INSIGHTS

No. 310 | 16 July 2024

Saudi Arabia's Space Programme

Evolution, Drivers and Approaches

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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. Saudi Arabia's first female astronaut, Rayyanah Barnawi (L), enters the International Space Station shortly after the hatches between the orbital outpost and the SpaceX Dragon Freedom spacecraft were opened, 22 May 2023. Courtesy of NASA.

Saudi Arabia's Space Programme

Evolution, Drivers and Approaches

Rufei Li*

Having made significant strides in building its space programme in recent years, Saudi Arabia now seeks to place greater emphasis on indigenous capacity building and institutional design for its space programme, which nonetheless remains dependent on foreign technology or services. As geostrategic competition in the space domain intensifies in the Middle East, specifically in the Gulf region, Saudi Arabia's space programme also embodies the kingdom's goal of matching other regional players such as the UAE and Iran in terms of advanced technology.

Saudi Arabia entered the arena of space exploration in a big way. As the kingdom witnessed an income boom from the late 1960s, it became a founding member of the Arab Satellite Communications Organization (ArabSat), the main provider of satellite services in the Arab region formed by members of the Arab League in 1976, and committed the highest amount among member states towards the

organisation's paid capital.[1] In the 1980s, with help from the United States and France, respectively, Saudi Arabia became not only the first Middle Eastern country to send an astronaut into space but also the first Arab country to launch a satellite.[2] By the year 2018, the kingdom was home to ArabSat, the largest satellite operator and service provider in the Arab world, as well as to various institutions that participate in space research and the commercialisation of space technologies.

Nevertheless, despite consistent efforts at promoting scientific and technological cooperation with Western partners, along with the domestic production of satellites, until the second decade of the 21st century, there was limited progress in Saudi Arabia regarding policy and institutional support for an indigenous space sector, let alone the formulation of a dedicated space programme.

The rise in Saudi Arabia's space efforts came about as the kingdom sought to lay a more systemic foundation for, and upscale, its space economy. This shift corresponded with Saudi Arabia's national transformation drive starting in 2016 under the new leadership. With Vision 2030 as its guideline, this grand scheme aims to build a knowledge-based economy and bring about openness and vitality to Saudi society, in addition to forging a new identity for the Saudi nation.

"The rise in Saudi Arabia's space efforts … corresponded with Saudi Arabia's national transformation drive starting in 2016 under the new leadership."

The space programme of Saudi Arabia is now driven by a variety of factors. Besides the aforementioned domestic need for economic diversification and identity building, geopolitics is another consideration.

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[1] Arab Satellite Communications Organization, "Arab League Member States", 2013, https://web.archive.org/web/20131022203843/http://www.arabsat.com/pages/ArabLeague.aspx.
[2] Nidhal Guessoum, "The Arab World's First Satellite", *Arab News Japan*, 4 June 2020, https://www.arabnews.jp/en/45thanniversary/article_21190/.

Regional competition for power and influence is driving Saudi Arabia to upscale its space programme and ramp up space expenditure: other states in the Middle East and North Africa (MENA) region with substantive wealth or sufficient technological capabilities, such as the UAE, Algeria, Israel and Iran, are also striving to establish themselves as important players in the space sector. Specifically, Riyadh views with concern the space programme of Iran – with its close connection with the military – and seeks to match the latter's relatively complete industrial chain and launch capacity.

Laying the Foundation: A Nascent Satellite Industry and Initial Focus on the Space Sector

In analysing Saudi Arabia's space ventures, it is important to distinguish between "space economy" and "space programme".[3] Given that "space economy" encompasses all actors in this realm and hence lacks focus, this essay uses the term "space programme" to narrow down its focus and to mainly denote the state-led institutional design, policy support and economic activities of public sector actors in "developing, providing and using space-related products and services". Between the 1980s and 2010s, Saudi Arabia's main focus in developing its space economy was in satellite manufacture and provision of satellite communications (Satcom) services. During this period, ArabSat and King Abdulaziz City for

[3] The Organisation for Economic Co-operation and Development (OECD) defines the space economy as "the full range of activities and the use of resources that create and provide value and benefits to human beings in the course of exploring, understanding, managing and utilising space. Hence, it includes all public and private actors involved in developing, providing and using space-related products and services, ranging from research and development, the manufacture and use of space infrastructure (ground stations, launch vehicles and satellites) to space-enabled applications (navigation equipment, satellite phones, meteorological services, etc.) and the scientific knowledge generated by such activities." See OECD, *OECD Handbook on Measuring the Space Economy*, (Paris: OECD Publishing, 2012), http://dx.doi.org/10.1787/9789264169166-en; and OECD, *OECD Handbook on Measuring the Space Economy,* 2nd Edition (Paris: OECD Publishing, 2022), https://doi.org/10.1787/8bfef437-en.

Science and Technology (KACST), a state body, served as the two main actors.

As a commercial corporation, the Riyadh-based ArabSat operates satellites to provide Direct-to-Home (DTH) television broadcasting, broadband and telephony backbone connectivity, and satellite internet.[4] The manufacture and assembly of ArabSat's 17 satellites was mainly entrusted to Western companies, including Thales Alenia Space, Lockheed-Martin and Boeing. The main characteristics of ArabSat's commercial model are direct purchases of Western satellites and subsequent reliance on overseas launch missions, while the corporation focuses on downstream services in the space sector.

"Between the 1980s and 2010s, Saudi Arabia's main focus in developing its space economy was in satellite manufacture and provision of satellite communications services."

In contrast, KACST adopted a different pattern regarding satellite development and operation. The City, formerly known as Saudi Arabia National Center for Science and Technology, took on its current name in 1985, and since then has served as a hub of scientific research in the kingdom, with direct support from the royal family. During the period under discussion, the City, with the affiliated Space Research Institute (SRI), functioned as the kingdom's semi-official space centre. In 2002, the Saudi government launched a National Science, Technology, and Innovation Plan (NSTIP), with KACST tasked with designing the plan and its implementation.[5] In this plan, space and aeronautics technology was listed among the 12 programmes for developing "the

[4] Satellite Markets & Research, "ArabSat", http://satellitemarkets.byteslinger.net/industry-resources/company-profiles/arabsat.
[5] Mohammad Alsudairi, Steven Jiawei Hai, and Kameal Alahmad, "How Saudi Arabia Bent China to Its Technoscientific Ambitions", Carnegie Endowment for International Peace, 1 August 2023, pp.3–4.

strategic technologies that are most important to the Kingdom", signalling the national security implications of the selected programme fields.[6]

Between 2000 and 2019, KACST produced 17 Saudi satellites, with the majority designed and manufactured locally by SRI. Currently capable of manufacturing mini satellites weighing between 100 kg and 500 kg,[7] the City's manufacturing capacity has steadily risen. It is worth noting that KACST also participated in the manufacture and operation of ArabSat satellites and paid special attention to obtaining technological transfer from foreign partners.[8]

"Until 2016, a space programme at the national level was yet to be established, given the lack of a coherent set of government guidelines, corresponding regulations and incentives for developing space products or missions."

Therefore, it would be valid to say that Saudi Arabia has made gradual progress in establishing an indigenous space industry and has come up with a comprehensive plan aimed at promoting the kingdom's techno-scientific infrastructure. Meanwhile, a space programme at the national level was yet to be established, given the lack of a coherent set of government guidelines, corresponding regulations and incentives for

[6] King Abdulaziz City for Science and Technology, Saudi Arabian Ministry of Economy and Planning, "Strategic Technology Program Summary Document", 2009, p.4.
[7] SaudiSat 5A and 5B, launched by a Chinese CZ-2D(2) rocket, are by far the heaviest satellites designed and manufactured by SRI. See Gunter D. Breb, "Saudisat 5A, 5B", *Gunter's Space Page*, https://space.skyrocket.de/doc_sdat/saudisat-5.htm#:~:text=SaudiSat%205A%20and%205B%20are,Saudisat%202%20and%20Saudisat%203.
[8] Peter B. de Selding, "Arabsat Orders US Satellites — with a Side of Know-how", *Space News*, 30 April 2015, https://spacenews.com/arabsat-orders-u-s-satellites-with-a-side-of-know-how/.

developing space products or missions.[9] ArabSat and KACST largely worked on their own despite occasional joint efforts in satellite production and operation.[10]

The Space Programme: Between Indigeneous Capacity Building and Foreign Outsourcing

Saudi Arabia's space programme in terms of a structured, government-directed effort to strategise and develop the entire gamut of space activities began to take shape only after 2016, under the leadership of King Salman and his son, Prince Mohammed bin Salman. However, it would be unfair to attribute the formulation of the Saudi space programme entirely to the new leadership. During the reign of the late King Abdullah, the Saudi government was in fact aware of the significance of expanding KACST's role in the value chain of the state's space economy The government hence designated TAQNIA Space, a subsidiary of the Saudi Technology Development and Investment Company (TAQNIA), as the authority responsible for "commercializing KACST technologies and operating national Saudi Satellite Assets".[11] On 14 March 2014, the Saudi government also signed a memorandum of understanding on cooperation in space science and technologies with China, which laid the foundation for various joint projects, according to

[9] Regarding the incentives, financial support for the first phase of the Innovation Plan was relatively scanty, with US$2 billion to be distributed among various entities in the 12 fields. See Ministry of Economy and Planning, "Ninth Development Plan 2010-2014", 2010, p.90.

[10] PR Newswire, "Arabsat and KACST Award Lockheed Martin Contract to Provide Satellite Systems to Strengthen TV, Internet, Telephone Communication", Lockheedmartin.com, 28 April 2015, https://news.lockheedmartin.com/2015-04-28-Arabsat-and-KACST-Award-Lockheed-Martin-Contract-to-Provide-Satellite-Systems-to-Strengthen-TV-Internet-Telephone-Communication.

[11] "Taqnia Space, Skyware & Crescent Join Forces to Form Joint Venture with KACST Saudi Arabia as the Technology Partner Aims to Be a Global Manufacturer of Satellite Equipment", *Business Wire*, 9 May 2016, https://www.businesswire.com/news/home/20160509006097/en/Taqnia-Space-Skyware-Crescent-Join-Forces-to-Form-Joint-Venture-with-KACST-Saudi-Arabia-as-the-Technology-Partner-Aims-to-Be-a-Global-Manufacturer-of-Satellite-Equipment.

Chinese sources.[12] However, the kingdom's strained budget caused by the drastic drop in oil prices forced a pause in its space activities between 2014 and 2016.[13]

"The approach that Saudi Arabia has adopted for its space programme is a top-down one."

The direct context for the formulation of Saudi Arabia's space programme is a new round of Saudi state-building. With King Salman taking office in 2015, the new leadership laid out a grand scheme for domestic economic and social reform under the banner of Vision 2030. The economic diversification agenda of this vision is aimed at building a knowledge-based economy and reducing the state's dependence on rent-seeking through oil.[14] Against this new domestic context, the current Saudi leadership has set its sights on the potential that space research, along with space activities, has as a "technological engine".[15]

The approach that Saudi Arabia has adopted for its space programme is a top-down one, seeking to nurture the still nascent space sector at home and simultaneously engaging in cutting-edge space projects, namely, manned flights, with almost sole reliance on purchases of foreign services.

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[12] 蔺陆洲, 《中阿共建"天基丝路"：现状、问题和对策》, 载《西亚非洲》2021年第1期, 第103页。[Lin Luzhou, "China—Arab Joint Construction of "Space Silk Road": Status, Problems and Countermeasures", *West Asia and Africa* 1, 2021, p.103.]

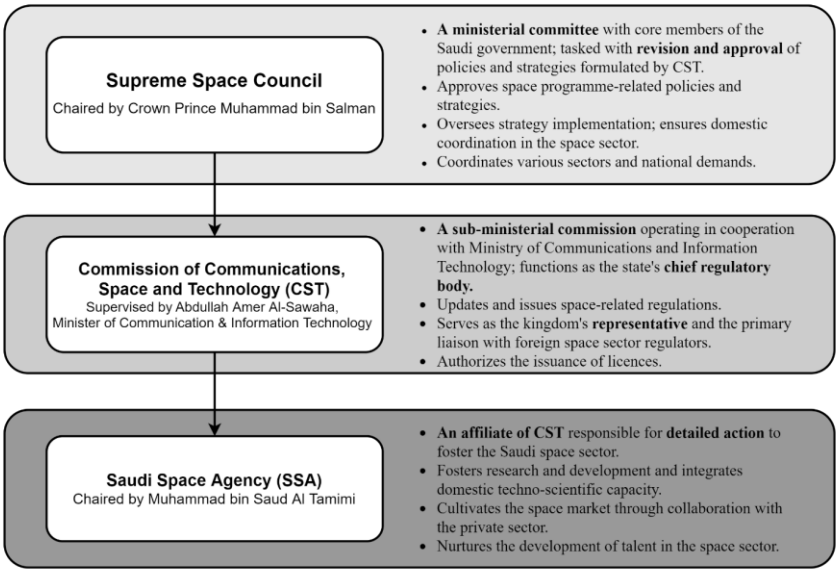
[13] The World Bank, "How Is Saudi Arabia Reacting to Low Oil Prices?" 28 July 2016, https://www.worldbank.org/en/country/gcc/publication/economic-brief-july-saudi-arabia-2016.

[14] Mark C. Thompson and Neil Quilliam (eds.), *Governance and Domestic Policymaking in Saudi Arabia: Transforming Society, Economics, Politics and Culture* (London and New York: I.B. Tauris, 2022), p.41.

[15] Yoel Guzansky, "Shooting for the Stars: The Arab 'Space Club'", *INSS Insight* 1175, 2019, p.1.

In the area of domestic capacity building, institutional design stands out among Saudi Arabia's efforts since 2015. In December 2018, the Saudi Space Commission was established by royal decree and later transformed into the Saudi Space Agency on 14 June 2023.[16] Its

Fig. 1. The Governing Structure of the Saudi Space Sector



Source: Adapted from Communications, Space & Technology Commission, "KSA Space Market Opportunities", 2023, https://www.cst.gov.sa/ar/mediacenter/Documents/KSA_Space_Market_Opportunity_Report.pdf, p.39.

supervising authority, the Communications and Information Technology Commission of Saudi Arabia, changed its title to Communications, Space

[16] Ghinwa Obeid, "Saudi Space Commission Elevated to Saudi Space Agency, Expanding Kingdom's Ambitions", *Al Arabiya English*, 14 June 2023, https://english.alarabiya.net/News/saudi-arabia/2023/06/14/Saudi-Space-Commission-elevated-to-Saudi-Space-Agency-expanding-Kingdom-s-ambitions.

& Technology Commission (CST) by cabinet approval on 10 November 2022.[17] The following year, the space budget skyrocketed to US$1 billion, up from US$160 million in 2018.[18] At the top level of the Saudi government, the establishment of the Supreme Space Council in 2022, which Crown Prince Muhammad bin Salman presides over, marks the completion of space-related institutional design in the Saudi state. (See Figure 1.)

"The bulk of the kingdom's space budget remains reserved for satellite-related operations, where the main need lies."

As for developing an indigenous space economy, Saudi Arabia continues to invest in its capabilities in satellite manufacture and operation with the aim of strengthening the state's comprehensive competence in both the upstream and downstream space sectors. The bulk of the kingdom's space budget remains reserved for satellite-related operations, where the main need lies. In 2019, expenditure related to satellite communication and Earth observations took up 63% and 22% of Saudi Arabia's space budget, respectively.[19]

By introducing an institutional framework for its space programme, Saudi Arabia seeks to integrate domestic techno-scientific capacity and extend the space sector value chain to incorporate more private sector actors. In this regard, the first "KSA Space Market

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[17] Communications, Space & Technology Commission, "Background", https://www.cst.gov.sa/en/AboutUs/Pages/History.aspx#:~:text=On%20the%2010th%20of%20November,of%20communications%2C%20space%20and%20technology.
[18] John Sheldon, "Saudi Space Agency Begins to Take Shape, Reported $1 Billion Budget in First Year", *Spacewatch Global*, 19 April 2019, https://spacewatch.global/2019/04/saudi-space-agency-begins-to-take-shape-reported-1-billion-budget-in-first-year/.
[19] Simon Seminari, "Where Do Arab Space Programmes Stand? Euroconsult Gives Us the Lowdown", *SatellitePro ME*, 25 September 2019, https://satelliteprome.com/opinion/update-arab-space-programmes/.

Investment Opportunities Report", unveiled by CST in November 2023, explicitly depicts the projected roadmap for the state's space economy. The "opportunities and challenges" section of the report mentions seven fields, the first three of which are manufacturing capabilities, launch services, and ground station infrastructure and services.[20] It is also worth noting that SAMI Advanced Electronics – a subsidiary of Saudi Arabian Military Industries (SAMI) – was among the "key players" mentioned in the report.[21] Given Saudi interest in the military potential of aerospace technologies, especially the latter's application to missile manufacture, the kingdom may expand the role of the military industry in its space programme in order to obtain parity with Iran, as will be discussed below.[22]

"The Saudi space programme also has what can be called an overseas dimension, which relies heavily on purchases of foreign services for high-end space activities."

While shoring up domestic capacity by improving indigenous techno-scientific infrastructure and expanding local markets for its space products, the Saudi space programme also has what can be called an overseas dimension, which relies heavily on purchases of foreign services for high-end space activities. The overseas dimension has been given renewed attention in Saudi Arabia's space programme. Branding itself as

[20] Communications, Space & Technology Commission, "KSA Space Market Opportunities", 2023, https://www.cst.gov.sa/ar/mediacenter/Documents/KSA_Space_Market_Opportunity_Report.pdf, pp. 47–49.
[21] Communications, Space & Technology Commission, "KSA Space Market Opportunities", 2023, https://www.cst.gov.sa/ar/mediacenter/Documents/KSA_Space_Market_Opportunity_Report.pdf, p. 44, 54.
[22] Khalil Shirgholami, "Missile Cooperation between China and Saudi Arabia: The Whys and Consequences", *Institute for Political and International Studies*, 29 December 2021, https://www.ipis.ir/en/subjectview/668320/missile-cooperation-between-china-and-saudi-arabia-the-whys-and-consequences.

the first Arab country to have sent a man into space, the new leadership seeks to revitalise this piece of memory and consolidate its leading position in manned flights. Reflecting this ambition, the kingdom sent two Saudi astronauts – including the first female astronaut – on an eight-day mission in the International Space Station (ISS) on 22 May 2023, four months after the UAE's Sultan al-Neyadi began his six-month mission in the ISS. In addition to manned missions, in July 2022, Saudi Arabia joined the Artemis Accords, a set of non-binding agreements between the United States and several governments setting out the norms for cooperation in exploring the moon and several aspects of space.[23] Despite the benefit that the overseas dimension of Saudi Arabia's space programme holds for training future Saudi talents, the recent mission to the ISS was merely a purchase by Riyadh – at a cost of about US$60 million per person.[24] Such manned space missions are more about the symbolic impact on the public. Hence, the recent manned

"The Saudi space programme essentially entails a twofold approach – the combination of ambitious targets in official statements and pragmatism in actual development."

mission to the ISS and a projected moon mission of Saudi Arabia not only serve as a sign of the state's capabilities and resolution to further its space programme, but also as a way of boosting Saudi national pride and

[23] Soon after signing the Artemis Accords, Saudi Arabia withdrew from the UN Moon Agreement for reasons that are not clear. See Ricky J. Lee, "Saudi Arabia's Withdrawal from the Moon Agreement", Australian and New Zealand Society of International Law, 25 July 2023, https://anzsilperspective.com/saudi-arabias-withdrawal-from-the-moon-agreement/.

[24] Tim Fernholz, "How Much Does It Cost to Visit the International Space Station?" *Quartz*, 22 May 2022, https://qz.com/how-much-does-it-cost-to-visit-the-international-space-1850461158.

strengthening the progressive role of the ruling Al Saud family in official narratives.[25]

Therefore, the Saudi space programme essentially entails a twofold approach – the combination of ambitious targets in official statements and pragmatism in actual development. The pragmatic element involves gradually building an indigenous space economy while the ambitious element involves outsourcing certain projects, especially involving deep space exploration, in exchange for boosting state prestige and strengthening national identity.

However, the current approach of Saudi Arabia's space programme means that a large portion of economic resources is still directed to outsourced projects of limited benefits in cultivating a domestic industrial and techno-scientific capacity, posing a potential risk to the development of an indigenous space economy. In addition, the sustainability of the approach itself remains an open question, as both the domestic capacity building element and outsourced manned missions are largely supported by government funding, while a domestic industrial system and participation of the private sector remain lacking.[26]

Space as a New Field of Geostrategic Competition

It is worth noting that the decision of the Saudi leadership to develop a space programme is not only a response to the pressing need for economic and societal transition. Developments in the space sector at the regional level since 2013 were another important factor prompting Riyadh to form its own space programme as several regional states renewed their respective space programmes. For instance, the UAE, Saudi Arabia's Gulf neighbour, established its space agency in 2014 and

[25] Madawi al-Rasheed, *A History of Saudi Arabia,* 2nd ed, (Cambridge: Cambridge University Press, 2010), pp. 11, 183, 188; Rosie Bsheer, *Archive Wars: The Politics of History in Saudi Arabia*, (Stanford: Stanford University Press, 2020), pp. 31–32.
[26] Yoel Guzansky, "Shooting for the Stars: The Arab 'Space Club'", *INSS Insight* 1175, 2019, p. 4.

quickly managed to establish itself as an important regional player.[27] Algeria, for its part, designed and built its first remote sensing satellites, which were launched by India in 2010 and 2016. It also strengthened its cooperation with China by signing a contract for the procurement of the country's first satellite, Alcomsat-1, in December 2014.[28] Despite economic constrains, Iran has managed to maintain a large space programme with a relatively complete space industry chain that entails not only consistent satellite production but also an indigenous launch capability. Iran's success in launching the Noor-3 reconnaissance satellite in 2023 clearly demonstrated its ability to build reliable solid fuel rockets, while also eliciting concerns about the possible application of such a technology to the launching of ballistic missiles.[29]

"Developments in the space sector at the regional level since 2013 were another important factor prompting Riyadh to form its own space programme."

It is unsurprising that financially or industrially capable countries in the MENA region are allocating more resources for national space programmes owing to the ability of such programmes to boost both their soft and hard power. For Saudi Arabia, Iran remains the major regional

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[27] John Sheldon, "The Spectacular Rise of the UAE Space Agency and the Challenges Ahead", *Spacewatch Global*, 3 July 2016, https://spacewatch.global/2016/07/spectacular-rise-uae-space-agency-challenges-ahead/.

[28] CIA, "The World Factbook, Space Programs", n.d., https://www.cia.gov/the-world-factbook/references/space-programs/; 蔺陆洲, "中阿共建'天基丝路'：现状、问题和对策", 载《西亚非洲》2021年第1期, 第101页。[Lin Luzhou, "China－Arab Joint Construction of "Space Silk Road": Status, Problems and Countermeasures", *West Asia and Africa* 1, 2021, p.101].

[29] "Iran Launches Satellite Using Ballistic Missile Technology", Foundation for Defense of Democracies, 29 September 2023, https://www.fdd.org/analysis/2023/09/29/iran-launches-satellite-using-ballistic-missile-technology/#:~:text=The%20Qased%2C%20first%20launched%20in,2%20satellite%20in%20March%202022.

rival notwithstanding the Chinese-brokered reconciliation between the two states in mid-2023, which has greatly eased tensions and paved the way for rebuilding mutual trust.[30] As the risk of direct armed conflicts has been significantly reduced, the two states now place even more emphasis on economic and technological competition, and, like their nuclear programmes, the space sector is another important arena for demonstrating their superiority over one another. In this bilateral competition, although Iran has a fairly strong industrial basis and a large pool of talents, it possesses limited economic resources owing to continual Western sanctions. In contrast, Saudi Arabia remains less competent in the field of industry, science and technology in spite of its deep pocket.

"The space sector is another important arena for Saudi Arabia and Iran to demonstrate their superiority over one another."

Apart from the goal of containing Iran, another driving force behind Saudi Arabia's space programme could be the subtle contest between Saudi Arabia and the UAE for leadership of the Gulf Cooperation Council (GCC) countries. From institutional build-up to manned missions in space, the two states have been taking turns to scale up their investments in space economies and projected extraterrestrial missions. Yet, both countries are willing to cooperate with one another.

[30] The relationship between Saudi Arabia and Iran is sometimes termed as "comprehensive strategic competition", as both states utilize their economic, diplomatic and sometimes military resources to forward their own interests while seeking to undermine others. For the scholarly debate on Saudi-Iranian relations and ongoing geostrategic strife, see David H. Rundell, *Vision or Mirage: Saudi Arabia at the Crossroads*, (London and New York: I.B. Tauris, 2021), pp. 225–238.

Saudi Arabia joined the Arab Group for Space Cooperation in June 2020, an initiative mooted by the UAE.[31]

Conclusion

Since its first steps in space, Saudi Arabia has come a relatively long way to formulate its national space programme. With an increased push from the leadership since the later years of King Abdullah's reign, along with further institutional and financial support since 2016, the space programme of Saudi Arabia now plays an important role in both state development and geostrategic competition.

"The effective implementation of the space programme … would still hinge on whether Saudi Arabia can tackle its structural weaknesses, such as its limited techno-scientific infrastructure and consequent external dependency."

This article argued that the space programme of Saudi Arabia should firstly be seen as a new channel for realising domestic economic and societal needs in the state's transformation agenda. The space programme is not an end in itself but also serves Riyadh's competition for regional influence and dominance. The long-standing emphasis that Saudi Arabia has placed on the strategic significance of space technologies, in addition to the recent participation of the Saudi military industry in the state's space programme, can well be viewed as part of Riyadh's attempts to address its security concerns and catch up with its Gulf neighbours by acquiring the capability to manufacture and launch rockets. Nevertheless, such an effort remains modest, compared to the

[31] Saudi Press Agency (SPA), "Saudi Arabia Signs Basic Charter of Arab Group for Space Cooperation with Participation of 14 Countries", 15 June 2020, https://www.arabnews.com/node/1690426/saudi-arabia.

long strides made in developing the domestic satellite industry and nurturing private players in the industry.

Saudi Arabia has, no doubt, started to reap the benefits of its nascent space economy,[32] in addition to creating the positive image among its citizens that it is leading the region's advancements in this new frontier. Nevertheless, the effective implementation of the space programme and fulfilment of the actual needs raised by the ongoing state-building process would still hinge on whether Saudi Arabia can tackle its structural weaknesses, such as its limited techno-scientific infrastructure and consequent external dependency. It would also depend on the country's ability to maintain the delicate balance between pragmatic development of an indigenous space economy and commencement of eye-catching but costly projects. ◆

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[32] Fast Company Staff, "Saudi Arabia is riding the exponential growth in space economy, with $400 million revenue in 2022", *Fast Company Middle East*, 8 November 2023, https://fastcompanyme.com/news/saudi-arabia-is-riding-the-exponential-growth-in-space-economy-with-400-million-revenue-in-2022/.

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