

Mohammed bin Rashid Space Centre Magazine

# Majarat

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*Inspired by Space Science and Technology*



**HAMDAN BIN MOHAMMED**  
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**HAMAD AL MANSOURI**  
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**A NEW EARTH**  
Astronomers discover Kepler-452b, the most Earth-like planet ever found





Emirates Mars Mission Project Manager, Omran Sharaf:

## MBRSC offers the best career opportunities for Emirati innovators

Omran Sharaf shares with us some interesting information about the MBRSC Mars Hope Probe, and the opportunities that have arisen because of the project.

**Majarat:** At MBRSC, you announced that the objective of the project is to study the climate conditions on the Red Planet. How was this objective identified, and why?

**Sharaf:** "The scientific objectives of the UAE's Mars mission project were identified based on studies and research carried out by the centre in collaboration with our strategic partners. It's also based on recommendations from the global scientific community, including MEPAG (Mars Exploration Program Analysis Group), which is specialised in the analysis of Mars exploration programs.

"Usually, scientific institutions and research centres suggest what they think would be a scientific benefit that serves humanity in general, fills a void in terms of information

**“The Mars exploration project embodies educational objectives, and I encourage Emirati students to major in scientific disciplines”**

and compliments other global efforts in the exploration of outer space. The UAE's scientific contribution in this field aims to conduct a comprehensive and detailed study of the climate on the Red Planet. This study will be the first of its kind and will result in more than 1,000 gigabytes of Mars data that will be shared with research centres and institutions worldwide."

**Majarat:** Are there any other objectives for the UAE Mars mission?

**Sharaf:** "All space exploration projects have parallel objectives that are just as important as the scientific objectives. We have educational objectives targeted at school and college students, and all members of society through the production and localisation of knowledge. The project will also encourage research and innovation related to space discoveries, inventions and science. We hope to encourage new generations to take an interest in scientific disciplines as a result of the Mars project."

**Majarat:** How did you develop the initial design of the Hope probe?

**Sharaf:** "The spacecraft design must comply



with the scientific objectives of the project. When we developed the initial design of the Hope probe, we took into consideration these scientific goals. Our team of scientists, engineers and technicians joined hands to design the probe, which will be equipped with smart devices capable of accurate data collection. We ran a number of brainstorming sessions between the Hope probe team and our strategic partners, which resulted in the initial design of the Hope probe."

**Majarat:** MBRSC has announced that at least 150 Emirati engineers are needed for the Hope Probe project. How do you plan to find the UAE scientific teams required?

**Sharaf:** "It is true that we will find ourselves in the position of needing more scientific teams, engineers and technicians as the project progresses. Therefore, I encourage Emirati students who have a passion for science and technology to major in subjects such as physics, mathematics, mechanical and electrical engineering, chemistry, software, computer science, and other scientific disciplines. Employment opportunities are now available at MBRSC for talented Emiratis with distinctive, creative and innovative minds.

"This project aims to transfer, localise and develop space science knowledge. We have an agreement with our partners on that. The experience that the team has gathered from the manufacturing process performed on both DubaiSat-1 and DubaiSat-2 will form the basis of a strong foundation for us to be able to build the Hope Probe and deliver the project within the proposed timeframe, Insha' Allah."

**Majarat:** Is it mandatory that Emirati engineers applying to work on the Hope probe mission hold degrees from scientifically advanced foreign countries, to ensure that they have a high level scientific education?

**Sharaf:** "No! More than 95% of MBRSC's employees are graduates from UAE universities, and a large number are currently developing their academic and scientific programs in a way to meet the needs of strategic projects, especially the Emirates Mars project. UAE universities continue to graduate scientifically qualified engineers, technicians and administrators with the necessary skills required to work on the UAE Mars mission

project. We are proud of our students who graduated from Emirati universities, and they all have high scientific and academic standards. Our universities have proven their capabilities in meeting the need of technical sectors that are more scientifically specialised. MBRSC will employ the best Emirati science and research talent in various disciplines, as well as the most qualified technical teams."

**Majarat:** The Emirates Mars project was assigned to MBRSC by the country's leadership, what do you feel about this ambitious mission and the challenges that you face? Has your lifestyle been affected by the responsibility of this mission?

**Sharaf:** "The declaration of His Highness Sheikh Khalifa bin Zayed Al Nahyan (may God protect him) to establish the UAE Space Agency and the Mars mission project marked the UAE's entry into the space age. The objective is to boost development and develop scientific capabilities, as well as to provide knowledge contributions to mankind.

"Epic challenges inspire us and motivate us." This is the vision of HH Sheikh Mohammed bin Rashid; a vision that carved the path towards a bright future, and we are working passionately and enthusiastically around the clock to accomplish this vision. Experiences in the UAE have taught us that the road towards achieving progress and development is filled with challenges. But at the same time, it's

promising and prosperous and will certainly contribute to shaping the future of our country. We are proud and happy because the leadership trusted us with such a mission.

"The team is working continuously to make this project happen, and we realise the big responsibility that we have taken on here. We look to Sheikh Mohammed bin Rashid as a source of inspiration to us, and he has always given his continuous support to the centre in all the projects we have undertaken. We are committed to participating fully in making his vision come to light.

"This project has become a major part of all our lives. The team members travel in consecutive trips based on a drawn plan, to meet with partners and inform scientific research centres in a number of leading universities about our project, to hopefully coordinate with them."

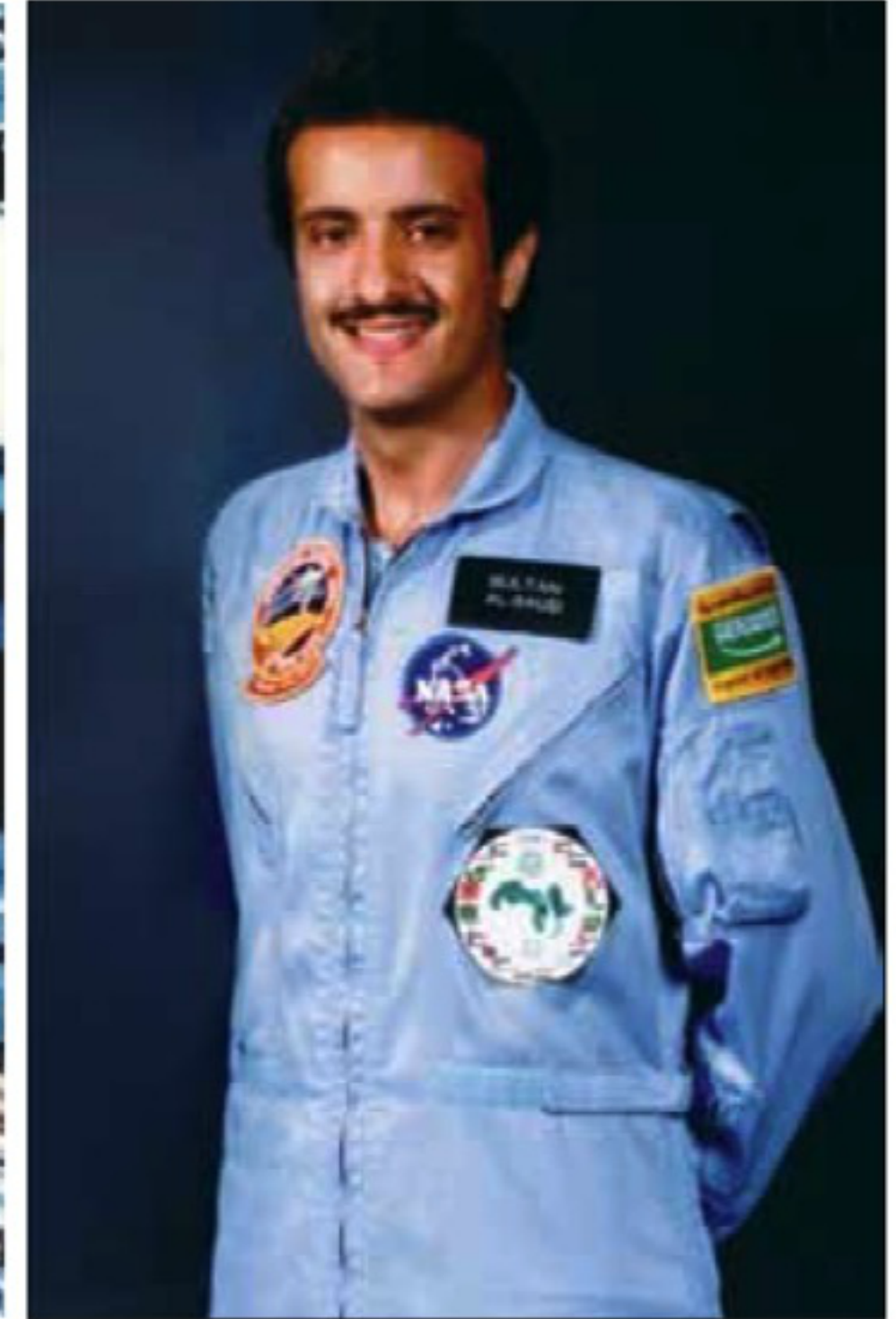
**Majarat:** Could you tell us about your education and the experience you have gained at MBRSC?

**Sharaf:** "I joined MBRSC in 2006 and was a member of the team that developed DubaiSat-1, DubaiSat-2 and KhalifaSat. I graduated from the University of Virginia in the United States with a Bachelor's degree in electrical engineering. During my participation in developing DubaiSat-2 in 2013, I earned my Master's degree in science and technology policies from the Korea Institute of Science and Technology in South Korea."



*Members of the Hope Probe team at work*





*Prince Sultan getting ready for the most important journey of his life*

## The story of the first Arab in space

On the 17th June 1985, Prince Sultan bin Salman of Saudi Arabia blasted off from the Kennedy Space Centre aboard the Space Shuttle Discovery with a team of international crewmembers, on a mission that would forever transform the Arab world.

It was 1976, and the Arab League had identified the need to bring the region together by finding a new, reliable means of interstate communication. The decision was made to launch a satellite that would link the entire 14 million square kilometre Arab world, and it was the Arab Telecommunication Union, the Arab Organisation for Education, Science and Culture, and the Arab States Broadcasting Union that worked in collaboration under the umbrella of the Arab League to implement a satellite network that would bring the Arab world into a new era. With the idea now firmly in place, it was decided to establish an institution for satellite communications to be based in Riyadh, named Arabsat.

Arabsat began work right away, and commissioned a French company, Aérospatiale, to work on Arabsat-1a, destined to be the first Arab satellite placed into orbit. The satellite was successfully launched from a launchpad in Europe, however with the eyes of the Arab world upon it, the satellite failed to open correctly when placed into orbit due to a malfunction, and although after several failed attempts it was eventually opened, it was unable to function at the level they hoped for initially.

The Arab League were disappointed, but persevered with their plan and, instead of losing hope, they decided to try for a second

time. This time however, they planned to send an Arab astronaut or payload specialist to oversee the mission. It had also been a long-term ambition of the Arab League to launch a satellite through NASA, and a contract was drawn up and signed, which would see an Arab astronaut accompany the second satellite, Arabsat-1b into outer space with the American space agency.

The idea of NASA ever allowing a non-American to fly was completely alien at that time, but NASA broke with tradition as they saw the amazing enthusiasm the Arab world had for the space program and space exploration, and so a payload specialist role





*The NASA team were multi-national, the first time this was the case*

was opened up for an Arab to take their place on the Space Shuttle Discovery flight arranged for the 17th June, 1985.

The journey towards becoming a NASA astronaut is one of the most demanding anyone could ever face, both mentally and physically, and many candidates barely make it through the initial week of the testing period. So as a young Prince Sultan took his place among the 19 other Arab hopefuls, he wasn't even contemplating the idea that he might succeed in the training and have a chance of playing a role in the mission, he was just delighted to have been able to apply, having learnt of the opportunity only weeks before the testing of the applicants was due to begin.

During testing, each applicant was scrutinised and put through their paces severely in a search for the extra aptitude required to successfully partake in a space mission. When it comes to space missions and NASA protocol, it would be extremely naïve to think that one's social standing would have any impact upon whether they would be allowed to go into space, so for Prince Sultan there

was never a question that he may be allowed to go because of who he was. The process of selection is based on a list of very specific criteria related to skillset and competence, and although the Prince felt drained after the testing, he thought he had done a good job.

### Arab ambassador

The news came though that the Prince had been selected for the mission, and his original tiredness made way for excitement, but there was still many obstacles in his way before he would be looking down upon the Earth from the atmosphere, not least the requirement to gain approval from King Fahd. No member of any royal family had ever flown a space mission before, and the King was certainly staking a lot on the 27-year old Prince being the ambassador for the whole Arab World, with the eyes of the planet upon him. He wanted to make sure he was up to the job, but the Prince showed his commitment and his enthusiasm, and with some words of reassurance and encouragement from his father, the current ruler King Salman, King Fahd gave his blessing and wished the Prince the very best

of luck for the training and the mission.

Prince Sultan had great responsibility on his shoulders, carrying the weight of expectation and the global reputation of the Arab states with him through the intense training period. The trip would potentially change the way the western world perceived the Arab world forever. The Arab world had always had to import the latest technology from the western world, but Prince Sultan's journey was something that people would always be able to marvel at and call their own, and the coverage would hopefully inspire a new generation to embark upon careers in the fields of science and technology, reducing dependence on the west for modern conveniences, and establishing a strong presence for the sector in a number of states throughout the Middle East. This was one of the core objectives in the long run.

When the Prince arrived at Houston, Texas for his condensed 10-week training period, he nearly wasn't allowed into the high-security training complex. Turning up wearing jeans and a t-shirt, the security guards refused to believe that the Prince was actually who he said he was. They were of course expecting him at the Lyndon B Johnson Space Centre that day, but when the arrival of such a high profile member of a royal family is anticipated, so too is an entourage, perhaps a fleet of limousines, and a lot of expensive luggage. This really wasn't the Prince's style though, and after finally negotiating his way in with the help of his passport, he was able to begin his intensive course.

There was one other quite significant obstacle in his way, and that was the fact that in the summer months in Houston, temperatures and humidity soar to a level similar to that of the Middle East, and the daylight hours run from around 5am to 8:30pm. This wouldn't usually be an issue, but the holy month of Ramadan fell in the middle of the training program, so the long days and intense physical exertion made fasting a real challenge, but even though scholars are unanimously agreed that a traveller is permitted to refrain from fasting, the Prince was adamant that he would not only fast, but also complete a year's worth of training in a two-month period. And he did.



When the launch day came around, the sense of nervousness and excitement across the Arab world was palpable. In the mid-eighties, the global interest in space missions was at an all-time high, so the eyes of the entire world were fixed on the Space Shuttle Discovery on the 17th June 1985. What made this particular mission so interesting on a purely human level was that it was a multi-national mission, the first time this had really been done by NASA. The Shuttle contained predominantly Americans, but also one payload specialist of French descent, and a mission specialist who originated from China, despite being raised in Oklahoma USA, in addition to Prince Sultan.

### Into orbit

The main mission of the flight was to place Arabsat-1b into orbit, and the responsibility in the eyes of the watching Arab world was firmly in the hands of Prince Sultan. As the launch process began, the tension was evident on the faces of the watching public and the Prince's family, who had made the trip to the Kennedy Space Centre, Florida, to witness their young Prince leave the Earth. The launch was a success, and work began in earnest at making the Space Shuttle a home for the next seven days.

The satellite was placed into orbit, and a day later it was time to test its operational capabilities. The method for testing was

perhaps the highest profile method of all. On television, in a live satellite link up with the King, and with the whole Arab world watching. If they could converse, the satellite would be officially operational. The call took place, and the Prince and King spoke for five minutes, with the King commending Sultan for his achievements and his representation of the Arab world.

As a result of the mission, not only did the Arab world now have instant communication connectivity to each other via telephone, but also people were now far more aware of and interested in space science, particularly the young. This was one of the goals of Prince Sultan's mission, and since the mission he has constantly toured schools to talk to and inspire youngsters as a role model for millions.

His main job started when he landed safely back on earth. He was now a symbol of the Arab world, and he showed the Arab children that here is nothing you can't accomplish. The mission also acted as a catalyst for the Arab World to be able to enter into agreements and collaborate with some of the most distinguished global scientific organisations, which suddenly realised that the Arab world too has brilliant minds and capable scientists.

The Arab people felt their region had now realised a high level of scientific achievement,

and they celebrated together. This was not just a Saudi mission; this was an Arab mission, with the message that we must take challenges, and embark upon new experiences, a message that has remained to this day, and is exhibited by the UAE and the ambition with which MBRSC has displayed by moving onto new frontiers with the Hope Probe to Mars.

*"I remember watching the Apollo 11 moon landing aged just 13 in Saudi Arabia. It was definitely a very exciting moment for myself as a young boy and my friends. We were talking about the momentous event for whole week afterwards. As young people we began to dream. I never thought that I would one day be an astronaut that travelled into space, and it was an honour. A larger honour for me was being able to meet the astronauts, cosmonauts and the flyers that have spent their lifetime learning, participating in and observing the space program."*

*"I can say with full confidence that the space program still energises and inspires real people. In my case, in 1985 I remember, when our team of scientists and myself came back to Saudi, the faces on the young people of Saudi and the pride they felt by seeing their own people participating in the space program. Space has always been a very real attraction for young people aspiring to do more with their lives, and as I live in Saudi and indeed travel the world giving lectures, I still feel the welcoming arms of young people everywhere who get excited by talking about space, and as I go around and lecture and speak about space programs, I feel that the space program and the interest is more powerful than ever before."*

Prince Sultan bin Salman bin Abdulaziz Al Saud – the first Arab in space, the first Muslim in space, and the first member of royalty in space.



*The Prince making notes in zero-gravity*