



Scan for our social media

NATION | P3

Two Emiratis revive UAE's marine heritage



THE VIEWS | P14

How China is outpacing the US in Africa



BUSINESS | P10

DP World to set off on Metaverse Journey

NATION | P8

LATINO-ARAB RHYTHMS AT MEXICO BOOK FAIR



SHOOTOUT CONTEST 2022



Scan & Download the App to Participate in the Contest

PREDICT & WIN STARTING PRE-QUARTER

WIN A FREE BMW X1



GOLDEN BALL 20 KARAM PURE GOLD

GOLDEN BOOT 20 KARAM PURE GOLD

64 MOBILES 20 KARAM PURE GOLD

ABC CARGO & COURIER

800 916 www.abccargo.ae

Moon-bound Rashid Rover set for historic lift-off today

UAE'S MISSION TO LUNAR SURFACE IS A FIRST AMONG ARAB NATIONS

DUBAI

BY ANGEL TESORERO
Senior Reporter

From the desert dunes of the UAE, the Emirati-made Rashid Rover will shoot to the Moon today at 12.39pm (UAE time) aboard a Japanese-made lunar lander that will be sent to space on a SpaceX Falcon 9 rocket from Cape Canaveral Space Force Station in Florida, USA.

The UAE's historic moonshot is a boon to mankind. The success of the first Emirates Lunar Mission (ELM) will not only make the UAE the first Arab nation and among the first countries in the world to land a rover on the Moon, it will also give the global scientific community more knowledge about Earth's closest planetary neighbour.

Scientific data, new images

Rashid Rover – named after the late Shaikh Rashid Bin Saeed Al Maktoum, builder



■ The Rashid rover during a test by the Emirates Lunar Mission team in preparation for the first Arab mission to moon.

of modern Dubai – will help scientists better understand how lunar dust and rocks vary across the Moon. It will collect about 10 gigabytes of recorded material, scientific data and new images of the Moon's plasma conditions and lunar

regolith (blanket of superficial deposits covering solid rocks).

According to Mohammad Bin Rashid Space Centre, the rover will provide fresh data for the development of new technologies that can be used to unravel the origins of our solar system.

HOW TO WATCH

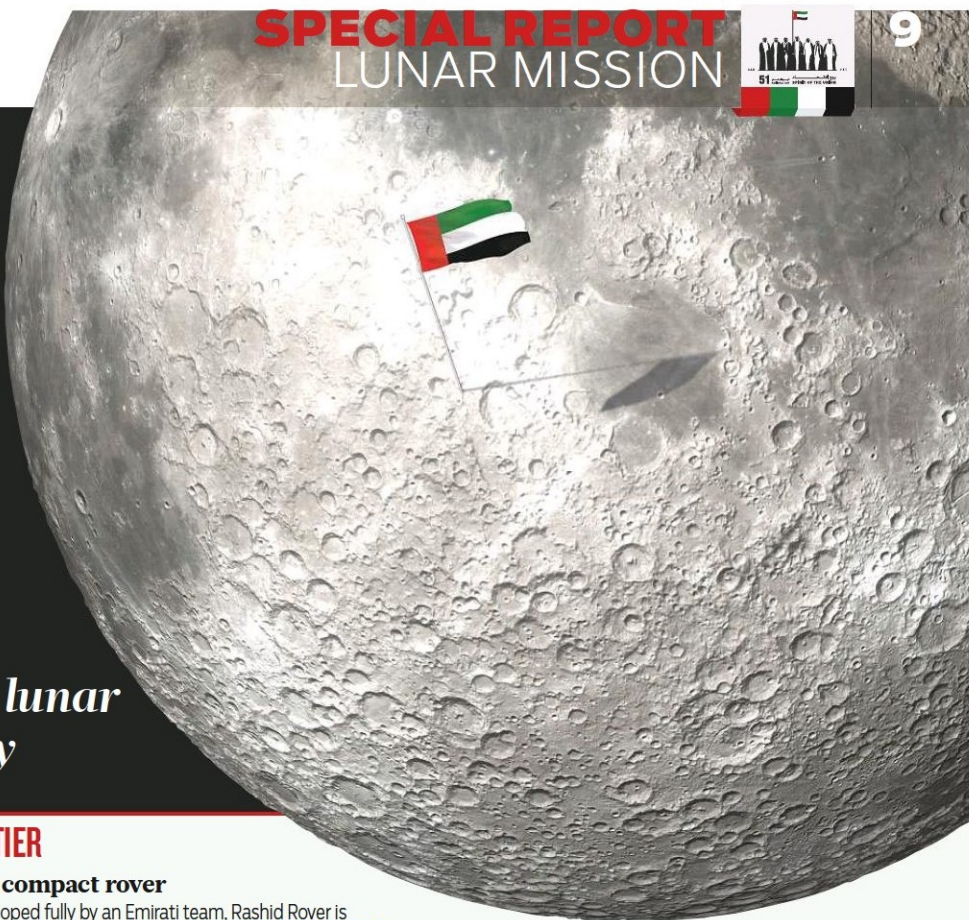
The launch will be streamed live by the Mohammad Bin Rashid Space Centre (MBRSC), beginning at 10.30am. Viewers can visit MBRSC channel (www.mbrsc.ae/lunar) to catch the action. *Gulf News* portal will also provide minute by minute updates.

Good weather permitting at launch site, Rashid Rover will begin the 385,000-kilometre space journey and land approximately five months from now on Atlas Crater, located on the Moon's southeastern outer edge of Mare Frigoris (Sea of Cold). From there, it will capture photos and send back to Earth information of the unexplored crater area and the vast basins on Moon's surface that were formed billions of years ago.

SEE ALSO P9

FROM DUNES OF DUBAI TO MOON, RASHID ROVER SET TO MAKE HISTORY

All you need to know about UAE's lunar mission scheduled to take off today



DUBAI
BY ANGEL TESORERO
Senior Reporter

In what is a huge feat ahead of UAE's 51st National Day, the Emirati-made Rashid Rover is poised to shoot to the Moon, today at 12.39pm (Gulf Standard Time), carrying with it the pride and dreams of the UAE.

From the dunes of Dubai to the soil of the Moon, the lunar rover – named after Shaikh Rashid Bin Saeed Al Maktoum, builder of modern Dubai – will give the global scientific community more knowledge about Earth's closest neighbour in space.

The rover and lander will lift off aboard a SpaceX Falcon 9 rocket from Cape Canaveral Space Force Station in Florida.

Hakuto-R M1, which means 'white rabbit' in Japanese, will also carry other payloads, including a transformable lunar robot from Japan Aerospace Exploration Agency; a test module for a solid-state battery from NGK Spark Plug, an artificial intelligence flight computer from Mission Control Space Services, a multiple 360-degree camera from Canadensys Aerospace, a panel engraved with the names of Hakuto crowdfunding supporters, and a music disc containing the song *Sorato*, played by Japanese rock band Sakanaction.

TWO YEARS AHEAD

His Highness Shaikh Mohammed Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, first announced Rashid Rover in September 2020, and the original goal was to land it on the Moon by 2024. In April 2021, Mohammed bin Rashid Space Centre (MBRSC) signed a contract with ispace, a Japanese private lunar robotic exploration company, to transport Rashid Rover to the Moon aboard the Hakuto-R M1 lander.

Under the terms of agreement, ispace will also provide wired communication and power during the cruise phase and engage in wireless communication on the lunar surface.

AUTOMATED LANDING

SpaceX Falcon 9 rocket will take Hakuto-R M1 into the Moon's orbit, and following successful separation, the lander will use the gravitational pull of the Earth and the sun to guide it to the moon.

As it gets closer to the lunar surface, the lander will first orbit the moon in an increasingly elliptical trajectory before angling itself vertically to perform a fully-automated landing.

Hakuto-R M1 will then establish a steady telecommu-



In order to reach to the moon in six days, you would need to burn a lot of fuel ... To reduce the cost, ispace selected an approach that takes five months, but burns much less fuel."

Dr Hamad Al Marzooqi
| Project manager

nication and power supply on the lunar surface to support customer payload's surface operations, including that of the Rashid Rover.

Rashid Rover will land on Atlas Crater, on the Moon's south-eastern outer edge of Mare Frigoris, and capture photos and collect information about the unexplored crater and the vast basins on the Moon's surface, formed billions of years ago.

Atlas Crater, for example, has a diameter of 88km, and is believed to have been formed between 3.2 to 3.8 billion years ago. It is circular and bounded by a terraced rim wall. The crater is 2km deep and has a complex floor covered in hills and cracks.

FUEL-SAVING ROUTE

Hakuto-R M1 will take a low-energy route to the Moon rather than a direct approach. This means the landing will take about five months after launch – April 2023.

Dr Hamad Al Marzooqi, project manager of Emirates Lunar Mission at MBRSC, said: "The main factor is the cost of the mission. In order to reach to the moon within six days – the shortest path – you would need to burn a lot of fuel, which means that you need a big tank and a big propulsion system. In order to reduce the cost, ispace selected an approach that takes five months, but burns much less fuel.

"Therefore the launch cost is lower."

Dimitra Atri, astrophysicist at New York University in Abu Dhabi, added: "In order to keep

A NEW FRONTIER

World's most compact rover

Designed and developed fully by an Emirati team, Rashid Rover is touted as the world's most compact rover. **Its height is 70cm, length is 50cm and width is 50cm. It weighs around 10kg with payload, but can climb over an obstacle up to 10cm tall and descend a 20-degree slope.**



The four-wheeled Rashid Rover has 3D cameras, advanced motion system, sensors, and communication system that are powered by solar panels. There are four cameras that move vertically and horizontally, including two main cameras, which are Caspex (camera for space exploration) and can withstand vibrations during launch and landing.

MBRSC has partnered with French space agency CNES for the two Caspex that will be used to analyse the properties of lunar soil, dust, radioactivity, electrical activities, as well as the rocks on the moon's surface. One Caspex is installed on top of the rover's mast to provide panoramic visibility of its surroundings while the rear-mounted camera will deliver images of the lunar soil with high spatial resolution.

What it will do on the Moon

Rashid Rover will study the Moon's surroundings for one lunar day, which is equivalent to 14 Earth days. There is a chance that its mission could be extended to another lunar day. After the first lunar day, the rover will go into hibernation or sleep during the lunar night (also equivalent to 14 Earth nights).

After that, the team will try to 'wake up' the rover to see if its systems are still active.

The temperature on the Moon drops to as low as -173 degrees Celsius from as high as 127 degrees Celsius.

In particular, the rover will study the characteristics of lunar soil, petrography (composition and properties of lunar rocks) and geology of the Moon. It will also take photos of the moon's dust movement, surface plasma conditions, and the lunar regolith (blanket of superficial deposits covering solid rocks).

The rover will not return to Earth. What it will send to Earth are multiple images – around 10GB of recorded material and scientific data. The Emirates Lunar Mission team at MBRSC will use these to

the prices of payload delivery attractive to customers, private companies reduce their expenses by choosing the lower cost option, which consumes less energy but takes much longer."

10GB OF DATA

According to the MBRSC, "The Rashid Rover will provide about 10 gigabytes of recorded material, scientific data and new images to the global scientific community to study the Moon".

The success of the first Emirates Lunar Mission will make

the UAE the first Arab country and among the first countries in the world to land a spacecraft on the Moon, after the US, former Soviet Union and China.

MBRSC said: "The mission embodies the aspirations of the UAE.

"Rashid Rover will collect images and information that will allow the UAE to conduct comprehensive and integrated studies on how to build human settlement on the Moon, prepare for future missions to study Mars and provide the scientific community with answers about the solar system

Rashid Rover will study the Moon's surroundings for one lunar day, which is equivalent to 14 Earth days. There is a chance that its mission could be extended to another lunar day.

test new technologies in material science, robotics, mobility, navigation and communications. The findings will also help in the design of future missions to survive and function in harsh space environment.

"Rashid Rover's drive tracks will be analysed to determine wheel sinkage and to investigate the detailed wheel-soil interaction. Such data will be important to design the mobility systems of future rovers," MBRSC noted.

How to watch the launch

The historic launch of the Rashid Rover will be streamed live by the Mohammad Bin Rashid Space Centre (MBRSC), from 10.30am today. Viewers can visit MBRSC channel (www.mbrsc.ae/lunar) to watch mission briefings and catch all the action from Cape Canaveral Space Force Station in Florida, culminating in the actual lift-off at 12.39pm (UAE time).

MBRSC earlier said the lift-off date and time are subject to change, depending on weather and other conditions at launch site.



Hakuto-R, Hakuto-R M1, which means 'white rabbit' in Japanese, will carry the Rashid Rover to its destination.

ON GULFNEWS.COM

More on National Day

Take the best road trips from Dubai
Four days of free parking in Dubai



51 ways to celebrate the 51st UAE National Day

and other planets."

THE FIRST OF MANY

Rashid Rover is just the first of the UAE's multiple missions to the Moon.

A couple of months ago, in September, the MBRSC signed an agreement with China National Space Administration to kick-start joint space projects and future lunar exploration.

This includes sending the next UAE rover aboard Chang'e 7, a robotic Chinese lunar exploration mission expected to be launched in 2026 to target the Moon's south pole.