



**ESPI**

European Space  
Policy Institute

# ESPI Insights

## Space Sector Watch



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## TIME TO ACT TO BREAK SILOS IN SPACE AND BETTER SUPPORT SECURITY AND DEFENCE



The traditional lines between civilian security and defence in Europe are vanishing. People affected by crises and security actors in the field are facing challenges increasingly induced by climate change as well as crises resulting from war. They need help and support. European policy-makers are reacting to the situation: more than € 50 billion have been made available to Ukraine by the EU and its Member States for humanitarian assistance, emergency budget and military support; Germany unblocked € 30 billion for reconstruction after the floods in 2021. European governments are increasingly addressing security and defence through a whole-of-government approach, beyond the perimeter of the Ministries of Interior and Defence. The European and foreign policy dimension of the challenges, and their duality, are being understood.

At the same time, the strategic importance of space starts to be recognised, as can be seen with the creation of military space organisations in several countries and the higher prominence of the topic on the political agenda. A prime example is the EU Space Strategy for Security and Defence, which acknowledges the dual-use nature of many space solutions, and advocates for greater interconnection between space and security and defence.

With the invasion of Ukraine by Russia, the general public has directly witnessed for the first time the actual value of space, as Earth observation, communications and navigation satellites provide help to both civil society and military actors. Yet, this support from space primarily originates from U.S. entities. U.S. commercial companies are supplying Earth observation information (e.g. Maxar) and connectivity (e.g. Starlink), and have been very responsive and instrumental in providing critical help to Ukrainian authorities and people. In comparison, European support through space solutions has been rather reduced in scale, thus not being fully in line with the intentions expected from a € 50 billion aid package.

Europe has no clear framework for programmes that would link security policy priorities with space policy decisions to secure fresh funding and generate concrete actions delivering the urgently needed space solutions in the field. In parallel, other space powers have since long defined their industrial capacity and capability to innovate as part of their security and defence strategy. They also increasingly leverage commercial dynamics. Therefore, like in the United States, a European framework should fully include support to industry competitiveness and commercial efforts, in order to safeguard Europe's ability to develop and implement the required technologies, systems and services.

Implementation mechanisms exist in Europe in the civilian space domain, in particular with ESA, and many of the developments entrusted to ESA by its Member States already concern technologies and systems that can later be used for dual-use applications. European space industry, in cooperation with ESA and other public stakeholders, also contribute to the development of these capabilities. It has since long used them to operate in global markets and respond to commercial needs as much as to military ones.

In this context, the 2nd ESA Security Conference, co-organised by ESA and ESPI on 16-17 May 2023, provided further insights. More than 250 participants and 40 speakers took part in the event, about twice as many as during the first conference in 2021. Contributions from national, European and international institutions, industry, think tanks as well as security users defined the debate. The Conference reflected on the European response that space can provide to current and upcoming security challenges, in particular through better integration of security aspects into space programmes. Two points received increased attention: the relevance of better involving users and solution providers in the development of space programmes; and the need to consider a competitive space industry as a tool and integral part of a European security policy.

Space endeavours in Europe need to ensure that all relevant stakeholders work together and join their efforts to reach common objectives in support of security and defence actors. Implementation action is urgently required to create the building block precursors and demonstration missions to prepare full-fledged operational programmes. Synergies between the initiatives and investments at national and European levels should be leveraged. The Civil Security from Space Programme of ESA is one small but important example in this direction. Similar approaches are also urgently required from other actors, including national military space organisations, in a federated European effort.

Yours sincerely,

Hermann Ludwig Moeller  
Director of ESPI

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## POLICY & PROGRAMMES

### ESA Security Conference took place in Brussels

On 16-17 May 2023, **the 2nd ESA Security Conference took place in Brussels**. The event, which was **co-organised by ESA and ESPI with support of the Belgian Science Policy Office (BELSPO)**, gathered more than 250 participants and 40 speakers coming from national, European and international institutions, industry, think tanks as well as representatives of the security community using space solutions.



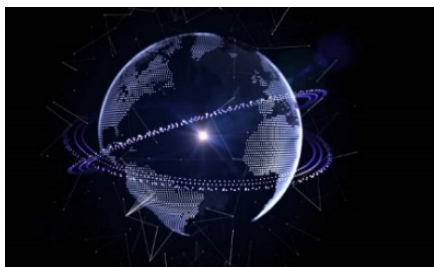
*Credit: ESA/ ESPI*

The conference was **comprised of 5 panels**:

- Strategic foresight at a defining crossroads for Europe
- Space as a tool for the protection of citizens and society
- Improving the contribution of space capabilities for more effective security
- The commercial contribution to space and security
- The benefits of partnerships in a multidimensional institutional landscape

The conference highlighted 3 key aspects: (1) the major change of paradigm triggered by the war in Ukraine, resulting in increased urgency for space actors to prioritize security (2) the underlying need of fostering a competitive and resilient space industry as a key pillar of European security, (3) the relevance of better involving users in the development of space programmes.

### Council of the EU adopts conclusions on European approach for Space Traffic Management



*Credit: SPACEWAYS*

On May 23rd, **the Council of the EU adopted conclusions on “fair and sustainable use of space”**, calling for a European approach to space traffic management (STM). In particular, the **conclusions** call for measures to monitor and manage space debris and to reduce space debris in the future, proposing to reinforce capabilities through the contribution of the EU Space Surveillance and Tracking (EU SST) jointly with EUSPA, to progress towards a EU approach to STM.

Moreover, the conclusions call on EU Member States and the European Commission to continue the implementation of the 21 UN long-term sustainability of outer space activities (LTS) guidelines.

### EU, ESA and EDA transform Joint Task Force towards powering strategic autonomy in space

The **European Commission, ESA and EDA initiated an evolution of their Joint Task Force (JTF)**, founded in 2008, to strengthen their cooperation for powering strategic autonomy in space. The 2023 JTF cycle started on May 17th and will be completed by early 2024. The evolution of the JTF envisages new activities to address the increasing technological dependencies of the EU in space research, which includes the development of common JTF roadmaps, institutional synergies, and increased cooperation. In particular, the JTF will enable and envisage (1) a greater political focus and a streamlined top-down approach, (2) a greater focus on closing technological gaps, which includes identifying critical dependencies, and leading joint technological roadmaps and implementation plans, (3) increased and coordinated interaction with EU Member States and industry.





## Updates and progress on European launchers

In May 2023 several voices indicated that the inaugural flight of Ariane 6 will slip into early 2024. This update contrasts with previous predictions, anticipating a potential **maiden flight by the end of 2023**. In light of this situation, the Ariane 6 Launcher Task Force outlined the **key milestones leading up to the rocket's inaugural flight**:

- May 2023: Flight software qualification tests.
- May 2023: Ground combined tests sequence at Europe's Spaceport.
- Completion of outstanding qualification reviews of products and sub-systems.
- Late June 2023: Overall launch system qualification review.
- Early July 2023: Upper stage additional test at DLR Lampoldshausen.
- Starting November 2023: Launch vehicle assembly and inaugural flight launch campaign.



*Credit: ESA/ D. Ducros*

**In May, the 10th DLR Industrial Days** on the future of European space transport at the DLR site in Lampoldshausen brought together stakeholders from space agencies, space industry and research. The main topic was the future of European access to space and space transportation, and how launch facilities need be prepared for the future. Central discussion points were the increasing demands and new opportunities of European space transportation, the relevance of strategic test infrastructure for current and future space transport systems, test stands for space propulsion, and the potential of small launch vehicles (mini- and microlaunchers).

On May 29th, **ESA signed 4 contracts with ArianeGroup, Avio, Sener, and The Exploration Company** to conduct studies to explore solutions for the preparation of the future for the European launcher sector, with focus on reusable launch systems (covering the full range of micro-mini, medium and heavy launchers and including human space transportation) – as part of the technical vision exercise “Vision 2030+”. These studies are part of ESA’s effort to prepare for the upcoming Space Summit and react on the recommendations expressed in the **Report “Revolution Space - Europe’s Mission for Space Exploration”** of the HLAG on Human and Robotic Space Exploration for Europe.

**Moreover, ESA started the new “PROTEIN” investigation study** (as part of the ESA Future Launchers Preparatory Programme (ESA-FLPP)) about European reusable, sustainable and cost-effective heavy lift transport towards developing a European Heavy Lift Launcher (EHLL). The study will investigate the feasibility and identify technologies that are necessary for developing such a system. **ArianeGroup and Rocket Factory Augsburg have been chosen by ESA to carry out a Phase**



*Credit: ESA*

**0/ A investigation of the PROTEIN study.** This launcher aims to enable access to LEO and beyond, offering substantial payload capacities (at least 10,000 tons per year), a high launch frequency, cost-effectiveness in construction and operation, and minimised environmental impact in alignment with the European Green Deal initiative. It is engineered to be more efficient than current launchers, with optimised capabilities for deploying extensive infrastructures, including as part of the **ASCEND** and **SOLARIS** studies, and supporting deep space missions beyond 2035, alongside In-Space Transportation Vehicles (ISTV).



## U.S. Department of State releases the first-ever Strategic Framework for Space Diplomacy

The **U.S. Department of State released its first-ever Strategic Framework for Space Diplomacy**. Through this Framework, the U.S. plans to expand international cooperation in space activities, including through the Artemis Accords, promote commitments against destructive anti-satellite missile tests, such as the U.S. led self-imposed ASAT moratorium, and foster a conducive environment for responsible behavior in outer space. Moreover, the new framework aims to strengthen the understanding and support for U.S. national space policies to promote the international use of U.S. space capabilities. The **framework document** outlines 3 objectives:

- **Diplomacy for Space - Advancing space policy for the benefit of future generations:**  
Advancing U.S. space policy and programs at international level through bi- and multilateral cooperation in order to advance U.S. leadership in safe and responsible space activities, while strengthening U.S. and allied capabilities and reducing the potential for conflict.
- **Space for Diplomacy – Leveraging space activities for wider diplomatic goals:**  
Pursuing increased international cooperation in the use of satellite applications to support solving societal challenges and achieve objectives of U.S. foreign policy.
- **Empowering the Department Workforce on Space Diplomacy:**  
Providing diplomatic posts and the Department's workforce with the modernised skill set of tools needed to pursue space policy and programmatic goals through bi- and multilateral fora.

## NASA awards Blue Origin \$3.4B contract to develop lunar lander for Artemis 5

**NASA selected Blue Origin to develop a lunar lander**, which aims to transport astronauts on the Artemis 5 mission as part of NASA's Sustaining Lunar Development (SDL) efforts. Blue Origin will lead a team, which includes Boeing, Draper and Lockheed Martin, to develop the lander designated as "Blue Moon". The \$3.4B contract includes the development of the lander, a demonstration landing on Artemis 5 scheduled for late 2029, and an uncrewed test flight of the lander in 2028. In addition to the lander designed to carry astronauts, Blue Origin is planning a lander to transport cargo (20 metric tons). Blue Origin was one of two bidders - the competing team was led by Dynetics. In a **source selection statement**, the choice is justified by highlighting technical strengths and lower cost,

## Lunar Terrain Vehicle: enhancing Moon exploration and research for Artemis missions



*Credit: NASA*

**NASA is seeking industry proposals for a next-generation Lunar Terrain Vehicle (LTV)** that will enhance astronaut exploration and scientific research in the south polar region of the Moon during the Artemis missions. The selected rover will undergo testing and demonstration in the lunar environment before being employed in crewed missions, which are expected to begin in 2029. Before that, the vehicle will transport equipment, assist with cargo delivery, and expand research opportunities on the Moon. Indeed,

the LTV will function as a combination of an Apollo-style lunar rover and a Mars-style uncrewed rover, enabling scientific exploration even when astronauts are not present.



### Bipartisan House Bill to create Space National Guard (SNG)

In January 2023, Rep. Jason Crow, D-Colo., and Rep. Doug Lamborn, R-Colo., introduced a bipartisan House legislation the **Space National Guard Establishment Act (H.R. 3048)** which aims at creating a Space National Guard (SNG) under the Space Force. In the 117<sup>th</sup> Congress, lawmakers considered the proposal and it passed the House but it never came to a vote in the Senate. Since the establishment of the Space Force in 2019, the creation of the SNG was discussed, but the Biden administration rejected the proposal (with costs estimated \$500M annually) in 2021 due to cost concerns. This month, **a group of 51 National Guard adjutant Generals send a letter to President Joe Biden to request for his support for the creation of a separate SNG** and to reverse a decision to create an alternative structure (released by the National Guard Association of the United States (NGAUS)) by the Office of Management and Budget. The letters states: "OMB's opposition to establishing a SNG and directive to transfer current National Guard space missions to an unestablished 'Space Component' will create a 7–10 year gap in the capabilities Air National Guard Space Units provide today," Moreover, with regard to the costs, the letter states: "The National Guard Bureau (NGB) estimates the one-time cost to be \$250,000 for heraldry, uniform items, and the transfer of existing manpower and resources from [Air National Guard] Space units to the new SNG. This cost is dwarfed by the estimated one-time cost of over \$644M to move all ANG Space missions to the U.S. Space Force (USSF)".

### 2023 Global Space Conference on Climate Change (GLOC 2023) took place in Oslo



*Credit: GLOC 2023*

From May 23<sup>rd</sup> until May 25<sup>th</sup>, the **2023 Global Space Conference on Climate Change (GLOC 2023) with the theme „Fire and Ice – Space for Climate Action“**, jointly organised by the International Astronautical Federation (IAF) and the Norwegian Space Agency (NOSA), took place in Oslo. GLOC 2023 aimed to contribute to the global efforts to of understanding and fighting climate change through the use of space-based services and applications and to encourage the exchange and sharing of programmatic, technical and policy information. The conference programme was designed to bring together the international community, including high-level representatives of space agencies, industries, governments, policy makers, academia and NGOs, and also of non-space sectors. The GLOC addressed various topics including climate change impacts on the environment; applications and services driven by climate change; impacts of a changing climate on policy and law; commercial opportunities created by a changing climate; present and future international collaboration on space missions related to climate change; and social, communications, economic and cultural dimensions of environmental change. **Key takeaways** include (1) the need to make data more accessible, (2) improving the usability of data, and (3) the need of the industry to shape up a more convincing communication strategy.

ESPI also took part in the GLOC 2023 and **presented a paper on the topic “Using Effective Science Communication to Increase the uptake of Earth Observation Data in Climate Policymaking”**.





### Poland plans lunar exploration mission

During the Impact'23 Congress in Poznań, the President of the Polish Space Agency (POLSA) Grzegorz Wrochna announced that **Poland plans a national lunar exploration mission**, incl. the development of a probe named “Sony”- and in the long-term also the construction of lunar bases. Previously, POLSA asked the Polish space industry, scientists and researchers to submit proposal on ideas for a lunar exploration mission. The Polish space industry already demonstrated capabilities and expertise, having contributed so far to more than 80 space exploration missions by developing and providing research instruments. The “Sony” probe is planned to fly to space within this decade and to employ infrared radiation technology for scanning the lunar surface and searching for raw materials. While a prototype probe is currently undergoing testing, initial mission preparations will start later this year with Phase A.



Tomasz Gzell/ PAP

### Slovenia seeks stakeholder opinions on recently published Draft Space Strategy

Following the publication and public presentation of **Slovenia’s Draft Space Strategy 2030** in April, Slovenia’s Ministry of Economic Development and Technology called for stakeholder opinions through an open invitation for feedback until May 10<sup>th</sup>. **ESPI provided inputs and held consultations with the Ministry in May 2023**. The draft Space Strategy encompasses the period 2023-2030 and sets the national priorities for actions from the Slovenian government in the space sector - focusing on international cooperation, space applications, space R&D, STEM education, and entrepreneurship. The purpose of the strategy is to guide and support the Slovenian space industry and research. The strategy outlines 5 objectives:

- Supporting development of space technologies and R&D
- Increasing and extending cooperation in international space research
- Promoting development and use of applications to obtain and utilise space data on Earth
- Encouraging STEM education for future generations
- Boosting space entrepreneurship

At ESA CM22, Slovenia announced to increase its contribution to ESA budget and to seek becoming ESA Member States in 2024 – for **which the new strategy is considered an important step**.

### U.S. and Australia striving to “reach new frontiers in space” through enhanced cooperation

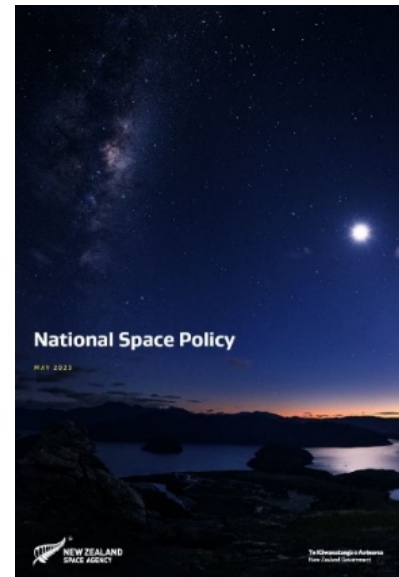
The **United States and Australia released the Joint Leaders’ Statement – An Alliance for our Times**, which agrees on cooperation in several domains, including space. Related to space, the **agreement** highlights in a section called “Reaching New Frontiers in Space” the objective to establish high-skilled, well-paying jobs and to increase investment between the U.S. and Australia. Moreover, the U.S. and Australia intend to establish a new ground station based in Australia to provide communication support to lunar mission, in particular for NASA’s Artemis program. In addition – but still subject to domestic legislation approvals - the agreement envisages to enable “the controlled transfer of sensitive US launch technology and data while protecting US technology consistent with US non-proliferation policy, the Missile Technology Control Regime, and US export controls”.



### New Zealand releases National Space Policy and Policy for ADR and On-Orbit Servicing

On May 31st, **New Zealand released a space policy**, which provides an overview of New Zealand's values and goals to guide future policies and regulation related to space, outlining the increasing space-related geopolitical risks and the importance and need to cooperate with allies and partners to secure New Zealand's national security. The policy outlines 4 key values for New Zealand in space: (1) Stewardship; (2) Innovation; (3) Responsibility; and (4) Partnership. The space policy sets 5 objectives:

- Growing an innovative and inclusive space sector
- Protecting and advancing national security and economic interests
- Regulating to ensure space safety and security of activities
- Promoting the responsible use of space at international level
- Modelling sustainable space and Earth environments



*Credit: New Zealand Government*

Earlier this month, on May 10th, New Zealand released an **Operational Policy for Active Debris Removal (ADR) and On-Orbit Servicing Missions**. The policy relates to applications for ADR or On-Orbit Servicing missions made under the Outer Space and High-altitude Activities Act 2017 and in line with the Outer Space and High-altitude Activities (Licences and Permits) Regulations 2017, outlining the New Zealand Space Agency's approach to assess applications under the Act for missions and demonstrations, including payload permit and overseas payload permit.

### U.S. outreach in Asia-Pacific: the U.S. expands space cooperation with the Philippines

As part of a broader U.S. outreach series towards Asian-Pacific countries to strengthen (space) cooperation, the **U.S. agreed to intensify cooperation with the Philippines** in security, economic affairs, technology development and education. As part of this, the two countries agreed to foster bilateral cooperation in the areas space situational awareness and space-based maritime domain awareness and to organise the first U.S.-Philippines Civil Space Dialogue this year. Moreover, the cooperation will include the use of space-based technology in areas such as disaster/ emergency management and response, healthcare, resources mapping and pollution monitoring, and to intensify cooperation on the Landsat Program. This follows a series of agreements signed by the United States in the APAC region in 2020; in April, the **U.S. and South Korea agreed to strengthen space cooperation**, while in January and March, the U.S. and its Asian key partner Japan signed agreements for **cooperation in SSA/ SDA** as well as in **space and lunar exploration**.

### Germany, France and Italy signed MoU on the European "Spacefounders" Programme

The Italian Space Agency (ASI), the French Space Agency (CNES) and the German University of the Bundeswehr in Munich (UniBW) **signed a MoU for cooperation in and promotion of the European New Space Accelerator Programme "SpaceFounders"**, which was launched by CNES and UniBW in 2021. The third Demo Day event of the programme took place in Rome. During the event, 10 selected start-ups presented their projects to investors and experts from ASI, CNES, ESA, the European Innovation Council (EIC) as well as from Thales Alenia Space, Beyond Gravity and Airbus. As the core of the MoU, ASI, CNES and UniBW committed to promote the programme actively and contribute to the scouting of the start-ups and (co-)organise networking events.



### French Ministry of Armed Forces to deploy a new generation military observation satellite

The French Ministry of the Armed Forces **plans to deploy a new generation military observation satellite “Iris” before 2030**. The Iris programme will take over from CSO, is comprised of two satellites to be launched between 2030 and 2035. Currently, two French CSO spy satellites are in orbit (CSO-1 and -2), while the third CSO-3, initially planned to be launched by Soyuz rocket at the end of 2022, is now rescheduled for an envisaged launch in 2024 with Ariane 6. The Ministry submitted a government amendment to the military programming law (LPM), which aims at enabling the registration of an additional Iris satellite even before 2030-2035.

### Iran agrees on space cooperation with Oman, Syria and Russia

May saw developments and announcements of Iran to boost Iran's space sector and bilateral cooperation. The Iranian Defence Minister Mohammad Reza Gharaei Ashtiani announced the **plan to launch two more satellites before April 2024**. Moreover, Iran signed 3 agreements with Oman, Syria and Russia:

During a bilateral meeting between Iran's Minister Isa Zarepour and Oman's Minister of Transport, Communications and Information Technology Saeed bin Hamoud al-Maawali, **Iran and Oman agreed to cooperate in Information and Communications Technology (ICT) and in the space sector**, in particular in developing and manufacturing EO and communications satellites.

Also in May, **Iran and Syria signed a MoU to strengthen cooperation in information and communication technology (ICT) sector**, through the creation of joint specialised working groups. Among cooperation in fields such as technical and engineering services, active and passive telecommunications products, transport, health, e-government services, communications infrastructures, the two countries also agreed to cooperate in the field of space services. According to Zarepour, **“Iran is ready to help Syria build communications satellites”**.

Moreover, Iran and Russia announced **a cooperation between the University of Tehran and the University of Moscow to jointly develop and manufacture a research satellite**. Moreover, Russia and Iran expressed the need to expand scientific and technological cooperation (especially in the field of Artificial Intelligence).



Credit: ISA

### China progresses in its human space and lunar exploration plans

On May 30th, the 3 Chinese astronauts (including the first Chinese civilian astronaut) of the Shenzhou-16 crewed mission **arrived at the Tiangong space station**. Moreover, the China Manned Space Engineering Office (CMSEO) launched a **call for proposals for a commercial, low-cost flexible transportation system to deliver cargo to and from its Tiangong space station**. The requirements include a plan for the launch segment, the capability of sending not less than 1.800 kg to LEO, the spacecraft's ability to stay docked in orbit for at least 3 months, the capability of controlled reentry, and the limit of the offered price at 120M yuan (\$17.2M) per 1.000 kg delivered. The program is similar to NASA's Commercial Resupply Services (CRS) program. **ESPI provided further analysis on the similarity of the two approaches in an interview with SpaceNews**.

Also, with regard to crewed lunar exploration, **China stated the goal to land astronauts to the Moon before the end of the decade** and that the Moon Landing Phase of its human lunar exploration



program has started. The ongoing preparatory work includes the development of the Long March 10 rocket for crewed launches, a crew spacecraft, a lunar lander, and a Moon suit, as well as the construction of a new launch site. In addition, Chinese scientists built a **chamber simulating lunar conditions** to support China's preparation for long-term lunar exploration. As part of China's 2023 lunar roadmap, **China provided and unveiled from January until May**: (1) designs for its lunar lander, (2) details on its fully reusable Long March 9 rocket, (3) details on forming an international coalition for its Moon base, (4) plans for a lunar base by 2028, (5) the goal of landing a crew on the Moon by 2030.

Furthermore, the Beijing Institute of Technology (BIT) received the lunar samples delivered by the Chang'e-5 mission and **will now study the samples' material characteristics**. Finally, China announced to **launch the communications relay satellite "Queqiao 2" in early 2024 to the Moon** – to be used to support China's upcoming robotic lunar missions Chang'e 6, 7 and 8.

### Developments in the Gulf Nations

With regards to astronauts, the Gulf nations have a few premieres to celebrate:



*Credit: SPA*

The two **Saudi astronauts Rayyanah Barnawi and Ali Al Qarni flew to the ISS as part of the Axiom Space 2 Mission (AX-2) for a 10-days stay on May 21st** – 2 weeks later than planned. They are the first Saudi astronauts to visit the ISS. Rayyanah Barnawi is the first Arab woman aboard the ISS and Saudi Arabia's first female astronaut that traveled to space.

In addition, the **UAE's Astronaut Sultan Al Neyadi becomes first Arab spacewalker**, having conducted a 6.5 hour maintenance mission outside ISS with the U.S. astronaut

Stephen Bowen end of April.

During a bilateral meeting in Paris, the UAE's President His Highness Sheikh Mohamed bin Zayed Al Nahyan and the French President Emmanuel Macron **discussed their countries' longstanding strategic partnership and further opportunities of bilateral cooperation** in various sectors, including space and other sectors such as culture, environment, climate change, renewable energy, sustainable development ambitions, food security and advanced technology.

On May 28th, the **UAE Space Agency announced the UAE's Mission "Max" ("Multiple Asteroid Exploration")**, which will see the MBR Explorer spacecraft travel 5B km to a region called Asteroid Belt EMA between Mars and Jupiter to study asteroids. The mission, whose planning started in 2019, will take 13-years in total, 6 years for spacecraft development and 7 years travel time to the belt, including 6 asteroid fly-bys and fly-bys of Venus, Earth and Mars.

Moreover, at the UAE Climate Tech Event which took place from May 10th to 11th in Abu Dhabi, the **UAE Space Agency announced phase 2 of its Space Analytics and Solutions (SAS) Programme to combat climate change**. The second phase of the programme will include 3 new challenges that will offer entrepreneurs and researchers support to develop space applications to address climate change: (1) the Air Quality challenge to monitor and control air pollution, (2) the Infrastructure challenge to foster infrastructure monitoring, maintenance, and operations solutions, and (3) the Losses and Damages challenge to use satellite data to investigate the losses and damages caused by climate change.





Moreover, Bahrain's National Space Science Agency (NSSA) is **currently reviewing its upcoming 2024-2028 national space strategy with 85 national stakeholders** in a series of consultation meetings. The strategy will focus on supporting the development of skills in the space sector, the creation of research programmes, the provision of space data, and establishing regional and international partnerships. The second draft of the strategy will consider and include the stakeholders' recommendations and is planned to be completed by the end of Q2/ 2023. The final strategy is planned to be approved by the end of the year.

Moreover, during a visit in Japan, **Bahrain and Japan agreed to increase cooperation in space**, in particular in space science.

### JAXA aims to launch from UK's spaceports



*Credit: SaxaVord Spaceport*

In a recent renewed **Science and Technology Agreement signed by the UK Minister of Science and the Japanese Ministry of Economy, Trade and Industry**, the two countries committed to develop joint R&D projects to tackle planetary issues including climate change and bio-security to space sustainability, and to develop R&D projects.

On this basis the UK Science Minister Freeman unveiled the intentions of the **Japanese Space Agency (JAXA) to launch from British SaxaVord spaceport**, Shetland islands.

### U.S. Space Force will conduct its first orbital warfare exercise "Red Skies" in the summer

This summer, the **U.S. Space Force plans to conduct its first "orbital warfare exercise" named "Red Skies"**. Red Skies is part of a broader series of exercises developed by STARCOM which aims at training especially Guardians who are assigned to the Space Force's Space Operations Command (SpOC).

Two other exercises of this series called "Black Skies" focused on electronic warfare and defending U.S. space assets from jamming attacks, were conducted last year. STARCOM conducted an experiment, whose results will be implemented in the Red Skies exercise. As part of this experiment, hostile units flew the Tetra-1 experimental spacecraft in a higher altitude orbit and undertook rendezvous and proximity operations (RPO) maneuvers, simulating to approach another satellite, while the other unit was tasked to consider the implications of this behaviour.





### Developments in Azerbaijan and cooperation with Israeli industry and SpaceX



*Credit: Azercosmos*

May saw some news and developments in the space sector and policy in Azerbaijan – host country of the upcoming 74th International Astronautical Congress (IAC) 2023.

On May 11th, the Azerbaijan Parliament Committee for Economic Policy, Industries, and Enterprising reflected a **new draft law on space activities (rules of state regulation in the space industry)**. According to the draft law, Azerbaijan's regulation of space activities is carried out in areas such as certification of goods and services that are intended to be used for space activities, related processes and production methods as well as registration of space objects. So far, Azerbaijan's Azercosmos space agency does not need to obtain licenses/ permits for these issues to act

in these activity areas. Azercosmos owns two communication satellites – Azerspace-1 (launched in 2013) and Azerspace-2 (launched in 2018), and the LEO Azersky satellite.

Moreover, Chairman of the Board of the Azercosmos Space Agency Samaddin Asadov stated during this session that **Azerbaijan started implementing new satellite projects (own projects and in cooperation with Israeli companies)**, in order to further enhance the country's security and defence capability. The first satellite under the Azersky-2 project is planned to launch in 2025, with further launches planned for 2027. Asadov also noted that Azerbaijan plans to use SpaceX launch services.

A few days before, **he met the President and Chief Operating Officer of SpaceX Gwynne Shotwell**. During the meeting, the two parties signed a cooperation agreement for the provision of SpaceX's Starlink internet services in Azerbaijan - following **Starlink's move to open offices in Azerbaijan** in December 2022. Moreover, the parties highlighted achievements in the development of the ICT industry (including space) in Azerbaijan.

### NASA selects 5 research teams to conduct lunar science and sample analysis studies

NASA selected 5 research teams (out of 14 competitive proposals) **to jointly study lunar science and sample analysis in support of future lunar exploration** as part of NASA's Solar System Exploration Research Virtual Institute (SSERVI), supporting each team for 5 years with ca. \$1.5M per year. The research should support enabling the future human and robotic exploration of the Moon with NASA's Artemis program and Commercial Lunar Payload Services initiative.



### In other news

**The Czech Republic and Spain sign the Artemis Accords:** With the signature on May 3rd, the Czech Republic became the 24th country to join the U.S.-led Artemis Accords. Spain signed the Artemis Accords on May 30<sup>th</sup> and became the 25th signatory. Moreover, Spain launched a formal partnership between NASA and the Spanish Space Agency (AEE) to expand space cooperation.

**The Italian Committee for Aerospace Policies appoints Teodoro Valente new President of the Italian Space Agency (ASI):** Valente is Director of the Institute for Polymers, Composites and Biomaterials of the CNR and will take over the role as President of ASI from Giorgio Saccoccia.

**ESA Comet Interceptor Mission approved for construction:** The study phase is now completed and in the next step the work to build the mission will start.

**ESA partners with UEFA to support for the safety of football fans with space services:** The services include EO satellites to monitor crowds in and around football stadiums to support police forces, and telecommunications satellites to fill gaps due to overloaded terrestrial communications networks. Moreover, the agreement includes supporting the sustainability of football and exploring how space can contribute to promoting football.

**The U.S. Space Force commercial services office (COSMO) will open a new facility in Virginia:** COSMO will oversee the procurement of commercial space sector's satellite-based services and will absorb other organisations who cooperate with the industry (incl. i.a. SpaceWERX, the SDA data marketplace, and the SSC Front Door initiative). The new facility, a commercial collaboration center will be kicked-off during an industry day on June 7th.

**DLR celebrates kick-off for the DLR Startup Factory in Berlin:** The DLR Startup Factory aims to strengthen the transfer from science to the economy and society, monitor and support start-ups and spin-offs in a multi-stage process. During the event, 10 DLR teams presented their ideas and technologies and had the opportunity to network and meet potential investors.

**Dietmar Pilz takes up new position as ESA Director of Technology, Engineering and Quality and Head of ESTEC on May 1st:** Prior to joining ESA, he was Head of Space Chief Engineering and Products and Head of Site for Friedrichshafen at Airbus D&S in Germany.

**Tanzania plans to build and launch its first national satellite:** The satellite reportedly aims to address a broad spectrum of applications, including monitor environmental developments and weather, improve surveillance, and provide connectivity services in Tanzania, for applications including agriculture, infrastructure development, disaster/emergency response and management, early warning systems, and post-disaster recovery.

**Nigeria's National Space Research and Development Agency (NASRDA) joins the Group on Earth Observations (GEO):** Nigeria is the second African nation (after South Africa) to become part of the GEO initiative, an intergovernmental organisation comprised of 100 national governments that aims at improving the availability, access and use of EO data and supports decisions and actions based on EO data.

**Egypt's MisrSat-2 successfully completes testing phase:** This milestone of the Egyptian-Chinese MisrSat-2 technology transfer project laid the basis for the on-site testing and assembly of the Multi Transponder Mode and Frequency Modulation experimental work. The project was delayed in 2022. Egypt and China cooperated to provide Egyptian engineers and scientists with satellite design and integration experience and knowledge, using facilities in Egypt.



## INDUSTRY & BUSINESS

### Thales Alenia and partners awarded €235M to enhance Italian in-orbit capabilities

**ASI has allocated € 235M for an in-orbit servicing demonstration in 2026.** Thales Alenia Space, in partnership with Leonardo, will design and develop a spacecraft capable of autonomous robotic operations on satellites in low Earth orbit. The mission will involve a servicer with a robotic arm for tasks such as refuelling, component repair, orbital transfer, and atmospheric re-entry. The consortium also includes Telespazio and Altec, Avio, and D-Orbit, which will respectively contribute to the mission's ground segment, its propulsion module, and its refuelling system.



*Credit: Thales Alenia Space*

### Space consortium pursues role in EU's IRIS<sup>2</sup> amid merger and regulatory challenges

Major space companies in Europe, including Eutelsat, SES, Hispasat, Airbus Defence and Space, and Thales Alenia Space, have formed a **consortium to bid for a role in the EU's proposed multi-orbit connectivity constellation, IRIS<sup>2</sup>**. The constellation is expected to provide global coverage by 2027 and will utilise quantum cryptography for secure communications.

However, the inclusion of Eutelsat, and its pending combination with UK-based OneWeb, could pose challenges. In an investor call on Eutelsat's quarterly financial results, company's CEO Berneke revealed the merged Eutelsat-OneWeb is considering the **creation of a new legal structure that would own at least part of OneWeb's Gen 2 network**, without the UK government's "golden share." The golden share grants the UK government a range of national security rights, including use of the OneWeb network for national security purposes. The European Commission, on the other hand, has imposed strict limits on the involvement of non-EU companies in IRIS<sup>2</sup>.

### L3Harris Technologies secures \$80.8M contract for military-multiSatcom integration

L3Harris Technologies has been awarded \$80.8M by the U.S. Air Force Research Laboratory (AFRL) to conduct communications experiments **integrating commercial space internet services with military platforms and weapon systems**. The contract, which falls under the Defense Experimentation Using Commercial Space Internet (DEUCSI) Program, will see L3Harris establishing a network of multiple satcom providers to allow the AFRL to quickly switch among commercial space internet services in different frequency bands to access favorable spectrums, or split traffic between them.

### SSC wins €2.26M contract for NODES Optical Network

The **Swedish Space Corporation (SSC) has secured a € 2.26M contract by ESA for the second phase of the NODES optical communication project**. The project aims to develop a direct-to-Earth data reception service using free-space optical communication. The contract will support the implementation, testing, and demonstration of an optical network, including the commissioning of a second ground station. The NODES project is part of ESA's ARTES ScyLight program, which focuses on optical communications, photonics, and quantum communication.



### ClearSpace and Arianespace partner for first-ever active debris removal mission



*Credit: ClearSpace*

**ClearSpace and Arianespace have signed a launch contract for ClearSpace-1**, the first mission to actively capture and deorbit space debris weighing over 100 kg. The European light rocket Vega C will be used for the launch, scheduled for the second half of 2026, and the spacecraft will be released into a sun-synchronous drift orbit for testing. Subsequently, it will be raised to rendezvous with the target object for capture and deorbit through atmospheric re-entry. **The Swiss**

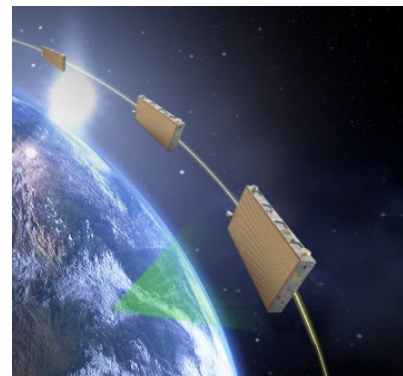
**ClearSpace had been awarded a €86M contract by ESA in 2020** under ESA's Space Safety Programme and is procured as a service contract with a commercial consortium, aiming to establish a new market for in-orbit servicing and debris removal.

### DARPA awards contract to broaden its Mosaic Warfare Vision

The **Defense Advanced Research Projects Agency (DARPA)** has awarded four contracts under the Distributed Radar Image Formation Technology (DRIFT) Program to Umbra, Terran Orbital's PredaSAR unit, Northrop Grumman, and Jacobs. The programme, which supports DARPA's "**Mosaic Warfare Vision**", aims to demonstrate new imagery collection techniques using synthetic aperture radar (SAR) satellites flown in formation, namely monostatic and bistatic operations. Umbra and PredaSAR, awarded \$4.5M and \$500K respectively, will focus on joint image collection techniques to enhance detection capabilities. Northrop Grumman and Jacobs received contracts worth up to \$3.9M and \$4M and will develop processing algorithms to utilise data from the SAR satellites.

### Hanwha Systems and KAI to provide military satellites to monitor the Korean peninsula

**Hanwha Systems and Korea Aerospace Industries (KAI)** have been awarded contracts by the Korean Agency for Defense Development (ADD) to develop SAR satellites for the Korean military compartment. Hanwha Systems and KAI will develop SAR verification satellites for the "micro-satellite system development project" worth ₩67.9B (€48M) and ₩67B (€47M), respectively. The SAR satellites will enable nighttime and all-weather imaging, quasi-real-time surveillance and observation of the entire Korean Peninsula and surrounding waters, providing valuable security assets. Hanwha Systems and KAI aim to complete the satellite development and in-orbit demonstration by June 2027.



*Credit: Hanwha Systems*

### L3Harris awarded 4th NOAA contract to enhance its ground services

**L3Harris secured a contract worth \$275.2M from the National Oceanic and Atmospheric Administration (NOAA)** to extend its provision of ground services for the existing fleet of geostationary weather satellites. The indefinite-delivery, indefinite-quantity Geostationary Ground Sustainment Services contract entails that the company handles communications with the NOAA's Geostationary Operational Environmental Satellites-R Series (GOES-R) satellites, data processing



and information distribution, as well as the monitoring of satellites health and safety. The contract awarded to L3Harris is the latest installment of a series of previously awarded deals, totalling \$1.4B. In addition, it follows a **recent study developed by NOAA's National Environmental Satellite Data and Information Service (NESDIS)**, which stresses the need to transition from the current strategy of developing unique ground systems for each mission, to an enterprise ground architecture that leverages cost-effective and diversified solutions of the private industry.

### Updates on UK's spaceports

#### Orbex launches construction of UK's first vertical spaceport, Sutherland



*Credit: Orbex*

On May 5th, Scottish launch startup **Orbex** has announced the commencement of construction at **Sutherland Spaceport**, the first vertical launch facility on the UK mainland. Situated on the northern coast of Scotland, this spaceport will serve as the primary base for Orbex, enabling to launch up to 12 orbital rockets annually for satellite deployment.

**Orbex has recently secured a 50-year sublease with Highlands and Islands Enterprise (HIE)**, the regional economic and development agency, granting the

company full control over construction and operational management of the new facility. Economic assessments conducted by HIE predict a potential gross value added (GVA) of nearly £1B (€ 1.16B) over the next three decades. Notably, Orbex's innovative reusable Prime rocket relies on a renewable biofuel called Futuria Liquid Gas, supplied by Calor UK, which significantly reduces carbon emissions compared to other rockets of similar size being developed worldwide. A study from the University of Exeter revealed that a single launch of the **Orbex Prime rocket would result in 96% lower carbon emissions than comparable space launch systems** utilising fossil fuels. Additionally, the Nuclear Decommissioning Authority has confirmed a £3M (€ 3.5M) contribution to support the development of Sutherland Spaceport, completing a public investment package that includes over £9M (€ 10M) from HIE and the Scottish Government, along with £2.55M (€ 3M) previously announced by the UK Space Agency in **2018**.

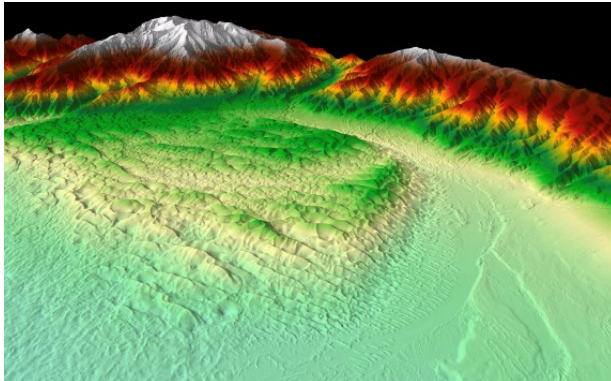
#### UAE's Bayanat and Yahsat partner with ICEYE to develop national SAR satellite constellation

Bayanat, a UAE geospatial solutions provider, and Yahsat, the UAE's main satellite solutions provider, have announced a comprehensive programme aimed at developing national satellite remote sensing and Earth Observation capabilities. In **collaboration with the Finland-based SAR satellites manufacturer ICEYE**, the programme will establish a five-satellite constellation of SAR satellites in LEO to provide consistent geospatial insights for various industries, fuel collaboration in the UAE's space ecosystem, and contribute to the nation's space exploration capabilities. The first satellite is scheduled for launch in the first half of 2024.





### NUVIEW plans to offer a 3D LiDAR scan of the entire Earth



*Credit: USGS*

Current satellite imageries provide only a 2D view of the planet, with **only an estimated 5% of the Earth's landmass having ever been mapped with LiDAR** (Light Detection and Ranging).

With \$1.2B in Early Adopter Agreements, U.S.-based geospatial technology company NUIVIEW plans to map the entire land surface of the Earth in 3D with LiDAR. **The company will begin with the launch of a "proof of concept" satellite named "Mr. Spoc,"** although a definite launch location has not

been secured yet. After showcasing the technology, NUIVIEW will aim to deploy the commercial constellation in groups of five, with a gap of 18 months between each launch, until they reach a constellation size of 20.

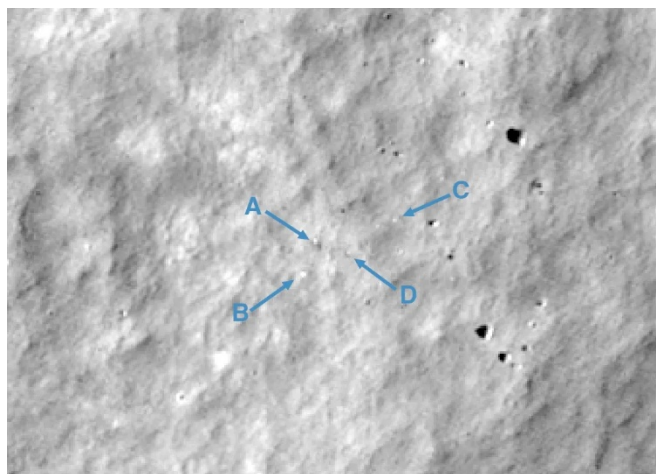
### Successful Axiom-2 mission brings crew back to Earth

Ax-2 has been the second mission that Axiom Space has organised and operated aboard the ISS. This time, it has shipped the first two Saudi astronauts to the station, Rayyanah Barnawi –the first Saudi woman to reach space – and Ali AlQarni. Axiom Space's Ax-2 crew docked to the ISS on Monday 22nd, following a nearly 15-hour journey, undocked, and splashed down off the coast of Florida on May 30th.

While **NASA approved the Ax-3 mission for September 2023**, Axiom has not yet disclosed the crew for it. Interestingly, **the crew investigated the effects of microgravity in space on stem cells**, specifically to understand its impact of the way the induced pluripotent stem cells (iPSCs) develop into other cell types like brain and heart cells.

### ispace reveals causes of lunar lander failure

**Following the failure of its lunar lander Hakuto R**, ispace has publicly shared the key reasons for the mission's failure. After analysing telemetry data, ispace identified that the lander's software mistakenly rejected altitude measurements as erroneous when it passed over the rim of the Atlas crater, where it was supposed to land. As a result, the lander continued decelerating at a slow rate and eventually ran out of fuel while still at an altitude of approximately 5 kilometers. Consequently, **the lander experienced an accelerated free fall crash due to the Moon's gravity**. ispace is now working on assembling a new flight lander for a launch in 2024.



*Credit: NASA/ GSFC/ Arizona State University*



### Latest advancements in Inmarsat's satellite services and connectivity solutions

Inmarsat, a UK-based satellite service provider, has placed an order with Swissto12, a Swiss 3D printing specialist and manufacturer of advanced RF products, for **three small geostationary satellites to bolster its L-band safety services**. These satellites, based on Swissto12's HummingSat platform, offer reduced capacity compared to traditional satellites but at a significantly lower cost. The specific performance details were not disclosed, but the satellites will form Inmarsat's eighth-generation spacecraft (I-8). Currently, the company's L-band safety services include a four-satellite constellation, "ELERA", tasked to provide tracking and emergency communications for approximately 1.6 million seafarers and over 200 aircraft. I-8's transponders will also feed into Inmarsat's Satellite-Based Augmentation System (SBAS) services, which enable coastguards, air traffic controllers, and other users to increase the accuracy of GPS from 5-10 meters to as little as 10 centimeters.

Additionally, **Inmarsat is launching the world's first broadband global area network (BGAN)** terminal for use on foot, which is powered by the company's ELERA satellite network and is meant to provide continuous connectivity to government personnel during security missions. Ultimately, the **recent partnership with the IoT service provider FreeWave Technologies** aims to integrate Inmarsat's IsatData Pro (IDP) service into FreeWave's IoT solutions, offering reliable connectivity in remote locations for various industries. IDP is also enabled by Inmarsat's ELERA geostationary L-band satellite network.

### Vast announces plans for world's first commercial space station, Haven-1



*Credit: Vast*

Vast, a Californian space habitation technology company, aims to launch **Haven-1, the world's first commercial space station**, into LEO by August 2025. The station will initially operate independently before integrating with a larger Vast space station.

Haven-1 will offer accommodation for four astronauts up to 30 days, featuring pre-loaded cargo capacity, an observation dome, and continuous communication and

internet access. SpaceX will be a crucial partner, facilitating the launch of Haven-1 aboard a Falcon 9 rocket, and providing support for crewed missions. Subsequently, Vast's long-term goal is to develop a 100-meter-long multi-module spinning artificial gravity space station launched by SpaceX's Starship transportation system.



### In other news

**EMSA awarded European Space Imaging (EUSI) and Airbus a VHR contract:** They will deliver very high-resolution (VHR) optical satellite imagery offering true 30 cm satellite data downlinked in Europe. The contract spans over twenty-four months with the option to renew it for two additional years.

**PLD Space to invest € 85M for the development of a new reusable rocket factory:** The factory will measure 40.000 square meters in size and the move is set to promote the creation of approximately 325 jobs in the town of Elche.

**Lockheed, Raytheon to develop ground systems for nuclear proof Satcoms:** Each company was awarded a \$30M contract to develop prototypes of a ground system for the Evolved Strategic Satcom (ESS) Program.

**SkyWatch secures \$1.1M from the Canadian Space Agency:** The remote sensing specialist is tasked to complete Phase 2 of the Artificial Intelligence and Big Data for Advanced Autonomous Space Systems challenge, which envisages the use of AI and big data analytics to optimise the use of space and EO assets.

**Hispasat and Intelsat partner to provide in-flight connectivity through Amazonas Nexus:** The agreement includes long-term leasing of the entire throughput satellite capacity available over the U.S. and Brazil to enable Intelsat's connectivity services.

**Redwire Space NV secured a € 14M contract under ESA Exploration Programme:** the Belgian company will design, develop, and qualify its 3D-BioSystem Facility to produce samples in orbit for experimental purposes, which can then be further processed there or be returned to ground.

**IBM and NASA partner to ramp up the use of AI for climate change monitoring:** The new geospatial foundation model, which is part of IBM's Space Act Agreement with NASA, converts the space agency's satellite observations into customised maps of natural disasters and other environmental changes.

**Intelsat partners with Azercosmos in West Africa:** Intelsat will provide more than 430 million potential customers with mobile network and telecommunication services using the resources of the Azerspace-2 satellite.

**Lulav and Sidus Space partner for lunar guidance navigation and control (GN&C):** The two companies will offer a robust GN&C suite to support all lunar missions, from launcher separation in LEO through trans-lunar injection (TLI), lunar capture, lunar orbiting, and landing phase with touchdown on the lunar surface.

**OneWeb and iSAT Africa LTD forge collaboration for the benefit of Africa:** iSAT Africa will exploit OneWeb's high-speed broadband connectivity services to stimulate regional economic growth, enhance access to education and healthcare, and empower individuals and communities across the continent.

**Astroscale and Momentus to reinforce NASA's Hubble with in-orbit servicing:** The goals of the mission encompass ensuring the secure relocation of Hubble and eliminating potentially hazardous debris in close proximity to the space telescope's newly established orbit.



## INVESTMENT & FINANCE

### Investments in European space start-ups at an all-time high

On 10 May, the **European Space Policy Institute (ESPI)** published **Space Venture Europe 2022**, its annual report on private investment in the space sector. The report highlights the nexus between the European and global investment markets. This year's report also contains a special section on Chinese space investments.

In Europe, the space sector saw significant growth of investment in 2022, with total investments reaching €1B, up by 64% compared to 2021. The majority of the funding (77%) came from venture capital, with the largest share of investments in satellite manufacturing and services. European companies, however, still face challenges, including smaller deal sizes and a concentration of capital in a handful of companies. The top five deals in Europe reached €411M in 2022, or 41% of the total raised by European space start-ups

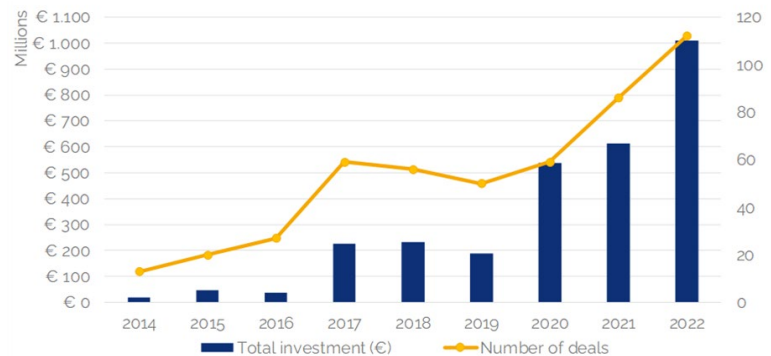


Figure 1: Investment value and number of deals in Europe since 2014  
Credit: ESPI

Globally, the sector experienced a 28% decline in total investments in 2022, amounting to a total of €8.8B. This is primarily caused by the absence of Special Purpose Acquisition Companies (SPACs), following their short-lived boom in 2021. Despite the decrease, the industry has maintained a healthy growth rate of 14% CAGR since 2019.

The acquisition of space companies globally reached €1.8B in 2022, underlining some changing sectorial dynamics. Still, Venture Capital accounts for the largest share of financing worldwide with 55% of the total or for approx. a total of €5B. The United States remains the most significant player in global investments, with a 17% CAGR, followed by Europe and China. Furthermore, the rest of the world (outside of the USA, Europe, China and Japan) has seen impressive

growth, with an increase of more than 3000% in tracked investments since 2019. This highlights the rapid expansion of the space sector worldwide.

China's space sector has seen remarkable growth in investment, with over ¥50B (€6.5B) raised by more than 100 companies since 2014. While still largely dominated by state-owned enterprises, an increasing number of commercial companies have entered the sector. The Chinese commercial space sector has attracted significant funding, with the launch sector receiving the largest share of investments, accounting for nearly 40% of the total amount.

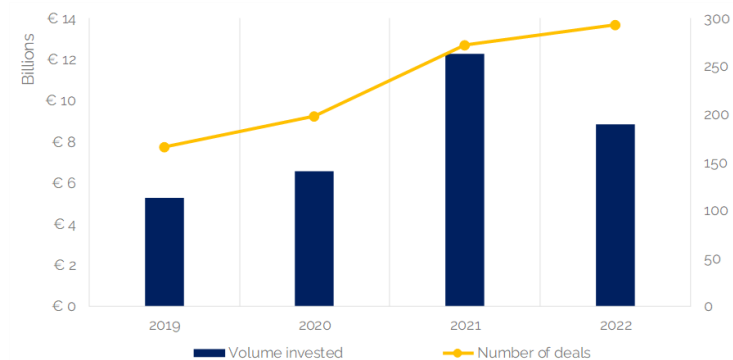


Figure 2: Investment value and number of deals globally since 2019  
Credit: ESPI





## Major European space companies report their Q1 2023 revenues

The beginning of 2023 has shown robust momentum for the main European space companies, with varying revenues in Q1 2023, ranging from declines to modest growth and significant achievements in various contracts and projects.

### Satellite Manufacturers

**Airbus Defence and Space recorded revenues of € 2.5B in Q1 2023**, indicating a decrease of 21.8% compared to Q1 2022. The decline was primarily due to lower volume in Military Air Systems and Space Systems.



*Credit: Unsplash*

**Thales Alenia Space generated € 1.197B in Q1 2023**, representing an increase of 12% compared to Q1 2022. Although the order intake in the Aerospace segment decreased by 3% organically, the performance in aeronautics remained strong.

**OHB SE (Space segment) generated € 154.7M in Q1 2023**, reflecting a notable increase of 8.3% compared to Q1 2022.

### Satellite Operators

**SES achieved revenues of € 490M in Q1 2023**, indicating a positive growth of 9.4% compared to Q1 2022. The company reported solid Q1 results, driven by double-digit revenue growth resulting from the acquisition of DRS GES in 2022. SES also made significant progress with the O3b mPOWER and US C-band projects, securing various deals across different markets.

**Eutelsat reported revenues of € 272M in Q1 2023**, marking a decline of 5.2% compared to Q1 2022. The decrease was primarily driven by a 10.6% drop in the main broadcast division due to sanctions against its Russian and Iranian channels. However, Eutelsat expects sales to improve once new in-orbit assets become operational in the second half of 2023.

## Maxar acquired by Advent International for \$6.4B

Satellite imagery company **Maxar Technologies, has been purchased by Advent International**, a US private equity firm, along with minority investor British Columbia Investment Management Corp., in a transaction valued at \$6.4B. The acquisition was finalized on May 3rd, resulting in Maxar becoming a privately-owned company and its shares no longer being traded on the New York and Toronto stock exchanges. Maxar operates a fleet of high-resolution imaging satellites and manufactures satellites in Palo Alto, California. This acquisition reflects a recent trend in the space industry, wherein an increasing number of private equity firms are investing in the sector due to its promising growth potential and the growing demand for satellite imagery and data. Maxar's acquisition follows the purchase of satellite imaging company DigitalGlobe in 2017 by MacDonald Dettwiler and Associates for \$3.6 billion.





### Viasat completes Inmarsat acquisition and prepares to compete with LEO service providers



*Credit: Viasat*

Satellite broadband hardware and service provider **Viasat has completed its acquisition of London-based mobile satellite services fleet operator Inmarsat**. This consolidation marks the largest satellite communications merger in the past two decades and concluded after 18 months of regulatory review. The valuation of the deal, initially valued at \$7.3B in November 2021, dropped to slightly over \$6.3B due to a decline in Viasat's stock. Inmarsat's former

shareholders now hold 37.6% of Viasat's shares. The strategic combination of the two companies aims to leverage their satellite capacities and global reach, including Inmarsat's S-band satellite/terrestrial aero connectivity network in Europe. With the integration of Inmarsat's assets, Viasat is well-positioned to test the viability of a near-global broadband service delivered via GEO satellites against the competition from LEO operators. Viasat argues that a global broadband constellation using low-orbiting satellites is not as efficient as their geostationary satellite business model, as such spacecrafts spend much of their time flying over unprofitable territories. The company has confirmed that its "global international business" will be based in London, while its headquarters will remain in Carlsbad, California.

### Scotland's SaxaVord Spaceport secures \$173M funding

Scotland's startup **SaxaVord Spaceport has secured a \$173M debt package** to complete site development and prepare for orbital missions from three launch pads. The £139M (\$173M) funding adds up to £28M raised from private sources a £13M investment by the Germany-based Rocket Factory Augsburg (RFA). SaxaVord plans to conduct 30 launches per year initially, with a potential extension to 40-50 launches per year. Several companies have expressed interest in launching from SaxaVord and utilizing its ground station for satellite data retrieval. The spaceport also intends to engage in tourism-related activities and become an hub for launches of European Commission's payloads.

### European Investment Fund grants €60M in equity to Munich-based Alpine Space Ventures

**Alpine Space Ventures secured €60M in equity from the European investment Fund (EIF)**, bringing ASV's committed capital to over €100M. ASV is dedicated to the entire value chain of satellite constellations and Earth observation within the NewSpace industry, as demonstrated by recent investments in three companies, including Reflex Aerospace, a small satellite manufacturer, Morpheus Space, an electric propulsion company, and Blackwave, a specialist in carbon composites. Additionally, ASV has expanded its Limited Partners with the inclusion of 20 SpaceX executives and early employees, which enhances the fund's competitive edge and provides portfolio companies with additional expertise and reach.

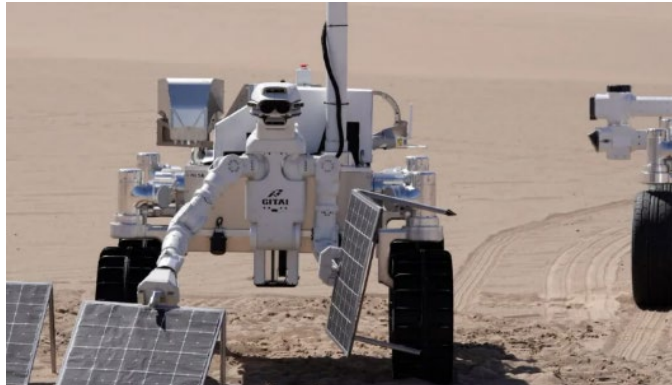


### UK Government launches £50M Space Clusters and Infrastructure Fund (SCIF)

The UK government has launched the Space Clusters and Infrastructure Fund (SCIF), a **funding programme worth £50M (€ 58M) to support the procuring, building, and upgrading of state-of-the-art R&D infrastructures** necessary to prepare space products for missions and commercial markets. The fund is open to industry and academia, and is expected to support around 5-10 projects, each with funding of up to £10M (€ 11.6M).

### Japanese Space Robotics Venture GITAI Raises \$29M

Japanese space robotics venture GITAI has raised ¥4B (\$29M) in funding to accelerate technology development and expand its presence in the U.S. The funding round was led by Tokyo-based investor Global Brain and serves as an extension of a Series B round that raised approximately \$17M in 2021. The funds will support GITAI's efforts in developing a lunar rover and a two-meter-long Inchworm robotic arm. The venture has already achieved significant milestones,



*Credit: GITAI*

with the rover passing tests equivalent to Level 4 (out of 9) of NASA's Technology Readiness Level (TLR) and the Inchworm robotic arm reaching TRL 5. GITAI plans to further advance these technologies, with the aim of launching the S2 robotic arm system to the ISS. The venture also plans for a lunar surface demonstration mission in 2026, where the rover would assemble a communication antenna and solar panels. Ultimately, GITAI intends to use a portion of the funding to expand its engineering and manufacturing facilities in Los Angeles.

### AccelerComm concludes £21.5M Series B funding

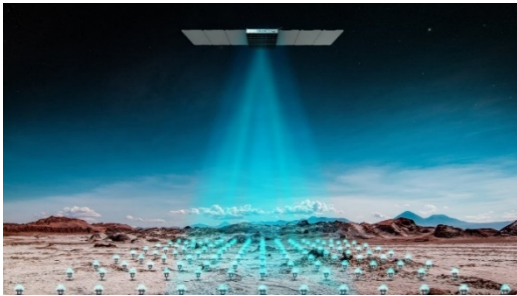
On May 11th, UK-based AccelerComm, which specializes in enhancing the performance of 5G radio access networks, has recently concluded a **Series B funding round, raising £21.5M**. The investment was secured from Parkwalk, Swisscom, and Hostplus, with participation from existing investors Bloc Ventures, IP Group, and IQ Capital. The funding will support various initiatives, including team expansion, global and US market expansion, and further technological advancements. Furthermore, it will be used to meet the growing demand for its intellectual property (IP) among mobile operators, telecoms equipment vendors, and satellite operators.

### UK receives 17% of global space investments

According to a report released on May 18th, by the UK Space Agency and PwC, **the United Kingdom has received 17% of global private capital in the space sector since 2015**. This makes it the second most attractive destination for private space investment after the US, and the top choice in Europe. Since 2015, nine major UK venture capital firms have invested in the space industry. The space and space-related products and services contribute approximately 18% to the UK's GDP annually, with earth observation alone driving over £100B (\$124.9B) of the British economy. The UK is home to more than 1,500 space companies, generating £17.5B (\$21.9B) in domestic revenue, accounting for about 5% of the global sector in 2022. Earth observation, manufacturing, and satellite connectivity are the primary investment areas.



### Fleet Space secures \$33M in Series C funding round



*Credit: Fleet Space Technologies*

The Australian **Fleet Space Technologies** has raised **approximately \$33M in a Series C funding round** to expand its satellite-based mineral exploration services. The funding round resulted in a valuation of over AUD\$350M (\$232M), doubling the company's value since 2021. The Series C round was led by venture capital firm Blackbird, an existing investor. The fund will primarily support the expansion of Fleet Space's Exosphere mineral prospecting business, particularly in

North America. Exosphere utilises low-power ground sensors that send seismic data via Fleet Space's LEO constellation of seven satellites, enabling the creation of 3D subsurface models in a matter of days, a significant improvement over conventional techniques that take weeks or months.

### Virgin Orbit shuts down business after selling its assets for \$36M

In May, **Virgin Orbit shuts down business after selling its assets for \$36M**. In particular, Rocket Lab won their Long Beach, CA headquarters, along with manufacturing machinery to accelerate production of Neutron rocket for \$16.1M; Stratolaunch won the modified Boeing 747 Cosmic Girl carrier craft for \$17M; Launcher won the Mojave launch site lease and equipment for \$2.7M.

### Satellite Vu raises £12.7M IN Series A2 funding round

UK climate technology company **Satellite Vu** has announced the successful completion of their **Series A2 funding round, securing £12.7M (€ 14.7M)**. This brings the company's total investment to £30.5M (€ 35.4M) in Venture Capital funding. The round was led by Molten Ventures, with participation from existing investors such as Seraphim Space Investment Trust PLC, A/ O PropTech, Lockheed Martin, Ridgeline Ventures, Earth Sciences Foundation, and Stellar Ventures. With this new funding, Satellite Vu aims to enter commercial operation and convert their EAP customers into revenue bookings starting from Q4 2023, following the launch of its satellite named "The World's Thermometer". After the completion of a Series B funding round, expected to take place post first launch, Satellite Vu intends to launch a constellation of eight satellites to enable high-frequency thermal monitoring at scale.

#### In other news

**Varda Space Industries Series C funding round results in an overall valuation of \$500M:** The startup, secured \$25M and facilitated the pre-Series C round through a special-purpose vehicle (SPV) managed by previous investor Side Door Ventures.

**Kenyan startup Amini raises \$2M in pre-seed funding:** The Europe Climate Technology Fund, Pale Blue Dot, led the pre-seed funding rounds supporting Amini's plans to launch a satellite constellation.

**EnduroSat raises \$10M in a Series A funding round:** The investment round was led by Ceecat Capital, a Luxembourg-based firm, with additional funding contributed by Freigeist Capital from Germany. The company employs a satellite-as-a-service business model and intends to utilize the funds to enhance its satellite technology, broaden its product line of constellation-as-a-service, and expand its workforce, which currently consists of 130 individuals.

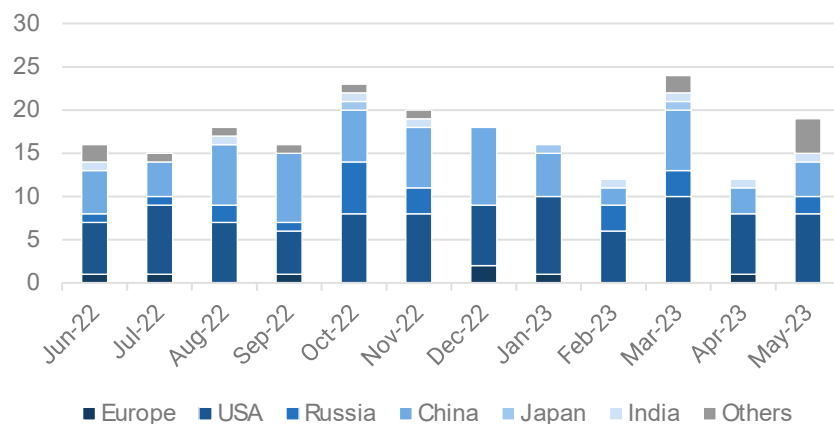


## LAUNCHES & SATELLITES

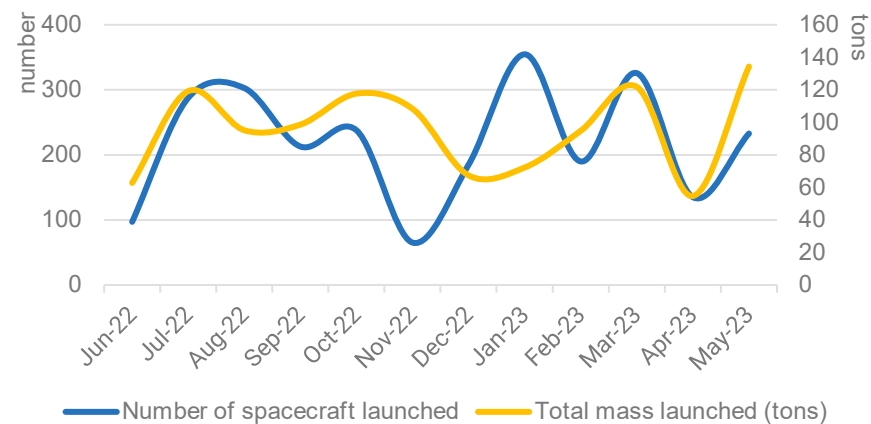
### Global space activity statistics

May 2023	USA	Russia	China	India	Other	Total
Number of launches	8	2	4	1	4	<b>19</b>
Number of spacecraft launched	211	2	6	1	13	<b>233</b>
Mass launched (in kg)	95 632	8380	27 702	2232	331,2	<b>134277.2</b>

### Launch activity over the year



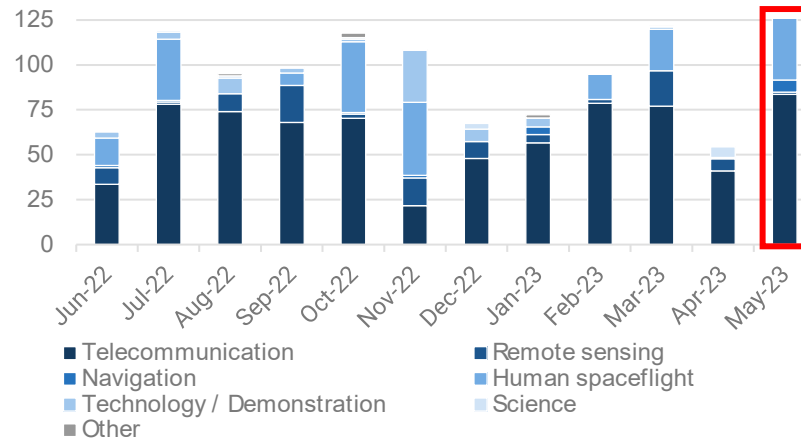
Evolution of the number of launches per launch country



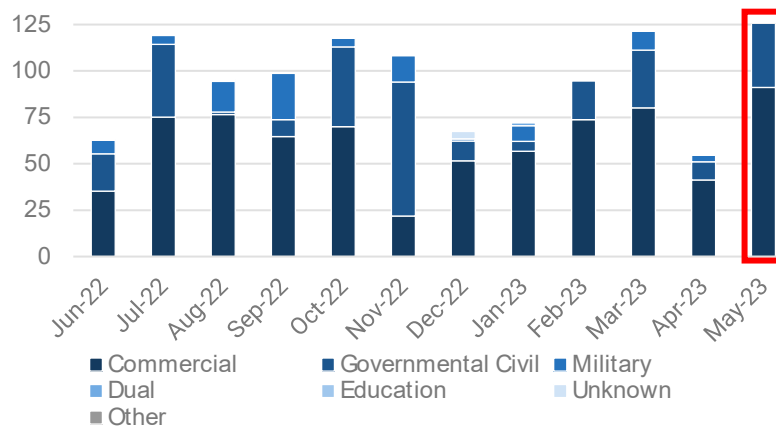
Evolution of launch activity over the year 2022-2023



## Satellite missions and markets



Evolution of the total mass launched (tons) per mission (Jun. 2022-May 2023)



Evolution of the total mass launched (tons), per market (Jun. 2022-May. 2023)

May 2023	Telecom	Remote sensing	Nav.	HSF	Tech/ Demo	Science	Other
Europe	2352						
USA	76 725			12 055		21.2	
China		20	4600	22 082		1000	
Russia		1100		7280			
India			2232				
Others	4500	106			154	50	

Total mass (kg) launched by mission and customer country

May 2023	Commercial	Governmental/ Civil	Military	Education
Europe	2352			
USA	88 780	212		
China		23082	4600	20
Russia		7280	1100	
India		2232		
Others		4710	100	

Total mass (kg) launched by market and customer country





## Launch Log

Launch date	Launch country	Launcher	Spacecraft name	Main customer	Customer country	Prime manufacturer	Manufacturer country	Mass (kg)	Mission	Market
01/ 05/ 2023	USA	Falcon Heavy (Block 5)	Arcturus / Aurora 4A	Astranis	USA	Astranis	USA	300	Telecommunication	Commercial
			G-Space 1 / Nusantara H-1A	Gravity Space	USA	Space Inventor	Denmark	22	Telecommunication	Commercial
			ViaSat 3.1	ViaSat Inc.	USA	Boeing	USA	6418	Telecommunication	Commercial
04/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (56 spacecraft)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
08/ 05/ 2023	New Zealand	Electron KS	TROPICS (05&06)	NASA	USA	Blue Canyon Technologies	USA	5.3 (each)	Earth Science	Gov. Civil
10/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (51 spacecraft)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
10/ 05/ 2023	China	CZ-7	Tianzhou 6	CNSA	China	CAST	China	14000	Cargo Transfer	Gov. Civil
14/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (56 spacecraft)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
17/ 05/ 2023	China	CZ-3B/ G3	Beidou 3 G4	PLA	China	CAST	China	4600	Navigation	Military
19/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Starlink Mini (22 spacecraft)	SpaceX	USA	SpaceX	USA	800 (each)	Telecommunication	Commercial
20/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Iridium-NEXT (5 spacecraft)	Iridium	USA	Thales Alenia Space	France	860 (each)	Telecommunication	Commercial
			OneWeb (16 spacecraft)	OneWeb Ltd.	United Kingdom	OneWeb Satellites (USA)	USA	147 (each)	Telecommunication	Commercial
21/ 05/ 2023	China	CZ-2C(3)	Aomen Kexue (1A&1B)	CNSA	China	MUST	China	500 (each)	Earth Science	Gov. Civil
			Luoja 2-01	Wuhan University	China	Wuhan University	China	20	Earth Observation	Education
21/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Crew Dragon Ax-2	Axiom Space	USA	SpaceX	USA	12055	Crew Transfer	Commercial
24/ 05/ 2023	Russia	Soyuz-2- 1a	Progress-MS 23	Roscosmos	Russia	RKK Energia	Russia	7280	Cargo Transfer	Gov. Civil
25/ 05/ 2023	South Korea	Nuri	JAC / JLC-101	KARI	South Korea	Justek	South Korea	4	Tech/ Demo	Gov. Civil
			KSAT3U	KARI	South Korea	Kairospace	South Korea	6	Meteorology	Gov. Civil
			Lumir-T1	KARI	South Korea	Lumir	South Korea	10	Space Science	Gov. Civil
			NEXTSat 2	KAIST	South Korea	KAIST	South Korea	150	Tech/ Demo	Gov. Civil
			SNIFE (4 spacecraft)	KASI	South Korea	KASI	South Korea	10 (each)	Earth Science	Gov. Civil
26/ 05/ 2023	New Zealand	Electron KS	TROPICS (03&07)	NASA	USA	Blue Canyon Technologies	USA	5,3 (each)	Earth Science	Gov. Civil
26/ 05/ 2023	Russia	Soyuz-2- 1a Fregat	Kosmos 2569 / Kondor-FKA 1	Ministry of Defense of Russia	Russia	NPO Mashinostroyeniya	Russia	1100	Earth Observation	Military
27/ 05/ 2023	USA	Falcon-9 v1.2 (Block 5)	Arabsat 7B / Badr 8	ArabSat	Saudi Arabia	Airbus	France	4500	Telecommunication	Gov. Civil
29/ 05/ 2023	India	GSLV Mk.2(4)	IRNSS 1J / NVS 01	ISRO	India	ISRO	India	2232	Navigation	Gov. Civil
30/ 05/ 2023	China	CZ-2F/ G	Shenzhou 16	CMSA	China	CAST	China	8082	Crew Transfer	Gov. Civil
30/ 05/ 2023	North Korea	Chollima-1	Malligyong 1	NADA	North Korea	NADA	North Korea	100	Earth Observation	Military



### Launch Highlights

#### China and India are launching satellites for their navigation systems

**China successfully deployed the 56th satellite of its Beidou navigation and positioning system** into geostationary orbit on May 16th. The satellite serves as a backup for the system, which was already completed in 2020. The primary objective behind the launch, which was carried out by a Long March 3B lifted off from Xichang Satellite Launch Center, is to enhance the system's reliability, consistency, communication capabilities, and accuracy in positioning.



*Credit: beidou*

**India also expanded its satellite navigation system NavIC by launching NVS-01**, the first second-generation navigation satellite series of the constellation. The launch took place on May 28th on a GSLV Mk.II rocket from the Satish Dhawan Space Centre. The system's first generation, launched between 2013 and 2019, consists of seven satellites in geosynchronous orbit.

#### OneWeb launches last tranche of first generation satellites and demonstrator for 2nd generation

A Falcon 9 rocket was launched by SpaceX from Vandenberg Space Force Base on May 20th, carrying a **technology demonstration satellite for OneWeb's second-generation broadband constellation**, as well as backup satellites for OneWeb's current, first-generation LEO network and spares for the Iridium-NEXT telecommunication constellation. OneWeb currently has 633 first-generation satellites in LEO, although only 588 are required for global coverage. OneWeb already surpassed the 588-satellite mark for operationality with a launch on March 25th. Among the satellites launched for OneWeb is JoeySat, which is designed as technology demonstration for a second-generation constellation.

#### Crew transfers to the ISS and the Chinese Tiangong space station



*Credit: Jordan Sirokie*

**Axiom Space's second private mission to the ISS, Ax-2, concluded on May 31th** after the four-person crew launched on May 21th for an eight-day stay at the space station. Axiom operated the mission, while the launch was provided by SpaceX from Kennedy Space Center with their Dragon capsule on a Falcon 9. The Ax-2 crew also featured the first Saudi astronauts to visit the ISS.

**On May 30th, a crew of three astronauts, including the first Chinese civilian astronaut**, arrived at the Tiangong space station for a six-month-long mission. The Shenzhou-16 spacecraft was launched into space on a Long March 2F rocket from the Jiuquan Satellite Launch Center on May 29th. Earlier this month, China launched the Tianzhou-6 cargo spacecraft to Tiangong, delivering supplies to support the Shenzhou-16 mission.

#### North Korea fails to launch its first spy satellite

**The May 31st launch attempt of the first North Korean spy satellite Malligyong 1 ended in failure.** The newly developed Chollima-1 launcher encountered instability issues in its engine and fuel system. This launch marked North Korea's sixth attempt to launch a satellite and was the first since 2016. It triggered emergency alerts in certain areas of South Korea and Japan. South Korea's military has initiated a salvage operation to recover presumed parts of the space launch vehicle.

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