

# The United Arab Emirates (UAE) and the "Space race"

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Within the Middle East and North Africa (MENA) region, the most ambitious space program has been launched by the UAE government. The UAE has expressed growing interest in space in recent years, establishing a national space agency and funding satellite projects, in addition to its planned human spaceflight program.

The Dubai ruler tweeted in September 2018: "We have the region's only Mars exploration program, a fully operating satellite manufacturing capability and an astronaut program as part of our Dhs 20 billion investment in the space sector. The secret is our young Arab people and their capabilities."<sup>1</sup>

The UAE launched the National Space Program on 12 April 2017, under which the UAE will prepare Emirati cadres specialized in airspace sciences. The country's investments in space technologies have already exceeded \$5.4bn.<sup>2</sup>

The UAE's space program is based on the following institutions:

## The UAE Space Agency

The UAE Space Agency, established in 2014 is in charge of national space programs. The agency directs national space programs, creates space policy and regulation.

One of the space programs is the Genes in Space, which will see students compete for the opportunity to have their experiments launched into space and conducted by scientists on board the ISS and the Satellite Launch project.<sup>3</sup>

## Khalifa University

UAE's Khalifa University has opened the region's first space lab. The government has announced the setting up of a research center which will act as an incubator for space research and innovation. The laboratory has special unmanned aerial vehicles, robots and sensing systems that help mimic actual conditions in space.

## Mohammed bin Rashid Space Centre

MBRSC was founded by Sheikh Mohammed bin Rashid, Vice President of the UAE and Ruler of Dubai, in 2015 when it was integrated with the existing Emirates Institution for Advanced Science & Technology (EIAST). The center's projects include satellites and the Emirates Mars Mission. It has scientific laboratories and research facilities based in Dubai, as part of its broader goal of building a sustainable knowledge-based economy.

## The UAE astronaut corps

The UAE on September 6, 2017, launched its ambitious plan to send Emirati astronauts into space. Young Emiratis have been invited to register for the UAE Astronaut Program.

The United Arab Emirates (UAE) has selected in September 2018 its first two astronauts to go on a mission to the International Space Station (ISS). The new astronauts are Hazza al-Mansouri, 34, and 37-year-old Sultan al-Neyadi.

The first Arab in outer space was Saudi Arabia's Sultan bin Salman Al-Saud, who flew on a U.S shuttle mission in 1985. Two years later, Syrian air force pilot Muhammed Faris spent a week aboard the ex-Soviet Union's Mir space station.<sup>4</sup>

## The International Space Station (ISS)

The International Space Station (ISS) is the largest human-made body in low-Earth orbit. Its first component launched into orbit in 1998 and its development and assembly continues, with components scheduled for launch this year and in 2019.

The International Space Station (ISS), is a partnership between European countries (represented by ESA), the United States (NASA), Japan (JAXA), Canada (CSA) and Russia (Roscosmos), the International Space Station is the world's largest international cooperative program in science and technology.

## The Mars project

The United Arab Emirates (UAE) has announced their ambitious plans to send an unmanned probe to Mars. The probe, which has been named 'Hope,' will be the first Arab mission to another planet. Hope's mission is to sample Mars' atmosphere and track how it changes over features such as canyons, volcanos and deserts as well as over time.

The "Hope probe" would touch down on Mars by 2021, in time to commemorate the 50<sup>th</sup> anniversary of when seven emirates came together to form the UAE.<sup>5</sup>

## The Yahsat Company

Formed in 2007, Al Yah Satellite Communications Co (Yahsat) is a private joint stock company fully owned by Mubadala, based in Abu Dhabi, the capital of the United Arab Emirates. Yahsat has positioned itself to be global provider of broadband services. Yahsat operates under the authority of the Telecommunications Regulatory Authority of the UAE.

Yahsat has designed the Middle East region's first multi-purpose satellite system, based on its extensive interaction with customers and research into their communication needs.<sup>6</sup> Yahsat develops customized

satellite solutions for the government as well as the commercial sector in the Middle East, Africa, Europe and Southwest Asia. Yahsat, offers a range of communication services including voice, internet and television.

The company provides satellite connectivity through its YahClick broadband service, YahService solutions provider, YahLink networking and backhauling capacity and broadcaster Yahlive – a joint venture between Yahsat and Luxembourg's SES satellite operator.<sup>7</sup> Yahsat satellites cover 140 countries across the Middle East, Africa, Europe and central and south-east Asia. Yahsat has two satellites in orbit:

**Yahsat-1A** - Yahsat launched its first satellite (Yahsat-1A) from Kourou on 22 April 2011. Yahsat-1A is multi-payload C/Ku/Ka band satellite covering the Middle East, Africa, Europe, and Southwest Asia. The satellite was launched by an Ariane 5 rocket and weighed approximately 6000 kg. Yahsat 1A carries Ku-, Ka-, and C-band transponders and antennas. It will provide direct-to-home television programming, and secure Ka-band communications capacity for government and military applications in the United Arab Emirates and other nations.

**Yahsat-1B** - was launched from Baikonur in Kazakhstan by a Proton-M rocket on 23 April 2012. Yahsat-1B is a multi-spot Ka band satellite that provides broadband services to 26 selected countries in the Middle East, Africa, and Southwest Asia.

Yahsat 1B weighed approximately 6000 kg and is outfitted with 25 Commercial Ka-Band Transponders operating at 110MHz and 21 Secure Transponders for Military and Government Purposes.

## The Yahsat's Al Yah 3 satellite

Yahsat's Al Yah 3 satellite has been launched by an Ariane - 5 rocket, on January 26, 2018, from Kourou Space Centre in French Guiana.

Once it reaches its designated parking slot, Al Yah 3 will extend Yahsat's commercial Ka-band coverage to an additional 600 million users across Africa and Brazil.<sup>8</sup>

Al Yah 3 satellite is part of a joint venture between Yahsat and Orbital ATK. Orbital ATK is a global leader in aerospace and defense technologies. The company designs, builds and delivers space, defense and aviation systems for customers around the world, both as a prime contractor and merchant supplier. Orbital ATK built the satellite at the company's manufacturing facility in Dulles, Virginia.<sup>9</sup>

## The KhalifaSat project

Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai Sheikh Mohammed bin Rashid Al Maktoum inspected on February 3, 2018, the progress of the KhalifaSat project, which was built at the Mohammed bin Rashid Space Center (MBRSC). KhalifaSat, the first satellite fully manufactured by Emirati engineers in the UAE, is expected to enter orbit in 2018.<sup>10</sup>

He toured the Center and was briefed about the advanced features of KhalifaSat, which include enhanced digital camera, satellite positioning system, faster download and communication, automatic satellite control system, and advanced target positioning system.<sup>11</sup>

The KhalifaSat project, launched by Sheikh Mohammed in 2013, is part of MBRSC's long-term strategy to encourage innovation, stimulate technological progress, promote sustainable development and create a

generation of Emirati scientists and engineers who will contribute to a scientific renaissance and lead ambitious space projects over the next decade.<sup>12</sup>

KhalifaSat is the first satellite to be fully built by Emirati engineers, an achievement that highlights the UAE's growing expertise in satellite technology. The satellite is set to be launched later this year, following a series of rigorous tests.

Once the manufacture and rigorous testing phases have been completed, the satellite will be transported to Japan for launch aboard the Mitsubishi Heavy Industries rocket – H-IIA. When placed into a Low Earth Orbit of approximately 613km, the satellite will proceed to capture detailed imagery capable of competing with the highest industry standards. The images beamed back to earth by KhalifaSat will be among the most detailed commercially available, with a GSD of 0.7m Panchromatic, and 2.98m GSD in four multispectral bands. Once in orbit, KhalifaSat will provide detailed high-quality imagery for a variety of uses, allowing the UAE to provide competitive services across the world.<sup>13</sup>

## Other satellites of the UAE

The UAE mobile satellite communications company Thuraya (a private company) launched its first satellite, Thuraya-1, in 2000, as the Middle East's first mobile telecommunication satellite.

**DubaiSat-1** was the first fully UAE-owned satellite. It was launched in 2009, and then part of EIAST, which was later rolled into MBRSC. Dubai-Sat-1 generates optical images in panchromatic and multispectral bands at spatial resolution of 2.5m and 5m respectively. The satellite is a vital tool in helping the UAE and the Middle East develop infrastructure, monitor environmental changes and complete urban planning. DubaiSat-1 images are also integral to the promotion of geoscience and the support of a variety of science programs in both academia and the private sector.

**DubaiSat -2** blasted off in 2013.

**Nayif-1 nanosatellite** was among the 104 satellites launched from Sriharikota, India, in February 2017. The nanosatellite was conceived and manufactured under the aegis of the Mohammed bin Rashid Space Centre in collaboration with Emirati students from the American University of Sharjah.<sup>14</sup>

## Summary

Within the Middle East and North Africa (MENA) region, the most ambitious space program has been launched by the UAE government with the country's first fully government-owned satellite –DubaiSat-1 – sent into space in 2009.

The UAE recognized the importance of space for its knowledge-based economy and the government has already invested more than \$5.4 billion in the space industry.

The UAE space program has seen ambitious initiatives that include the astronaut program and the Emirates Mars Mission, where the UAE aims to send an unmanned probe to Mars. The mission is scheduled for launch in 2020.<sup>15</sup>

The astronaut program would make the UAE one of only a handful of states in the Middle East to have sent a person into space.

## Notes

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<sup>1</sup> UAE names its first two astronauts to be sent to International Space Station, Al Arabiya, September 2, 2018.

<sup>2</sup> National Space Program, Government. ae, the official Portal of the UAE Government.

<sup>3</sup> Space tourism revolution: breaking the final frontier, Ameinfo, June 4, 2017.

<sup>4</sup> UAE announces first astronauts to go to space, Ahram Online, September 3, 2018.

<sup>5</sup> David Reid, This Arab country says it's on track to go to Mars within three years, CNBC, November 15, 2017.

<sup>6</sup> Dania Saadi, Yahsat to launch third satellite in January and expand into Brazil, The National, December 5, 2017.

<sup>7</sup> Dania Saadi, Yahsat to launch third satellite in January and expand into Brazil, The National, December 5, 2017.

<sup>8</sup> Al Yah 3 satellite set for launch today, Gulf News, January 25, 2018.

<sup>9</sup> Al Yah 3 satellite set for launch today, Gulf News, January 25, 2018.

<sup>10</sup> Space tourism revolution: breaking the final frontier, Ameinfo, June 4, 2017.

<sup>11</sup> UAE Vice President Inspects First Arab-Built Satellite, Asharq Al Awsat, February 3, 2018.

<sup>12</sup> UAE Vice President Inspects First Arab-Built Satellite, Asharq Al Awsat, February 3, 2018.

<sup>13</sup> UAE Vice President Inspects First Arab-Built Satellite, Asharq Al Awsat, February 3, 2018.

<sup>14</sup> Space tourism revolution: breaking the final frontier, Ameinfo, June 4, 2017.

<sup>15</sup> Space tourism revolution: breaking the final frontier, Ameinfo, June 4, 2017.