European Parliament

Asia's skyrocketing space race: A competition for peace?

SUMMARY

Over the past 20 years, new Asian players have emerged in the competition for space. Until the end of the 20th century, Japan – the only Asian country admitted to the International Space Station – played a leading role in the region. However, the beginning of the 21st century has seen the rise of other countries' space capabilities, fuelling a new space race.

China has made sizeable progress, outpacing Russia as the main competitor to the United States. Beijing aims to be the world's leading space power by the mid-2040s and has integrated its space activities in the army structure. China is planning to build a permanent research station on the lunar south pole and a solar power station in space. China and Russia are increasingly teaming up in space projects. India has showed the capability to perform low-cost missions, including the successful landing on the Moon in August 2023, making it the fourth country to achieve this. South Korea has a relatively recent space history, but aims to rank among the world's top five space powers by 2045. The United Arab Emirates (UAE) and Saudi Arabia have revealed ambitious space policies; the UAE aims to establish the first inhabitable human settlement on Mars by 2117.

Meanwhile, despite the narrative of a shared vision for humanity in space, China is accumulating major counter-space capabilities, including that of seizing control of a satellite, rendering it ineffective. The Chinese army has meanwhile designated outer space as a warfighting domain. There is also concern around the claimed pacific purpose of Iran's space programme, potentially supporting its intercontinental ballistic missile capacities. North Korea is also developing a space programme.

The European Union (EU) economy, society and security are increasingly reliant on space services. The April 2021 Space Regulation established the EU space programme and the EU Agency for the Space Programme. The EU's space strategy for security and defence was adopted in March 2023.

IN THIS BRIEFING

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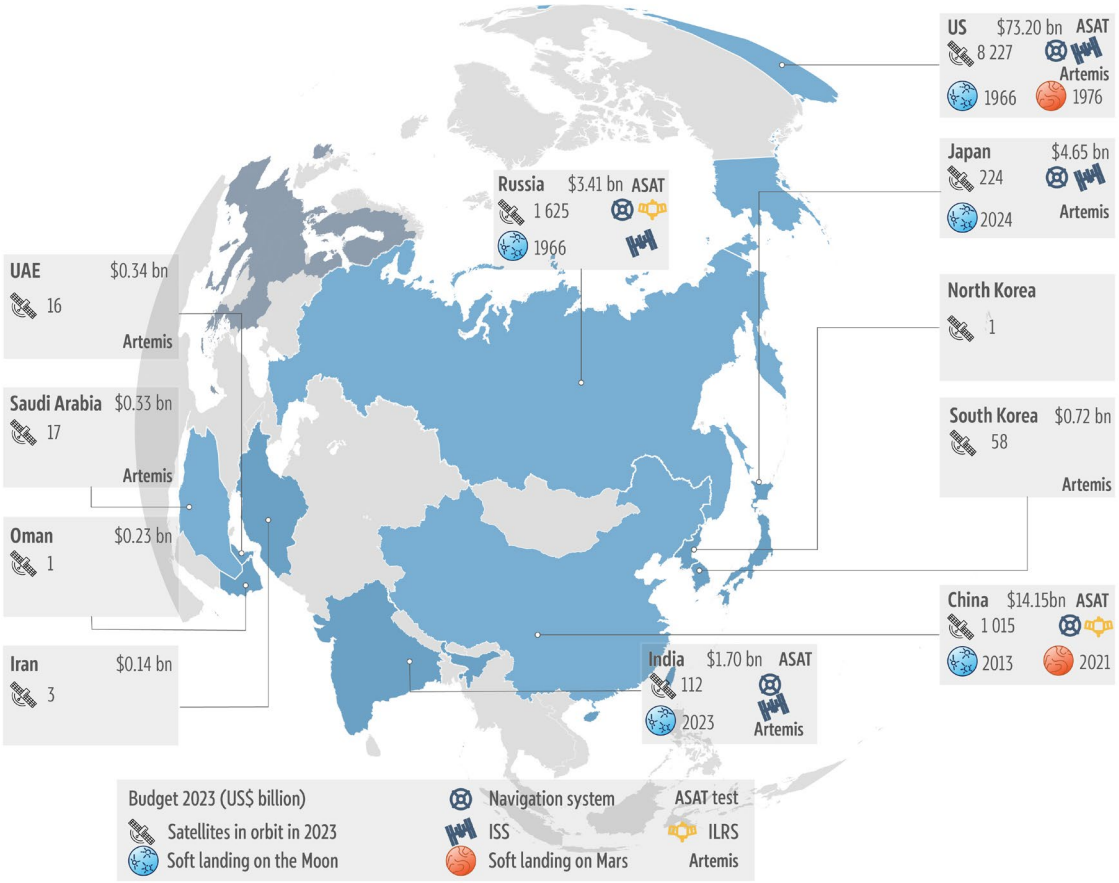
Figure 1 – Key space-related figures for selected countries



Data source: United Nations Office for Outer Space Affairs (UNOOSA), 2024.

The great space age

Global challenges are increasingly tackled with the support of space technologies. Space-based systems support a large part of critical infrastructure and services such as transportation, energy, water, food supply, communications and law enforcement. They represent key tools in observation of climate change, extreme environmental events and oceans, as well as in disaster management and also in dispelling disinformation. They are increasingly used in defence – warfare, conflict early warning, situational awareness, command and control. Today, lower launch costs are enabling a growing number of countries access to space, paving the way to an explosion in the number of satellite launches: in 2 years, the number of operational satellites in orbit has doubled. This is due in particular to the deployment of commercial satellite broadband constellations in low-Earth orbit by 'new space' actors: 78.6 % of active satellites are essentially operated by commercial operators. This growth has been driven largely by Elon Musk's SpaceX and its Starlink broadband constellation (used by both sides in the war in Ukraine), whose share of mass launched in the commercial market reached almost 80 % in the 2020-2022 period.

In 2022, the number of national space agencies around the world approached 70, while the number of countries able to launch a satellite in orbit is close to 100. Against this backdrop, the historical two-nation competition between the United States (US) and Russia (USSR until 1991) has been widening to many other countries (see Figure 1), resulting in a new international space order. Spanning from the Persian Gulf to East Asia, emerging actors at both national and private levels are engaged in a race towards space. Asia's share of global government expenditure on space programmes has nearly doubled since the early 2000s, driven by substantial Chinese investment.

According to Euroconsult, in 2023, with global government expenditure on space at US$117 billion, China (US$14.15 billion) was the world's second biggest spender after the US (US$73.2 billion), outpacing Japan (US$4.65 billion) and India (US$1.69 billion); the EU was at US$ 2.814 bililon). The United Nations Office for Outer Space Affairs (UNOOSA) calculates that over 13 000 satellites were orbiting Earth in June 2024; 1 015 belonged to China, second country of origin after the US (8 227 satellites).

Increasing reliance of the EU economy, society and security on space

The EU economy and society are increasingly reliant on space services: about 10 % of EU gross domestic product – over €1 100 billion – is enabled by satellite navigation signals. Eleven of the 27 EU Member States have already introduced national space laws. The Lisbon Treaty provided for a new Article 189 of the Treaty on the Functioning of the EU, defining space as a shared EU and Member State competence, and requiring the EU to draw up a European space policy. The 2021–2027 multiannual financial framework includes the April 2021 Space Regulation establishing the EU space programme and the EU Agency for the Space Programme (EUSPA, different from the European Space Agency (ESA), an international organisation created in 1975), and allocates €14.88 billion for its implementation. The Space Regulation brings together existing EU programmes (Copernicus, Galileo, EGNOS, GOVSATCOM, IRIS and Space situational Awareness) under one umbrella. The 2022 Strategic Compass for Security and Defence highlighted the need to boost the EU's security and defence in space. Following an EU Member States demand, in March 2023, the European Commission and the High Representative/Vice-President of the European Commission issued an EU space strategy for security and defence.

Several European Defence Fund and permanent structured cooperation (PESCO) projects are being used to develop space defence research and capability. An EU space law establishing rules on space traffic management and a framework to ensure the safety of critical space infrastructure is to be adopted later in 2024. In its November 2023 resolution on the Strategic Compass and EU space-based defence capabilities, the European Parliament suggested using the EU's space capabilities to address the 'increasingly important climate and security nexus', with consequences for EU security, its effect on migration and conflicts in neighbouring regions, and its implications for food security, energy production and international trade. Parliament welcomed the Commission EU space legislation proposal and urged the Commission and the Member States to increase investment in space surveillance and tracking data, as the EU is currently heavily dependent on other countries for it.

Space programmes of selected countries

China

China aims to be the world's top space power by the mid-2040s, in time for the People's Republic's centenary in 2049. According to Namrata Goswami, Beijing perceives space as a tool for its power projection capabilities, with the civilian and commercial space programme part of a national strategy towards greatness. To this end, in 2015, President Xi Jinpin instructed the People's Liberation Army (PLA) to provide for civil-military integration of space activities, through the creation of a fifth branch (along with army, navy, air and rocket forces): the Strategic Support Force (SSF). Tasked with several strategic functions and capabilities, the SSF is comprised of two divisions: the Space Systems Department – home to all space-related missions – and the Network Systems Department, housing the PLA's information warfare activities. Analysts argue that SSF missions likely support the pursuit of information dominance and fall into two categories: providing strategic information superiority and support capabilities directly to the PLA senior leadership, including counter-space operations and offensive cyber warfare, and offering information support services to military commands on the battlefield. Published in January 2022, China's 5-year 2021 white paper on its space programme reiterated Xi Jinping's guidance that the space industry is a critical element of the overall national strategy. Xi Jinping's speech at the 20th Party Congress in October 2022 identified space infrastructure as a critical component of the Chinese Communist Party's legitimacy.

China started its space programme in the 1950s, establishing the Chinese Academy of Space and Technology, and in 1970, launched its first satellite (Don Fang Hong 1) into outer space, using its

Long March-I indigenous rocket. Beijing has made major progress across a broad range of space technologies since 2000: in 2003, Shenzhou 5 carried aboard a first Chinese astronaut, making China the third country – after the USSR and the US – to send a human into space. Chang'e 1, its first lunar orbiter, was launched in 2007. Chang'e 3 landed on the Moon in 2013, while the Chang'e 5 mission was the first since 1976 to collect samples from the lunar surface and bring them back to Earth for scientific study. In January 2019, Chang'e 4 was the first-ever spacecraft to land on the far side of the Moon. Chang'e 6, a sample-return probe launched in May 2024, was the second one. In May 2021, Tianwen-1 made China the second country after the US to land a spacecraft on Mars successfully. In November 2022, China completed its Tiangong space station. China is excluded from the International Space Station (ISS) largely owing to US concern on the involvement of the PLA in Beijing's space programme, while Russia is to stay aboard at least until 2028.

The Venus Volcano Imaging and Climate Explorer (VOICE) mission is due to launch in 2026 and arrive in orbit around Venus in 2027. China is planning to send humans to the Moon by 2030 and to build a permanent research station on the lunar south pole by 2036. To support its lunar missions, in 2021, Beijing set up the International Lunar Research Station (ILRS) together with Russia's Roscosmos (the state corporation responsible for space). In 2023 Azerbaijan, Belarus, Egypt, Pakistan, South Africa and Venezuela joined the project, which is an alternative to US-led Artemis, set up in 2020 and gathering 43 countries, including Belgium, Bulgaria, Czechia, Germany, Greece, Spain, France, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Romania, Slovenia, Slovakia and Sweden. Related to ILRS is China's progression in planning for a generation of fully reusable rockets (such as SpaceX's Starship, with which it is sometimes compared): the Long March 9 rocket. This heavy rocket with a capacity to launch 150 tonnes to low Earth orbit (LEO) in its reusable version, and 250 tonnes in its expandable version, should be launched in 2030. Its two-stage reusable version is scheduled for an initial launch in 2040. According to Goswami, Long March 9 will be a game-changer for China's space programme, as it may allow for cheaper and more sustainable missions to the Moon and Mars. China is also developing a fleet of solid-propelled rockets: this makes it possible to launch quickly without having to rely on the cumbersome launch platform that liquid-propelled rockets require. In January 2024, Orienspace, a Chinese private company, launched the Gravity 1 rocket – the world's most powerful solid-propellant launch vehicle.

China is planning to build a space solar power station with power capability of 1 billion watts; this mega project will be operational for commercial use. The greatest challenge for this 10 000-ton power station will be the capability of long distance wireless power transmission technology. China is also going to cooperate with Russia to build a nuclear power plant on the moon by mid-2030s. Long-term, China would like to establish facilities for extracting water ice from the Moon, near-Earth asteroids, Mars, main-belt asteroids, and the moons of Jupiter by 2100. Through the construction of infrastructure such as resource transport routes and extra-terrestrial mining and processing stations, Beijing would thus have facilities forming a resupply system spanning the solar system.

In June 2020, China completed construction of its domestically developed BeiDou Navigation Satellite System (BDS), designed to rival the US-owned Global Positioning System (GPS). BeiDou is consistently referenced as 'the biggest' aerospace programme China has ever undertaken. The decision to build its own global satellite navigation and positioning system followed the 1996 third Taiwan Strait Crisis, when the PLA lost track of two of the three fired missiles in the strait, likely because the US had cut off the GPS signal in the Pacific. This made the Chinese aware of their vulnerability. BeiDou, which Beijing claims will be over 100 times more accurate than GPS, is offered as part of the Space Information Corridor (or Digital Silk Road) under the Belt and Road Initiative. According to Goswami, this may increase China's leverage over countries joining the Belt and Road Initiative (BRI). Voa News reported about possible security risks owing to the fact that – differently from the US GPS, Russia's GLONASS and the EU's Galileo mainly acting as beacons – BeiDou is a two-way communication system, which allows it to transmit data, such as the locations of receivers, back to satellites. For this reason, Taiwan has prohibited its use, deeming it a threat to its national security. In September 2022, China and Russia signed a partnership agreement to host three

ground-monitoring stations each for their respective navigation systems. State-owned China Satellite Network Group (SatNet), established in 2021, is building a satellite internet constellation of 26 000 satellites (the 'Chinese version of Starlink'), to provide global coverage.

China's commercial space companies are starting to enter their space systems' demonstration phases. Landspace, another Chinese commercial space company, successfully launched the world's first methane-liquid oxygen rocket – the Zhuque-2. Beijing Tianbing Technology, a Chinese space start-up, launched a kerosene-propelled rocket, the Tianlong 2, becoming the first such company to launch a liquid-propelled rocket to orbit.

China's potential military use of space development

Chinese sources weave a space narrative portraying China as a modernising nation committed to the peaceful uses of space and serving the broader interests of advancing humankind. Yet, according to China Aerospace Studies Institute's Kevin Pollpeter and others, the PLA has designated outer space as a warfighting domain that China must fight for and seize in order to win future wars, and must prepare for an enemy to attack from all domains, including space. Pollpeter identifies outer space as one of five major military threats facing the PLA. In particular, Beijing would aim to deter the US from taking actions that Beijing deems counter its national security interests. Moreover, Pollpeter argues that China is developing a wide range of counter-space technologies intended to threaten adversary space systems from the ground to geosynchronous orbit.

Beijing is developing major anti-satellite (ASAT) missile capabilities. While tests were first conducted by the US and the USSR back in the 1960s, the Chinese claimed to have conducted a satellite blinding experiment in 2005. China was the first country to destroy an orbiting satellite in 2007 (followed by the US in 2008, India in 2019 and Russia in 2021), at an altitude of 850 km. US Chief of Space Operations General B. Chance Saltzman said the Chinese test was a turning point in the history of military operations, as it showed potential not only to take out satellites but also to create debris that can be dangerous. In 2013, China allegedly tested a new ballistic missile relating to its ASAT programme. In January 2022, a Chinese satellite was spotted grabbing another long-dead satellite and later throwing it into a 'graveyard' orbit (space regions where defunct satellites are placed to minimise collisions with operational spacecraft) 300 km away. A 2023 CIA-classified document leaked by the Financial Times in April 2023 argues that China holds cyber capabilities 'to seize control of a satellite, rendering it ineffective to support communications, weapons, or intelligence, surveillance, and reconnaissance systems'. In May 2023, the Army Technology website announced that BlackSky geospatial satellite imagery intelligence identified the Korla East Test Site in Xinjiang as holding ASAT weapons to engage with foreign satellites.

According to an October 2023 US Ministry of Defence report, China is actively investing in space-based intelligence and developing counter-space capabilities, including kinetic-kill missiles, ground-based lasers and orbiting space robots. In March 2024, General Saltzmann said China has more than 470 intelligence, surveillance and reconnaissance satellites 'feeding a robust sensor-shooter kill web'. The Financial Times has stated that space is one of five military contests likely to determine the outcome of the China–US conflict over Taiwan. Taipei launched the third phase (2019-2028) of its national space technology long-term development programme, adopted a Space Development Act, and is working on developing its own satellite system. Taiwan's connectivity is currently served by 15 submarine internet cables that Beijing could attempt to sabotage in the event of an invasion.

According to a US–China Economic and Security Review Commission's staff report published in September 2017, China rejects the EU proposal on a non-binding code of conduct for outer space activities in pursuit of an option more favourable to its interests. At the 2008 UN Conference on Disarmament, China and Russia proposed a draft treaty designed to ban the deployment of weapons in space and the threat or use of force against outer space objects belonging to other state parties. The draft does not address ASAT weapons based on the ground, tests of ground-based weapons against a state's own outer space objects, or tests of ground-based weapons against other states' outer space objects that do not cause physical damage. The report remarks that while the draft

treaty would be legally binding treaty (unlike the EU-promoted code), it contains no verification measures and lacks specific compliance measures.

Namrata Goswami points to the Shenlong military spaceplane, able to transit unpredictably over another country although legally in outer space and above its sovereign airspace. She argues that a potential mission might be a surprise attack, which would not allow adversaries enough time to react, until the spaceplane opens its payload bay doors. In November 2023, the South China Morning Post reported that China has built the world's first 'Near-Space Command' equipped with deadly hypersonic weapons that can perform 'precise and merciless attacks'. The space command would operate in a 'near-space' area, between an altitude of 20 km and 100 km from Earth. This part of the atmosphere is above the upper limit for commercial airliners but below orbiting satellites. China was involved in accidents relating to violations of the sovereign airspace with its balloon reconnaissance.

Japan

When in 1969, the Japanese Diet set up the national space agency (known since 2003 as 'Japan Aerospace Exploration Agency' – JAXA), it adopted a resolution establishing the 'peaceful use of space' principle. This meant a limitation for the Japan Self-Defence Forces (JSDF) not to use satellites for intelligence gathering and communications, or to develop, launch and operate satellites and rockets. Therefore, Japan's space development – unlike other countries' – could not be linked to national security. In an evolving geopolitical environment, including the 2007 Chinese ASAT test, Japan decided to join the other countries, adopting a Basic Space Law in 2008 that aligned the country to the international 'non aggressive' interpretation of peaceful use of space. In 2012, the JAXA's foundational law was modified, to allow it to engage in military space activities. Meanwhile, University of Tokyo professor Kazuto Suzuki remarks that JSDF has retained its ability to operate without the use of space systems, limiting use to exceptional circumstances. Japan has no satellites for military purposes – the JSDF exclusively uses communications satellites operated by private companies. The JSDF set up a Space Operations Group, which does not perform activities in outer space; rather, it conducts space situational awareness activities, necessary to protect Japanese (but also US) assets in space, especially in cases of military conflict (e.g. with China).

In 2016, the Diet adopted the Space Activities Act in order to license launch and satellite operations and to clarify liability and indemnification for damages, and the Satellite Remote Sensing Act, which licenses remote-sensing devices and certifies remote-sensing data distributors. In May 2020, Japan launched its new space defence unit – the Space Operations Squadron – as part of its Air Self-Defence Force. Based on the 2008 Basic Space Law, in June 2020, the government adopted the fourth basic plan on space policy. The basic plan defines the all-governmental space programmes; its fourth version seeks to ensure the utilisation of private sector resources and initiatives, and the enhancement of business creation and open innovation by JAXA. The basic plan's implementation plan, defining the roadmap of all governmental space programmes, is regularly revised. In June 2021, Japan became the fourth country (after the US, Luxembourg and the UAE) to adopt a Space Resources Act requiring a permit in order to pursue space resource extraction activities. Application for the permit is combined with a permit for launching an artificial satellite. Adopted in December 2022, the new National Security Strategy of Japan (NSS) included a dedicated section on space, 'Reinforcing Comprehensive Efforts for Space Security', stating that 'Japan will strengthen its response capabilities in the field of space security'. Improving space capabilities and cooperation with JAXA are among the goals of the national defence strategy, adopted that same month. In June 2023, Japan published its first-ever Space Security Initiative.

As University of Washington's Saadia M. Pekkanen underlined, Japan has cutting-edge space technologies (which made it the undisputed space leader in Asia for decades), and it has developed legal and policy structures normalising the country's positions and interpretations to be consistent with international space law. Moreover, Tokyo has prioritised space diplomacy and governance in its foreign relations portfolio. Japan has been promoting regional space cooperation in the Asia–Pacific region: for instance, it hosted the first four annual Asia–Pacific Regional Space Agency Forums

(APRSAF) with partners in the Asia–Pacific region. In May 2021, Japan announced a new cooperation with UNOOSA on the 'Space Law for New Space Actors' project. The project seeks to support capacity building of emerging spacefaring Asia–Pacific countries for them to draft their national space legislation and regulations in line with international space law. This followed four BIRDS projects through which Japan assisted several countries in launching their own cube satellites in 2017-2018. In January 2023, the US and Japan announced the extension of their security alliance to space, in a move deemed to enhance defence capabilities against possible Chinese attacks on satellites. This is the first case of an alliance extending a formal military pact to outer space.

Japan – the only Asian country participating in the ISS – was the first after the US and the Russia to carry out a successful mission to the Moon orbiter in 1990. A leader in robotics, it became in 2013 the first country to launch a robotic astronaut – Kirobo – to the ISS. In 2019, its Super Low Altitude Test Satellite Tsubame set a Guinness world record as the lowest-altitude Earth observation satellite in orbit. Japan has also created a navigation system – the Quasi-Zenith Satellite System – which, differently from others, aims to complement the GPS and works as a satellite-based augmentation system. In January 2024, with the Smart Lander for Investigating Moon (SLIM) spacecraft, Japan became the fifth country to achieve a Moon landing after the US, USSR, China and India. In April 2024, it was announced that Japan would become the first country after the US to land an astronaut on the Moon, as part of the Artemis project. Beyond lunar exploration, Japan is to conduct a Martian Moons eXploration mission, with a launch envisaged in 2026, to study Mars's two moons (Phobos and Deimos) and return samples from Phobos to Earth in 2031.

South Korea

The Republic of Korea (RoK) initiated its space development programme in the early 1990s – later than other countries – following the establishment of the Astronomical Space Science Research Institute, the Korea Aerospace Research Institute and the Satellite Technology Research Center at the Korea Advanced Institute of Science and Technology in the late 1980s. According to Hyoung Joon An, Seoul's space programme has been driven primarily by a 'nationalistic rationale': space development is due to serve self-defence, economic security and national prestige. The RoK operated its first satellite in orbit (KITSAT-1) in 1992. The only Korean astronaut is a woman, Soyeon Yi, who had her first space mission in 2008, flying in the ISS with Russian Soyuz TMA-12. Korea's first successful orbital launch (Naro) was in 2013, when it developed its first space launch vehicle, KSLV1. In June 2022, it launched for the first time a satellite into orbit using its own rocket, the Nuri, becoming the sixth country (plus the ESA) able to launch independently into high orbits. The first lunar mission (Danuri) followed months later.

The 2005 Space Development Promotion Act aims to facilitate the peaceful use and scientific exploration of outer space. In February 2023, the RoK released the fourth revision of its Basic Plan for the Promotion of Space Development covering the 2023-2027 period, which laid out bold objectives for government investment in and structural changes to its space governance. In May 2024, Korea set up its own aerospace agency – Korea AeroSpace Administration (KASA) – modelled after US NASA (National Aeronautics and Space Administration). KASA's projects comprise the creation of a compact reusable launch vehicle system; the establishment of a maritime launch platform, the design of ultra-high-resolution satellites, and ventures into deep space exploration such as Mars, asteroids and L4 (Lagrange Points). The RoK wants to land a robotic spacecraft on the Moon in 2032 using indigenous technologies (the next-generation launch vehicle, KSLV-3, a kerosene and liquid oxygen-fuelled two-stage vehicle) and to 'plant the Korean flag' on Mars by 2045. Through KASA, the Korean government aims to bolster more than 2 000 innovative aerospace companies. KASA is to pave the way to joint initiatives with NASA, JAXA and the UAE. The ultimate objective is for the RoK to rank among the top five space powers worldwide by 2045.

The RoK has plans to build its own satellite navigation system (Korean Positioning System-KPS) composed by seven satellites by 2034, designed to be fully compatible with and complementary to GPS. Geopolitical reasons are at the base of some of Seoul's initiatives, including security issues with

North Korea and regional competition with China and Japan. Following North Korea's launch of a spy satellite in November 2023, the RoK launched its first one in December and its second one in April 2024 to monitor Pyongyang, which had reaffirmed its plan to launch multiple reconnaissance satellites. Under a contract with SpaceX, the RoK Korea is to launch five spy satellites by 2025.

North Korea

The first attempts of North Korea (Democratic People's Republic of Korea – DPRK) to launch satellites began in 1998 (Kwangmyongsong-1). Pyongyang has a story of some successes alternated with several failures. Its first succesful launch (Kwangmyongsong-3) was in December 2012; this sparked international outcry, as it potentially represented a step towards development of an intercontinental ballistic missile (ICBM), which actually occurred in 2017. In April 2013, North Korea established the National Aerospace Technology Administration (NADA), changed to National Aerospace Technology Administration (NATA) in 2023. In January 2021, the country's leader Kim Jong Un announced plans to develop military reconnaissance satellites. In September 2023, Russian President Vladimir Putin welcomed Kim Jong Un in Vladivostock announcing – along with bilateral military cooperation – Russia's support to North Korea in building satellites. In November 2023, North Korea finally succeeded in putting its first military spy satellite in orbit (allegedly with Russian aid): the Malligyong-1 satellite, intended to observe US and South Korean military movements in the region. Experts doubt whether the satellite would be able to provide high-resolution imagery useful for its military; Pyongyang has not released any photo. Following the launch, South Korea partially suspended a 2018 military agreement with North Korea, with the latter taking similar steps. UN Security Council resolutions prohibit North Korea from launching rockets for its space programme. Kim Jong Un stated the intention to launch more reconnaissances satellites.

India

India's space programme began in 1969 with the establishment of the Indian Space Research Organisation (ISRO). New Delhi's space policy goals included the creation of space technology for the benefit of the nation; the policy already emphasised the need to cooperate internationally in space exploration. Further developments included the satellite communication policy in 1997, the remote sensing data policy in 2001 and 2011, and the national geospatial policy in 2016. In December 2017, a space activities bill was tabled, to encourage and govern private sector participation in the space programme; it still awaits adoption.

In 2016, India acceded to the Missile Technology Control Regime (MTCR), which seeks to limit the risks of proliferation of weapons of mass destruction by controlling exports of goods and technologies. This paved the way for New Delhi working on military space capabilities (including to identify possible terrorist infiltrations from abroad) and shifting towards a more proactive approach to space security. In 2019, after conducting an ASAT test in March, India announced the setting up of a Defence Space Agency and later a Defence Space Research Organisation; in July, it conducted its first integrated space warfare exercise. NewSpace India Limited (NSIL), set up in 2019, aims to strengthen private-sector participation, transferring ISRO-developed technologies to Indian business. The 2020 government-led reforms allowed for private entities to carry out space activities. The establishment of an Indian National Space Promotion and Authorisation Centre (IN-SPACe) in 2020, in particular, has simplified the interface between ISRO and the private sector, as IN-SPACe functions as a single-window authorisation centre for both public- and private-sector space activities. In October 2022, the government announced the MissionDefSpace, which encourages private space companies to apply for 75 defence space challenges in order to provide solutions for both offensive and defensive capabilities. In November 2022, Skyroot launched the first privately made Indian space rocket Vikram-S (to be followed by Vikram-1).

A new Indian space policy was adopted in 2023, to set the framework for the above-mentioned reforms. One of the policy's goals is to develop India as a space power, while pursuing its security and international relations, with a focus on peaceful exploration of outer space. The Department of

Space, under the Prime Minister's Office, is the main policy-making and implementing body; ISRO remains responsible for research and development. With this policy, India (the second country in Asia after Japan) staked out its position on space resources, encouraging the private sector to extract them (in 2017, the Indian programme to mine Helium-3 on the Moon was revealed).

Across its activities, India has showed the capability to perform low-cost missions: in 2023-2024, ISRO had a budget of US$1.93 billion, against US$ 25.3 billion for US NASA. India launched its first satellite in 1975. In 1984, the first Indian astronaut went into space on a Russian spacecraft (Soyuz T-11). Chandrayaan-1, India's first mission to the Moon, was launched in 2008. India's Mangalyaan ('Mars Craft') spacecraft successfully entered the Mars orbit in 2014, making ISRO the fourth after the US, the USSR and the ESA. India can launch multiple payloads: in 2017, it put a record 104 satellites by a single launch. In 2018, it started the Indian Regional Navigation Satellite System, operational name NavIC ('Navigation with Indian Constellation'), covering India and the neighbouring region. In 2019, India became the third country to destroy an orbiting satellite, in a show of its ASAT missile capabilities. In May 2022, ISRO announced a mission to Venus for 2025. In June 2023, India joined the Artemis Accords. In August 2023, Chandrayaan-3 landed on the Moon, making India not only the fourth country to achieve this but also the first one to land a rover near the lunar south pole. Following a 13-month training in Russia, India is due to send its first three astronauts in the space in 2025 through its Gaganyaan mission – this would make India the fourth country after the USSR, the US (both in 1961) and China (2003). ISRO has announced plans for an independently owned space station by 2035, and to send astronauts to the Moon by 2040.

Iran

Iran's position on its space programme is that the country uses peaceful technologies in the path of its scientific-research development according to international standards. The space programme is also a reason of national pride. The Iranian Space Agency (ISA), established in 2004, operates under the Supreme Council of Space chaired by Iran's president. Analysts and institutions have raised doubts as to the purportedly purely pacific purpose of Iran's space programme. John Krzyzaniak, researcher at the Wisconsin Project on Nuclear Arms Control, remarks that while ISA falls under the Ministry of Communication and Information Technology, the Ministry of Defence is also directly involved, since its subsidiary groups develop the rockets for launching satellites and also some of the satellites. The Supreme Council of Space does not control the space activities of the Islamic Revolutionary Guard Corps (IRGC) – an elite military corps separated from the regular army, subject to four EU sanctions regimes, and which the European Parliament has been calling to designate as a terrorist organisation since January 2023. In April 2020, the IRGC launched its first reconnaissance satellite into space – Noor 1, followed by Noor 2 in March 2022 and Noor 3 in September 2023 (Shahryar Pasandideh argues that these satellites cannot capture high-resolution imagery).

Joint Comprehensive Plan of Action (JCPOA)

In July 2015, China, France, Germany, Iran, Russia, the United Kingdom (UK) and the US signed a Joint Comprehensive Plan of Action (JCPOA), to ensure the peaceful nature of Teheran's nuclear programme in exchange for the termination of restrictive measures against Iran. In May 2018, then US President Donald Trump decided to withdraw from the agreement and to re-impose US sanctions. In July 2019, Iran announced that it was reducing its commitments under the JCPOA, and later that it was no longer respecting any of the limits on its nuclear programme imposed under the agreement. New US–Iran negotiations under President Joe Biden have not been successful.

Concerned with the potential implications for the region's stability, the US administration has repeatedly warned that the Iranian space programme supports its intercontinental ballistic missiles (ICBMs) capacities, and circumvents UN Security Council Resolution 2231 adopted in October 2015 to endorse the JCPOA (see text box). It called on Iran to observe an 8-year moratorium on 'any activity related to ballistic missiles designed to be capable of delivering nuclear weapons, including launches using such ballistic missile technology'. In 2019, Washington denounced ISA for engaging in proliferation-sensitive activities. Krzyzaniak argues that the IRGC has focused on developing

solid-fuel rockets, which could be more easily converted to missiles, as opposed to the liquid-fuel rockets on which the state-run space programme initially relied. Russia supports Iran's space programme: it launched an Iranian Khayyam satellite in August 2022 (suspected to be used on troops movements in Ukraine), and in December 2022, the two countries signed a 10-year cooperation agreement. In January 2024 (shortly after the IRGC launched its own Soraya satellite), Iran announced that it successfully launched into space three satellites using technology similar to that of ICBMs. Tehran aims to launch astronauts into space by 2029.

United Arab Emirates

The United Arab Emirates (UAE) 2016 national space policy (NSP) lists several goals, including: building a strong and sustainable space sector protecting national interests and vital industries; contributing to the economy's diversification; promoting national pride; enhancing border protection and security; and strengthening the country's status at regional and global level. In March 2019, the UAE adopted its National Space Strategy 2030, which outlines plans to achieve NSP goals, including the opening of four space research and development centres, and the adoption of national space laws and regulations. The UAE Space Agency (UAESA), established in 2014, is meant to implement the NSS. The UAE Law on the regulation of the space sector, outlining the government's favourable attitude towards the commercial exploitation and use of space resources, was adopted in December 2019. A space court, open to both Emirati and foreign companies, was established in Dubai in January 2021 in order to settle commercial disputes in the space sector.

UAE activities in space began with the creation of the Thuraya Communication Company in 1997, followed by the launch of its first satellite – Thuraya 1 – in 2000. That year, the UAE set up the Space Reconnaissance Center, to provide armed forces with high-resolution satellite imagery for systems assisting in early warning, monitoring, and planning security missions. The UAE began to develop space capacities with South Korea's support and through the Emirates Institute for Advanced Science and Technology (EIAST) set up in 2006, until the UAESA took over many of these activities. In 2015, the EIAST was integrated into the Mohammed bin Rashid Space Center (MBRSC), a UAE scientific and technological hub. The first Emirati astronaut (and third Arab) travelled to the ISS in 2019 aboard a Russian Soyuz MS-15. The UAE undertook the first planetary science mission led by an Arab country in 2020; the 'Hope' mission reached orbit around Mars in February 2021 with a lunar lander designed by Japanese company iSpace. The UAE aims to establish the first inhabitable human settlement on Mars by 2117. In view of this, the Mars Science City, simulating the Martian habitat and landscape, is due to be built near Dubai, at an estimated US$135 million. In October 2021, in the context of the 'Emirati interplanetary mission', the UAE announced plans for a 'Beyond Mars' mission to reach Venus and several asteroids between Mars and Jupiter, with the launch planned for 2028. That same month, the UAE and Jeff Bezos's Blue Origin agreed a deal to build a spaceport in the UAE exclusively dedicated to launching space tourism missions. In July 2022, the government announced plans for a synthetic aperture radar satellite constellation – 'Sirb' – to be developed over 6 years, as part of a fund worth US$800 million supporting the space sector. The UAE is actively collaborating with other space agencies and nations, including Luxembourg and the UK.

Oman

In its July 2023 space policy for 2023-2033, Oman identifies four pillars: economic diversification (Oman Vision 2040), capacity building, national security, and environment and natural resources. The policy aims to make Oman a new space gateway; in 2022, Oman's national aerospace services company (NASCOM) began the Etlaq spaceport project in Duqm. Etlaq is meant to be an integrated space launch complex; taking advantage of its latitude, it would offer the second-highest launch velocity compared with the top five most utilised launch sites in the world (the highest being the *Centre Spatial Guyanais* located in Kourou in French Guyana, also known as 'Europe's spaceport'). The Omani spaceport – the first in the Gulf region – is set to become operational by 2030. UK Launch Services have been chosen to design the spaceport's official master plan. Oman's first space mission took place in November 2022, with the launch of its first satellite, Aman.

Saudi Arabia

Saudi Arabia's goal is to develop its space activities with a view to enhance the economy's diversification and growth, in the context of its Vision 2030. The country plays a leading role in the Arab world in terms of space policy: its capital Riyadh hosts the headquarters of Arabsat, the pan-Arab satellite communication organisation founded in 1976 by the 21 Arab League member states, as well as one of the two satellite control stations (the other is in Tunisia). The first Arab and first Muslim to become an astronaut was a prince: in 1985, Prince Sultan bin Salman bin Al Saud (son of current King Salman of Saudi Arabia), the first-ever member of a royal family to fly into space, flew on US space shuttle Discovery. He represented Arabsat in deploying its first satellite. (The second Arab and Muslim astronaut was in 1987 a Syrian turned refugee following civil war in his country.) The first Arab woman astronaut was Saudi Rayyanah Barnawi; she was part of Axiom Space's (the world's first commercial space station's) private mission to the ISS, launched by SpaceX in May 2023.

In December 2018, the Saudi Space Commission was established, then elevated to Saudi Space Agency (SSA) in June 2023. In February 2024, the SSA hosted a space debris conference. In April 2024, the SSA signed an agreement with the World Economic Forum to establish a space-focused Centre for the Fourth Industrial Revolution (C4IR), a platform for multi-stakeholder collaboration. The Centre for Space Futures, set to open in autumn 2024, will be the first centre in the C4IR network to focus exclusively on space. Germany's Global Government Technology Centre participates in the network. Saudi Arabia will also be the launch site of Spanish near-space tourism company's Halo Space prototype capsule 32 km above the Earth's surface. The company aims to start commercial flights by 2026. In May 2022, Saudi Arabia announced its intention to merge air and space forces – the US military is assisting Riyadh in this move.

Cooperation on space in Asia

Established in 1993 under Japan's initiative, the Asia–Pacific Regional Space Agency Forum (APRSAF) is the region's the largest space-related conference. Public and private stakeholders from more than 40 countries participate in this regional cooperative framework, whose secretariat is in Tokyo. Since 2008, the APRSAF's centrality has been challenged by China-driven Asia–Pacific Space Cooperation Organization (APSCO), headquartered in Beijing, which includes non-Asian countries such as Peru and Türkiye among its eight members states. APSCO is an intergovernmental organisation asymmetrically centred around China, while the APRSAF is a coordination mechanism of institutions, although running cooperation initiatives.

Space law treaties and principles

The core of international space law is represented by five treaties emphasising peace and international cooperation. Most of the Asian countries listed in this briefing have ratified four of them: the 1967 Outer Space Treaty, the 1968 Rescue Agreement, the 1972 Liability Convention, and the 1975 Registration Convention. Exceptions: Oman has not ratified the Rescue Agreement; Iran has signed the Outer Space Treaty and the Registration Convention but not ratified them. None of these countries has ratified the 1979 Moon Agreement (only India has signed it).

India uses space technology to enhance its regional leverage in response to the perceived growing presence of China in South Asia. In May 2017, Delhi launched its South Asia Satellite (GSAT-9), a communication satellite dedicated to offering services to the region, such as telecommunications and broadcasting applications, including telemedicine, tele-education and disaster management support. All South Asian countries minus Pakistan joined the project. India is also developing ties with other Asian and Gulf countries. India and Japan agreed on a LUPEX (Lunar Polar Exploration) joint mission to investigate for water near the lunar south pole in 2025. Other partnerships are in place among Asian countries, as well as between them and other regions' nations. China has signed bilateral space partnerships with more than 20 African countries, and has expanded its space cooperation with Latin America. China National Space Administration (CNSA) set up a Joint Committee on Space Cooperation with BRICS (Brazil, Russia, India, China, South Africa), whose first meeting took place in May 2022. They operate the BRICS Remote Sensing Satellite Constellation.

Europe–Asia cooperation on space

The ESA and the EU, separate organisations whose member states only partly coincide, are close partners. The ESA has been cooperating with Chinese authorities since the 1990s. SMILE (Solar Wind Magnetosphere Ionosphere Link Explorer) is a joint mission with the Chinese Academy of Sciences, scheduled to launch in May 2025. In 2004, China joined Galileo – a participation not well received by the US. However, Beijing backtracked once it decided its BeiDou, initially announced as a regional military system, emerged to be a global civilian system. China also decided to use the same radio frequencies for its encrypted services already used by Galileo. China was eventually removed from Galileo. In December 2014, the ESA and the China Manned Space Agency (CMSA) signed an agreement on human spaceflight activities. After a first joint training in 2017, the ESA lost interest in sending its astronauts to China's Tiangong space station. China cooperates with France on a China–France Ocean Satellite (CFOSAT) and Space-based Multiband Astronomical Variable Objects Monitor (SVOM) – the agreement was signed in 2006. In 2013, China and Italy signed a cooperation agreement on an electromagnetic monitoring experimental satellite.

The EU and Japan have a shared vision for space exploration. The ESA has several cooperation projects in place with JAXA. In January 2023, in the margins of the EU–Japan Space Dialogue, the European Commission and Japan's Ministry of Economy signed a Copernicus cooperation agreement to boost exchange of Earth observation data in areas of common interest (the Commission signed such an agreement also with India). In addition, Japan cooperates with several EU Member States: in June 2024, JAXA and Luxembourg Space Agency Foundation (LSA) signed a memorandum of cooperation. In August 2019, the ESA, JAXA and NASA issued a Joint Declaration on trilateral collaboration. They worked on the definition of the joint lunar communication and navigation international standards, LunaNet. A public LunaNet version was released in September 2023, as a standard to be applied to future ESA's Moonlight communication and navigation services on and around the Moon (the first off-planet commercial telecommunications and satellite navigation provider). In December 2023, Japan joined the Combined Space Operations Initiative (CSpO), a US-led multinational framework on cooperation and conflict prevention in space that includes Germany, France and Italy.

In November 2016, the ESA and the Asian Development Bank signed an agreement to collaborate on using information from space to support sustainable development. The Commission also cooperates with ASEAN (the Association of Southeast Asian Nations) on space applications. In January 2023, the Commission signed a contribution agreement with the ESA to build a national Copernicus data centre in the Philippines. The APRSAF and the European Space Policy Institute (ESPI, supported by the ESA) regularly organise an inter-regional space policy dialogue.

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