وكالة الفضاء السعودية
SAUDI SPACE AGENCY







# السعودية نحو الفضاء

SAUDI TOWARDS SPACE

# The Kingdom’s first mission under the Human Space Flight program

The Saudi Space Agency launched the Kingdom’s Human Space Flight (HSF) program to prepare Saudi cadres to become professional astronauts. They will undertake short- and long-stay missions, conduct scientific experiments and international research, and participate in future space missions.

The program draws on the opportunities offered by the global space sector and its industries to support research for the benefit of all humanity. Priority fields include:




- Physical science
- Human health
- Biology
- Biotechnology
- Earth Science
- In-space manufacturing

These fields support the development of technologies that enable future exploration missions to the Moon and Mars.

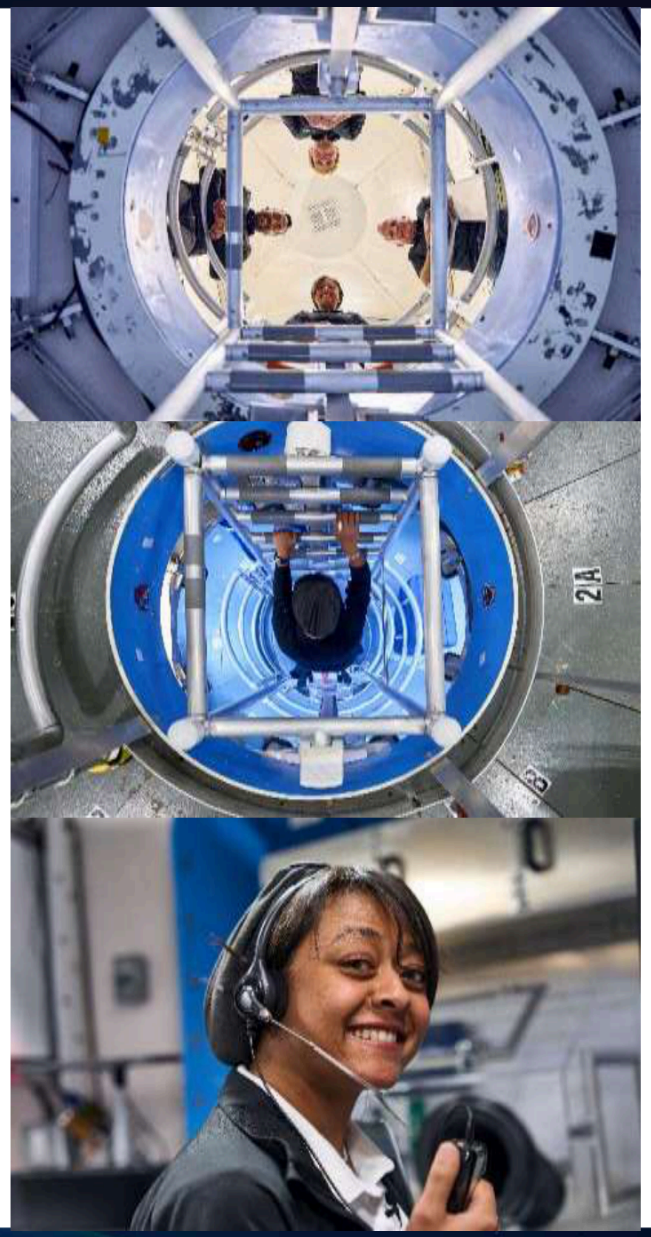





In a historic mission in 2023, Saudi Arabia announced that it would send the first Saudi, Arab Muslim female astronaut and a Saudi male astronaut to the International Space Station (ISS), building national human spaceflight capabilities for the benefit of humanity.

The 10-day scientific mission launched on May 21, 2023, from the United States of America to the International Space Station (ISS).

The program also trained two backup crew members, **Mariam Fardous** and **Ali Al-Ghamdi**, to meet all mission requirements.



## Mission Facts

- 14 scientific experiments were conducted.
- The mission took place 420 km above Earth.
- Research covered biomedicine and physical science.



## Mission Objectives

- Build and develop national human spaceflight capabilities.
- Strengthen the Kingdom's position in the space sector.
- Conduct advanced scientific research and experiments.
- Enhance international partnerships.



# Our Astronauts

## Ali Al-Qarni

Astronaut



A Saudi astronaut and experienced pilot, Ali was part of the SSA-HSF1 mission crew that traveled to the International Space Station.

With over 12 years of experience flying F-15SA aircraft, Ali's rigorous training, exceptional skill, and ability to execute tasks flawlessly have equipped him to conduct scientific experiments with high efficiency and precision, adhering to the required standards.

**Education:** Bachelor's Degree in Aeronautical Science.
**Previous Profession:** Fighter Pilot.

## Rayyanah Barnawi

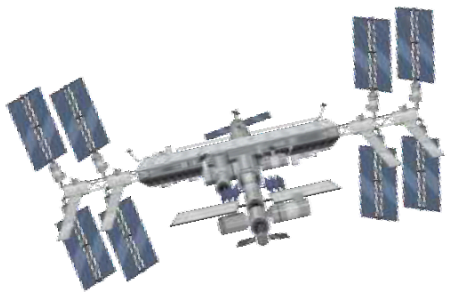
Astronaut



The first Saudi female astronaut and a crew member of the SSA-HSF1 mission to the International Space Station. Rayyanah brings over 9 years of experience in stem cell and tissue re-engineering.

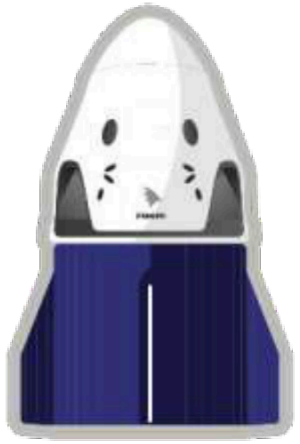
Known for her passion and love for exploring new horizons, she has dedicated her professional career to enhancing scientific research protocols. This passion led her to conduct scientific experiments in a microgravity environment to serve her nation and humanity.

**Education:** Master's Degree in Biomedical Sciences.
**Previous Profession:** Research Scientist and Laboratory Specialist.

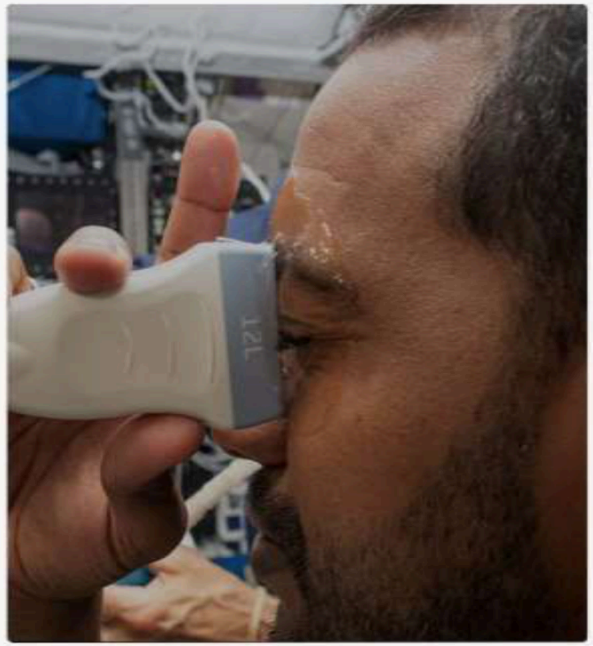


## Space Mission Information

| | |
|---|---|
| **ROCKET** | Falcon 9 |
| **VEHICLE** | Dragon 2 |
| **VEHICLE LOAD** | 4 passengers |
| **MISSION DURATION** | 10 days |
| **DESTINATION** | International Space Station (ISS) |
| **LAUNCH SITE** | Cape Canaveral, Florida,<br>United States of America |



# Saudi Toward Space Mission Scientific Experiments – SSA-HSF1



## Optic Nerve Sheath Diameter Measurement

Determine optic nerve sheath diameter in astronauts during human spaceflight missions.



## Use of EEG to Measure Brain Electrical Activity

Determine the effects of the microgravity environment on the brain's electrical activity using a portable EEG.



## Pupillometry to Measure Intracranial Pressure

Utilize a pupillometer during human spaceflight to measure changes in intracranial pressure and further our knowledge of Spaceflight Associated Neuro-ocular Syndrome (SANS).

# SSA-HSF1 Scientific Experiments



## Cerebral Perfusion and Alterations of Brain Position in Microgravity

Use near-infrared spectroscopy as a non-invasive neuroimaging technique to measure cerebral perfusion and alterations of brain position in microgravity.



## Alteration in Telomere Length

Measure the effect of human spaceflight missions on telomere length.



## Blood-Based Biomarkers in Microgravity

Investigate changes in blood-based biomarkers that reflect brain and nervous-system health during human spaceflight missions.



## Educational Outreach Microgravity Experiments

Three experiments: Liquid Fireworks, Space Kite, and Heat transfer, focused on fluid mechanics, aerodynamics, and heat transfer, respectively.



## Experiments in Cell Science

Four experiments examine messenger ribonucleic acid (mRNA), its lifespan, and its effects on inflammation in microgravity. An immune cell model simulates the inflammatory response to drug therapy.



## Cloud Seeding in Microgravity

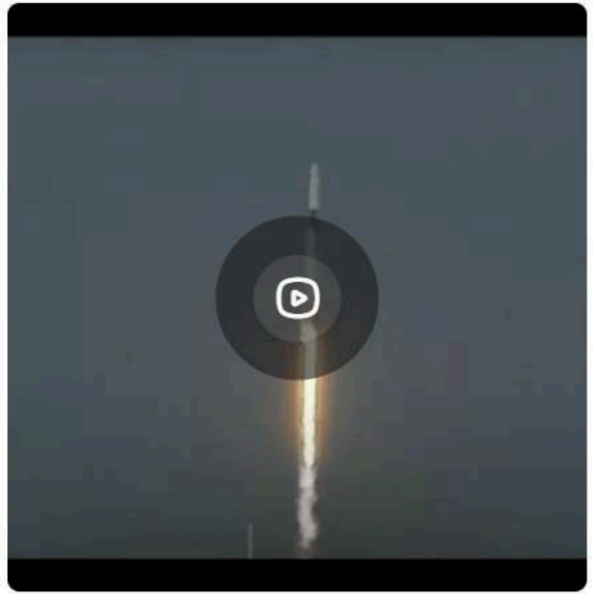
Explore whether cloud seeding could work in future settlements on the Moon and Mars.

## Mission Media




SSA-HSF1 Mission | Launch

Click here to watch



Saudi Astronauts Launch Towards Space

Click here to watch




Saudi Arabia Towards Space

Click here to watch

Visit the mission webpage

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