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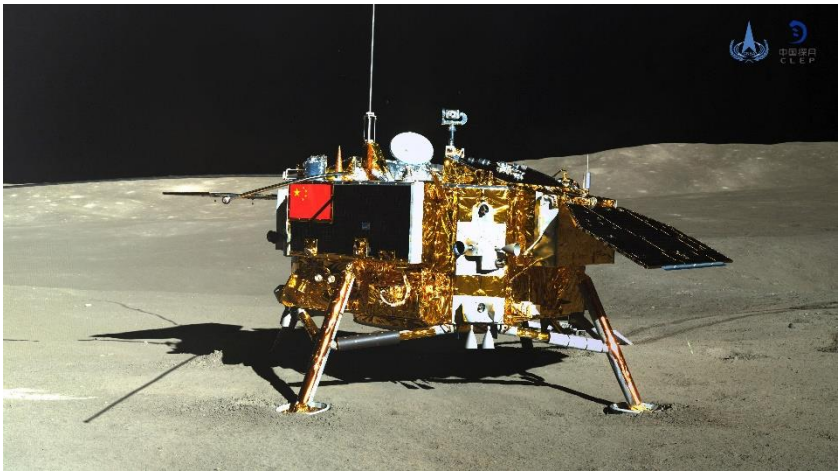

The Space Silk Road and China–Arab States Space Cooperation

A Chinese Perspective

Zhang Ming

NUS National University of Singapore | Middle East Institute Singapore

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The Middle East Goes to Space

In recent years, Middle Eastern governments have raised their profile in the field of space activities. The UAE sent an unmanned probe into Mars orbit and, like Saudi Arabia, has sent astronauts to the International Space Station. Both countries have made space exploration a major pillar of their post-oil economy. These projects are captivating Arab populations, reminding us of the enduring fascination with space and its appeal for national pride. Space is also a critical component of military strategies in the region, as reflected in Iran's ballistic missile programme or Israel's air defence systems.

This volume of *Insights* is aimed at discussing the various dimensions of the space programmes launched by countries in the Middle East as well as the role of external players in developing these programmes.

Cover image: China's Chang'e-4 lunar probe launched in 2018. The probe carried a micro optical camera provided by Saudi Arabia. Image released on 11 January 2019 by China National Space Administration. Reproduced courtesy of AFP.

The Space Silk Road and China–Arab States Space Cooperation

A Chinese Perspective

Zhang Ming*

Since its introduction in 2014, the Space Silk Road concept has aroused different responses around the world, ranging from welcome and praise to scepticism and criticism.[1] Given that China has identified the Belt and Road Initiative (BRI) as a key pillar of the global community of shared future,[2] it is safe to say that whether third parties like it or not, the jointly built Space Silk Road, as an important component of the BRI, will not go away, nor will China's commitment to advance space cooperation with the Arab states falter.

China's space cooperation with the Arab states began in 2007 with the signing of a memorandum of understanding (MoU) between China and Algeria for cooperation in space technology and application. The MoU identified earth observation, satellite communication and navigation as well as satellite launches as potential

[1] Daniel R. Russel and Blake H. Berger, "Weaponizing the Belt and Road Initiative", Asia Society, September 2020; John Dotson, "The Beidou Satellite Network and the 'Space Silk Road' in Eurasia", *China Brief* 20, No. 12, The Jamestown Foundation, July 2020, pp. 2–8.

[2] State Council Information Office, PRC, "The Belt and Road Initiative: A Key Pillar of the Global Community of Shared Future", October 2023, http://www.scio.gov.cn/zfbps/zfbps_2279/202310/t20231010_773734.html.

areas for future cooperation.[3] Six years later, in 2013, China and Algeria formalised their space cooperation by signing an agreement for cooperation on space science, technology and application. This was China's first governmental space cooperation agreement with an Arab state.[4] In hindsight, China–Arab states space cooperation up to this period was characterised by slow progress, involving just one country and in very limited areas.[5]

On a Fast Track

In the wake of the announcement of the Belt and Road Initiative (BRI) by President Xi Jinping during a visit to Kazakhstan in September 2013, a series of space proposals put China–Arab states space cooperation on a fast track. First, China Aerospace Science and Technology Consulting Co. Ltd. initiated the strategic concept of Space Silk Road at the 2nd China Space Forum in November 2014.[6] Second, at the 6th Ministerial Meeting of the China–Arab States Cooperation Forum (CASCF) in June 2014, President Xi outlined the "1+2+3" China-Arab cooperation framework,[7] which identified space satellites as one of three hi-tech and

[3] "孙来燕会见阿尔及利亚官员开展中阿航天领域合作" [Sun Laiyan met with Algerian officials to carry out China-Arab space cooperation], China Government Network, 14 June 2007, https://www.gov.cn/gzdt/2007-06/14/content_649319.htm.

[4] "中阿签署空间科学、技术及应用领域合作协定" [China and Algeria signed an agreement for cooperation on space science, technology and application], China Government Network, 12 December 2013, https://www.gov.cn/gzdt/2013-12/12/content_2546712.htm.

[5] 蔺陆洲 [Lin Luzhou]："中阿共建'天基丝路'：现状、问题与对策" [China-Arab joint construction of 'Space Silk Road': Status, problems and countermeasures],西亚非洲 [*West Asia and Africa*], No.1, 2021, pp. 100–101.

[6] "中国航天'智库'：'天基丝路'与'一带一路'结合" [China's space 'think tank': Combining the 'Space Silk Road' with the 'Belt and Road Initiative'], State Council Information Office, PRC, 13 November 2014, http://www.scio.gov.cn/ztk/wh/slxy/31213/Document/1386456/1386456.htm.

[7] The "1+2+3" China-Arab cooperation framework takes energy cooperation as the core, infrastructure construction and trade and investment facilitation as the two wings, and nuclear energy, space satellites and new energy as the three breakthroughs.

new technology cooperation priorities. This plan was reaffirmed in China's *Arab Policy Paper*,[8] released in January 2016. Third, China's State Administration of Science, Technology and Industry for National Defence (SASTIND) and the National Development and Reform Commission (NDRC) called for accelerating the construction and application of the BRI Space Information Corridor and elaborated on the relevant principles and goals in November 2016.[9]

"[China's] Space Silk Road is a broader, evolving space cooperation concept that goes beyond the Space Information Corridor to include cooperation in space sciences and deep space exploration."

At first glance, the definition of the Space Information Corridor is almost identical to that of the Space Silk Road. But in essence, the Space Information Corridor is a key pillar of the Space Silk Road and is focused on making full use of the existing and planned communication and navigation facilities and remote sensing satellites to build a space information service system to ensure interconnectivity with BRI countries and regions. The Space Silk Road is a broader, evolving space cooperation concept that goes beyond the Space Information Corridor to include cooperation in space sciences and deep space exploration.

That said, the reason China and Arab states have sought to boost space cooperation in the past decade runs deeper. First, it is based on the remarkable space progress that has taken place on both sides. As space-

[8] State Council Information Office, PRC, *China's Arab Policy Paper*, January 2016, https://english.www.gov.cn/archive/publications/2016/01/13/content_281475271412746.htm.

[9] "国防科工局发展改革委关于加快推进'一带一路'空间信息走廊建设与应用的指导意见" [Guidance issued by SASTIND and NDRC on accelerating the construction and application of the BRI Space Information Corridor], 23 November 2016, National Development and Reform Commission, PRC, https://www.ndrc.gov.cn/fzggw/jgsj/kfs/sjdt/201611/t20161123_1086163_ext.html.

based capabilities have become a key enabler and an important force multiplier in economic development, science discovery and technology advancement, as well as national security, while also conferring international prestige, both China and the Arab states aim high in space and have made big strides in the sector. Since the beginning of the 21st century, China has accomplished a series of landmark feats like the sending of the first Chinese into space in 2003, the Chang'e-4 robotic spacecraft's soft-landing on the far side of the moon in 2019, the completion of the BeiDou System-3 (BDS-3) navigation satellite system in 2020, the Zhurong's successful landing on Mars in 2021, and the completion of the Tiangong Chinese Space Station in 2023, to name a few. At the same time, led by the United Arab Emirates and Saudi Arabia, the Gulf Arab states, as an integral part of the Middle East, are investing heavily in space activities and have made impressive achievements in space application, manned spaceflights and deep space exploration, manifested in the UAE's ability to insert its Hope (al-Amal) probe into Mars orbit in 2021 and the first visit to the International Space Station (ISS) by a Saudi woman in 2023.

"Space cooperation between China and the Arab states is a win-win partnership mainly driven by mutual interests."

Second, China–Arab states space cooperation is facilitated by the gradual warming of China's overall relations with the Arab states. Broadly speaking, China–Arab states space cooperation is a symbol and a natural product of China-Arab friendship. China and the Arabs have historical relations dating back thousands of years. Besides various bilateral strategic partnerships signed over the past two decades between China and several Arab states, China and the League of Arab States jointly launched the China–Arab States Cooperation Forum in 2004, and the first China–Arab States Summit was held in 2022. Furthermore, as of December 2023, China has signed cooperation documents on the BRI with all 22 Arab nations and the League of Arab States. Meanwhile, economic ties between China and the Arab states grew explosively in the past decade. China is now the largest trading partner of the Arab states,

with trade volume between the two sides almost doubling in 2022 to US$431.4 billion from the level in 2012.[10]

Third, space cooperation between China and the Arab states is a win-win partnership mainly driven by mutual interests. The Space Silk Road aligns with the objectives of Abu Dhabi Economic Vision 2030, Saudi Vision 2030 as well as Oman Vision 2040. Space partnership between China and the Arab states includes satellite application and launch services, transfer of technology, joint space R&D, and space education and training. For China, the Space Silk Road aims to build a complete and technologically advanced civil space infrastructure system covering the entire Silk Road region with a view to providing regional public goods and expanding international space markets, besides promoting China–Arab states friendship. For instance, China's Fengyun meteorological satellites have been providing 24-hour monitoring services for the Arab states, with 10 Arab countries using Fengyun satellite data. For the Arab states, international space partnerships help them speed up the development of their homegrown space capabilities and contribute to their economic diversification. In essence, both China and the Arab states can mutually benefit from cooperating with each other in the space sector.

Achievements Abound

The concept of the jointly built Space Silk Road[11] injected new impetus to China–Arab states cooperation. In the decade following the launch of the concept, China has not only greatly increased the number of space partners but also has expanded the areas of cooperation, ranging from the Space Information Corridor to deep space exploration. Such

[10] Xinhua, "Ten years on, China-Arab states economic, trade cooperation scales new heights", 22 September 2023, https://english.news.cn/20230922/6600f65c818541a4b394b08385017977/c.html.
[11] National Development and Reform Commission, Ministry of Foreign Affairs and Ministry of Commerce, PRC, with State Council authorization, "Visions and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road", March 2015, http://qa.mofcom.gov.cn/article/chinanews/201504/20150400946146.shtml.

cooperation involved bringing in more and more space players from governments, industry and academia.

At the bilateral level, China co-developed space and satellite technologies with several Arab states, notably, Algeria, Egypt, Saudi Arabia, Sudan and the UAE. To name just a few instances of co-development, China launched Algeria's first communications satellite in 2017[12] and Sudan's first satellite in 2019;[13] China's Chang'e-4 lunar mission launched in 2018 carried an optical camera provided by Saudi Arabia;[14] and in November 2023 the UAE's University of Sharjah signed a MoU for cooperation on the International Lunar Research Station (ILRS), an initiative led by Russia and China.[15]

"China–Arab states space cooperation is becoming increasingly institutionalised."

Take China-Egypt space cooperation as an example. China not only completed a satellite assembly, integration and test (AIT) centre project in Egypt in June 2023, making Egypt the first African country to possess satellite AIT capabilities but also jointly designed and developed two satellites for Egypt. The second satellite, MisrSat-2, was assembled and tested in the AIT Centre in Egypt and launched into orbit from Jiuquan Satellite Launch Centre in China. This is an example of technology transfer from China to support capacity building in Egypt. Furthermore, China and Egypt signed a cooperation agreement on the

[12] "China launches Algeria's first communication satellite", CGTN, 11 December 2017, https://news.cgtn.com/news/77456a4d31637a6333566d54/index.html.
[13] "China launches Sudan's first ever satellite: official", *People's Daily*, 7 November 2019, https://peoplesdaily.pdnews.cn/tech/er/30001409223.
[14] "China launches unprecedented moon mission with Saudi technology", *Al Arabiya*, 21 May 2018, https://english.alarabiya.net/News/gulf/2018/05/21/China-launches-moon-mission-with-Saudi-optical-camera-technology.
[15] Andrew Jones, "Emirati university signs up to China's moon base project", *SpaceNews*, 20 November 2023, https://spacenews.com/emirati-university-signs-up-to-chinas-moon-base-project/.

International Lunar Research Station in December 2023, making Egypt the first Arab state to join the project.

At the regional level, China–Arab states space cooperation is becoming increasingly institutionalised, a development that is best illustrated by cooperation on the BeiDou navigation system (BDS). The China–Arab States BeiDou Cooperation Forum was set up in 2016 and first convened in 2017. The first overseas centre for China's BDS navigation system, the China–Arab states BDS/GNSS (global navigation satellite system) Centre in Tunis, opened in April 2018. The two sides also signed the China–Arab States Plan for Satellite Navigation in December 2021. As of October 2023, the biennial China–Arab States BDS Cooperation Forum had convened four times. In Saudi Arabia, Algeria, UAE, Oman, Morocco and other Arab states, BDS/GNSS high precision services have been widely used in land surveying and mapping, transportation, precision agriculture, environmental monitoring, security and other fields.

At the global level, China and the Arab states cooperate through relevant UN platforms such as the United Nations Office for Outer Space Affairs (UNOOSA), the Beijing office of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), and the UN-affiliated Regional Centre for Space Science and Technology Education in Asia and the Pacific (RCSSTEAP-China). Through the UNOOSA-China Manned Space Agency (CMSA) initiative, a Saudi experiment has been granted a place on board a future Tiangong Chinese Space Station mission; through the RCSSTEAP-China, China has trained a large number of space professionals for partner states.

Challenges Remain

China and the Arab states have made great progress in space cooperation in the past decade. However, both sides must brace themselves for an uphill battle in expanding space capabilities, geopolitical headwinds and growing competition as well.

First, space is hard, and the level of China–Arab states space cooperation ultimately depends on the level of space capabilities on both sides. Thus it is imperative that China and the Arab states remain on track in improving their space capabilities. Regardless of the remarkable space breakthroughs in the last two decades, China is still lagging behind the United States in terms of space funding, talents, technologies and industrial base. The US space budget of US$69.5 billion in 2022 represents nearly 60% of global government spending on space, dwarfing all other countries.[16] China needs to catch up and accomplish daunting space tasks like landing the first Chinese on the moon as well as completing the construction of the International Lunar Research Station.

"The level of China–Arab states space cooperation ultimately depends on the level of space capabilities on both sides."

Meanwhile, despite the recent surge of space activities across the Arab world, the Arab space sector is still in its infancy. Lacking space technologies and a skilled workforce, and with limited STEM education programmes and only a nascent space industrial base, the Arab countries still have a long way to go before emerging as heavyweights in the global space sector. Moreover, although both sides benefit from space cooperation, their priorities and agendas vary. While China aims to become a full-fledged space power by 2045, the Arab states for now mainly view space technologies as a powerful means for economic diversification, and their attention is focused on fostering a vibrant local space ecosystem.

Second, China–Arab states space cooperation is further complicated by the growing tension between China and the United States. It is no secret that the United States is increasingly concerned

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[16] "Space Foundation releases the Space Report 2023 Q2, showing annual growth of global space economy to $546B", Space Foundation, 25 July 2023, https://www.spacefoundation.org/2023/07/25/the-space-report-2023-q2/.

about China's growing space presence in the Arab world. In response, the United States is ramping up its charm offensive to compete with China for space allies in the Middle East.[17] On the one hand, the United States is leveraging its long-standing space ties and extensive space programmes to further cement its space ties with the Arab states. Take the Artemis Program, for example. The United States not only has successfully persuaded Bahrain, Saudi Arabia and the UAE to sign onto the US-led Artemis Accords – a series of non-binding bilateral arrangements between the US government and other governments covering the norms to be adhered to in outer space – but also has brought the UAE on board with an agreement that stipulated the latter would contribute to and operate the crew and science airlock module for the Gateway lunar space station[18] in exchange for a seat on the station.

"China–Arab states space cooperation is further complicated by the growing tension between China and the United States."

Armed with a more versatile toolbox, the United States can also thwart China–Arab states space cooperation. Notably, the agreement between the UAE and China in September 2022 to fly the former's planned Rashid II land rover for its second lunar mission on China's Chang'e-7 lander is stalled because the Rashid II includes some US-origin components that are forbidden to fly on Chinese rockets under the US International Traffic in Arms Regulations (ITAR).[19] Furthermore, some

[17] Mark R. Whittington, "NASA and China are competing for space allies in the Middle East", *The Hill*, 17 December 2023, https://thehill.com/opinion/technology/4360647-nasa-and-china-are-competing-for-space-allies-in-the-middle-east/

[18] According to a NASA press release, the airlock will allow "crew and science research transfers to and from the habitable environment of Gateway's pressurized crew modules to the vacuum of space". Abbey A. Donaldson, "United Arab Emirates Announce Artemis Lunar Gateway Airlock", NASA, 7 January 2024, https://www.nasa.gov/news-release/nasa-united-arab-emirates-announce-artemis-lunar-gateway-airlock/.

[19] Juan Pons, "US hinders lunar exploration mission agreed between Emirates and China", *Atalayar*, 19 June 2023, https://www.atalayar.com/en/articulo/new-

Arab states' heavy military dependence on the United States – 7 out of 18 US major non-NATO allies are Arab states[20] – gives the latter a very powerful lever to press the former to think twice before seeking space cooperation with China.

"China–Arab states space cooperation is also facing fierce competition from other players."

Last but not least, China–Arab states space cooperation is also facing fierce competition from other players. On the one hand, the Arab states have long engaged with a wide range of outside space powers like Russia, Europe (via the European Space Agency), India as well as Japan. In contrast, their space partnership with China is relatively new. Take UAE-Japan space partnership as an example. The UAE's Hope Mars probe was lifted to space by Mitsubishi Heavy Industries Inc's H-2A rocket from Japan's Tanegashima Space Center in 2020, and the first Rashid lunar rover bound for the moon in 2023 rode piggyback on the Hakuto-R M1 lander built by the Japan-based company ispace. On the other hand, strengthening regional partnerships has become increasingly popular across the Arab world. The Arab Space Cooperation Group (ASCG)[21] established in 2019 and the inaugural Middle East Space Conference held in January 2024 vividly reflect the Arab states' aspirations to promote regional space collaboration. Meanwhile, the MoU on space collaboration signed between the Saudi Space Agency and the Egyptian Space Agency at the end of 2023 further demonstrates a rising interest to enhance bilateral space cooperation among the Arab states. China must seriously take this new trend into consideration when

technologies-innovation/us-hinders-lunar-exploration-mission-agreed-between-emirates-and-china/20230619095722186839.html.

[20] They are Bahrain, Egypt, Jordan, Kuwait, Morocco, Qatar and Tunisia.

[21] Including 11 founding members, UAE, Saudi Arabia, Bahrain, Oman, Egypt, Algeria, Morocco, Jordan, Lebanon, Sudan and four other Arab states, Kuwait, Iraq, Mauritania and Tunisia.

pursuing space cooperation and economic opportunities with the Arab states.

Looking Ahead

As an important international space cooperation platform, the Space Silk Road has opened a new chapter in China–Arab states cooperation. Although it has undeniable geopolitical implications, the Space Silk Road is primarily an economic, science and technology cooperation platform. The BRI itself is an open and inclusive process that neither targets nor excludes any party.[22] Thus, despite the challenges and obstacles, the inevitable democratisation of space makes the prospect of building a high-quality Space Silk Road and of deepening China–Arab states space cooperation promising.

In the foreseeable future, China–Arab states space cooperation is likely to continue to centre on building the BRI Space Information Corridor, i.e., civilian space infrastructure, such as building a US$266 million satellite manufacturing plant in Saudi Arabia, developing the Abu Dhabi Space Eco City and constructing a US$1 billion vertical space launch installation in Djibouti. At the same time, China welcomes international partners, including Arab partners, to participate in its major space projects. Besides research and construction of the International Lunar Research Station at any stage and level of the mission China is also looking for various forms of cooperation involving the Tiangong Chinese Space Station, including sending astronauts to the space station as well as collaboration at the levels of module, payload and technology.

With regard to space science cooperation, China is accelerating the construction of a series of large space science equipment and facilities. These include the Lenghu astronomical observatory on the north side of the Qinghai-Tibetan Plateau, projected to be the largest astronomical observatory in Asia once completed, and the Xuntian

[22] State Council Information Office, PRC, "A Global Community of Shared Future: China's Proposals and Actions", September 2023, https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/202309/t20230926_11150122.html.

Chinese space station telescope to be deployed in 2025. The more sophisticated the space science equipment and facilities that China builds, the more cooperation opportunities it can offer to its Arab partners. ◆

* **Dr Zhang Ming** serves as a research professor at the Institute of International Relations, Shanghai Academy of Social Science. She obtained her PhD in international relations from Fudan University, Shanghai. Her research covers, among other fields, international security, space studies and transatlantic relations. She is the author of four books, the most recent being *Commanding the Ultimate High Ground: US Military's Space Operations Exploration* (2023). Her research has been published in the *Chinese Journal of European Studies*, *Contemporary International Relations*, *World Economics and Politics*, *International Review* and other well-known international relations journals in China.

29 Heng Mui Keng Terrace
Block B #06-06
Singapore 119620
Tel: +65 6516 2380; Fax: +65 6774 0458
Email: contact.mei@nus.edu.sg
www.mei.nus.edu.sg