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THIS MONTH IN THE SPACE SECTOR...

- SECURING THE FUTURE OF EUROPE IN SPACE – SPEED AND SIZE MATTER 1**

- POLICY & PROGRAMMES.....2**
 - The 15th European Space Conference took place2
 - The Swedish EU Presidency’s priorities for space and inauguration of Espace2
 - ESA appoints two new Directors and plans to hire 400 new employees3
 - Comet Interceptor: ESA partners with OHB Italia3
 - EU and NATO release Joint Declaration3
 - New Copernicus satellite data service kicked-off3
 - France and Germany release joint Declaration 4
 - President Biden signs FY2023 allocations to U.S. Space Programmes 4
 - The White House unveils National ISAM Implementation Plan..... 4
 - U.S. Senate passes ORBITS Act and House of Representatives introduces SSA policy bill.....5
 - ESA plans a zero debris policy and Europe sees progress in autonomy in STM5
 - United Nations General Assembly approves ASAT test ban resolution5
 - France and the U.S increase cooperation in space following French State Visit 6
 - UAE launches first Moon mission and signs agreements for space cooperation 6
 - China aims to build space partnerships with Gulf nations7
 - Saudi Arabia withdraws from Moon Treaty7
 - Plans for spaceports in the pipeline7
 - African Union Commission inaugurates the African Space Agency7
 - Rwanda and Nigeria sign the Artemis Accords as the first African nations 8
 - Canada plans to establish a governance for commercial space launch..... 8
 - Japan releases new National Security Strategy (NSS) 8
 - The U.S. and Japan sign space cooperation framework agreement 9
 - Iran and Russia sign agreement to strengthen space cooperation 9
 - U.S. push use of commercial space systems for military use 9
 - Space Force establishes component at U.S. Central Command 9
 - Italy and Hungary sign MoU for future cooperation in space10
 - Sevilla will host the Spanish Space Agency10
 - France provides Poland with two reconnaissance satellites and a ground station10
 - Funding for UK applicants to Horizon Europe10
 - FCC votes to establish Space Bureau and Office of International Affairs10
 - NASA and DARPA to test nuclear engine for Mars missions10
 - NASA chooses Collins Aerospace to develop new spacesuits for ISS missions 11
 - Leak on Soyuz MS-22 leak detected11

In other news.....	11
INDUSTRY & INNOVATION	12
SpaceX rolls out "Starshield" to boost U.S. defence and intelligence capabilities.....	12
ESA partners with Microsoft, Thales Alenia Space to explore the value of AI and quantum communications in space.....	12
The future of human presence in LEO seems anything but dark: Airbus joins Starlab project	12
Space to provide edge computing and green solutions.....	13
NorthStar Earth & Space partners with Axelspace to provide first combined SSA services ..	13
Latest developments on In-Flight Connectivity (IFC)	13
Ispace Hakuto-R Moon lander mission update.....	14
ESA 5G/6G Hub takes off.....	14
Eutelsat purchases Thales Alenia Space's Flexsat.....	14
Satellite connectivity booms.....	15
Microsoft & Viasat consolidate partnership for Africa.....	15
Blue Origin and Leidos won contracts from NASA for lunar lander.....	15
SimX VR medical simulation selected by U.S. Space Force	16
European NewSpace companies partner to bring AI-based STM solutions	16
Five Canadian companies selected for CSA Health Beyond Initiative.....	16
Raytheon contracts Lockheed Martin for Space Force missile-tracking satellite.....	16
German Rocket Factory Augsburg (RFA) prepares for launch	17
In other news.....	17
ECONOMY & BUSINESS	18
Launch of the European Space Index	18
Space economy reaches new peaks in 2022, Euroconsult reports	18
Reaction Engines closes £40M in investment round.....	18
European Investment Bank (EIB) to finance SES with €300M loan	19
NewSpace Capital closes space fund at €105M.....	19
L3Harris Technologies to acquire Aerojet Rocketdyne for \$4.7B	19
Maxar Technologies to be acquired by equity firm for \$4B	19
Cailabs closes €26M funding round.....	19
ClearSpace closes successful Series A funding round	20
Cailabs closes €26M funding round.....	20
Mangata Network raises \$100M in debt.....	20
OroraTech closes €15M investment round	20
E-Space plans to acquire CommAgility for \$14M	20
South Korean pharmaceutical company invests \$50M in Axiom Space	21

Capella Space closes \$60M equity financing round.....	21
Arqit Quantum ditches space plans.....	21
In other news.....	22
LAUNCHES & SATELLITES.....	23
Global space activity statistics.....	23
Launch activity over the year.....	23
Satellite missions and markets.....	24
Launch Log.....	25
Launch Highlights.....	30
ABOUT ESPI.....	32

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SECURING THE FUTURE OF EUROPE IN SPACE – SPEED AND SIZE MATTER



In times of climate crisis and war, each day counts. Only timely climate action can secure a green future of our planet. Rapid and resilient crisis response can save lives, and space can be an even more integral part of the solution. In turn, space itself, as a strategic asset needs to be protected. European space has much achieved and much more to offer. **A decisive European space policy is needed. Now. At scale. By all actors.** Recently, European space united twice, in Paris, where ESA Member States held their Ministerial Council meeting (CM22), and in Brussels, at the 15th European Space Conference. At both events, the strategic importance of space was clearly recognised. However, when measured against the magnitude of climate and geo-political challenges and the urgency to act, both events demonstrated that **transformation is needed to ensure effective and timely action.**

European space has come a long way. However, despite major efforts by EU and ESA **no major new impulse has been visible during the "Zeitenwende" of the past year**, which would truly secure the future of Europe in space when faced with global competition. The new EU security flagship, IRIS² will only become available earliest by 2027, its €2.4B of EU funding over several years is about 1% compared to the \$50B annually of public space funding for security & defence globally. Similar ratios apply for ESA CM22 initial funding of €1.6B for space safety & security. Despite the undisputed urgency to protect our space infrastructure and astronauts, there is little evidence of adequate SSA/SST funding at EU level prior to the next MFF, and situational awareness of cislunar space is beyond current European imagination. While Cassini provides valuable stimulus, its funding component only represents 30% of the capital raised by European New Space startups in 2022 and is unlikely to provide the critical funding structure enabling the late-stage growth needed in Europe. The strong voices of awareness and ambition provided in Brussels give **hope**. Josep Borrell Fontelles, High Representative and Vice-President, European Commission stated that "the geopolitical competition [...] is now increasingly projected up in space" and referred to space as a "battlefield". He underlined the urgency of concrete common European action. Commissioner for Internal Market, Thierry Breton referred to a "Single market moment of space". Sweden's Prime Minister Ulf Kristersson stated that Sweden will promote the space strategy for security and defence and sees climate change mitigation as a priority during its EU Presidency. Echoing the remarks on the Swedish EU Presidency for a sustainable use of space, Anna Christmann, Federal Government Coordinator of German Aerospace Policy stressed the importance of a zero debris policy. However, to close the gap between ambition and actual speed and size of action, Europe needs to step up:

- To ensure that space policy is better integrated into the national and EU policies of green transition, security & defence and digital infrastructures, acknowledging that more often than not space has no clear place in these policies yet.
- To increase synergies between national and European priorities, acknowledging that more than 80% of institutional funding for space in Europe originates from national budgets and agencies.
- To include the transformation of the industrial complex, stimulating its innovative powers and going beyond a focus on industrial policy and direct industrial return and harnessing the talent of the next generation.

During the European Space Conference, Niklas Nienass, Member of the European Parliament, voiced the need for more discussion about a European space strategy. The 2023 Space Summit, the EU MFF Mid-Term-Review and the preparation of ESA CM25 may provide the milestones to **shape and transform Space in Europe**, with all actors, EU, ESA, member states and industry. This would also respond to industry concerns, such as those expressed by Jean Marc Nasr, Executive VP, Airbus Defence and Space, seeing Europe's position at risk, referring to a wake-up call to Europe, if it wants to remain a strong player in the international scene facing the US and China and the **"need for a new deal"**.

For the times they are a-changin'.

Yours sincerely,



Hermann Ludwig Moeller
Director of ESPI



POLICY & PROGRAMMES

The 15th European Space Conference took place



Credit: Business Bridge Europe

On January 24th and 25th, the **15th European Space Conference**, organised by Business Bridge Europe, took place in Brussels under the motto “Securing the Future of Europe in Space.” The conference was comprised of keynote speeches and 16 sessions, **6 of which were moderated by ESPI**, on the key topics of secure connectivity, defence & security, space exploration, international cooperation, space applications, space entrepreneurship, and space & Green Deal. The conference saw various announcements and agreements signed, including:

- The EU Space Strategy for Security and Defence will be **tabled by the EC in March** and will be based on 4 pillars: (1) strengthen the resilience and security framework for EU national and commercial space systems; (2) reinforce the bloc’s ability to respond to threats; (3) increase the use of space for security and defence through EO and SSA/STM and increasing cooperation with partners such as NATO; (4) implement an EU space law for rules on safety, security and sustainability of European space systems.
- **ESA, the EC and the EUSPA signed a Coordination Arrangement** for commercialisation initiatives to support entrepreneurship and strengthen the New Space industry in Europe.
- The **EP will conduct the final vote on IRIS² on February 14th**, and the goal in 2023 is to get a legal basis and award the contract so that the work can start by 2024.
- **ESA signed a letter of intent with Euroconsult** to support entrepreneurship and the development of innovation by providing, especially European space start-ups that incubated in the ESA BICs, with a rate of market intelligence and insight.
- **ESA, the EC, and the VC firm Promus Ventures launched the Euronext Space Index** - the first-ever European space-related index.
- **ESA and the EC signed a contribution agreement** to build a “Copernicus mirror site” in the Philippines – an initiative called “CopPhil” which will be funded with €7.3M.
- The EC announced to establish a **EU-Africa space flagship programme**, which will focus on (1) innovation and a partnership, (2) space for green transition and (3) focus on establishing business ecosystems of start-ups and accelerators.

The Swedish EU Presidency’s priorities for space and inauguration of Espace

In December, the **Programme of the Swedish Presidency of the Council of the EU** was published. Sweden will take over the Presidency from January to June 2023. The programme **presents 4 priorities**: (1) Security – unity, (2) Competitiveness, (3) Green & energy transition, and (4) Democratic values and the rule of law. For space, Sweden announced the following objectives:

- to promote the work on the envisaged EU space strategy for security and defence;
- to promote measures for fair and sustainable use of space;
- to take up negotiations on the proposal for a Regulation to establish IRIS²



Credit: SSC

In conjunction with Sweden taking over the EU Presidency, on January 13th, **the inauguration of the new launch facility at the Esrange Space Center in Kiruna took place**, attended i.a. by the Swedish head of state, King Carl XVI Gustaf, President of the EC Ursula von der Leyen, and ESA DG Josef Aschbacher. Esrange is the first European spaceport that enables vertical orbital launches for small satellites from European soil. Since 1966, Esrange has hosted suborbital launches of sounding rockets and high-altitude balloons. Now, small satellites can be launched from Esrange into polar orbits in LEO. Moreover, the new facility enables testing for reusable rockets. ArianeGroup will conduct initial testing of its Themis reusable booster demonstrator. In addition, Isar Aerospace has been and will continue conducting tests at Esrange for their microlaunchers.

ESA appoints two new Directors and plans to hire 400 new employees

On December 15th, the **ESA Council approved the proposal of ESA DG Josef Aschbacher to appoint two new Directors**: Carole G. Mundell (UK) was appointed as the Director of Science, and Dietmar Pilz (Germany) as the Director for Technology, Engineering and Quality. Both are expected to take their positions in 2023. In addition, **ESA plans to hire 200 new employees in 2023** for positions created for the implementation of new projects approved at ESA CM22 and on top, ESA will hire 200 new staff to fill vacancies in existing positions.

Comet Interceptor: ESA partners with OHB Italia

On December 15th, the ESA and a consortium led by OHB Italia signed a **contract worth 117,5M EUR for the development of deep space mission Comet Interceptor**, with the financial support of ASI. The agreement includes OHB System AG, SENER Aerospacial S.A., and OHB Sweden AB and will consist in the management of the 1-ton space infrastructure, therefore from design to the delivery. It will be composed of one spacecraft and two probes that will intercept a pristine comet approaching from the periphery of our Solar System. The information acquired from the "coma", a thin particulate cloud surrounding the nucleus of the comet, will provide knowledge on the origins of the galaxy and Earth.

EU and NATO release Joint Declaration

On January 10th, the EU and the NATO released the third **joint EU-NATO Declaration**. Space is included in paragraph 12, which declares that EU and NATO will strengthen cooperation "[...] to address in particular the growing geostrategic competition, resilience issues, protection of critical infrastructures, emerging and disruptive technologies, space, the security implications of climate change, as well as foreign information manipulation and interference."



Credit: NATO

New Copernicus satellite data service kicked-off

In December, ESA and a consortium led by T-Systems International, which is composed of CloudFerro, Sinergise, VITO, ACRI-ST, DLR and RHEA **signed a €150M contract for a new Copernicus data access service** which has a period of 6 years and can be extended up to 10 years. The new service aims at improving the exploitation of the satellite data and will be fully operational in July 2023. The data will be made immediately available through industry-led standard interfaces.



France and Germany release joint Declaration



Credit: Federal Government/

On January 22nd, **Germany and France released a Declaration** in the frame of the **60th anniversary of the Élysée Treaty**, in line with the Versailles declaration of March 2022, committing to strengthen the EU towards more resilience, sustainability and independence/autonomy. The declaration includes a paragraph about cooperation in space, highlighting (1) the adoption and implementation of the EU Space Strategy for Security and Defence; (2) the development of a Roadmap with ESA and interested ESA MS for a thriving New Space ecosystem; (3) European launchers and European autonomous, independent, and cost-efficient access to space, incl. a dual launch of SYRACUSE and H2SAT military satellites by Ariane 5 in mid-2023 and the promotion of micro-launcher; and (4) exchanges on space-related defence issues, use of space for climate protection, and international cooperation for space exploration and human spaceflight.

President Biden signs FY2023 allocations to U.S. Space Programmes

U.S. President **Joe Biden signed the Consolidated Appropriations Act** into law and finalised funding for the 2023 financial year. A \$1.7T Omnibus Spending Bill budget (until September 30th 2023) is allocated to fund the U.S. departments and agencies executing space programmes. This includes NASA (\$25.4B), NOAA, U.S. **DoD (\$797.7B)**, and FAA as well as subordinated units, such as the **U.S. Space Force (\$26.3B)** and the DoT's Office of Commercial Space Transportation (\$37.9M), DoC's Office of Space Commerce (\$70M), NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) division (\$376M for Operations, Research, and Facilities (ORF) and \$1.4B for Procurement, Acquisition, and Construction (PAC)). **NASA with the \$25.4B budget** saw an increase for 2023 (\$24B FY2022) but received \$1B less than requested. NASA's financial issues in executing its portfolio of science, technology, aeronautics and human spaceflight programmes will continue – in particular, **NASA's planetary science programme, which receives \$3.2B, remains under stress.**



Credit: White House

Furthermore, in December, U.S. Vice President and Chair of the National Space Council (NSC), Kamala Harris, **announced the 30 members of the NSC's new Users Advisory Group (UAG)**, which will be officially appointed by NASA Administrator Bill Nelson. The appointed members represent companies and organisations from the U.S. space sector. The UAG will advise the NSC regarding space policy and strategy.

The White House unveils National ISAM Implementation Plan

In December, the White House Office of Science and Technology Policy **released a National In-Space Servicing, Assembly, and Manufacturing (ISAM) Implementation Plan**, based on the **ISAM National Strategy** that was released in April 2022. The **National ISAM Implementation Plan**, which the U.S. Government developed in cooperation with U.S. stakeholders across space-related sectors, outlines ways to build capabilities and technologies to manufacture, repair, assemble and transport objects in space (orbits, Moon and deep space). The implementation activities include: (1) Advance ISAM Research and Development; (2) Prioritise expanding scalable ISAM infrastructure; (3) Accelerate the emerging ISAM commercial industry; (4) Promote international collaboration and cooperation; (5) Prioritise environmental sustainability; and (6) Inspire the future space workforce.



U.S. Senate passes ORBITS Act and House of Representatives introduces SSA policy bill

In December, the U.S. Senate passed via unanimous consent the **Orbital Sustainability (ORBITS) Act**, a legislation to mandate space debris removal. The **legislation directs NASA to establish a programme for active space debris removal** and to join forces with other Government agencies and the private sector to publish a list of debris objects that could risk satellites.

The legislation was introduced in September 2022 by John Hickenlooper, chairman of the space subcommittee of the Senate Commerce Committee. In addition, the bill requires the National Space Council to update the Orbital Debris Mitigation Standard Practices (every 5 years) and directs the Department of Commerce continue efforts on standard practices for STM.

Moreover, the U.S. House of Representatives (Don Beyer (D-Va.) and Donald Norcross (D-N.J.)) **introduced a bill on Space Situational Awareness (SSA) policy**, the Space Safety and Situational Awareness Transition Act of 2022, to **fund the U.S. Department of Commerce's capabilities (incl. establishing a civil SSA capability) with \$95M and NASA R&D on SSA with \$50M in fiscal year 2024**. Moreover, the bill includes conducting further studies on the cybersecurity, data sharing agreements, international cooperation, and a research strategy of SSA.

ESA plans a zero debris policy and Europe sees progress in autonomy in STM



Credit: Frame Stock Footage/Shutterstock

In January, ESA DG Josef Aschbacher announced the plan to **establish a zero debris policy for European spacecraft in the next years** and expand it to the global level. The policy will commit to companies or nations that bring a spacecraft into orbit have the responsibility to remove it.

Moreover, during a session at the European Space Conference, European stakeholders from ESA, EC and industry highlighted **Europe's progress and the need to further push to achieve strategic autonomy in STM/SSA by building up capabilities and policy** – to reduce the reliance on the U.S.

United Nations General Assembly approves ASAT test ban resolution

On December 7th, the **United Nations General Assembly approved the new ASAT test ban resolution** initiated by the U.S. which is calling for a halt to direct-ascent anti-satellite (ASAT) testing, among other resolutions on arms control and related space security topics. 155 nations voted in favour of the resolution, with 9 voting against it (Belarus, Bolivia, China, Cuba, Iran, Nicaragua, Russia, Syria, and the Central African Republic), and 9 others abstaining.

Since the start of the initiative in April 2022, 9 countries joined the U.S. as a sponsor of the resolution: Australia, Canada, Germany, Japan, New Zealand, South Korea, Switzerland, the UK - and recently **France** in November 2022.



Credit: UN



France and the U.S increase cooperation in space following French State Visit



Credit: AFP

From November 29th to December 2nd, the **French President Emmanuel Macron was in the U.S for a state visit**. Regarding space, France and the U.S. **“agreed to strengthen U.S.-France space cooperation across civil, commercial, and national security sectors”** and outlined that they are working together to develop norms for the responsible and peaceful uses of outer space. As part of the visit, French Minister for the Armed Forces Sébastien Lecornu, and U.S. Secretary of Defense Lloyd Austin **signed a Declaration of Intent**, which updates the bilateral relation between France and the U.S. in the field of defence. Additionally, CNES President Philippe Baptiste and NASA Administrator Bill Nelson signed an agreement to host a French instrument on the commercial lunar lander Farside Seismic Suite, which will be sent to the Moon in 2025.

UAE launches first Moon mission and signs agreements for space cooperation

The UAE launched first Moon mission

On December 11th, the **UAE's first Moon mission, the Emirates Lunar Mission (ELM), was launched**. The mission's Rashid Rover was launched as a payload of the iSpace Hakuto-R M1 mission with SpaceX's Falcon Rocket.



Credit: MBRSC / Twitter

SANSA signs agreement with the MBRSC for UAE Moon mission

The South African National Space Agency (SANSA) signed an agreement with the UAE's Mohammed Bin Rashid Space Centre (MBRSC) to **support the UAE's Emirates Lunar Mission (ELM)**. SANSA's Hartebeeshoek (HBK) ground station will be used to establish direct communication between the rover and the ELM Control Centre at MBRSC once the rover lands on the Moon surface after a 5-months journey.

The UAE and South Korea expand space cooperation

On January 15th, during a joint summit in Abu Dhabi, the **UAE Space Agency and South Korea's Science Ministry signed a MoU to expand cooperation in space**, including cooperation in space exploration, EO, satellite communications, satellite navigation, exchange of space data, ground station, launch services, SSA and STM. The MoU follows a bilateral cooperation agreement from 2017 that was focused on space S&T&D and space-related policies, laws, and regulations. In addition, the UAE's MBRSC is considering placing a payload of the Korea Astronomy and Space Science Institute (KASI) on its robotic lunar rover which is expected to fly to the moon in 2026.

The UAE considers contributing an airlock module to Nasa's Lunar Gateway Moon station

Currently, **the UAE is exploring opportunities to contribute to NASA's planned Lunar Gateway Moon station**. In particular, Boeing and UAE representatives are discussing the UAE's provision of an airlock module, which will be used by astronauts to enter and exit the space station.

The UAE Space Agency and AWS sign agreement to support the UAE's space ecosystem

In December, the **UAE Space Agency and Amazon Web Services (AWS) signed a Statement of Strategic Intent and Cooperation to support the growth of the emerging space sector in the UAE** for 3 joint initiatives (1) “Emirati-AWS Space Industry Development Program (EASID)”, (2) “Emirati-AWS Talent for Space Program (EATS)” and (3) “Emirati-AWS Open Data Sponsorship Program”.



China aims to build space partnerships with Gulf nations

During the first China-Gulf Cooperation Council (GCC) Summit, which took place in December, priority areas of cooperation for the next 3-5 years were assessed, including space. The GCC intergovernmental group comprises Saudi Arabia, the UAE, Bahrain, Kuwait, Oman and Qatar. **China aims to build partnerships with the Gulf nations** to collaborate in remote sensing and communications satellites, space utilisation, aerospace infrastructure, and the selection and training of GCC astronauts to join China's space station for joint missions and considers building a China-GCC joint center for lunar and deep space exploration. Moreover, **ESA announced to not intend sending astronauts to China's space station** – both, because it does not have the budgetary capacity nor the political intention.

Saudi Arabia withdraws from Moon Treaty

On January 5th, UN Secretary General António Guterres released an official notification, stating that the **Kingdom of Saudi Arabia withdrew from the 1979 Moon Treaty**. Saudi Arabia was one of only 11 states that have signed the Treaty, with a short accession and signature in 2012. Saudi Arabia signed the Artemis Accords and is developing a space strategy expected to be released soon.

Plans for spaceports in the pipeline

Oman plans to build the Middle East's first spaceport

Oman plans to build the Middle East's first spaceport, the Etlaq Space Launch Complex, in the port town of Duqm. It is planned that the spaceport will be fully completed in 3 years, but the first rocket launch is envisaged early next year. The project is led by the National Aerospace Services Company.



Credit: Oman News Agency

Djibouti plans to develop an international commercial spaceport within 5 years for \$1B

The Republic of Djibouti signed a MoU with Hong Kong Aerospace Technology Group Limited and Touchroad International Holdings Group for the **development of an international commercial spaceport** located in the region Obock. The 5-year \$1B project will include 7 satellite launch pads and 3 rocket testing pads as well as port infrastructure and highways for the transportation of aerospace materials sent from China. Djibouti will not be the owner of the spaceport but will provide the necessary land (approx. 10 km²) with at least 35 years lease. Djibouti will only receive the infrastructure after a 30-year co-management contract with Hong Kong Aerospace Technology, planned to be signed in March.

African Union Commission inaugurates the African Space Agency

On January 25th, the **African Union Commission and the Egyptian government signed an agreement for the formal inauguration of the African Space Agency (AfSA)** on the HQ of the new agency in Egypt's Space City. The agreement defines the relation and competencies of both parties. The AfSA is aimed at serving as a platform for space research and innovation for Africa and strengthening space missions in Africa. The agency is also in charge of Africa's collaboration with Europe and other international non-African partners.



Rwanda and Nigeria sign the Artemis Accords as the first African nations

In December, **Rwanda and Nigeria signed the Artemis Accords** at the **U.S.-Africa Leaders Summit**, which took place on December 13th-15th in Washington, DC. The summit aims to continue efforts to strengthen ties between the U.S. and African partners. Rwanda and Nigeria are the first African nations and the 22nd and 23rd nations to sign the Artemis Accords.



Credit: NASA

Canada plans to establish a governance for commercial space launch

The Government of Canada announced plans to **support commercial space launch activities** in Canada with the following measures:

- In the next 3 years (interim) Canada intends to enable secure, safe, and environmentally sustainable commercial space launches under existing legislation/regulations.
- The Ministry of Transport will collaborate with other federal departments and agencies to develop the necessary regulatory requirements, safety standards, and licensing conditions.
- Furthermore, the Ministry will establish an interdepartmental review process for expertise coordination between the other departments and agencies to ensure that approvals of launches are consistent with national legislation and security and foreign policy interests, as well as with international treaties and conventions.

Japan releases new National Security Strategy (NSS)

On December 16th, a new **Japanese National Security Strategy (NSS), National Defense Strategy (NDS), "Defense Buildup Programme"** were decided upon by the National Security Council and approved by the Cabinet.

Space is one of the domains outlined in the **NSS document** in two contexts: first in the context of Japan's multi-layered cross-domain response to threats as a capability multiplier for the Japan Self-Defense Forces (SDF) (p. 3, 6); and second in a section on deepening security cooperation with the U.S. (p. 22). Moreover, the strategy includes a dedicated section on space, "Reinforcing Comprehensive Efforts for Space Security" (p. 25), stating that "Japan will strengthen its response capabilities in the field of space security". In particular, Japan will:

- drive forward measures to capitalise on its overall space-related capabilities in security, such as strengthening cooperation between JAXA and the SDF;
- set up a framework for the Government's decision-making in unforeseeable circumstances, strengthen mechanisms for understanding the space domain, promote measures regarding space debris, expand the development of capabilities for command and control as well as information and communications;
- enhance cooperation with its ally, including the formulation of international codes of conduct;
- utilise its civilian space technology in national defence by supporting Japan's space industry.



The U.S. and Japan sign space cooperation framework agreement



Credit: NASA

On January 13th, during a brief ceremony at NASA HQ, the **U.S. and Japan signed a space cooperation framework agreement for continued cooperation in space exploration**, especially on Artemis, which includes Japan's plan to develop a pressurised rover for future missions. Moreover, the U.S. Space Force confirmed the **delivery of the first of two space sensor payloads** planned to fly on two separate navigation satellites of Japan's Quasi-Zenith

Satellite System (QZSS) constellation (QZS-6, QZS-7) to GEO in 2023 and 2024. The delivery was agreed on in a **MoU in 2020**.

Iran and Russia sign agreement to strengthen space cooperation

On December 14th, **Iran and Russia signed a space cooperation agreement to strengthen the cooperation of the countries' space industries**, including jointly designing and constructing remote sensing and telecommunication satellites as well as the joint infrastructure development and training courses. The agreement was signed by the Head of Iran's Space Agency, Hassan Salarieh, and the Head of Roscosmos, Yuri Borisov, at the International Aerospace Exhibition in Iran.



Credit: Twitter/@Iranskiyz

U.S. push use of commercial space systems for military use

New Defense Science Board task force examines DoD's demand for commercial space systems

U.S. Undersecretary of Defense for Research and Engineering, Heidi Shyu, **established a Defense Science Board task force**, comprised of civilian experts, on 'commercial space system access and integrity' to examine the growing demand of the military for commercial space technology and related implications and to formulate recommendations for the U.S. DoD. The task force will conduct research over the next months, especially on (1) how the DoD should acquire commercial space services, in order to include it in the broader U.S. defence architecture, (2) how to ensure the availability of space services to military users and agencies that have demand but usually not access, and (3) on security threats to U.S. commercial or institutional space systems.

Space Force considers new procurement model for national security launch providers

The U.S. Space Force is currently considering a **change of the approach for the selection of national security launch services providers and the procurement process** – i.e. the National Security Space Launch (NSSL) Phase 3 procurement. The strategy for the Phase 3 procurement is the finalisation process and a draft solicitation is **envisaged to be released in the second quarter of 2023**. The contracts for Phase 3 are expected to be awarded in 2024. In 2020, the ULA and SpaceX won the Phase 2 competition, and the current contracts will be re-competed in 2024.

Space Force establishes component at U.S. Central Command

On December 2nd, the U.S. Central Command, which is responsible for military operations in the Middle East and South Asia, **launched the "U.S. Space Forces-Central" for the coordination of space-based services** that will be based at the U.S. Central Command's HQ at MacDill Air Force Base in Florida. The new space unit will be led by Space Force Col. Christopher Putman. Hitherto, the Air Force component of U.S. CENTCOM had this role.



Italy and Hungary sign MoU for future cooperation in space

On December 7th, **ASI and the Hungarian Ministry of Foreign Affairs and Trade signed a MoU to cooperate in the field of space activities** for peaceful purposes, including projects in space exploration, EO, space R&T, development of CubeSats and trainings. The MoU is part of a **broader bilateral cooperation framework** for cooperation in defence and energy supply. Furthermore, Hungary plans to establish a space agency.

Sevilla will host the Spanish Space Agency

In January, Isabel Rodriguez of the Spanish Government announced that **Sevilla will host the Spanish Space Agency**. In addition to this decision, she announced that the Spanish Agency for Supervision and Artificial Intelligence (Aesia) will be based in A Coruña, Galicia.

France provides Poland with two reconnaissance satellites and a ground station

At the end of December, the Polish Deputy Prime Minister and Defence Minister Mariusz Błaszczak and the French Defence Minister Sébastien Lecornu **approved a €575M deal between Airbus and the Polish Armaments Agency on France's delivery of two reconnaissance satellites and a ground station to Poland by 2027**, to strengthen the Polish Army's reconnaissance capabilities – which are currently based on Poland's participation in the Italian COSMO SkyMed EO project.



Credit: Hungarian Defence Ministry

Funding for UK applicants to Horizon Europe

In December, the UK government announced to **extend research funding support for UK applicants for Horizon Europe**. The extension, which will guarantee financial support to UK researchers for the calls that close on or before March 31st, is only a temporary solution to the UK exclusion from Horizon Europe since 2021.

FCC votes to establish Space Bureau and Office of International Affairs

In January, the Federal Communications Commission (FCC) voted unanimously to **reorganise the International Bureau into a Space Bureau and with a separate Office of International Affairs**. This reorganisation aims at better supporting the FCC's statutory obligations. Moreover, in December, the FCC voted to approve a **Notice of Proposed Rulemaking (NPRM)** in order to **improve and speed up the review process for satellite and earth station application** under its Part 25 rules. This move aims to accelerate the FCC's space innovation agenda.

NASA and DARPA to test nuclear engine for Mars missions

NASA and DARPA announced to cooperate for a **demonstration as early as 2027 of an in-space nuclear thermal rocket (NTR) engine**, as part of the Demonstration Rocket for Agile Cislunar Operations (DRACO) program which strives to enable crewed NASA missions to Mars through a faster transit time that reduces health risks for astronauts. DARPA will serve as the contracting authority for developing the stage and the engine and leader of the entire programme, including rocket systems procurement and integration, approvals, and assembly/integration of the engine with the spacecraft. NASA will lead the technical development of the engine.



NASA chooses Collins Aerospace to develop new spacesuits for ISS missions



Credit: Collins Aerospace

In December, **NASA awarded a \$97.2M contract (task order)** to Collins Aerospace for the design, development, and demonstration the next-generation ISS spacesuit that will replace the Extravehicular Mobility Unit (EMU) suits currently used for spacewalks outside the ISS. This is the first task order under the Exploration Extravehicular Activity Services (xEVAS) contract from May 2022. The **new spacesuits** will be less heavy,

have an open design to better adapt to individual mission requirements, and will provide oxygen, CO₂ removal, hydration, ventilation, electrical power, thermal control, and communications.

Leak on Soyuz MS-22 leak detected

On December 14th, an **external coolant leak was detected from the Roscosmos Soyuz MS-22** spacecraft docked to the ISS' Rassvet module. Roscosmos investigated the leak, with the conclusion that Soyuz MS-22 is not safe enough to return the astronauts back to Earth. On January 11th, **Roscosmos announced it will launch an uncrewed spacecraft (Soyuz MS-23) to the ISS on February 20th** to return cosmonauts Prokopyev and Petelin and NASA astronaut Frank Rubio back to Earth. The damaged Soyuz MS-22 will undock and return uncrewed.

In other news

EUSPA extends cooperation with CNES for the delivery of the Galileo Search and Rescue Service: The new Contract will further expand the cooperation between EUSPA and CNES in SAR activities

Italy and Algeria sign MoU for cooperation in space exploration, EO, and space S&T: The cooperation will include joint (research) projects, exchange of knowledge in the fields of space S&T, the organisation of joint workshops and training programmes.

UNOOSA, UNDP and Brazilian Space Agency form partnership to boost Brazilian space sector: UNOOSA and UNDP will provide the AEB with technical assistance and support to develop the Brazilian space sector, conduct research on the space sector, and develop trainings, as well as to enhance the cooperation between AEB and public and private stakeholders.

UNOOSA and the UK launch partnership to study international approaches to the registration of space objects: an anonymised survey will be conducted with international stakeholders, evaluating the processes used for space object registration.

NASA and AST & Science sign Joint Spaceflight Safety Agreement: the agreement includes information sharing for space safety and defines the governance, responsibilities, and procedures for the coordination of flight safety, focusing on conjunction avoidance and launch collision avoidance between NASA spacecraft and AST SpaceMobile's test satellite BlueWalker 3 and AST planned satellite constellation.

NASA's Perseverance rover deposits first rock sample on Mars: The sample is the first of a depot of 10 considered to be brought back to Earth in the Mars Sample Return campaign.



INDUSTRY & INNOVATION

SpaceX rolls out “Starshield” to boost U.S. defence and intelligence capabilities



Credit: SpaceX

On December 2nd, **SpaceX unveiled “Starshield”**, a brand-new product line offering defence and intelligence agencies end-to-end systems, including custom-built spacecraft, remote sensing, space surveillance payloads, and secure communications services leveraging SpaceX’s Starlink network of broadband satellites. Starshield satellites will be equipped with laser terminals to make them interoperable with military satellites, a move that confirms commercial space technologies as fundamental assets for national defence strategies. The **integration of commercial space solutions into military operations is “the way of the future,”** said John Plumb, Assistant Secretary of Defense for Space Policy, said December 14th at the Center for Strategic and International Studies.

ESA partners with Microsoft, Thales Alenia Space to explore the value of AI and quantum communications in space

ESA made clear in its **Agenda 2025** that “New technologies like AI and quantum computing will be integrated upfront to translate big data into smart information and services.” ESA is fostering the advent of Cognitive Cloud Computing in Space (3CS) by capitalising on high-performance AI accelerator chips directly onboard satellites. In a recently agreed initiative, **ESA Φ-lab will launch a challenge with Microsoft and Thales Alenia Space** to develop new Machine Learning (ML) models for a hyperspectral optical sensor. The output, the Φ-sat-2 satellite, will deliver a platform for in-flight uploading, deployment and updating of third-party ML models aboard the ISS.

In addition, on January 23rd, **Thales Alenia Space signed a contract to lead ESA’s TeQuantS project**, as part of the ESA’s ARTES 4.0 Core Competitiveness Programme. TeQuantS (Technological development for space-based Quantum reSource distribution) aims to develop quantum space-to-Earth communications technologies for cybersecurity applications and future quantum information networks, including optical ground stations by the end of 2026. Therefore, TeQuantS will help demonstrate the performance of long-distance quantum satellite links.



Credit: Thales Alenia Space

The future of human presence in LEO seems anything but dark: Airbus joins Starlab project

December and January have been high-performing months for the future presence of humans in low Earth orbit. In fact, the future decommissioning of the ISS does not seem to cause concerns, given the increasing interest expressed by both private companies and governments to carry out projects for future space stations. Remarkably, on January 4th, **Airbus defence and space announced it would join the Starlab project**, a free-flying space station serving NASA and other global customers. The partnership has been sought to also guarantee the ESA and its 22 Member States to continue their microgravity research in LEO and to lay down the foundation for long-lasting European and American presence in space.



Space to provide edge computing and green solutions

The 21st century industrial revolution is being driven by factors such as digitisation and sustainability. Space lines up with these trends and proves itself to be a reliable domain for the development of vanguard technologies, including edge computing and green solutions. The **EU revealed the beginning of the "ASCEND" study** (Advanced Space Cloud for Zero Emission and European Data Sovereignty), which follows this rationale and seeks to bring solar-powered data centers to space. The study counts on a €2M budget and **it is being spearheaded by Thales Alenia Space**. In addition, on January 3rd, a prototype satellite containing **Caltech's Space Solar Power Demonstrator (SSPD) has been launched** onboard a SpaceX Falcon 9 rocket. The spacecraft is tasked to demonstrate the feasibility of harvesting solar power in space.



Credit: AFRL

Similarly, Northrop Grumman announced on December 15th the **successful demonstration of the ground-based element of the Space Solar Power Incremental Demonstrations and Research (SSPIDR) Programme**. The company disclosed it has been able to beam radio frequency energy toward various antennas by steering the beam.

NorthStar Earth & Space partners with Axelspace to provide first combined SSA services

On January 11th, the Canadian **NorthStar Earth & Space signed a partnership with the Japanese microsatellite company Axelspace** to provide the first ever combined Ground and Space SSA services. The service will offer more complete coverage of the space domain and will leverage on Axelspace's Axelglobe constellation of GRUS EO microsatellites and combine it with NorthStar's algorithms to improve the quality of SSA data.

By joining forces, the two companies also aim to avoid the duplication of available information, that could potentially lead to orbital miscalculations. In the words of Richard Del Bello, Director of the U.S. Office of Space Commerce, **SSA sensors are not always in alignment to each other**, and this could result in incorrect collision avoidance information.

Latest developments on In-Flight Connectivity (IFC)



Credit: Aviage Systems

In-flight connectivity (IFC) is rapidly becoming a critical asset for aircraft operators, that aim at allowing customers with active IFC to use data, outgoing voice calls, and SMS at high altitude.

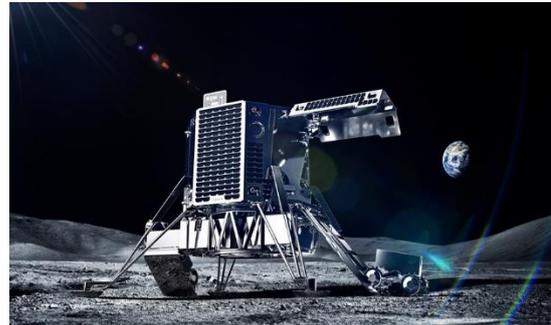
In early January, **Delta Air Lines announced it will start offering IFC services** from February exploiting Viasat space infrastructures. To the same extent, **Latvian-based airBaltic announced it will soon equip its Airbus A220-300 fleet with**

Starlink's SpaceX high-speed connectivity system.



Ispace Hakuto-R Moon lander mission update

Hakuto-R Mission 1, **the lunar lander built by Japanese company ispace, will arrive at the Moon in April** according to its mission operations plan. While pulling off the first-ever lunar touchdown for a Japanese company, the lander will also deploy the **Rashid Rover for the United Arab Emirates' Space Agency** to analyse the plasma on the lunar surface and conduct experiments to understand more about lunar dust. Hakuto-R was launched on December 11th onboard a SpaceX Falcon 9 rocket, that also lofted Lunar Flashlight, a briefcase-sized NASA spacecraft in search for water ice from orbit around the Moon. On January 2nd, **ispace announced that the lander had successfully carried out its second orbital control manoeuvre**, to then reach approximately 1.4 million km from Earth on January 20th. In the second half of 2023, American-based Intuitive Machines **plans to fly onboard its Nova-C lunar lander the Japanese Dyson's Yaoki rover**, tasked to demonstrate lunar mobility. It will be the second mission to the Moon for the American space services company.



Credit: ispace

ESA 5G/6G Hub takes off



Credit: ESA

As the transformation of connectivity proceeds at a fast pace, ESA aims to invest in 5G and 6G satellite-enabled communication technologies and pursue new partnerships with key industrial stakeholders. For this reason, **ESA selected the UK-based information technology company CGI to expand the competencies of the 5G/6G Hub**, based at ESA's European Centre for Space Applications and Telecommunications (ECSAT) in UK. CGI will collaborate with the UK Space Agency (UKSA) and

other partners, including satellite operators Eutelsat and OneWeb, as well as mobile network operator Vodafone UK. The expansion of the Hub's features is set to increase the physical footprint of its dedicated networks, and aid the development of innovative satellite services, edge-computing solutions, multi-network and multi-orbit orchestration, and improved easy-of-use connectivity systems.

Eutelsat purchases Thales Alenia Space's Flexsat

On December 1st, **Eutelsat announced Thales Alenia Space will build a GEO broadband satellite for the French company** to support multi-orbit services in the Americas by 2026. The high-throughput, Software-Designed Satellite (SDS), will be called Flexsat (flexible satellite) by reason of enabling reconfigurations and in-orbit adjustments in response to changing mission needs. The satellite will combine GEO and LEO services, adding complementarity to the connectivity layer provided from LEO, and will be based on the **Thales Alenia Space's "Space Inspire" (Instant Space In-orbit Reconfiguration)** product line.



Satellite connectivity booms



Credit: Techslang

About 85% of the Earth's surface is not served by any mobile network. Satellite operators and connectivity providers all around the world are mobilising resources to turn the tide.

In late November, British handset maker **Bullit announced it will release a new smartphone line** capable of sending and receiving texts via GEO satellites in around 10 seconds. While the names of the satellite operators it will rely on are unknown,

the smartphone will run on Google's Android operating system. In addition, it will include a satellite-enabled SOS service to communicate with both emergency units and any other mobile phone connected to a satellite network. Recently, also the **Canadian satellite operator Iridium and the American chipmaker Qualcomm revealed the beginning of a new partnership**. The two companies will combine their expertise and assets to enable Android users to tap directly into the Qualcomm Snapdragon satellite infrastructure and send SMS and emergency messages when out of range of a cell tower.

Microsoft & Viasat consolidate partnership for Africa

Global communication company Microsoft is pioneering the Airband Initiative, through which the enterprise and its partners can monitor the digital divide in developing countries. The programme, embraced by Viasat in a **partnership sealed in December**, aims to offer satellite connectivity to around 10 million people and five million across Africa by 2025. The partnership propels the lasting cooperation between the two companies, that already band together in the Azure Space Initiative to deliver advances in satellite connectivity anywhere on the planet.

The first African countries benefitting from the service will be Angola, Egypt, and Senegal. They will experience first-hand the use of space in healthcare, remote learning, precision agriculture, energy management. On the other side, African governments are welcoming the services by streamlining their licensing procedures.



Credit: Microsoft

Blue Origin and Leidos won contracts from NASA for lunar lander

Following the **U.S. Senate's call** for more redundancy and competition in 2021, two consortia of private companies are competing to adjudicate funding on a new human lander system. On the one side there is Blue Origin, whose team consists of Lockheed Martin, Draper, Boeing, Astrobotic, and Honeybee Robotics, and **boasts an extensive network** across the U.S. On the other side there is Dynetics, a subsidiary of Leidos, partnering with Northrop Grumman. Both companies can count on the latter's legacy in building the lander modules, including for the Apollo Programme. The winner of the bid will fly a demo mission on Artemis V in the second half of this decade.



SimX VR medical simulation selected by U.S. Space Force

On January 15th, the American-based SimX announced that its **VALOR (Virtual Advancement of Learning for Operational Readiness) Programme has been selected by the U.S. Space Force** to provide clinical simulation training for astronaut recovery and space launch medicine. The VR training programme has been tailored for flight surgeons and Air Force Pararescuers, and is being developed and tested alongside the USAF 24th Special Operations Wing and 1 Air Force.



Credit: U.S. Airforce

European NewSpace companies partner to bring AI-based STM solutions

The Portuguese Neurspace, the Spanish lenai Space, and the Bulgarian EnduroSat announced on January 9th the **start of a new partnership that will test an end-to-end collision avoidance system** in LEO. Neurspace's AI-driven STM platform will perform collision risk assessments and generate example manoeuvres for the mission. lenai's electric propulsion system will automatically perform the manoeuvres generated by Neurspace. Finally, EnduroSat is building the satellite bus, which will also host other customer payloads. The launch is scheduled for 2023 onboard the German Isar Aerospace's Spectrum rocket (ISAR 2).



Credit: Neurspace

Five Canadian companies selected for CSA Health Beyond Initiative

Following a call for tender issued by the Canadian Space Agency (CSA), **five Canadian companies have been selected** to build prototypes of the Connected Care Medical Module (C²M²) as part of the **Health Beyond Initiative**. Each contract lasts up to 8 months and is worth \$2M and stipulates the identification and development of state-of-the-art medical solutions for astronauts engaged in deep space exploration. A C²M² consists of a scalable integrated system of medical technologies contained in a deployable unit and is equipped with a core computer-based system that facilitates the incorporation and interconnection of multiple information. The system aims to increase the user's ability to autonomously diagnose and monitor health conditions on-site, therefore improving the timeliness, quality, and continuity of health care practices.

Raytheon contracts Lockheed Martin for Space Force missile-tracking satellite

As the U.S. Space Force is adding layers of MEO satellites to enhance the national missile-defence architecture, the **Pentagon has selected two satellite designs for a future constellation of sensors** to detect and track ballistic and hypersonic missiles. U.S.-based Raytheon Intelligence & Space contracted Lockheed Martin to construct a **LM400 missile-tracking satellite** suitable for military, governmental, commercial, and multi-mission purposes, which will be integrated with Raytheon's infrared sensing payload. While the value of the contract has not been disclosed, the consortium announced that a "system critical design review" is scheduled for 2023, and that the satellite will be delivered no earlier than 2026.



German Rocket Factory Augsburg (RFA) prepares for launch

In December, the German Rocket Factory Augsburg (RFA) and DLR selected seven German and Italian companies of the **microlauncher payload competition**, worth €11M, that will see their payloads flying on board the first flight RFA ONE. The launch, scheduled for late 2023, will take off from SaxaVord Spaceport in Scotland and fly into a sun-synchronous orbit at an altitude of 500 km. In early January, **RFA secured exclusive access to the Scottish launch pad** after sealing a multi-year partnership that included an investment in SaxaVord worth tens of millions of GBP.

In other news

Pulsar Fusion will construct nuclear-based space engine: Pulsar Fusion, a UK-based start-up received **funding** from the UK Space Agency to develop an integrated nuclear fission-based power system for electric propulsion.

Mynaric signs \$24M contract with WARPSPACE: Munich-based Mynaric announced a deal to supply its CONDOR Mk3 terminals to Japanese WARPSPACE, which is using them to build a commercial optical data relay network for EO satellites.

SpaceX launches internet satellites for UK-based OneWeb: Although competitors, a SpaceX's Falcon 9 launched 40 mini satellites on behalf of OneWeb following the termination of the latter's contract with Roscosmos for use of the Soyuz rocket. The satellite constellation has now reached 80% of its total planned infrastructure.

The ASI purchases two satellites from Leonardo: The contracts, with a total value of €33M, include the development of a high-resolution optical chamber for PLATiNO 3 and a hyperspectral instrument for PLATiNO 4. The payloads will improve the Italian capabilities to monitor the territory, natural resources, and the atmosphere.

Airbus and VDL Group partner to develop laser communication terminals: The laser infrastructure will enable the aircraft UltraAir to exchange large amounts of data with a ground station and satellites positioned in GEO. The system is deemed to serve both military and commercial purposes.

The ESA invests \$4M in Azores' Teleport: ESA will invest in the Portuguese Island of Santa Maria to enhance the capabilities of the ESA Teleport *in loco*, allowing the continuation of ESA permanence on the Santa Maria Space Technological Center for another five years.

German Isar Aerospace signs first-ever contract with U.S. customer: Under the agreement, U.S.-based Spaceflight Inc. secured one dedicated launch in 2026 taking off from Andøya, Norway, and an option to add an additional dedicated launch to occur in 2025.

NASA selects SpaceX to launch Sentinel-6B: The contract, worth \$94M, includes launch onboard a Falcon 9 rocket - targeted for late 2025 - and other mission related costs.

Thales Alenia Space will provide Thailand with SAR solutions: The European company will partner with App works to enable the detection of distress signals from COSPAR-SARSAT beacons, mainly using the Galileo satellite positioning system. The system will be enhanced by Thales's innovative Medium Earth Orbit Local User Terminal (MEOLUT) Next product.

New Space Spanish companies partner for future Atlantic Constellation: Elecnor Deimos, Alén Space, DHV Technology, and Satlantis will join forces to build eight satellites dedicated to the European EO Atlantic Constellation. The first satellites will be positioned at around 500km in 2025.



ECONOMY & BUSINESS

Launch of the European Space Index



Credit: ESA

On January 24th, **the ESA, the European Commission, and the VC firm Promus Ventures launched the Euronext Space Index**, the first-ever European space-related index to measure the stock market performance of European companies operating in the space sector.

The index, managed by the pan-European stock exchange group Euronext, aims to streamline exchange of information on the financial performance of space companies, with a view to guiding the increasing number of investors interested in space markets. In addition, the initiative offers a benchmark and point of reference for management companies, enabling them to compare the space financial market with national stock exchange indices.

Space economy reaches new peaks in 2022, Euroconsult reports

In its 9th edition of its annual space market overview, Euroconsult estimates a **growth of 8% in 2022 for a total value of \$424B**. More specifically, most of the space market's value, 83%, is represented by downstream companies which rely on satellite data to provide services. \$70B is the amount counted for the "core" space sector, being companies that produce or own space assets. The value of this segment is expected to grow to \$100B in 2031.

Euroconsult also valued the manufacturing segment at \$29B, with satellite operators at \$16B, launch services at \$10B, and ground at \$5B.

According to the market research firm, by 2031 those sectors will grow to \$30B, \$30B, \$11B, and \$5B, respectively.



Credit: Euroconsult

Furthermore, government spending for space activities reached \$103B, a year-on-year growth of 9%, and it is expected to hit \$124B in 2031. 2022 saw well 86 nations investing in space, with only five most spending countries representing 84% of the total value. While these digits signal an unequal competition, it is also true that in the year 2000, the top five government space investors accounted for 93% of the world total.

Reaction Engines closes £40M in investment round

The UK company developing advanced propulsion capabilities **received £40M in a funding round** led by Strategic Development Fund, the investment arm of Tawazun Council, the UAE's defence acquisitions authority. The new capital will be used to accelerate the development and commercialisation of Reaction Engines' thermal management technologies.



European Investment Bank (EIB) to finance SES with €300M loan

On January 11th, Luxembourg-based telecommunication company SES and the European Investment Bank (EIB) announced an **agreement for a seven-year term loan with a value of €300M**. The loan is the largest ever provided by the EIB to a Luxembourgish company and will support investment for the design, procurement, and launch of three satellites from Thales Alenia Space in 2023, with advanced broadcast and broadband services spanning Western Europe, Africa, and the Middle East. The transaction reflects the EU commitment to reinforce its support for the European space commercial sector and it is in line with the **Gigabits Society targets** of the European Commission. According to this Europe-wide initiative, all households should have access to internet speeds of at least 100 Mbps by 2025.

NewSpace Capital closes space fund at €105M

NewSpace Capital announces the closing of its **space-focused growth fund at €105M** and a €15M lead investment in Cailabs' series C investment round. NewSpace Capital is a Luxembourg-based private equity fund that focuses on downstream applications and supply chain segments of the space market, with a main focus on Europe and the U.S. The closing was led by a cornerstone investment from Archean Capital Partners and other investors include corporates, financial institutions, and family offices.

L3Harris Technologies to acquire Aerojet Rocketdyne for \$4.7B

L3Harris Technologies announced an agreement to **acquire Aerojet Rocketdyne for \$4.7B**. The deal is an all-cash transaction at \$58 per share and is expected to close in 2023, pending regulatory approval. Aerojet Rocketdyne, based in California, manufactures rocket engines, propulsion systems, and weapons, generating the company \$2.3B in annual revenue. The deal will expand L3Harris' portfolio in defence systems and civil space.

Maxar Technologies to be acquired by equity firm for \$4B

Maxar Technologies, a space technology company, has entered into a definitive merger agreement with Advent International, a private equity firm. **The all-cash transaction values Maxar at \$6.4B**. Under the deal, Advent will

Credit: MAXAR

contribute \$3.1B, complemented by \$1B in minority equity from British Columbia Investment Management Corporation. According to the agreement, Advent will purchase all common stock for \$53 per share, which is 135% above the 60-day volume-weighted average price before the announcement. The deal is expected to be finalised in mid-2023 and is subject to stakeholder and regulatory approval. Following the deal, Maxar plans to expedite the launch of its new Legion satellite constellation and invest in new capabilities, such as advanced machine learning and 3D mapping.

Cailabs closes €26M funding round

The French company with expertise in bringing innovative photonic products to market has **raised €26M in funding** to support the expansion of its laser communications and optical ground station activities. The funding round was led by NewSpace Capital and included a range of public and private investors. Cailabs has also been selected to receive support from the European Innovation Council (EIC) fund for innovative deeptech companies.



ClearSpace closes successful Series A funding round



Credit: EPFL

The Swiss company ClearSpace, engaged in in-orbit services and active space debris removal, **has raised €26.7M in a Series A funding round led by OTB Ventures and Swisscom Ventures**. Additional participants included the Luxembourg Future Fund, Klaus Hommel's Lakestar, In-Q-Tel, Happiness Capital and 600 T Space Investments.

Furthermore, the company announced a strategic collaboration with SatCom operator Intelsat, to develop the space debris removal mission ClearSpace-1 requested by the ESA in 2020, amounting to €110M.

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Mangata Network raises \$100M in debt

U.S.-based Mangata Networks has **raised \$100M in loans** from UK public entities, including Scottish Enterprise. Mangata will use the funds to develop a satellite manufacturing plant in Prestwick, Scotland, combining R&D, engineering, manufacturing, and operations. Construction begins in early 2023 and manufacturing and operations teams are expected to move in from late 2024.



Credit: Mangata

OroraTech closes €15M investment round

The German company, OroraTech, which is developing a constellation of thermal mapping satellites for tracking wildfires, has **raised €15M to support work on future satellites**. The funding came as an extension of a Series A round that raised €5.8M in June 2021 and was led by Edaphon, a Belgium-based climate impact fund, along with several existing investors as well as public sector co-funding. The investment will be used to fund work on the company's second satellite, which is scheduled for launch in May 2023 on a SpaceX Transporter rideshare mission.

E-Space plans to acquire CommAgility for \$14M

E-Space plans to acquire radio frequency module developer **CommAgility in a \$14.5 million deal**. The acquisition will give E-Space access to 5G software and experience. CommAgility, currently part of Wireless Telecom Group, specialises in systems that manage signals for cellular, air-to-ground, and satellite networks. **E-Space plans to integrate CommAgility's** source code into its network of potentially hundreds of thousands of connectivity satellites.



South Korean pharmaceutical company invests \$50M in Axiom Space

Boryung, a South Korean pharmaceutical company, has **invested \$50 million in Axiom Space's Series C** funding round for a 2.28% stake in the company. The investment is aimed at establishing a business footing in space and finding diverse business opportunities in the private space industry. Boryung has previously invested \$10 million in Axiom and is committed to exploring space-based healthcare solutions. The investment is part of a larger funding round that Axiom will close out in the beginning of the new year.



Credit: Axiom Space

Capella Space closes \$60M equity financing round



Credit: Capella Space

The U.S. satellite manufacturer and EO company **closed \$60M in growth equity financing** from the U.S. Innovative Technology Fund, an investment firm recently created by billionaire Thomas Tull. The company plans to use the funding to expand its imaging capacity and develop new data products as customer demand increases for its frequent, timely, and high-quality SAR imagery and analytics capabilities. In April 2022, **Capella closed a \$97M Series C Round**.

Arqit Quantum ditches space plans

Arqit Quantum, a UK-based company that focuses on quantum encryption, announced it is **canceling its plans to build quantum satellites**. The company has developed a terrestrial method just as secure as its satellite method, but significantly cheaper. The company will now recoup capitalised costs by partially or totally selling the satellite system currently under construction and licensing its quantum satellite intellectual property.



In other news

Slingshot Aerospace raises \$40.8M in oversubscribed Series A2: The U.S. data and analytics company aiming to making space operations safer, announced the oversubscribed round complemented by a venture loan. The funding will be used to grow Slingshot's customer base, further build its Global Sensor Network, and finance acquisitions.

Northstar Earth and Space raises \$35M in Series C: The Canadian start-up is building a constellation for in-situ space situational awareness. The investment round was led by New-York-based private equity firm Cartesian and was the first investment for Northstar from a U.S.-entity.

Reflex Aerospace raises €7M: Reflex Aerospace, a German satellite tech company, has closed the initial round of its seed funding with €7M from investors including High-Tech Gründerfonds and Alpine Space Ventures.

Dawn Aerospace raises \$13M: The New Zealand-based manufacturer of satellite propulsion systems and a reusable spaceplan plans to use the funding to accelerate the development of its spaceplane and extend its in-space propulsion products to GEO/lunar orbits.

Innospac raises \$15M in Series B Bridge round: The funding round was led by venture capital firm Korea Investment Partners. Including this latest round, the Korean rocket startup has raised \$43M in five rounds.

Sofant Technologies raises €4.7M: The Edinburgh-based radio technology start-up has secured €4.7M in its latest investment round. The company plans to use the funding to build a satellite communications terminal targeting mobile applications in the first half of 2023.

SpiderOak completes \$16M Series C Round: The Canadian space cybersecurity company raised \$16.4M in an oversubscribed round led by Empyrean Technology Solutions. SpiderOak will use the funds to complete on-orbit testing and achieving OrbitSecure 2.0 among other things.

Quantum Space raises \$15M: The U.S. start-up focused on building an information "superhighway" in cislunar space announced that it has raised \$15M from Prime Movers Lab, and plans to close a Series A by year-end. The funds will be used to complete the development of its QS-1 mission and begin work on the next batch of satellites.

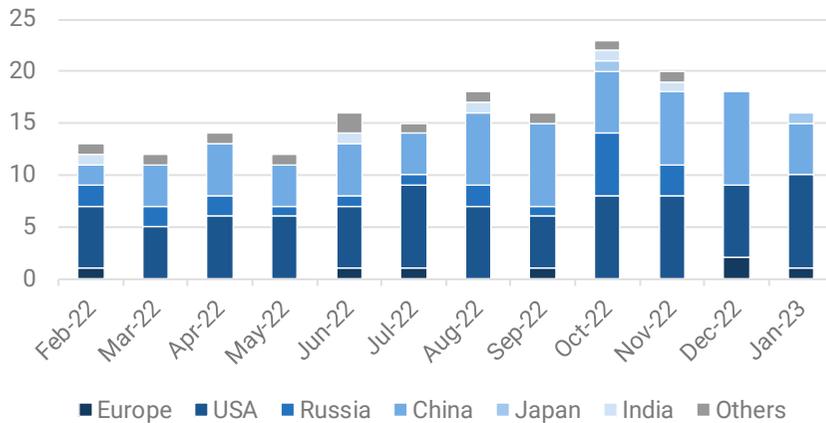


LAUNCHES & SATELLITES

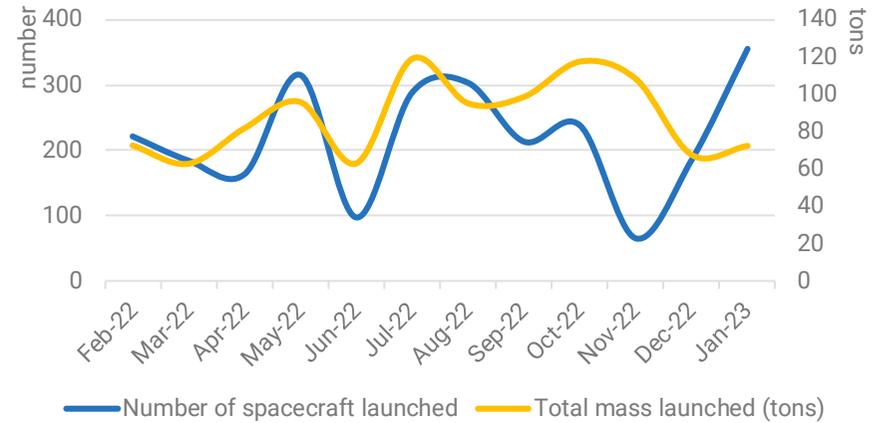
Global space activity statistics

December 2022-January 2023	Europe	USA	China	Japan	Total
Number of launches	3	16	14	1	34
Number of spacecraft launched	14	475	50	1	540
Mass launched (in kg)	12 142	107 053	18 825	1600	139 620

Launch activity over the year



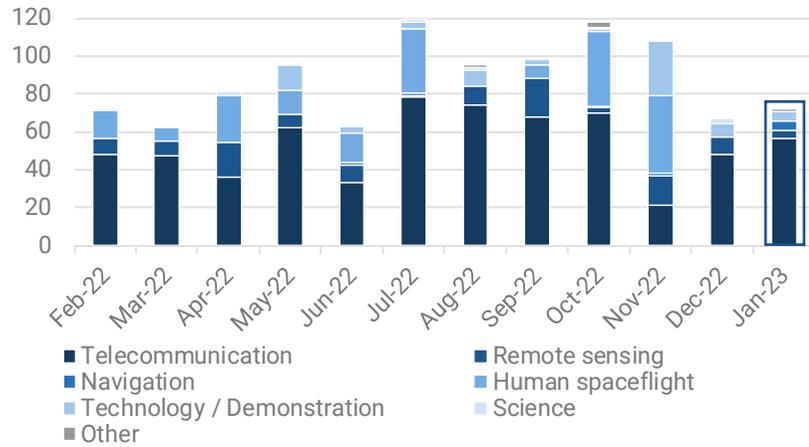
Evolution of the number of launches per launch country



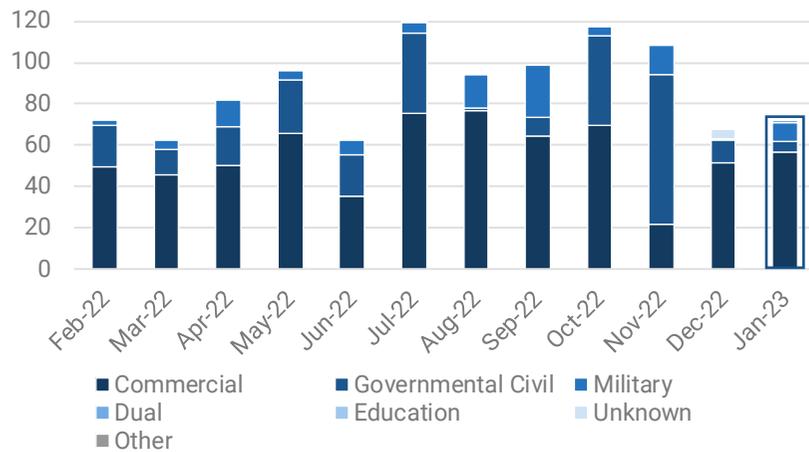
Evolution of launch activity over the year 2021-2022



Satellite missions and markets



Evolution of the total mass launched (tons) per mission (Feb. 2022-Jan. 2023)



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

Dec. 2022-Jan. 2023	Telecom	Remote sensing	Navigation	Technology/ Demonstration	Science	Other
Europe	15 188	5909		71	12	306
USA	87 007.8	597	4352	237	2214	1398
China	2045	5311		11 457.8	5	6.5
Japan		1600			1000	6
India				3		
Others	220	567		25.1	2	80

Total mass (kg) launched by mission and customer country

Dec. 2022-Jan. 2023	Commercial	Gov. Civil	Military	Dual	Education	Unknown	Other
Europe	17 681	3760	44				1
USA	85 825.8	2214	7764		2		
China	2838.8	9975	1950		11.5	4050	
Japan	1006			1600			
India	3						
Others	882.1	3			9		

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
07/12/2022	China	Kuaizhou-11	Xingyun Jiaotong VDES Shiyao	Xingyun Satellite Co.	China	CASIC	China	100	AIS	Commercial
08/12/2022	USA	Falcon-9 v1.2 (Block 5)	OneWeb (40 satellites)	OneWeb Ltd.	UK	OneWeb Satellites	USA	147 (each)	Telecom	Commercial
08/12/2022	China	CZ-2D(2)	Gaofen 5-01A	CNSA	China	SAST	China	1000	Earth Observation	Governmental Civil
09/12/2022	China	Jielong-3	CAS 5A / Fengtai Shaonian 2	CAMSAT	China	CAMSAT	China	6	Radio Amateur	Education
			CAS 5B	CAMSAT	China	CAMSAT	China	0.5	Radio Amateur	Education
			HEAD 2H	HEAD Aerospace	China	SAST	China	45	AIS	Commercial
			Huoju 1	Rocket Pi	China	Rocket Pi	China	12.8	Tech / Demo	Commercial
			Jilin-1 Gaofen-03D (7 satellites)	Chang Guang Satellite Technology	China	Chang Guang Satellite Technology	China	42 (each)	Earth Observation	Commercial
			Jilin-1 Pingtai-01A-01	Chang Guang Satellite Technology	China	Chang Guang Satellite Technology	China	15	Tech / Demo	Commercial
			Golden Bauhinia 1 (-05 & -06)	HKATG	China	ZeroG Lab	China	50 (each)	Earth Observation	Commercial
Tianqi 7	Guodian Gaoke	China	Guodian Gaoke	China	50	Telecom	Commercial			
11/12/2022	USA	Falcon-9 v1.2 (Block 5)	Hakuto-R M1	ispace (Japan)	Japan	JAL Engineering Co.	Japan	1000	Planetary Science	Commercial
			Lunar Flashlight	NASA	USA	NASA	USA	14	Planetary Science	Governmental Civil
12/12/2022	China	CZ-4C	Shiyao 20 (A & B)	Unknown (China, Public)	China	CAS	China	1200 (each)	Tech / Demo	Governmental Civil
13/12/2022	France	Ariane-5ECA+	Galaxy (35 & 36)	Intelsat	USA	Maxar	USA	3250 (each)	Telecom	Commercial
			MTG-I 1	Eumetsat	Europe	Thales Alenia Space	France	3760	Meteorology	Governmental Civil
14/12/2022	China	CZ-2D(2)	Yaogan 36-04 (A, B & C)	People's Liberation Army	China	CAST	China	400 (each)	Earth Observation	Military
16/12/2022	USA	Falcon-9 v1.2 (Block 5)	O3b mPower (1 & 2)	SES	Luxembourg	Boeing	USA	1700 (each)	Telecom	Commercial
16/12/2022	USA	Falcon-9 v1.2 (Block 5)	SWOT	NASA	USA	Thales Alenia Space	France	2200	Earth Science	Governmental Civil
16/12/2022	China	CZ-11	Shiyao 21	Unknown (China, Public)	China	SAST	China	500	Tech / Demo	Governmental Civil
17/12/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (54 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
21/12/2022	France	Vega-C	Pléiades Neo (5 & 6)	Airbus	France	Airbus	France	920 (each)	Earth Observation	Commercial



Launches & Satellites

27/12/2022	China	CZ-4B	Gaofen 11-04	CNSA	China	CAST	China	805	Earth Observation	Governmental Civil
28/12/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (54 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
29/12/2022	China	CZ-3B/G2(2)	Shiyan 10-02	Unknown (China, Public)	China	SAST	China	4000	Tech / Demo	Unknown
30/12/2022	USA	Falcon-9 v1.2 (Block 5)	EROS C3-1	ImageSat International	Israel	IAI	Israel	400	Earth Observation	Commercial
03/01/2023	USA	Falcon-9 v1.2 (Block 5)	Astrocast (4 satellites)	Astrocast	Switzerland	Astrocast	Switzerland	5 (each)	Telecom	Commercial
			BDSAT 2	BD Sensors	Czech Republic	CEITEC	Czech Republic	1	Tech / Demo	Amateur
			BRO 8	UnseenLabs	France	GOMSpace	Denmark	6	Signal Intelligence	Commercial
			Chimera-LEO 1	Epic Aerospace	USA	Epic Aerospace	USA	200	Tech / Demo	Commercial
			Connecta T1.2	Plan-S	Turkey	Plan-S	Turkey	4	Tech / Demo	Commercial
			EOS-SAT 1	EOS Data Analytics	USA	Dragonfly Aerospace	South Africa	178	Earth Observation	Commercial
			EWS RROCI	US Space Force	USA	Orion Space Solutions	USA	12	Tech / Demo	Military
			EYE 1 / Star Sphere 1	Sony	Japan	University of Tokyo	Japan	6	Other	Commercial
			Flock-4y (36 satellites)	Planet	USA	Planet	USA	5 (each)	Earth Observation	Commercial
			Futura SM1	Spacemind	Italy	Spacemind	Italy	3	Tech / Demo	Commercial
			Futura SM3	Spacemind	Italy	Spacemind	Italy	6	Tech / Demo	Commercial
			Gama Alpha	Gama	France	Gama	France	12	Tech / Demo	Commercial
			Guardian alpha	OrbAstro	UK	OrbAstro	UK	4	Tech / Demo	Commercial
			ICEYE (3 satellites)	ICEYE	Finland	ICEYE	Finland	85 (each)	Earth Observation	Commercial
			ION-SCV (7 & 8)	D-Orbit	Italy	D-Orbit	Italy	100	Other	Commercial
			Kelpie 1	Orbcomm	USA	ÅAC Clyde Space	Sweden	3	AIS	Commercial
			KSF 3 (4 satellites)	Kleos Space	Luxembourg	ISIS	Netherlands	8 (each)	Signal Intelligence	Commercial
KuwaitSat 1	Kuwait University	Kuwait	Kuwait University	Kuwait	2	Tech / Demo	Education			
Lemur-2 (6 satellites)	Spire	USA	Spire (UK)	UK	4 (each)	Earth Observation	Commercial			
Lynk (8 & 9)	Lynk	USA	Lynk	USA	60 (each)	Telecom	Commercial			
MDQSAT 1 (A & B)	Innova Space	Argentina	Innova Space	Argentina	0.55 (each)	Tech / Demo	Commercial			
Menut	Open Cosmos	UK	Open Cosmos	UK	6	Earth Observation	Commercial			



			MilSpace2 1	Norwegian Defence Research Establishment	Norway	NanoAvionics	Lithuania	10	Tech / Demo	Military
			MilSpace2 2	Netherlands Aerospace Centre	Netherlands	NanoAvionics	Lithuania	10	Tech / Demo	Military
			NPC Spacemind 1	NPC SpaceMind	Italy	NPC SpaceMind	Italy	1	Tech / Demo	Commercial
			NSLSat 2	NSLComm	Israel	ÅAC Clyde Space	Sweden	8	Tech / Demo	Commercial
			ÑuSat (4 satellites)	Satellogic SA	Uruguay	Satellogic SA	Uruguay	41 (each)	Earth Observation	Commercial
			Orbiter SN1	Launcher	USA	Launcher	USA	200	Other	Commercial
			Platform-2	EnduroSat	Bulgaria	EnduroSat	Bulgaria	6	Other	Commercial
			PolyITAN-HP-30	National Technical University of Ukraine	Ukraine	National Technical University of Ukraine	Ukraine	2	Tech / Demo	Education
			PROVES-Yearling	Cal Poly Pomona	USA	Cal Poly Pomona	USA	1	Tech / Demo	Education
			Pushan alpha	Digantara	India	Digantara	India	3	Tech / Demo	Commercial
			Sapling 1 / Sapling Sempervirens	Stanford Student Space Initiative	USA	Stanford Student Space Initiative	USA	1	Tech / Demo	Education
			Sharjah-Sat 1	University of Sharjah	UAE	University of Sharjah	UAE	3	Tech / Demo	Education
			Skykraft (4 satellites)	Skykraft	Australia	Skykraft	Australia	55 (each)	Telecom	Commercial
			Skykraft Deployer 1	Skykraft	Australia	Skykraft	Australia	80	Other	Commercial
			Skyline Celestial 1	Skyline Celestial	USA	Skyline Celestial	USA	1	Tech / Demo	Commercial
			SpaceBEE (12 satellites)	Swarm Technologies	USA	Swarm Technologies	USA	0.4 (each)	Telecom	Commercial
			Star-Vibe	Scanway Space	Poland	German Orbital Systems	Germany	6	Tech / Demo	Commercial
			Sternula 1	Sternula	Denmark	Space Inventor	Denmark	8	AIS	Commercial
			TAU-SAT 2	Tel Aviv University	Israel	Tel Aviv University	Israel	2	Space Science	Education
			Umbra-SAR (04 & 05)	Umbra Lab	USA	Umbra Lab	USA	70 (each)	Earth Observation	Commercial
			Unicorn 2 (G & H)	Alba Orbital	UK	Alba Orbital	UK	0.5 (each)	Earth Observation	Commercial
			Vigoride 5	Momentus	USA	Momentus	USA	215	Other	Commercial
			YAM 5	Loft Orbital	USA	LeoStella	USA	83	Other	Commercial
			ZEUS 1	Qosmosys	Singapore	Qosmosys	Singapore	5	Tech / Demo	Commercial
08/01/2023	China	CZ-7A	Shijian 23	Unknown (China, Public)	China	CAST	China	4500	Tech / Demo	Governmental Civil
09/01/2023	China	Ceres-1 (3)	Keji 1 / Xiamen SciTech 1	Xiamen University	China	Xiamen University	China	20	Earth Observation	Governmental Civil
			Nantong Zhongxue	Nantong Middle School	China	Nantong Middle School	China	5	Earth Science	Education



Launches & Satellites

			Tianmu-1 (01 & 02)	Xiyong Microelectronics	China	Xiyong Microelectronics	China	20 (each)	Meteorology	Unknown
			Tianqi 13	Guodian Gaoke	China	SAST	China	50	Telecom	Commercial
09/01/2023	UK	LauncherOne	AMAN	ETCO	Oman	SatRevolution SA	Poland	3	Earth Observation	Governmental Civil
			CIRCE (1 & 2)	Dstl	UK	Blue Canyon Technologies	USA	6 (each)	Earth Science	Military
			DOVER	RHEA Group (UK)	UK	Open Cosmos	UK	3	Tech / Demo	Commercial
			ForgeStar 0	Space Forge	UK	Space Forge	UK	3	Tech / Demo	Commercial
			IOD 3 AMBER	Horizon Technologies	UK	ÅAC Clyde Space	Sweden	6	Signal Intelligence	Commercial
			Prometheus 2 (A & B)	Dstl	UK	InSpace	United Kingdom	6 (each)	Tech / Demo	Military
			STORK 6	SatRevolution SA	Poland	SatRevolution SA	Poland	3	Earth Observation	Commercial
10/01/2023	USA	Falcon-9 v1.2 (Block 5)	OneWeb (40 satellites)	OneWeb Ltd.	United Kingdom	OneWeb Satellites (USA)	USA	147 (each)	Telecom	Commercial
10/01/2023	USA	RS1	VariSat 1 (A & B)	VariSat LLC	USA	OmniTeq	USA	11 (each)	Tech / Demo	Commercial
12/01/2023	China	CZ-2C(3)	APStar 6E	APT Satellite	China	CAST	China	1800	Telecom	Commercial
13/01/2023	China	CZ-2D(2)	Shiyan 22 (A & B)	Unknown (China, Public)	China	SAST	China	200 (each)	Earth Observation	Governmental Civil
			Yaogan 37	People's Liberation Army	China	CAST	China	750	Earth Observation	Military
14/01/2023	USA	Falcon Heavy (Block 5)	CBAS 2	US Space Force	USA	Boeing	USA	2500	Telecom	Military
			LDPE-3A	US Space Force	USA	Northrop Grumman	USA	900	Other	Military
15/01/2023	China	CZ-2D(2)	Beiyou 1	Beijing University of Posts and Telecommunications	China	Spacety Co.	China	10	Tech / Demo	Governmental Civil
			Jilin-1 Gaofen-03D-34	Chang Guang Satellite Technology	China	Chang Guang Satellite Technology	China	42	Earth Observation	Commercial
			Jilin-1 Hongwai-A (07 & 08)	Chang Guang Satellite Technology	China	Chang Guang Satellite Technology	China	42 (each)	Earth Observation	Commercial
			Jilin-1 Mofang-02A (-03, -04 & -07)	Chang Guang Satellite Technology	China	Chang Guang Satellite Technology	China	32 (each)	Earth Observation	Commercial
			Golden Bauhinia (2 & 4)	HKATG	China	Commsat	China	50 (each)	Earth Observation	Commercial
			Golden Bauhinia 6	HKATG	China	Shanghai Institute of Satellite Engineering	China	50	Earth Observation	Commercial
			Luoja-3 01	Wuhan University	China	DFH Satellite Co.	China	20	Earth Observation	Governmental Civil
			Qilu (2 & 3)	Shandong Industrial Technology Research Institute	China	Shandong Industrial Technology Research Institute	China	150 (each)	Earth Observation	Governmental Civil
			Tianzhi 2D	CAS	China	Hunan Hangsheng Satellite Technology	China	20	Tech / Demo	Governmental Civil



Launches & Satellites

18/01/2023	USA	Falcon-9 v1.2 (Block 5)	GPS-3 6	US Space Force	USA	Lockheed Martin	USA	4352	Navigation	Military
19/01/2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (51 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
24/01/2023	USA	Electron KS	Hawk 6 (A, B & C)	HawkEye 360	USA	UTIAS/SFL	Canada	25 (each)	Signal Intelligence	Commercial
26/01/2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (56 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
26/01/2023	Japan	H-2A-202	IGS-Radar 7	Cabinet Satellite Information Center	Japan	Mitsubishi Electric	Japan	1600	Earth Observation	Dual
31/01/2023	USA	Falcon-9 v1.2 (Block 5)	ION-SCV 9	D-Orbit	Italy	D-Orbit	Italy	100	Other	Commercial
			Starlink (49 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial



Launch Highlights

The third generation of Meteosat takes off



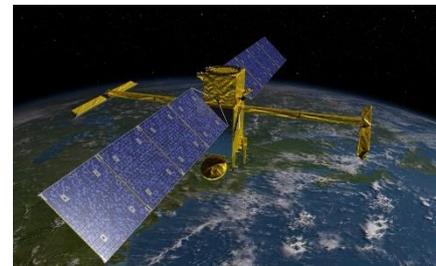
Credit: ESA

On December 13th, the last Ariane 5 launch of the year sent to orbit two Galaxy satellites for Intelsat and one spacecraft for EUMETSAT, the **Meteosat Third Generation-Imager1** (MTG-I1). The calibration and validation steps for the satellite's data will take approximately one year and operational data will start being disseminated after this period. Overall, six of the Meteosat third-generation spacecraft will be deployed, all of which will feature radically improved instruments as well as

completely new ones for Europe (Lightning Imager) and worldwide (Infrared Sounder).

The SWOT satellite, a game-changer for water monitoring

On December 16th, a Falcon 9 rocket launched the **Surface Water and Ocean Topography** (SWOT) satellite from the Vandenberg Space Force Base. SWOT is a mission jointly led by NASA and CNES, with contributions from CSA and UKSA. It will use radar technology to monitor water on more than 90% of Earth's surface. It will be particularly useful to understand the influence of oceans on climate change and, in turn, how global warming affects water areas on Earth.



Credit: NASA

OneWeb's first flight using SpaceX

On December 8th, OneWeb launched a **new batch of 40 satellites** for its telecommunications constellation. For the first time, the company had to resort to SpaceX to bring its satellites to orbit, due to the aftermath of the Ukraine war, which led Arianespace to stop operating Soyuz spacecraft (OneWeb's preferred launcher so far), and to the delays of Ariane 6. Another launch was also performed in January. OneWeb is also relying on Indian launchers to deploy its remaining satellites.

The first private Japanese lunar lander launches on a 4-month voyage to the Moon

On December 11th, a SpaceX's Falcon 9 launched two spacecraft towards the Moon. The first is a commercial lunar lander, **Hakuto-R**, developed by the Japanese company ispace. The lander is carrying several commercial and governmental payloads, including the first rover of the UAE. If successful, this will become the first privately-developed spacecraft to accomplish a soft landing on Earth's satellite. The launch also carried Lunar Flashlight, a lunar orbiter aiming at mapping ice around the lunar south pole.

Rocket Lab launches for the first time from the United States

On January 24th, Rocket Lab sent three signal intelligence satellites to orbit for the company Hawkeye 360. This was the first launch of the company **from the U.S. territory**. It took place from the Wallops Launch Centre, Virginia, where a launch pad has been specifically developed to support Electron missions. The future Neutron rocket developed by the company will also be produced and launched from Virginia.



An unexpected rate of failures in a short timeframe

The months of December 2022 and January 2023 witnessed a series of launch failures, some of them for significant projects. This started with the failure of the **Zhuque-2 rocket** on December 14th, a new launcher operated by the Chinese company LandSpace. Zhuque-2 was the first attempt to reach orbit with a methane-fueled rocket and the first launch attempt for a Chinese commercially-developed liquid propellant rocket. It failed due to an issue with the second stage. Later in December, the European Vega-C launcher **experienced a failure** while carrying two Pléiades Neo satellites from Airbus to orbit. This failure happened during the second launch of Vega-C, the first successful one having taken place in July 2022.



Credit: LandSpace

In January 2023, two other unsuccessful launches occurred. The **first launch taking place from the UK soil** was one of them. Operated by Virgin Orbit and lifting off from Spaceport Cornwall, the LauncherOne rocket, and its payload of nine satellites, was deployed in the air by a Boeing 747 carrier aircraft. Among them were several payloads for the UK Ministry of Defence as well as the



Credit: Virgin Orbit

first satellite of Oman. However, although the rocket reached space, a problem happened that prevented the spacecraft to be inserted into orbit. Finally, on January 10th, the first launch of ABL Space Systems' rocket, **RS1**, failed as well, due to a complete loss of power in the first stage. The rocket is able to place up to 1350 kg in LEO. In the previous months, the company already had to postpone several launch attempts due to diverse issues.

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