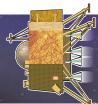
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'The 15 minutes of terror near the South Pole of the lunar surface. India's Chandrayaan-2 aims to do so between 1.30 a.m. and 2.30 a.m. today. A look at the last 15 minutes of the



At this point, Vikram's throttleable engines will fire, marking the beginning of its descent. The engines will the moon's surface

Using the controls in the throttleable engines, the lander will be prepared for vertical descent. Vikram is equipped with sensors which will sweep the topography of the touchdown spot to avoid craters, boulders and slopes

Vikram will perform a se-

ries of complex braking ma-

noeuvres to soft-land in the

south polar region of the

Moon between two craters,

Manzinus C and Simpelius N,

A few hours later, the rov-

er will roll down from Vik-

ram and will explore the sur-

September 7 marks the

The finale will be wit-

nessed by the Prime Minister

and about 80 high school

students at the Mission Oper-

ations Complex of ISRO Te-

lemetry Tracking and Com-

mand Network in Bengaluru

from around midnight.

(With PTI inputs)

culmination of the most pre-

cious phase of Chan-

rounding lunar terrain.

on September 7.

drayaan-2.

**Final touchdown** 

The engines will be shut off when the lander is

surface, from where it will be allowed to fall

will be used to reduce the vertical velocity and blow off lunar dust to prevent

clouding after the soft-landing

proposed landing site

Hello, South

The soft-landing will be

Simpelius N. The region is estimated to hold 100 mn tonnes of water, and is uncluded by sunlight

for billions of years, thus offering an undisturbed record of the solar

Pole!

IN BRIEF



#### Aircel-Maxis case hearing adjourned

NEW DELH In an unprecedented happening, a Delhi court on Friday adjourned sine die the hearing in the Aircel-Maxis corruption and money laundering cases against former Union Home Minister P. Chidambaram and his son Karti.

**NEWS** ▶ PAGE 12

#### Zimbabwe's former **President Mugabe dies**

Robert Mugabe, the first Prime Minister and later President of independent Zimbabwe, who traded the mantle of liberator for the armour of a tyrant and presided over the decline of one of Africa's most prosperous lands, died on Friday. He was 95. WORLD ▶ PAGE 14

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#### Former Pakistan spinner Abdul Qadir passes away

Former Pakistan spinner Abdul Oadir, credited with reviving the art of leg-spin bowling in the 1970s and 1980s, died of a heart attack in his home town Lahore, his son said on Friday. **SPORT** ▶ PAGE 20

## 'Indus Valley settlers had a distinct genetic lineage'

Genome shows no Steppe pastoralist or Iranian farmer link

SPECIAL CORRESPONDENT NEW DELHI

Throwing fresh light on the Indus Valley Civilisation, a study of DNA from skeletal remains excavated from the Harappan cemetery at Rakhigarhi argues that the hunter-gatherers of South Asia, who then became a settled people, have an independent origin. The researchers who conducted the study contend that the theory of the Harappans having Steppe pastoral or ancient Iranian farmer ancestry thus stands refuted. The finding also negates the hypothesis

outside South Asia, they ar-Vasant Shinde, the professor who headed the Rakhigarhi Project, said on Friday that researchers had successfully sequenced the first genome of an individual from Harappa and combining it with archaeological data, found that hunter-gatherers of South Asia had an independent origin, and

about mass migration dur-

ing Harappan times from

authored the settled way of life in this part of the world. "They do not contain genome from either the Steppe region or ancient Iranian farmers. The genetic continuity from hunter gatherer to modern times is visible in the DNA results," Prof. Shinde, affiliated to the Department of Archaeology,

### Distinct ancestry

A study argues that Harappan settlers have independent origin and are not descended from Eurasian farmers

The individual studied was from a population that is the largest source of ancestry for South Asians

■ Iranian-related ancestry in South Asia split from Iranian plateau lineages more than 12,000 years ago

First farmers of the Fertile Crescent contributed little to no ancestry to later South Asians



Deccan College Post-Graduate and Research Institute, Pune, said

The study, he said, finds that the same hunter-gatherer communities developed into agricultural communities and formed the Harappan civilisation.

The researchers also suggest that there was a movement of people from east to west as the Harappan people's presence is evident at sites like Gonur in Turkmenistan and Sahr-i-Sokhta in

"As the Harappans traded with Mesopotamia, Egypt, the Persian Gulf and almost all across South Asia, there was bound to be movement of people, resulting in a mixed genetic history. India had a heterogeneous population right from the beginning of settled life," Prof. Shinde said. There was a hint that settled life and domestication went from South Asia to West Asia.

The Rakhigarhi study was reported in a paper titled "An Ancient Harappan Genome Lacks Ancestry from Steppe Pastoralists or Iranian farmers" in the journal Cell on Thursday.

### Origins of farming

In Europe, ancient-DNA studies have shown that agriculture tended to spread through an influx of people with ancestry in Anatolia, in modern day Turkey.

The new study shows a similar dynamic in Iran and Turan (southern Central Asia), where the researchers found that Anatolian-related ancestry and farming arrived around the same time. In South Asia, however, the story appears quite different. The researchers found an absence of Anatolian-related ancestry.

**CONTINUED ON ▶** PAGE 12

## Lander Vikram moves in for tryst with moon

It is designed for a soft-landing on the lunar surface

MADHUMATHI D.S. BENGALURU

As the nation awaited with bated breath the soft-landing of the Vikram lander on the South Pole of the lunar surface, the first attempt by any country, the Indian Space Research Organisation (IS-RO) said on Friday that everything related to the touchdown was going as per plan.

Joining the nation in wishing ISRO success, Prime Minister Narendra Modi said the mission manifests the best of Indian talent and spirit of tenacity. "Its success will benefit

crores of Indians," he said in a series of tweets.

"We are eagerly waiting for the event," ISRO chairman K. Sivan said.

"Certainly, there is a lot of anxiety in the minds of the entire [Chandrayaan-2] team because it's a very complex operation and we are doing it for the first time," a senior official associated with the mission said.

"Everything... sensors, computers, command systems...has to work perfectly. But we are confident in the sense we have conducted a large number of simulations on the ground; it gives us the confidence it would go alright," the official said.

He described the softlanding as "almost like placing a baby on the cradle", and said, "There is a certain amount of anxiety but there is no fear."

As India attempts a softlanding, all eyes will be on the lander Vikram and the rover Pragyan.

#### One lunar day

The 1,471 kg Vikram, named after Dr. Vikram A. Sarabhai, father of the Indian space programme, is designed to execute a soft-landing on the lunar surface and to function for one lunar day, which is equivalent to about 14 earth

Chandrayaan-2's 27 kg robotic vehicle Pragyan, which translates to 'wisdom' in Sanskrit, can travel up to 500 m from the landing spot on the Moon and leverages energy for solar

functioning. "The lander carries three scientific payloads to conduct surface and sub-surface science experiments, while the rover carries two payloads to enhance our understanding of the lunar surface," according

ISRO.

After landing Pragyan, the rover, will roll out on the moon's surface. The solar-powered rover will have a life of one lunar day (14 Earth days). It can travel a maximum distance of 500m at a speed of 36m an hour

### Madras High Court Chief Justice to resign

Upset over transfer to Meghalaya

MOHAMED IMRANULLAH S.

Madras High Court Chief Justice Vijava Kamlesh Tahilramani, the senior-most High Court judge in the country, has decided to put in her papers in the wake of a decision taken by the Supreme Court Collegium (comprising top five judges) to transfer her from the chartered High Court to a relatively small High Court of Meghalaya.

She made her decision public on Friday night during a dinner hosted by six Madras High Court judges, who were made permanent

recently. The dinner party was held at the Tamil Nadu State Judicial Academy building here and was attended by almost all judges of the High Court, barring a few who had been deputed to the

Madurai Bench. Thanking the puisne



Vijaya Kamlesh Tahilramani

judges for their cooperation ever since she took over as the Chief Justice on August 12 last year, Justice Tahilramani told them that she had discharged her duty without any fear or favour right from the time she assumed office as a judge of the Bombay High Court in June 2001.

She had also served as an acting Chief Justice of her parent High Court on three different occasions between 2015 and 2018.

**CONTINUED ON ▶** PAGE 12

publishing.

It was precipitated by

events such as the Indian

elections, which highlight-

ed the dangers of disinfor-

### Free metro ride for women unviable: SC

LEGAL CORRESPONDENT NEW DELHI

The Supreme Court on Frivoiced scepticism about the Delhi government's scheme to make metro rides free for women, saying the move may become financially unviable for the Delhi Metro Rail Corporation. A Bench led by Justice Arun Mishra said rather than handing out sops, the government should make proper use of public money.

"Why should anyone be given free rides? Who will bear the losses?" he asked.

The court said the financial health of the DMRC should be of prime concern for the Delhi government as the metro is an essential mode of public transport in the city. However, in a relief for the Delhi government, the court said the Centre should equally share the land costs for the Phase IV project of the Delhi Metro.

### SIT finds multiple lapses in Pehlu Khan case probe

Stage set for appeal in Rajasthan HC

SPECIAL CORRESPONDENT

A Special Investigation Team (SIT) of the Rajasthan police, constituted to review the original investigation of the Pehlu Khan lynching case which resulted in the acquittal of all the six accused by a sessions court in Alwar last month, has found multiple lapses and irregularities in the probe.

The 84-page SIT report, submitted to Director General of Police Bhupendra Singh on Thursday, could set the stage for an appeal against the trial court's judgment in the Rajasthan High Court. After the trial court's indictment of the Investigating Officers (IOs), the Congress government, headed by Chief Minister Ashok Gehlot, drew criticism for not correcting the course of the probe during the seven months of its tenure prior to the judgment.



Pehlu Khan

The SIT, headed by Deputy Inspector-General of Pol-(Special Operations Group) Nitin Deep Blaggan, was formed on August 16 after the State government decided to challenge the sessions court's August 14 verdict through an appeal.

Police officials, who spoke on the condition of anonymity, said the SIT had found lacunae in the investigation as well as some laxity in the prosecution.

**CONTINUED ON ▶** PAGE 12

### Another IAS officer quits from service

SPECIAL CORRESPONDENT MANGALURU

Dakshina Kannada Deputy Commissioner S. Sasikanth Senthil, a 2009 batch Indian Administrative Service (IAS) Officer of the Karnataka cadre, resigned from the ser- cedented manner".

vice on Friday, stating that it would be "unethical" on his part to continue in service when the fundamental building blocks of our diverse democracy are being compromised in an unpre-

"I also feel strongly that the coming days will present extremely difficult challenges to the basic fabric of our nation," he said in a state-

**INTERVIEW** ▶ PAGE 13



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# News majors to fight disinformation

The Hindu joins BBC and others in global campaign against fake narratives

SPECIAL CORRESPONDENT

The Hindu is partnering with the BBC and other leading global news and technology organisations in a new industry collaboration to tackle disinformation. The collaboration was announced by the BBC and the partners in the early hours of Saturday.

Under this collaboration, news and technology majors will work together to protect their audiences and users from disinformation, particularly around crucial events such as elections.

Earlier this year, the BBC convened a 'Trusted News



Summit', bringing together mation and underlined the senior figures from major importance of working global technology firms and together.

The summit agreed to work collectively on various initiatives, including creating systems where organisations can warn each other

disinformation that threatens human life or disrupts elections. The emphasis of the 'early warning system' will be on moving quickly and collectively to undermine disinformation before it can take hold. The summit also agreed

quickly when they discover even to people's lives. This

to work towards a joint online media education campaign, and also to co-operate on election-related information such as explaining how and where to vote. "Disinformation and so-called fake news is a threat to us all. At its worst, it can present a serious threat to democracy and

summit has shown a determination to take collective action to fight this problem and we have agreed [upon] some crucial steps towards this," said Tony Hall, Director-General of the BBC and European Broadcasting Union (EBU) president. The BBC's partners who

attended the summit were the EBU, Facebook, Financial Times, First Draft, Google, The Hindu, and the Wall Street Journal. Other partners were AFP, CBC/Radio-Canada, Microsoft, Reuters, the Reuters Institute for the Study of Journalism, and Twitter.