

# Air Marshal Ashutosh Dixit appointed next Indian Air Force chief

**Saurabh Trivedi**

NEW DELHI

Air Marshal Ashutosh Dixit has been appointed the next Chief of the Air Staff, the Defence Ministry announced on Tuesday.

He is currently the Vice-Chief of the Air Staff and will take over the top post on October 31, succeeding Air Chief Marshal Amar Preet Singh, who retires on the same day.

Air Marshal Dixit will be the 29th Chief of the Air Staff. A fighter pilot with nearly four decades of service, he has more than 3,500 hours of flying experience on a range of aircraft, including the Mirage-2000, MiG variants, Jaguar, IL-78, Hawk, and Tejas, the Ministry said.

## Key operations

Commissioned into the fighter stream of the Indian Air Force on December 6, 1986, Air Marshal Dixit has held several key operational and staff appointments.

Before taking over as Vice-Chief of the Air Staff, he served as Chief of Integrated Defence Staff to the Chairman, Chiefs of Staff Committee (CISC) at Headquarters Integrated De-



Air Marshal Ashutosh Dixit

fence Staff and as Air Officer Commanding-in-Chief of the Central Air Command. During his career, he has commanded a frontline fighter airbase in the Western Sector and a fighter training base in the Southern Sector.

He has also been involved in several operations and exercises, including Operation Safed Sagar, Operation Rakshak, and Operation Sindoor.

He is an alumnus of the National Defence Academy; Defence Staff Service College, Bangladesh; and National Defence College. He was awarded the Vayu Sena Medal in 2006, Vishisht Seva Medal in 2011, Ati Vishisht Seva Medal in 2023 and Param Vishisht Seva Medal in 2026 for his service.

# 'India's bullet train not delayed, even Japan can't make it in 10 yrs'

**Dheeraj Mishra & Siddharth Upasani**  
New Delhi, October 6

AMID ALLEGATIONS over delays in India's first bullet train project between Mumbai and Ahmedabad, the head of the international high speed rail body said it should not be said that the project is delayed given the many unforeseen problems India encountered, such as the Covid-19 pandemic and land acquisition.

Speaking to *The Indian Express* on the sidelines of the Kautilya Economic Conclave, Masafumi Shukuri, Chairman of the Japan Transport and Tourism Research Institute (JTTRI) and International High-Speed Rail Association (IHRA), defended the Indian government, saying that even though Japan has 62 years of experience in building and operating bullet trains, it cannot complete a 500-km long stretch in 10 years.

"The first high-speed rail (project) in Japan was launched in 1964, which means Japan has 62 years of experience of constructing and operating the high-speed train. Now, let us just say today Japan decides to make a high-speed rail track of 500 km. It is not possible to complete it in 10 years.

**Even today's Japan cannot do it..**

I think from this perspective, given the different conditions, building a high-speed rail of 500 km long in India is a big deal" Shukuri said.

"We also have to remember that initially when any project starts, there are many unforeseen problems. I know that there was a delay in land acquisition and many other things which have to be factored in," the IHRA Chairman added. Shukuri's comments come after Hideki Makihara, a former justice minister and a member of Japan's ruling Liberal Democratic Party, who alleged in July that India had displayed "sheer recklessness" in its bullet train project that stalled its progress. **The Mumbai-Ahmedabad High Speed Rail (MAHSR), India's first ever bullet train project, was initially expected to be completed in 2022. "I do not think there is a delay really, because you have to look at the size of this project. It is a 500-km long alignment. It is being done for the first time in India. With all of this together, it is a humongous, massive project. It is not a project which is expected to be wrapped up and completed in a matter of just a few years. It is just not possible," Shukuri said.**

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## World Bank raises India's FY27 growth outlook to 7.1%

**Siddharth Upasani**  
New Delhi, October 6

THE WORLD Bank has raised its GDP growth forecast for India for the current fiscal by half a percentage point to 7.1%, with this rapid expansion seen driving the broader South Asia region. According to the multi-lateral organisation's twice-yearly South Asia Economic Update, released on Tuesday, the South Asia region's GDP in 2026 is seen expanding by 6.9%, up from the previous forecast of 6.3%.

However, excluding India, regional growth is seen 3.6%, down from 4.1% earlier, mostly because of a large downward revision for Bangladesh. The World Bank expects the "strong" momentum in industry and services to continue, with the reforms that have been undertaken — consolidation of labour codes, GST reforms, rationalisation of tariffs, the bankruptcy and insolvency act, and physical and digital infrastructure investments — keeping the growth potential strong. **"Strength in the rest of the economy is expected to make up for agricultural weakness," the World Bank said, adding that the sub-par monsoons will likely reduce agricultural output.**

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UNION CABINET ANNOUNCES A HOST OF MEASURES TO BOOST GROWTH

# Small, medium enterprises get Rs 10,000 cr fund boost

Pratyush Deep &  
Ravi Dutta Mishra  
New Delhi, October 6

THE UNION Cabinet on Tuesday approved the Small and Medium Enterprise (SME) Growth Fund (SGF) with an outlay of Rs 10,000 crore.

This fund to provide equity support to small and medium enterprises was first announced in the Union Budget for 2026-27.

According to the government, while several existing funds provide equity support to businesses, most of them focus on early-stage enterprises and largely cater to micro enterprises. This has left a structural gap in the availability of growth-stage equity capital for small and medium enterprises.

"While various initiatives have enhanced access to credit for SMEs, a gap remains in the availability of long-term risk capital required by enterprises seeking to scale, innovate, expand internationally, adopt advanced technologies, undertake acquisitions, and transform into industry leaders," the government said in a statement.

"The SME Growth Fund is designed to address this critical financing gap by providing patient growth equity capital to high-potential SMEs with demonstrated business viability and scalability," it added.

Under the initiative, the government will provide an aggregate commitment of Rs 10,000 crore to the Alternative Investment Fund (AIF) established under the SGF framework. A majority of the fund's investments will be directed towards small and medium manufacturing enterprises, with a focus also on SMEs operating in industrial clusters in Tier-II and Tier-III



A majority of the fund's investments will be directed towards small and medium manufacturing enterprises, with a focus also on SMEs operating in industrial clusters in Tier-II and Tier-III cities. REUTERS

cities. "Investments across industrial clusters, including those in Tier-II and Tier-III cities, will support balanced regional industrial development, reinforce local supply chains and generate high-quality employment opportunities," it said.

The Centre expects the fund to help SMEs scale up, improve productivity and strengthen export competitiveness by enabling manufacturing enterprises to expand capacity, adopt advanced technologies and achieve greater scale.

India SME Forum in a note said the fund is critical for the MSME as they are facing structural and severe capital gaps. They have been over-dependent on debt financing and have weak integration with the global value chain, the forum said.

"The SME growth fund could help mobilisation of institutional capital and creation of globally competitive mid-sized champions," it said.

Vinod Kumar, President, India SME Forum said the Rs 10,000 crore SME Growth Fund can set in motion a powerful cycle, where stronger manu-

facturers place larger and more consistent orders with smaller suppliers, enabling those businesses to invest in better machinery, improve quality, build skills and create jobs.

"As these capabilities deepen across industrial clusters, more MSMEs can meet the standards required by large domestic buyers and global supply chains. The cumulative outcome can be higher domestic value addition, greater export competitiveness and reduced dependence on imported components and finished products," Kumar said.

Experts said the fund is critical for the MSME as they are facing structural gaps and severe capital gaps and have been over-dependent on debt financing and have weak integration with the global value chain. Sandeep Jain, an auto-component manufacturer and former President of Federation of Indian Micro and Small & Medium Enterprises (FISME) said the growth fund would give motivation to SMEs to grow and not be overtly concerned with the financing.

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## New apex body for transport and logistics gets nod

New Delhi: The Union Cabinet on Tuesday approved the constitution of an Integrated Transport & Logistics Authority (ITLA) to have a synergy among different transport departments and assess the country's future requirements in infrastructure development.

The authority will be set up in the Ministry of Commerce & Industry, serving as the apex body for project planning and appraisal, research, monitoring and evaluation, among other functions.

Minister of Information and Broadcasting Ashwini Vaishnaw said that all the major sectors such as the railways, highways, aviation, among others, will have representation under the new authority.

"Practically, if GDP increases by 7%, the logistics requirement increases by 10% in the economy. To meet this heavy requirement, Highways, railway lines, waterways, ports, airports are being built. To have a unified planning of these things, Gati Shakti portal was launched. Now, to meet the future requirements in transportation and have a synergy among different departments, the Integrated transport & logistics authority will be set up," said Vaishnaw, as he announced the decision. ENS

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• **ECONOMICS**

# G7 to release 100 mn barrels of crude, oil products: Will this curb diesel prices?

**Sukalp Sharma**

*New Delhi, October 6*

LATE LAST week, the Group of Seven (G7) countries agreed to release 100 million barrels of crude oil and petroleum products from emergency reserves, including substantial volumes of diesel, amid apparent pressure from US President Donald Trump.

With diesel prices at US pumps reaching record levels, Trump had been pressuring Europe to release its diesel stockpiles, and even warned that he could ban diesel exports amid a global supply crunch and soaring prices of the fuel.

Following the G7 announcement, Trump — who wants to lower diesel prices ahead of the midterm polls in the US in November — announced that the country won't ban exports of its diesel. Interestingly, Trump added that a diesel export ban was never really on the table, although he himself had publicly stated over the past few days that he was inclined towards it.

## *Why diesel prices are rising*

US and European diesel prices surged in recent weeks amid the highly constrained fuel movement through the Strait of Hormuz as well as attacks on Russia's oil and gas infrastructure.

Diesel is among the most important petroleum fuels globally due to its use in transportation, agriculture, construction, and other industries. This also makes it the most politically sensitive fuel amid the ongoing geopolitical crises.

While G7's steps won't do much to deal with the structural problems that the diesel market is grappling with, they are expected to put some downward pressure on international diesel prices, at least in the short-term, according to industry experts.

The extent and duration of relief will largely depend on whether global diesel flows from West Asia and Russia improve hereon.

## **DIESEL EXPORT BAN WON'T HELP U.S.**

- The US is a major diesel exporters. These have surged amid the supply squeeze from West Asia and Russia.

- The fuel's prices in US are spiking. But restricting diesel exports, as Trump threatened, wouldn't have helped.

- That's because of regional disparities within US in production and supply. Also, US prices are linked to international ones.

## *Effect on India*

For India, these developments are broadly positive. A lower international diesel price would help consumers, particularly bulk and industrial buyers who are supposed to pay prices in line with global rates.

Retail consumers, meanwhile, continue to get diesel much below international prices as public sector fuel retailers are absorbing the

hit for this segment. Any cool-off in diesel prices will also reduce these companies' heavy under-recoveries on retail fuel sales. If bulk diesel rates decline, it would be a positive for the Indian economy as inflationary pressure would be eased to some extent.

But higher international supply could squeeze the super-normal margins of standalone Indian refiners — who don't have much exposure to retail fuel sales — as well as large diesel exporters, which are predominantly private sector refiners like Reliance Industries and Nayara Energy.

## *The G7 decision: Shoring up supply*

The G7 last week agreed to coordinate, through the International Energy Agency (IEA), the release of 100 million barrels of crude oil and petroleum products over four months, including "front-loaded substantial diesel release" in the first 20 days. The countries also agreed to examine additional diesel releases if required by market conditions.

The G7 wants a substantial quantity of diesel to reach the market within days, instead of being spread out over the four-month period, which shows that the tightness in diesel flows is among the most immediate pressure points in the global energy market. But there is a limit to what reserve releases can accomplish on their own. They are not endless and their release can at best be a temporary solution.

Europe has become increasingly dependent on diesel imports from beyond the region over the past few years as it moved away from Russian fuel amid the war in Ukraine. The West Asia war has further exacerbated the supply situation for Europe, which now depends heavily on American diesel.



## World Bank raises India FY27 growth forecast by 50 bps

The World Bank on Tuesday raised India's GDP growth forecast for the current fiscal to 7.1%, up 0.5 percentage points from its projections in April, supported by robust domestic demand and strong exports, despite global headwinds. The medium-term prospects are strong, it said, but also cautioned that external risks are elevated, including downside risks related to global oil prices, El Nino, and stock market corrections that would result in capital flow volatility. PTI

# Supreme Court gets three new judges, strength goes up to 37

**The Hindu Bureau**

NEW DELHI

Three new Supreme Court judges took oath on Tuesday, raising the working strength to 37 even as case pendency hovers near one lakh. Chief Justice of India (CJI) Surya Kant administered the oath of office to Justices Sunita Agarwal, Devendra Kumar Upadhyay and Aparesh Kumar Singh at the Supreme Court.

The three judges were sworn in a day after the Centre notified their appointments. The Supreme Court Collegium had recommended their names to the government on September 28.

The appointment of the new judges has increased the number of working



CJI Surya Kant administers oath of office to newly appointed SC judge Sunita Agarwal during a swearing-in ceremony. PTI

judges in the apex court to one short of its sanctioned judicial strength of 38, including the CJI.

Justice Agarwal was serving as the Gujarat High Court Chief Justice before her appointment to the Supreme Court. The parent High Court of the judge is Allahabad. Justice Upadhyay's parent High Court is

also Allahabad though he was serving as the Delhi High Court Chief Justice at the time of his recommendation.

Justice Aparesh Kumar Singh, whose parent High Court is Jharkhand, was serving as Chief Justice of the Telangana High Court before being appointed to the Supreme Court.

# Rahul calls SIR 'treason' as INDIA unites against ECI; MPs detained

LoP leads sit-in at Akashvani Bhavan after protest march to ECI headquarters stopped; PM Modi 'stole votes to hijack the country', he says; Opposition leaders demand CEC's removal, suspension of SIR, and restoration of deleted names in rolls

**Sobhana K. Nair**  
**Sandeep Phukan**  
NEW DELHI

**“W**hat has been done to my country is treason,” Rahul Gandhi, the Leader of the Opposition in the Lok Sabha, said on Tuesday even as the Opposition parties closed ranks, marching from Parliament to the Election Commission of India's (ECI) headquarters to demand the scrapping of special intensive revision (SIR) of electoral rolls, restoring the names deleted from the rolls, and sacking of Chief Election Commissioner Gyanesh Kumar.

Later in the evening, Mr. Gandhi, his sister, the Wayanad MP Priyanka Gandhi Vadra, and other MPs were forcibly removed, detained and huddled into a bus even as Mr. Gandhi resisted, attempting to wriggle out of the vehicle's window.

Before being detained, Mr. Gandhi, along with Ms. Vadra and Congress leader K.C. Venugopal, held a sit-in at Akashvani Bhavan, just metres away from Nirvachan Sadan, where the protest march was stopped at 11 a.m. by Delhi Police.

Around 6 p.m., Congress reached out to all parties to join the sit-in. Trinamool's Derek O' Brien and Mahua Moitra, IUML's E.T. Muhammad Basheer, and SP's Mohibullah Nadvi, who were removed earlier in the day by Delhi Police, also returned to join Mr. Gandhi.



**Strong pushback:** Rahul Gandhi trying to get out of a police van after being detained during a protest in New Delhi on Tuesday. AP

While the Aam Aadmi Party and Dravida Munnetra Kazhagam stayed away from the protest, all 19 parties that attended the September 30 Indian National Developmental, Inclusive Alliance (INDIA) meeting were represented.

## Joining hands

Top Opposition leaders, including Samajwadi Party chief Akhilesh Yadav, Trinamool general secretary Abhishek Banerjee, Shiv Sena (UBT)'s Sanjay Raut, and NCP (SP)'s Supriya Sule, were seen walking together. For the first time, Biju Janata Dal, which has maintained distance from both the ruling side and

the INDIA bloc, joined in.

Communist Party of India MP P. Sandosh Kumar also took part in the protest.

Mr. Yadav accused the ECI of working for the BJP. "Only BJP members can vote. BJP's workers can be India's citizens," he said, accusing the government of using multiple measures to "steal the mandate".

He accused the ECI of especially targeting the "Pichde, Dalit and Alpsankhyak (PDA)" (backward, Dalit and minorities). The acronym PDA is a rallying call for his party.

The march began at 10.30 a.m. from Makar Dwar of the Parliament,

with the leaders carrying a banner reading: "Election Commission is compromised - Sack Gyanesh Kumar". At Akashvani Bhavan, after being stopped by police, the leaders sat down, raising slogans against Mr. Kumar and the government.

Delhi Police had barricaded all roads leading to Parliament amidst heavy security deployment. Around noon, the Delhi Police began bundling the leaders into buses, clearing the site.

**CONTINUED ON**

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## Could not accept 'unusual demand' for meet outside premises: ECI

**NEW DELHI**

The Election Commission of India (ECI) said on Tuesday that INDIA bloc parties had demanded a meeting with the full commission at a venue outside its premises, which was "unusual" and therefore "could not be accepted". The poll body said it had proposed that its senior-most officer on duty could be sent to the meeting venue. It added that this "unprecedented" offer was also declined by the protesting leaders. **» PAGE 11**

# Bypolls held in five Assembly segments, one Lok Sabha seat

Highest voter turnout of 86% in T.N.'s Madurantakam seat; West Bengal CEO got 97 official complaints on polling day; Congress seeks cancellation of Bengal bypolls due to 'booth capturing'

**The Hindu Bureau**  
NEW DELHI

**B**ypolls were held on Tuesday in five Assembly seats in Tamil Nadu, West Bengal, and Puducherry, and one Lok Sabha seat in Assam. The Madurantakam Assembly constituency in Tamil Nadu recorded the highest polling percentage of 86.26%.

The other Assembly seat which went to the polls in Tamil Nadu was Dharapuram, which saw a turnout of just over 80%. Both seats in the State were reserved for Scheduled Caste candidates.

The byelections to these two seats were necessitated by the resignations of Magaratham Kumaravel from Madurantakam (SC) and P. Sathyabama from Dharapuram (SC), who both won on All India Anna Dravida Munnetra Kazhagam (AIADMK) tickets in the 2026 State election and subsequently switched to the Tamilaga Vettri Kazhagam (TVK) after resigning their Assembly memberships within three weeks in May 2026.

In Puducherry, where the bypoll was held in the Thattanchavady Assembly



As West Bengal CM Suwendu Adhikari vacated one seat to retain another, bypolls were needed seat Nandigram seat. RITU RAJ KONWAR

segment, there was 80.8% voting. The election was caused by the resignation of AINRC chief and Chief Minister N. Rangasamy, who retained the Mangalam Assembly seat.

In West Bengal, where bypolls were held in the Nandigram and Rejinagar Assembly seats, there was a voter turnout of almost 80%. In the State, many people are awaiting a decision on their inclusion in the electoral roll as their appeal is with the Appellate Tribunals.

Voter polling trends till 5:30 p.m. showed Nandigram at 79.4% and Rejinagar at 78.4%. West Bengal's Chief Electoral Officer received 97 official complaints through designated

portals on the polling day.

The bypolls were needed as West Bengal Chief Minister Suwendu Adhikari won two seats and then vacated Nandigram to retain Bhabanipur, where he had defeated former Chief Minister Mamata Banerjee. Aam Janata Unnayan Party (AJUP) MLA Humayun Kabir, had also won in both Rejinagar and Nowda in Murshidabad, later giving up the Rejinagar seat.

## Poll irregularities

Nearly 19,000 members of the electorate from these two seats who could not vote in the last Assembly election were also unable to exercise their franchise in the bypolls. Their names were put under adjudica-

tion, and still remain in that state. Congress State president Subhankar Sarkar submitted a memorandum to the West Bengal CEO office, asking for the bypolls in Nandigram and Rejinagar to be cancelled, calling for repolling to take place. West Bengal Congress leaders have made allegations of voter intimidation, booth capturing, proxy voting, and EVM malfunctioning.

About 76% of 19.05 lakh electors voted in the byelection held in Assam's Nagaon Lok Sabha constituency, which was necessitated after Pradyut Bordoloi, who won the constituency for the second successive term in 2024, quit the Congress to contest and win the Dispur Assembly seat on a BJP ticket.

Though 15 candidates are contesting in the Nagaon Lok Sabha seat, which comprises eight Assembly segments in Morigaon and Nagaon districts, the contest is expected to be primarily among the BJP's Devasish Sharma, the Congress's Sibamoni Bora, and the All India United Democratic Front chief Mohammed Badruddin Ajmal.

## 'Provisional Census data expected to be out by March-April'

**Vijaita Singh**  
NEW DELHI

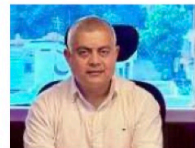
The provisional data for Population Census 2027 will be available by March or April next year, according to Amit Sharma, Chief Principal Census Officer and Director of Census Operations for Jammu and Kashmir and Ladakh.

Ladakh became the first of India's Union Territories and States to complete the entire Census exercise, ahead of the rest of the country where the exercise is scheduled to finish in February 2027. This is the first digital Census and the first in independent India to enumerate caste, other than Scheduled Castes and Tribes.

## Advance enumeration

Other than Ladakh, the second phase or Population Enumeration (PE) phase also concluded in the snow-bound areas of Uttarakhand, Himachal Pradesh, and Jammu and Kashmir on September 30, with a revisional round from October 1 to 5.

On September 5, the PE phase was advanced in the poll-bound States of Uttar Pradesh, Punjab, Uttarakhand, and Goa, scheduled to take place from November 16, 2026 to January 4,



Amit Sharma

2027, ahead of the nationwide enumeration planned for February 2027. The Union government also formally deferred the Census exercise in conflict-ridden Manipur "till further declaration," Mr. Sharma said.

## Snow-bound areas

Mr. Sharma said that provisional data from the PE phase shows that 5,292 enumeration blocks have been covered in the designated snow-bound areas of J&K (4,597 blocks) and Ladakh (695 blocks).

The snow-bound enumeration was preceded by a self-enumeration window from August 17 to 31, followed by field enumeration from September 1 to 30.

Mr. Sharma said the completion of the exercise was an important operational milestone and involved specialised arrangements because of the difficult terrain and climatic conditions.

# Opposition MPs' demand for meeting at Parliament Annexe 'unusual', says ECI

**Sreeparna Chakrabarty**

NEW DELHI

As the Indian National Developmental, Inclusive Alliance (INDIA), led by Leader of the Opposition in the Lok Sabha Rahul Gandhi, sat on a more than eight-hour dharna on Tuesday, the Election Commission of India (ECI) said that the Opposition parties had demanded a meeting with the full Commission at a venue outside the ECI premises, which was "unusual" and therefore "could not be accepted".

The ECI said it had offered to send its senior-most officer on duty to the proposed meeting venue to receive the memorandum of the protesting MPs, which in itself would have been an "unprecedented" step. However, this offer was also declined by the protesting leaders.

## **'Learnt through media'**

In an official statement issued after Mr. Gandhi was detained from his protest site inside Akashvani Bhavan, the headquarters of All India Radio in the national capital, the poll body said it had learnt through the media till 4



Till 4.00 p.m. today, no political party, through its representatives, had sought an appointment for a meeting with the Election Commission

## **ECI STATEMENT**

p.m. that some MPs wished to meet the Commission along with their delegation during a march by certain political parties towards the ECI.

"With regard to today's developments, it is clarified that, till 4.00 p.m. today, no political party, through its representatives, had sought an appointment for a meeting with the Election Commission," it said.

However, at around 4.00 p.m., information was received from the Delhi Police that a delegation of MPs, led by Mr. Gandhi, wished to meet the Commission and submit a memorandum.

Following this, when the Election Commission was considering the request, it was informed by the Deputy Commissioner of Police (DCP), Delhi Pol-

ice, that the delegation comprised 240 MPs and that the proposed venue was the Parliament House Annexe.

## **ECI protocol**

"The Election Commission considered this request as unusual and therefore, could not be accepted, as, in accordance with ECI protocol, such meetings are held only on the premises of the Election Commission of India," the statement said.

The ECI said it instead offered to send its senior-most officer on duty to receive the memorandum, but the offer was rejected by the Opposition MPs.

The statement further said that in 2025, the ECI had laid down a procedure for meetings with political parties. All political parties had been informed of the same.

Under the procedure, whenever a delegation of a political party or a joint delegation of several parties wishes to meet the Commission, it seeks an appointment through its duly authorised representative. The meeting is thereafter held at a time mutually agreed upon, the poll body said.

# Why NASA wants to build a nuclear reactor on the moon

## NEWS ANALYSIS

**Vasudevan Mukunth**

NASA wants to install a nuclear reactor near the moon's south pole by 2030. Its planned output, 20 kilowatt (kW), could power a few households on earth. Russia's planned reactor for the International Lunar Research Station (ILRS), led by China, will produce around 10 kW. But the fact that they are nuclear makes them significant. The U.S. and China are pursuing parallel efforts today – in partnership with other countries – to be the first to set up a semi-permanent, and in future permanent, moon base. Such a facility will need electricity for everything from heating and life-support to recharging rover batteries. European scientists are also exploring lunar microreactors.

At most locations on the moon, a fortnight of daylight follows a fortnight of darkness. Near the south pole, where both factions are focusing their activities, promontories and craters create a pastiche of lit and shadowed patches, with temperatures inside some of the latter dipping under a frigid -200 C. But unlike solar panels, a nuclear reactor can produce power even in the dark.

The colder craters preserve water ice, which can quench astronauts' thirst and can also be electro-



View of Moon limb. ISTOCKPHOTO

lysed to produce hydrogen and oxygen, to power rockets launched from the moon itself. In one 2020 assessment, NASA scientists Julie Kleinhenz and Aaron Paz figured producing 10 tonnes of oxygen this way would require around 68 kW of power. So a 20-kW reactor could be a stepping stone in countries' plans to set up an array of reactors on the moon.

While the moon as a whole is barren, the more ideal locations, with longer periods of sunlight, terrain more suitable to land on, access to craters with water ice, and so on, are highly limited. Research commissioned by NASA has recommended situating nuclear reactors at least 1 km away from humans.

Now, the Outer Space Treaty 1967 says no country may appropriate any part of the moon through occupation or other means. But the Artemis Accords, to which the U.S. and its allies vis-à-vis the moon are signatories, envisage 'safety zones' to prevent harmful interference. Put differently, a state does not have to stake territory

on the moon to limit access to others: it can simply plonk a nuclear reactor there and appeal to the need for legitimate safety requirements.

The Accords say these zones must be temporary and respect free access – but a country or a bloc operating a cluster of reactors, landing pads, mines, and habitats could nevertheless gain a controlling advantage. For the appeal of this idea, however, both Artemis and ILRS face breathtaking technical hurdles. Shielding a nuclear reactor on the moon demands either launching the components to ensure its safe operation or producing them on the moon with lunar resources. Distancing a reactor from a base demands deployment machines and power cables. The reactor core will also have to be launched unirradiated and, once online, space agencies will have to find ways to absorb and store all the heat – or radiate waste heat away from large surfaces kept free of moondust. If a reactor fails on the moon, it could contaminate the same few places astronauts would like to be at.

While nuclear power could prove indispensable to a mature economy centred on the moon, no country possesses that economy today even as governments are being tempted to install reactors before their opponents – a danger in itself.

# Houthis 'hit' Riyadh airport; Yemen military claims gains

The group denies being pushed back and says it still controlled territory seized during its recent advance along Yemen's Red Sea coast; Riyadh airport is facing temporary closures of its airspace

Agence France-Presse

SANAA

**Y**emen's Houthis (Ansar Allah) claimed an attack on the Saudi capital's main airport and on Tuesday denied being pushed back by government forces, who have launched a major operation to recapture lost territory.

The Houthi statements come as Yemen's military said it had removed the pro-Iran group from areas around the Bab el-Mandeb strait, a Red Sea choke-point, and the port city of Mokha.

Claims by both sides in Yemen have been impossible to independently verify, with the situation on the ground moving fast and access for journalists difficult.

Houthi military spokesperson Yahya Saree said the group still held all territory seized last month when they swept through



Pro-government fighters celebrate while riding vehicles in a convoy near the Bab el-Mandeb Strait in Taiz on Tuesday. AFP

coastal areas along the Red Sea oil-and-cargo route.

Houthi fighters "have full control over all their advances on the ground", he posted on Telegram.

Mr. Saree said they had carried out dozens of strikes in the past few hours targeting government forces in Yemen's Al-Jawf and Marib regions, while also attacking Taiz governorate.

On Monday, the Houthis said they had struck Ri-

yadh airport and a refinery belonging to Saudi state oil giant Aramco.

Loud explosions rattled the Saudi capital on Monday evening. They were followed by another explosion on Tuesday that echoed through northern parts of the city, residents said.

Riyadh's King Khalid International Airport is facing frequent temporary closures of its airspace, according to tracking website

Flightradar24. Saudi authorities have not publicly acknowledged the closures or confirmed any strikes targeting the facility.

But on Tuesday the civil aviation authority said at least three people were wounded in attacks on Jazan and Najran airports near the Yemen border a day earlier.

Saudi Arabia, the main backer of the Yemeni government, has been providing air support for the counter-offensive launched by government forces.

Government forces claimed late Monday that they had achieved "victories on several fronts". But military sources with the government refrained from confirming Mokha's recapture, only saying they had cut the one supply route to the area.

They also said they expelled the Houthis from several areas in Taiz in the southwest.