troop-contributing countries to UNIFIL, later endorsed by six more countries, including India, condemning the ongoing attacks on peacekeepers and called all to respect UNIFIL's mission and ensure the safety of its personnel.

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United Nations Interim Force in Lebanon (UNIFIL) – Key Information:

- ➔ **Established:** March 1978 by the UN Security Council.
- ➔ **Original Mandate:** Confirm Israeli withdrawal from Lebanon, restore international peace and security, and assist Lebanon in restoring authority.
- ➔ **Post-2006 Role:** Expanded after the Israel-Hezbollah conflict.
 - Monitor the cessation of hostilities.
 - Support Lebanese Armed Forces in southern Lebanon deployment.
 - Ensure humanitarian access to civilians.
 - Facilitate the safe return of displaced persons.
- ➔ **Troop Strength:** Over 10,000 personnel from 50 countries.
- ➔ **Mandate:** Governed by UN Security Council Resolution 1701 (2006).

Places in Focus:

- ➔ **Ramyah (South Lebanon):** Location of the UN peacekeeping force's facility attacked by IDF tanks; near the volatile border with Israel.
- ➔ **Blue Line:** Demarcation between Israel and Lebanon, established by the UN to confirm Israeli withdrawal from Lebanon.
- ➔ **Meiss ej Jebel:** Another location in south Lebanon where IDF soldiers halted a UNIFIL logistical movement.

Ladakh's auroral sightings highlight advancements in space weather monitoring, as predicted by the Indian Institute of Astrophysics and CESSI at IISER Kolkata.

- These occurrences signal increased solar activity, with auroras visible due to coronal mass ejections and solar storms.

Ladakh aurorae validate space weather tracking, scientists say

Press Trust of India

LADAKH

Ladakh's recent sightings of aurora, marked by reddish or greenish light in the night sky and usually observed in the far-northern regions, is a validation of efforts in space weather monitoring, a team of astrophysicists that predicted the activity about 48-72 hours prior said.

The appearance of intense red-hued rays of light on the night of October 10-11 was the latest in a series of recent auroral sightings. Previous ones occurred on May 11 this year, and in November and May 2023.

All sky cameras operated by the Bengaluru-based Indian Institute of Astrophysics at Hanle and Merak in Ladakh captured the aurorae throughout the night.

Dibyendu Nandi, head of the Centre of Excellence in Space Sciences India (CESSI) at the Indian Insti-



Solar signal: A rare red-coloured aurora was observed over the Hanle Dark Sky Reserve in Ladakh on May 11. PTI

tutes of Science Education and Research Kolkata, said, "The aurora sightings are a validation that we are on the right track. It boosts our confidence to predict extreme weather events in space that can potentially endanger all kinds of satellite-based services on the earth, bringing modern society to a standstill."

While aurorae are known for their scenic beauty, their occurrence in lower-latitude regions such as Ladakh is an indication of heightened solar activity in the form of solar storms,

known as coronal mass ejections (CMEs), Mr. Nandi said.

Solar storms periodically occur as the sun's internal dynamo, which creates its magnetic field, intensifies and weakens. This activity cycle typically lasts 11 years.

In 2018, a CESSI team that included Mr. Nandi predicted the current solar activity cycle would peak in 2024.

Aurorae are a common sight in the planet's far-north, in countries near or within the Arctic Circle.

Analysis of the news:

- Ladakh recently witnessed auroral sightings, marked by reddish or greenish lights, typically seen in northern regions.
- The latest aurora occurred on October 10-11, following previous sightings in May 2023 and November and May 2022.
- The auroras were captured by all-sky cameras operated by the Indian Institute of Astrophysics at Hanle and Merak in Ladakh.



- These sightings validate advancements in space weather monitoring by astrophysicists, who predicted the event 48-72 hours earlier.
- The occurrence of auroras in Ladakh, a lower-latitude region, signals heightened solar activity and coronal mass ejections (CMEs).
- Solar storms are part of the sun's 11-year activity cycle, with the current cycle predicted to peak in 2024.



Precision medicine, driven by genomics and emerging technologies like gene editing and mRNA therapeutics, is transforming healthcare globally.

- ➔ India's biobanking ecosystem is growing but faces challenges due to inconsistent regulations around data protection and ethical practices.
- ➔ Aligning India's biobanking laws with global standards is crucial for advancing next-generation therapeutics.

Why precision medicine in India can't advance without biobank laws

A biobank is a repository of biological samples alongside their genetic data. These samples are collected from consenting individuals for use in research. For precision medicine to succeed, biobanks need to be large and diverse or only a small section of society will benefit from the findings of research

Manjeera Gowravaram

Precision medicine is bringing in a new era of personalised healthcare. The field began to take concrete shape when scientists were wrapping up the Human Genome Project. Since then, genomics has played a major role in the diagnosis and treatment of various cancers, chronic diseases, and immunological, cardiovascular, and liver diseases. Other emerging technologies, such as gene editing and mRNA therapeutics, also contribute to precision medicine. In a recent success story, researchers were able to restore vision in people who had lost it due to a genetic mutation using gene therapy. In a more recent and more notable example, researchers in the U.K. reversed an individual's diabetes by transplanting reengineered stem cells. During the COVID-19 pandemic, researchers were able to use the mRNA platform to develop new vaccines in record time, winning the technology a Nobel Prize last year.

Organ-on-chips is another area that promises precision medical solutions. These small microfluidic devices containing human cells can replicate the microenvironment of a tumour or an organ in a laboratory setting. They are expected to allow researchers to test drugs in settings more similar to the drugs' eventual users.

Precision medicine in India

The Indian precision medicine market is estimated to be growing at a CAGR of 16% and is expected to be worth more than \$5 billion by 2030, according to industry estimates.

Currently, it contributes 36% of the national bioeconomy, alongside cancer immunotherapy, gene editing, biologics, etc. The development of precision therapeutics is also part of the new 'BioE' policy.

In October 2023, the Central Drugs Standard Control Organization approved NexCAR9, India's domestically developed CAR-T cell therapy, and earlier this year the government opened a dedicated centre for it. Recently, the Apollo Cancer Centre and a collaboration between Siemens Healthineers and the Indian Institute of Science, Bengaluru, opened new facilities to deploy artificial intelligence for precision medicine.

Biobanks in precision medicine

A biobank is a repository of biological samples, such as blood, DNA, cells, tissues, and/or organs, alongside their genetic data. These samples are collected from consenting individuals and intended for use in research. For precision



A biobank is a repository of biological samples, such as blood, DNA, cells, tissues, and organs, alongside their genetic data. GETTY IMAGES/ISTOCKPHOTO

medicine to succeed, biobanks need to be large and diverse. Otherwise, only a small section of society will benefit from the findings of precision medicine.

Recently, researchers identified people with an undiagnosed rare genetic disorder using data from a biobank and comparing it to people who were already diagnosed with it. Their findings were published in *Nature Communications* on August 29.

In another study published in *Cell* on October 3, health researchers created the largest biobank of sarcoma patient-derived organoids to date. Organoids are miniaturised, synthetic versions of organs that can replicate tumours; the researchers used it to understand the sarcoma and identify potential therapies using high-throughput drug screening.

Biobanks in India

There are 19 registered biobanks in India that host many biological specimens, including cancer cell lines and tissues. Earlier this year, the 'Genome India' programme finished sequencing 10,000 genomes from 99 ethnic groups to identify treatments for rare genetic diseases, among others.

The pan-India 'Phenome India' project has collected 10,000 samples to create better prediction models for cardio-metabolic diseases. The Paediatric Rare Genetic Disorders (PRaGeD) mission could help identify new genes or variants to develop targeted therapies for genetic diseases that affect children.

However, biobank regulations in India are a significant hurdle to realising the full

The Indian precision medicine market is estimated to be growing at a CAGR of 16% and is expected to be worth more than \$5 billion by 2030, according to industry estimates

potential of precision medicine.

India's biobanking regulations

The U.K., the U.S., Japan, China, and many European countries have laws or comprehensive regulations that address several biobanking issues, including informed consent, withdrawal rights, privacy, and data protection. At present, India's regulation of biobanks is inconsistent, with gaps that could undermine public trust and limit the potential of precision medicine. In particular, there is no law to protect the rights of individuals.

The Indian Council for Medical Research handbook on 'National Ethical Guidelines for Biomedical And Health Research Involving Human Participants' and the Department of Biotechnology's (DBT) practices for data storage and analysis have many gaps. For instance, participants are expected to consent to providing samples without knowing how their data will be used, who will have access to it, for how long they will be stored, and when they will be used. Genetic information can provide details about a person, including their family, that also could result in discrimination.

Next, in the absence of a single authority to regulate biobanks and no

penalty for misconduct, the risk of inconsistencies arising from sample mishandling and ethical violations like data or sample sharing for non-consenting purposes is nontrivial.

Without proper regulations, many pharmaceutical companies, including those abroad, will have access to samples from India. Research projects often require researchers and pharmaceutical companies to collaborate with biobanks during drug discovery and development.

In the absence of an overarching law, Indians could be deprived of the ownership of biological samples and/or the data thereof and the profits from the resulting research findings.

A leadership opportunity

Taken together, strong data and privacy protections and regulatory oversight by an expert committee will encourage more people to share samples and participate without worry. It will also allow research to happen on the right foundations instead of the findings becoming the fruits of a poisoned tree.

India is a part of international groups like the Quad and BRICS, and an important plank of its soft diplomatic efforts has been pharmaceuticals. It is a major supplier of generic drugs and is a hub of vaccine manufacturing, and it has plans to expand leadership to include next-generation therapeutics. To do this, it will have to align its biobanking laws with global standards to encourage public participation and trust.

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THE GIST

Gene editing and mRNA also contribute to precision medicine. Researchers were able to restore vision using gene therapy. In the U.K., an individual's diabetes was reversed by transplanting reengineered stem cells.

India's rulebook has many gaps. Participants do not know how data will be used, who will have access, for how long they will be stored, and when they will be used. Pharmaceutical companies, including those abroad, will have access to samples from India.

Strong data and privacy protections will encourage more people to share samples and participate without worry. It will also allow research to happen on the right foundations instead of the findings becoming the fruits of a poisoned tree.

Introduction to Precision Medicine

- ➔ Precision medicine is transforming healthcare by offering personalised treatments, especially in fields such as cancer, chronic diseases, and genetic disorders.

- The Human Genome Project laid the groundwork for advancements in genomics, which have enhanced diagnostics and therapies for multiple health conditions.
- Emerging technologies like gene editing, mRNA therapeutics, and organ-on-chips are contributing to the progress of precision medicine.

Technological Advancements in Precision Medicine

- Gene editing and mRNA therapeutics are two key emerging technologies.
- Success stories include restoring vision through gene therapy and reversing diabetes with reengineered stem cells.
- During the COVID-19 pandemic, the mRNA platform played a critical role in the development of vaccines, which led to a Nobel Prize.
- Organ-on-chips offer promising solutions by replicating human organs in laboratories, aiding in more accurate drug testing.

Precision Medicine in India

- The precision medicine market in India is growing rapidly at a CAGR of 16% and is projected to exceed \$5 billion by 2030.
- It contributes significantly to India's bioeconomy, alongside innovations in cancer immunotherapy, gene editing, and biologics.
- In 2023, India approved NexCAR19, its first domestic CAR-T cell therapy, and opened a dedicated center for its development.
- Collaborative efforts between healthcare institutions, such as Apollo Cancer Centre and the Indian Institute of Science, are driving the use of artificial intelligence in precision medicine.

Role of Biobanks in Precision Medicine

- Biobanks store biological samples (e.g., blood, DNA, tissues) and are crucial for the success of precision medicine.
- Large and diverse biobanks ensure that research benefits a broad section of society.
- Recent research using biobank data has led to the discovery of rare genetic disorders and the identification of potential sarcoma therapies through organoid-based studies.

Biobanks in India

- India currently has 19 registered biobanks storing various biological specimens, including cancer cell lines.
- Key initiatives like the 'Genome India' project, which sequenced 10,000 genomes from 99 ethnic groups, and the 'Phenome India' project, focused on cardio-metabolic diseases, are aiding precision medicine research.
- The Paediatric Rare Genetic Disorders (PRaGeD) mission aims to develop therapies for genetic disorders affecting children.
- Despite progress, India's biobanking regulations are fragmented and hinder the full potential of precision medicine.

Challenges in Biobanking Regulations

Daily News Analysis

- ▶ Unlike other countries such as the U.S. and the U.K., India lacks comprehensive regulations on biobanking, leaving gaps in informed consent, data protection, and privacy.
- ▶ Current guidelines from the Indian Council for Medical Research and the Department of Biotechnology are inadequate and do not protect individual rights effectively.
- ▶ Issues like mishandling of samples, data misuse, and non-consensual sharing pose ethical challenges.
- ▶ Without robust laws, Indian citizens risk losing control over their biological samples and the resulting research profits.

The Need for Regulatory Reform

- ▶ Stronger regulations, overseen by an expert committee, would encourage public participation in biobanks and ensure ethical practices.
- ▶ Proper biobanking laws aligned with global standards would position India as a leader in next-generation therapeutics, enhance trust, and facilitate international collaborations.
- ▶ India's involvement in international organisations like the Quad and BRICS, as well as its leadership in pharmaceuticals, underscores the importance of aligning its biobanking policies with international standards.

Conclusion

- ▶ To harness the full potential of precision medicine, India must strengthen its biobanking regulations, ensuring ethical practices, data protection, and public trust.
- ▶ These reforms will not only benefit domestic healthcare but also enhance India's position in global medical research and pharmaceutical diplomacy.

The Union Ministry of Earth Sciences has approved the installation of an X-band radar in Wayanad, Kerala, to improve disaster monitoring following the devastating July 2024 floods and landslides.

➔ This radar will enhance early warning systems for landslides and severe weather events.

What is Wayanad's new X-band radar?

What is a Doppler radar and how does it work? Why does Wayanad need an X-band radar? Where and when was the first indigenously designed and manufactured X-band installed? Is India increasing the procurement and instalment of radars?

EXPLAINER

Priyali Prakash

The story so far:

After devastating floods and landslides killed more than 200 people in Kerala's Wayanad district in July 2024, the Union Ministry of Earth Sciences approved an X-band radar to be installed in the district. A torrential downpour triggered the landslide in the valley above Punchirimattom, near the Mundakkai region; its effects were compounded by a massive debris flow triggered by the rains.

How do radars work?

Radar is short for 'radio detection and ranging'. The device uses radio waves to determine the distance, velocity, and physical characteristics of objects around the device. A transmitter emits a signal aimed at an object whose characteristics are to be ascertained (in meteorology, this could be a cloud). A part of the emitted signal is echoed by the object back to the device, where a receiver tracks and analyses it.

Weather radar, also known as a Doppler radar, is a common application of this device. The Doppler effect is the change in frequency of sound waves as their source moves towards and away from a listener. In meteorology, Doppler radars can reveal how fast a cloud is moving and in which direction based on how the cloud's relative motion changes the frequency of the radiation striking it.

A pulse-Doppler radar can measure the intensity of, say, rainfall by emitting radiation in pulses and tracking how often they're reflected to the receiver.

This way, modern Doppler radars can monitor weather conditions and anticipate new wind patterns, the formation of storms, etc.

What is an X-band radar?

Doppler radar relies on Rayleigh scattering, when the scatterer is much



Weather blues: The complex housing an S-Band Doppler Weather Radar at the Meteorological Centre in Begumpet, Hyderabad. FILE PHOTO

smaller than the wavelength of the radiation. A radar trying to 'see' smaller particles like rain droplets or fog will need to use radiation of lower wavelengths, like in the X-band. An X-band radar is radar that emits radiation in the X-band of the electromagnetic spectrum: 8-12 GHz, corresponding to wavelengths of around 2-4 cm (this is in the microwave part of the spectrum.)

The smaller wavelengths allow the radar to produce images of higher resolution. However, the greater the frequency of some radiation, the faster it will be attenuated. So X-band radars have a relatively shorter range.

In Wayanad, the new radar is expected to be able to monitor the movements of particles, such as soil, to inform landslide warnings. The device will also perform high temporal sampling, that is, rapidly sample its environs, allowing it to spot particle movements happening in shorter spans of time.

How many radars does India have?

The India Meteorological Department (IMD) started using radar for weather applications in the early 1950s. The first indigenously designed and manufactured X-band storm detection radar was installed in 1970 in New Delhi. In 1996,

IMD replaced 10 outdated X-band radars with digital X-band radars.

In its X-band radar network, India has both wind-finding and storm-detecting radars, and some with dual capabilities. The country also uses S-band radars (2-4 GHz) for long-range detection. The first S-band cyclone detection radar was installed in Visakhapatnam in 1970 and the first locally made variant was commissioned in Mumbai in 1980.

In September 2024, the Ministry of Earth Sciences said India is set to have 56 additional Doppler radars in a few years. On September 11, the Union Cabinet cleared the ₹2,000-crore 'Mission Mausam' to upgrade meteorological infrastructure in the country. This includes installing up to 60 meteorological radars until 2026 under the Mission's first phase.

Minister of State for Earth Sciences Jitendra Pradhan said in August in Parliament that the government has started the process to procure and install 10 X-band Doppler radars to improve weather forecasting in the northeast States and in Himachal Pradesh's Lahaul and Spiti district.

The initiative to install an X-band radar in Wayanad included installing a C-band radar (4-8 GHz) with an observational range of 250 km in Mangaluru.

What is NISAR?

NASA and the Indian Space Research Organisation (ISRO) are currently developing a satellite called NISAR, short for 'NASA-ISRO Synthetic Aperture Radar'. It will use radar imaging to produce a high-resolution map of the earth's landmasses.

Its payload consists of an L-band radar (1.25 GHz, 24 cm) built by NASA and an S-band radar (3.2 GHz, 9.3 cm) built by ISRO. Together they will track and record changes in the earth's various natural processes.

It is currently expected to be launched onboard an ISRO GSLV Mk II rocket in 2025, at a total cost of \$1.5 billion, the bulk of it borne by NASA.

THE GIST

➔ Radar is short for 'radio detection and ranging'. The device uses radio waves to determine the distance, velocity, and physical characteristics of objects around the device.

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➔ The initiative to install an X-band radar in Wayanad included installing a C-band radar (4-8 GHz) with an observational range of 250 km in Mangaluru.

What Are X-Band Radars:

- ➔ The radar operates within the X-band of the electromagnetic spectrum (8-12 GHz, 2-4 cm wavelengths) and provides high-resolution images by using shorter wavelengths to detect smaller particles like rain droplets and soil.
- ➔ This technology will help monitor particle movements in the region, including soil shifts, to provide early landslide warnings.
- ➔ The radar offers high temporal sampling, meaning it can frequently sample its environment, enabling detection of rapid particle movements.



- X-band radars are limited in range due to faster attenuation of higher frequency signals but are highly effective for localised monitoring.
- It is part of a broader radar infrastructure initiative by the Ministry of Earth Sciences, including the addition of 56 Doppler radars across India.



The U.S. will send a THAAD missile defence system to Israel to bolster air defences amid escalating tensions with Iran.

➔ Iran has warned against U.S. military involvement, further inflaming the conflict in the region.

U.S. to send missile defence system and troops to Israel

The delivery of THAAD battery risks further inflaming the conflict in West Asia; Pentagon spokesperson says the deployment underscores United States' commitment to defence of Israel

Associated Press
WASHINGTON

The United States will send a Terminal High Altitude Area Defence (THAAD) battery to Israel, along with the troops needed to operate it, the Pentagon said on Sunday, even as Iran warned Washington to keep American military forces out of Israel.

Maj. Gen. Pat Ryder, Pentagon spokesperson, said in a statement that Defence Secretary Lloyd Austin authorised the deployment of the THAAD battery at the direction of President Joe Biden. He said the system will help bolster Israel's air defences following Iran's ballistic missile attacks on Israel in April and October.

The delivery of the sophisticated missile defence system risks further inflaming the conflict in the West Asia despite widespread diplomatic efforts to



Added armour: A Terminal High Altitude Area Defence interceptor being launched during a successful intercept test. REUTERS

avoid an all-out war. The Iranian warning came in a post on X long associated with Foreign Minister Abbas Araghchi, who noted the earlier reports that the United States was considering the deployment.

Israeli forces and Hezbollah fighters in Lebanon have been clashing since October 8, 2023, when the Lebanese militant group began firing rockets over the border in support of its ally Hamas in Gaza. Late

last month, Israel launched a ground invasion into Lebanon.

Military response

Israel is widely believed to be preparing a military response to Iran's October 1 attack when it fired roughly 180 missiles into Israel.

In a brief exchange with presspersons before leaving Florida on Sunday, Mr. Biden said he agreed to deploy the THAAD battery "to defend Israel".

Mr. Biden spoke at MacDill Air Force Base in Tampa after making a quick visit to see the damage caused by Hurricane Milton and meet with first responders, residents and local leaders.

Mr. Ryder, in his statement, said the deployment "underscores the United States' ironclad commitment to the defence of Israel, and to defend Americans in Israel, from any further ballistic missile attacks by Iran".

It was not immediately clear where the THAAD battery was coming from or when it will arrive. Lt. Col. Nadav Shoshani, an Israeli Army spokesperson, declined to provide any timeline for its arrival, but thanked the U.S. for its support.

The THAAD is considered a complementary system to the Patriot, but it can defend a wider area. It can hit targets at ranges of 150 to 200 kilometres.

TERMINAL ■ HIGH ■ ALTITUDE ■ AREA ■ DEFENSE

THAAD

INTERCEPTING A MISSILE.

The system has a track record of 100% mission success in flight testing.

LOCKHEED MARTIN



THAAD Missile Defence System:

- The Terminal High Altitude Area Defense (THAAD) is an advanced missile defence system designed to intercept and destroy short-, medium-, and intermediate-range ballistic missiles during their terminal phase (final stage of descent).
- It uses a hit-to-kill technology, relying on the kinetic energy from impact to destroy incoming missiles, rather than using explosive warheads.
- The system operates at high altitudes, providing wide-area coverage and complementing other missile defence systems like the Patriot, which operates at lower altitudes.
- THAAD consists of four main components: interceptors (missiles), a launcher, a radar system to detect and track targets, and a fire control system for command and control.
- The system has a range of up to 200 kilometres and can target missiles at altitudes of up to 150 kilometres.
- Developed by Lockheed Martin, THAAD is a critical part of the U.S. military's layered missile defence strategy.
- It has been deployed in several regions, including South Korea, the Middle East, and Guam, for defence against missile threats from adversaries.

China, India and New Delhi's Quad dilemma

In September this year, the Prime Minister Narendra Modi visited the United States to attend yet another meeting of the Quad nations (Australia, India, Japan and the U.S.). This turned out to be possibly the most significant meeting of the Quad to date, during which the quartet seemed to firm up what may be viewed as a security alliance.

The 'Wilmington Declaration' did not mention any country, least of all China by name, but left nothing to the imagination that it was aimed at the containment of China across the entire Indo-Pacific. Despite the absence of any reference to a formal mutual defence declaration, it was obvious that the "four maritime democracies" had a single objective, viz., to checkmate China.

The state of India-China ties

The message from the Wilmington Declaration has certain overriding implications for India and India's security. India-China relations today are not merely stalemated but are also steadily deteriorating. In the northern border regions, the stalemate in the Galwan region continues despite some soothing statements by India's military and civilian leaders. Recently, India announced that it will maintain, if not increase, its vigilance in the border areas by inducting more forces despite the onset of winter. In the Depsang Plains and Demchok, there has been no breakthrough in negotiations regarding disengagement. In Ladakh alone, the number of 'friction points' has increased, with Indian forces unable to access several 'patrolling points' that they were previously accustomed to.

The military is currently in the process of further augmenting its fighting capabilities across the entire length of the China-India border. It is inducting new long-range firearms and heavy artillery, and has begun to deploy howitzers, missiles, rocket systems and 'loitering munitions'. While the Indian Army Chief has characterised the current situation along the Line of Actual Control as 'stable and sensitive', he has also stated that the Indian armed forces "are operational and fully prepared to deal with any contingency". While strengthening its border capabilities, China appears unfazed by India's moves, confident that given its defence budget (which dwarfs that of India), it can thwart any new Indian initiative.

China's arrogance, misplaced or otherwise, is legendary. It is again true that China greatly depends on the element of surprise to achieve the best results for itself. Hence, while it may look unfazed at this time by talk by India acquiring 'new alliance partners' from the West, China is unlikely to take such a situation lightly. Dealing with China is never a 'zero sum game', and India's leaders need to be wary and watchful of



M.K. Narayanan

a former Director, Intelligence Bureau, a former National Security Adviser, and a former Governor of West Bengal

how China reacts to the developing situation. What is again worrying is that China under Xi Jinping seems increasingly willing in most situations to test the waters vis-à-vis its neighbours, including India.

An aggressive nationalism

It may, thus, be prudent for India to proceed with care in its dealings with China on the one hand, and with its Quad partners on the other. In the short term, it may be expedient not to be seen to align with countries that have openly declared their hostility to China, for Xi Jinping's China is almost certain to treat this as a provocation, compelling it to 'walk the talk'. In this context, it is worth recalling that as far back as 2017, Mr. Xi had ominously declared that 'China under Xi was different from China under Deng'. In 2021, the centenary year of the Chinese Communist Party (CPC), Mr. Xi had again made a series of pronouncements which included a stern warning to all external forces "seeking to bully, oppress or subjugate China". In 2022, in the course of the 20th National Congress of the CPC, statements made by China's leaders appeared to reveal an increasingly aggressive brand of Chinese nationalism. Rationality is not something to be expected of China in any situation. India must not overlook this aspect, and should 'read the tea leaves' correctly in its dealings with China.

Over the years, India's strategic experts had sought to differentiate between what in the Chinese mind constitutes a 'real' threat as distinct from peripheral dangers that haunt the Chinese psyche. From China's postures it can be inferred that the border issue with India in the Himalayas does not represent a real threat to China's sovereignty and to its future. This is notwithstanding that from the early 1950s, China has made territorial claims on several thousand square kilometres of Indian territory, in Ladakh and in Arunachal Pradesh. China is well aware that its claims here were based on maps that were at best 'non-official', created during predecessors' regimes. China itself tends to doubt their sanctity though it is not willing to give up its claims.

The situation existing as far as China's eastern seaboard is concerned, as also its claims in the Pacific to its east, fall into an entirely different category. Here, any attempt to tamper with what China believes is its territory, constitutes in its mind a real threat to China's very existence. Understanding the difference is important as far as the Chinese psyche is concerned.

India's strategic community has understood this for a long time and has dealt with China's quirky behaviour in a nuanced manner over the years. Lately, however, India does seem to have shifted its stance to an extent and it is possible

that the Chinese read this as an outcome of India's growing alignment with the West, specifically with the U.S. Recent overtures by China, including statements of the Chinese Defence Ministry that China and India have been able to 'reduce differences and build some consensus' on disengaging troops from friction points to end the stand-off in eastern Ladakh, and have also agreed to a dialogue to reach a resolution acceptable to both sides, could well signal a shift in China's approach, but India does not seem to take this seriously.

Beijing's view

All this serves as a backdrop to China's increasing concerns over India's association with the Quad – seen by it as a U.S.-sponsored 'coalition of the willing'. Rumbblings from China have grown stronger of late. To the fevered Chinese mind of today, India's membership of the Quad represents a far more serious threat to it than the occasional skirmishes on the Himalayan heights. The Wilmington Declaration, having given up any pretence that the Quad is not a defence alliance, could well be seen by China as an indication of a grand design by the U.S. and its enemies to encircle and contain China. With this, China's understanding of the threat posed by India will increase significantly.

India must take due care not to send out any wrong signals, as the consequences of this could be serious. Any resort to confrontational politics, in substance and as well as in style, can have adverse repercussions in the India-China context. History may not repeat itself, but as Mark Twain is reported to have said, "it rhymes" enough to make one uneasy. India must not, and need not, subscribe to Mr. Xi's notion of a 'community of shared future of mankind' (first mentioned almost a decade ago), but India must not also be seen to subscribe to the West's entrenched belief that China's rise is inimical to the future of mankind, and that nations across the globe should join together to post a challenge to it.

In the context of China, it would, hence, be prudent for India not to be seen to be increasing its security congruence with the U.S. and the West. Clearly, India has no intention of being part of any pincer movement directed at China and its future ambitions, but it is equally important that China understands this – and the world recognises this as well – and has no reason to doubt where India stands in terms of Asian and world security. Any impression that India has become part of the U.S. bandwagon, engaged in checkmating China's ambitions is best avoided. India's future is hardly dependent on checkmating China's ambitions or in aiding any U.S. attempts to prevent this from becoming a reality.

It would be prudent for India to proceed with care in its dealings with China on the one hand and with its Quad partners on the other

GS Paper 02 : International Relations

(UPSC CSE (M) GS-2 2020): 'Quadrilateral Security Dialogue (Quad)' is transforming itself into a trade block from a military alliance, in present times – Discuss.

UPSC Mains Practice Question : Discuss the strategic implications of India's growing alignment with the Quad for its relations with China. How should India balance its partnerships with Western nations while addressing regional security concerns? (250 w/15m)

Context :

- The recent Quad meeting led to the Wilmington Declaration, highlighting the growing security cooperation between India, the U.S., Japan, and Australia, focused on containing China in the Indo-Pacific.
- Amid deteriorating India-China ties, India must balance its Quad alignment and manage its complex relationship with China cautiously.

Introduction

- The recent meeting of the four Quad nations (Australia, India, Japan, and the U.S.) has emerged as one of the most significant to date.
- The Wilmington Declaration, while not mentioning any country, was aimed at containing China in the Indo-Pacific region.
- The article discusses the implications of this development for India, especially concerning its relations with China and the evolving strategic landscape.

The Wilmington Declaration

- **Wilmington Declaration:** Joint statement by leaders of Quad countries (U.S., India, Japan, Australia) at the September 2024 summit in Wilmington, Delaware.
 - It reaffirms Quad's dedication to a stable, open international system grounded in rule of law, human rights, and democratic values.
- **Focus on Indo-Pacific:** Stresses the need for a free and open Indo-Pacific region, free from coercion or aggression.

- Key Areas of Cooperation: Emphasises respecting sovereignty and collaboration in maritime security, emerging technologies, and global health.

The Significance of the Wilmington Declaration

- The Wilmington Declaration highlighted the security alliance among the four Quad nations, though it avoided naming China directly.
- The strategic objective of the Quad nations is evident, focused on countering China's influence across the Indo-Pacific.
- While no formal mutual defence agreement was declared, the alliance's primary aim is to act as a check against China's growing power.

Current State of India-China Relations

- India-China relations have reached a point of deterioration, with a stalemate continuing in key border areas such as Galwan, Depsang Plains, and Demchok.
- Despite efforts to disengage, there has been no breakthrough in the negotiations.
- India is responding by strengthening its military capabilities along the border, with the induction of new artillery, long-range firearms, and other advanced systems.
- Despite India's efforts, China remains confident, bolstered by its significantly larger defence budget.

China's Strategic Posture and Its Reaction to the Quad

- China has historically relied on the element of surprise in its foreign policy and military actions, and its response to India's growing alliance with the West may reflect this.
- Although China appears unbothered for now, its leadership is likely closely monitoring the Quad's moves, as any alignment could be seen as a provocation.
- India should be cautious about China's unpredictable behaviour and to carefully navigate its relationships with both China and its Quad partners.
- It is important for India to maintain a nuanced and balanced approach, recognizing the difference between China's territorial claims in the Himalayas and its more serious concerns on its eastern seaboard.

India's Strategic Shift

- There is a perception that India's growing alignment with the West, particularly the U.S., may have shifted its stance towards China.
- Recent Chinese overtures towards India for disengagement from friction points in Ladakh have not been met with much optimism from the Indian side.
- China, on the other hand, views India's membership in the Quad as a more significant threat than its territorial disputes in the Himalayas.

Conclusion

- The article emphasises that India must be careful in its dealings with both China and the Quad, ensuring that it is not seen as part of any movement to contain or confront China.



Daily News Analysis

- ▶ While India need not subscribe to China's geopolitical vision, it should avoid aligning too closely with U.S. efforts to check China's rise.
- ▶ A cautious approach is advised to avoid unnecessary confrontational politics, which could have adverse consequences for India-China relations and regional stability.

