

DAILY PT POINTERS

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India, Kuwait elevate ties to strategic partnership following PM Modi's talks with top leadership

In their discussions, the two leaders focused on boosting ties in areas of information technology, pharmaceuticals, fintech, infrastructure and security.

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PTI



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India and Kuwait elevated their relationship to a strategic partnership after Prime Minister Narendra Modi's talks with Kuwaiti Emir Meshal Al-Ahmad Al-Jaber Al-Sabah.

Key Areas of Cooperation: Information technology, pharmaceuticals, fintech, infrastructure, and security.

- Kuwait is among India's top trading partners, with bilateral trade valued at USD 10.47 billion in 2023-24. Kuwait is India's sixth-largest crude supplier, meeting 3% of India's energy needs. Indian exports to Kuwait reached \$2 billion, and investments by the Kuwait Investment Authority in India exceeded \$10 billion.

The Hindu-Science and Tech (GSIII)-Page10

Are Manipur militants using Starlink devices?

Why has the recovery of a Starlink satellite antenna and router in Manipur in mid-December sparked concerns? Does Starlink have regulatory approval in India? How exactly does Starlink prevent users, in regions which do not have authorisation, from accessing their satellites?

EXPLAINER

Sahana Venugopal

The story so far:

Billionaire Elon Musk has denied claims that his space company SpaceX's satellite internet technology, Starlink, is being used by militants in Manipur. This came after the Indian Army and police seized weapons and what looked like a Starlink-branded satellite router and antenna. Starlink is still pending approval in India, though it will be starting in Bangladesh and Bhutan in 2025.

What is Starlink?

Starlink uses an extensive low Earth orbit satellite constellation to deliver



work. But that is provided the terminal has a built-in geographic location identifier," theorised former Indian Space Research Organisation (ISRO) engineer, Arup Dasgupta. To help visualise how Starlink stops users in prohibited regions from accessing its satellite internet, Mr. Dasgupta used the analogy of a set-top box that does not let TV watchers access some channels while others who have access can watch these channels.

With regards to seized Starlink devices, Mr. Dasgupta pointed out that by tracking the unique identification code of the Starlink terminal, it might be possible to find the buyer. However, this too could prove difficult due to shadow companies obfuscating the trail of illegal buyers. In essence, more information is needed from SpaceX and Mr. Musk to understand how the company ensures that Starlink

THE GIST

The Spear Corps of the Indian Army on December 16 shared photos on Elon Musk-owned X of guns, ammunition, and country-made mortars that the army and police units had seized in Manipur. X users spotted a small satellite device and router, with the latter bearing the SpaceX logo.

India strictly regulates and restricts the use of satellite-based communication devices, even by Indian civilians and citizens in

Elon Musk denied claims that SpaceX's Starlink technology is being used by militants in Manipur.

Indian Army and police seized weapons and a Starlink-branded router and antenna in Manipur.

Starlink Overview: Uses low Earth orbit satellites to deliver high-speed, low-latency broadband internet.

Popular in remote areas, sea vessels, disaster regions, and under oppressive regimes.

Not authorized to provide services in some regions, including India.

Indian Regulations:

India restricts satellite-based communication devices.

Emergency satellite features on premium phones are not enabled in India.

Use of thuraya/iridium satellite phones is illegal under the Indian Wireless Act and Indian Telegraph Act.

The Hindu-Governance (GSII)-Page10

What are the new interception rules and safeguards?

What do the new Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024 state? Will it override Rule 419A of the Indian Telegraph Rules, 1951?

R.K. Vij

The story so far:

The Union Government, on December 6, notified the Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024 which empower some enforcement and security agencies to intercept phone messages under certain conditions. These rules supersede Rule 419A of the Indian Telegraph Rules, 1951.

What do the new rules state?

The new rules authorise the Union Home Secretary and the Secretary to the State government in-charge of the Home Department as the competent authority to order the interception of any message or class of messages. An officer not below the rank of a Joint Secretary to the Union

interception in 'unavoidable circumstances' (without defining such circumstances). The Central Government may also authorise any law enforcement or security agency to intercept messages for reasons specified under Section 20(2) of the Telecommunications Act, 2023.

"In remote areas or for operational reasons", the head or the second senior most officer of the authorised agency at the central level, and head or the second senior most officer of the authorised agency at the State level may also issue an order of interception, but the officer will have to submit such an order to the competent authority within three working days of the date of its issuance. If such order is not confirmed by the competent authority within seven working days from the date of issue, such interception shall

interception every six months by the authorised agency and review committee (unless required for functional requirements or court directions).

How are the new rules different?

First, the condition of interception by authorised agencies only in 'emergent cases', has been relaxed. Interception by authorised agencies is now possible if it is not feasible for the competent authority to issue orders in 'remote areas or for operational reasons'. Second, under Rule 419A, there was no limit for the number of IGP rank officers at the State level who could be authorised for interception. But now, in addition to the head of the authorised agency, only (one) the second senior most officer can be authorised for interception. Third, in case the interception order by an authorised

be used for any purpose, including as evidence in court.

The Indian Telegraph Act of 1885 had provided the Union Government to make rules for 'the precautions to be taken for preventing the improper interception or disclosure of messages', but no such safeguards were framed for a long time. The safeguards and procedure of interception under Rule 419A were notified only in March, 2007, consequent to the directions issued by the Supreme Court in *People's Union for Civil Liberties (PUCI) versus. Union of India and Another* in 1996. The Supreme Court, in this case, not only elaborated the terms 'public emergency or in the interest of the public safety', but also held that the right to privacy cannot be curtailed arbitrarily without laying down safeguards which are just, fair and reasonable.

What are concerns about new rules?

While the pre-requisite of 'emergent cases' for interception by authorised agencies has been relaxed without additional checks, the rules are criticised for not fixing any accountability for the wilful misuse of powers of interception by authorised agencies. The rules are silent about punitive actions if any authorised agency abuses the powers of interception for a period up to seven days, before its confirmation by the competent authority.

THE GIST

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▼ The Indian Telegraph Act of 1885 had provided the Union Government to make rules for 'the precautions to be taken for preventing the improper interception or disclosure of messages', but no such safeguards were framed for a long time.

▼ The rules are silent about punitive actions if any authorised agency abuses the powers of interception.

- The Union Government notified the Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024. These rules empower enforcement and security agencies to intercept phone messages under specific conditions, replacing Rule 419A of the Indian Telegraph Rules, 1951.
- In remote areas or for operational reasons, senior officers can issue interception orders but must submit to competent authority within three days.
 - If not confirmed within seven days, interception ceases.
- Records of interception must be destroyed every six months unless required for functional requirements or court directions.

The Hindu-Science and Tech (GSIII)-Page11



Quick action: Traffic police have started using speed guns to monitor drivers for speeding violations in Puducherry. Inset: Scientist. © AP/WIDEWORLD

The principle behind the working of a speed gun, used for motion tracking

A speed gun is a device to measure the speed of a moving object, without having to be in contact with the object. Speed guns are widely used by law enforcement officials to monitor traffic speed, by coaches to gauge the performance of their athletes, and in various other industries.

Ananya Sriharan
Narasimhan Mahalingam

The world of today is a world in motion. People constantly want to get somewhere. The highways are filling up with cars, our lives with airplanes and rockets, our seas with ships and submarines, and our land with cars, buses, and trains. Humans have developed laws, rules, technical rules, and subsequently entire industries to make sure all these vehicles move smoothly, without harming humans or each other. A small but significant piece of this puzzle is the speed gun.

What is a speed gun?
A speed gun is a device to measure the speed of a moving object without having to be in contact with the object. To know this, the doctor becomes electromagnetic radiation of a specific frequency off the object, capturing the reflection and using the Doppler effect to infer the object's speed. Speed guns are electronic, and use complex circuitry to send the collation used to make the measurement.

These devices are widely used by law enforcement officials to monitor traffic

velocity. Say there's a man sitting at the centre of a field throwing a javelin. The sound waves move out in a circular, concentric pattern and if the athlete at the centre, and steadily speed out, a woman standing at the edge of the field will receive these waves at longer intervals — or not when the waves cross her's but, since sound waves cross at 343 m/s in air, human ears can't hear the gaps.

Each wave has a frequency and a wavelength. A higher frequency produces a higher pitch and vice versa.

Now, say the javelin man is moving around the field in a buggy. If the buggy is moving towards the woman, the waves in front of the vehicle become bunched up. In other words, from the woman's perspective, the waves would have a shorter wavelength.

Thus the waves will reach the woman more frequently, and she will perceive a higher pitch. If the woman moves, the sound will have a lower pitch in her direction and using the Doppler effect to infer the object's speed.

This is why, when a train moves into a station, people on the platform will hear the horn blowing at a higher pitch than when the train is leaving the station. This effect is the Doppler effect.

When the waves cross her's but,

speed gun.

If the object is approaching the speed gun, the frequency of the returning waves will be slightly higher than that of the transmitted waves. A single component in the gun can deduce the object's speed based on this difference.

How are the speed and the effect related?

All electromagnetic waves have a fixed speed — equal to the speed of light in that medium. In vacuum, this value is constant at 299,792,458 m/s. Any change in the frequency the speed gun detects directly corresponds to the Doppler shift caused by the object's motion. This principle is possible because it allows the speed gun to work accurately over a wide range of distances and vehicle speeds without being affected by air resistance.

A speed gun can calculate the speed of moving objects by multiplying the difference between received and emitted frequencies with c and dividing by the emitted frequency times 2.

This relationship shows how the difference is directly proportional to the speed of the object. The faster it moves, the more pronounced the difference will be. In other words, the only condition is, for the correct choice of the transmitted

frequency, it emits radio waves. Radio wave frequency is in the range of 30 Hz to 300 billion Hz.

For a long time, the equipment to produce the waves was bulky. This changed when scientists invented transistors in the 1940s. Electronics circuits built using transistors considerably simplified the process of producing radio waves and also made the transmitters much smaller.

However, radio waves have intrinsic shortcomings that transmitters can't fully adjust for. For example, radio waves diverge as they move through the air. If an antenna is 2 cm long, the waves it emits will diverge by 22° to either side, producing a beam that is 44° wide overall.

Such a beam could make more than one moving vehicle and produce inaccurate speed readings.

A continuous wave radar — which emits radio waves and tracks their reflections continuously — can also produce readings due to multiple vehicles.

Engineers have developed systems to compensate for these errors but the resulting setups have been more sophisticated and more expensive.

For such reasons, LIDAR speed guns have been replacing radar counterparts. The main reason for this is that LIDAR

• What is a Speed Gun?:

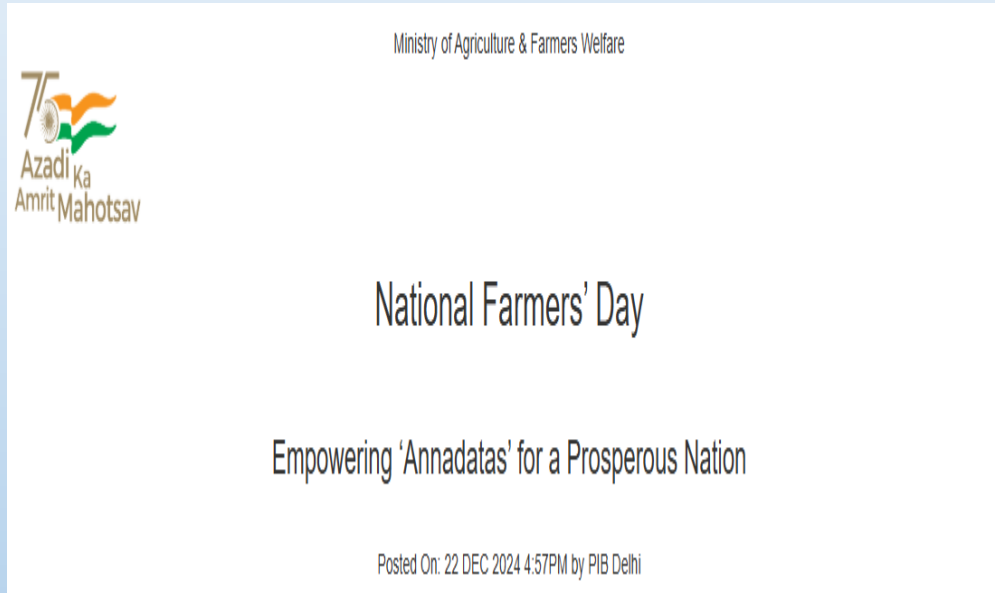
- A device to measure the speed of a moving object without contact.
- Uses electromagnetic radiation and the Doppler effect to infer speed.
- Used by law enforcement, coaches, and various industries for accurate motion tracking.
- **Doppler Effect:** Named after physicist Christian Doppler.
 - Relies on relative velocity and frequency change of waves (e.g., sound or radio waves).
 - Higher frequency when moving towards the observer, lower when moving away.

How Speed Guns Work: Developed during WWII for military use, applying the Doppler effect using radio waves.

- Consist of a radio transmitter and receiver.
- Transmitter emits radio waves directed at an object; receiver captures reflected waves.
- The frequency difference between emitted and received waves helps calculate speed.

HEADLINES OF THE DAY

PIB-Economy(GSIII)



- Farmers, the lifeblood of the nation and revered as 'Annadata's', are the foundation of India's prosperity.
- Their relentless toil feeds the nation, sustains the rural economy, and ensures the strength of every household.
- National Farmers' Day, observed on 23rd December, celebrates their invaluable contribution.
- This day marks the birth anniversary of Shri Chaudhary Charan Singh, India's fifth Prime Minister, renowned for his deep understanding of rural issues and unwavering advocacy for farmers' welfare.
- It is a moment to honour our farmers' unwavering dedication and recognise their pivotal role in shaping the nation's progress.

HEADLINES OF THE DAY



PIB-Environment(GSIII)



India State of Forest Report 2023 (ISFR 2023) Released by Environment Minister Bhupender Yadav at the Forest Research Institute, Dehradun.

Forest and Tree Cover:

Total Forest and Tree cover: 8,27,357 sq km (25.17% of India's geographical area).

Forest Cover: 7,15,343 sq km (21.76%).

Tree Cover: 1,12,014 sq km (3.41%).

Top States for Cover Increase:

Maximum increase in forest and tree cover: Chhattisgarh (684 sq km), Uttar Pradesh (559 sq km), Odisha (559 sq km), Rajasthan (394 sq km).

Maximum increase in forest cover: Mizoram (242 sq km), Gujarat (180 sq km), Odisha (152 sq km).

Top States for Largest Cover: Largest forest and tree cover: Madhya Pradesh (85,724 sq km), Arunachal Pradesh (67,083 sq km), Maharashtra (65,383 sq km).

Largest forest cover: Madhya Pradesh (77,073 sq km), Arunachal Pradesh (65,882 sq km), Chhattisgarh (55,812 sq km).

HEADLINES OF THE DAY

DD News -Economy(GSIII)

55th GST Council Meeting: Tax Rate Changes And Compliance Reforms Announced



Summary of 55th GST Council Meeting Decisions

- **Tax Rate Changes:** Reduction of GST rate on Fortified Rice Kernel (FRK) to 5%.
Full GST exemption on gene therapy and third-party motor vehicle premium contributions to the Motor Vehicle Accident Fund. No GST on transactions involving vouchers.
- **Banking Operations:** Penal charges by banks and NBFCs for non-compliance with loan terms will not attract GST.
- **Pre-deposit amount for penalty-related appeals reduced from 25% to 10%.**
- **Tax Rate Revisions and Exemptions:** Extended exemptions for specific imports and goods used in government welfare schemes.
- **Concessional 5% GST rate on food inputs for free distribution under government programs will continue.**
- **Clarified tax classifications for items like popcorn and pepper.**