



ESPI

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Space Sector Watch



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MUCH MORE THAN A SPACE PROGRAMME – GIVE EUROPEAN AMBITION A CHANCE



At ESPI we had the privilege to support the work of the High-Level Advisory Group on Human and Robotic Space Exploration of Europe (HLAG) over the past 7 months, which resulted in the report titled “Revolution Space”. We witnessed a very engaged group of leaders from diverse backgrounds, mostly from outside the space and technology sectors, but all united by a clear vision. The group is calling for Europe to embark on a revolutionary space endeavour and for the required visionary political decisions of European leaders.

It puts space exploration and space in the wider context of geopolitical, economic and societal benefits, also as a reflection of the reality of our times, as space becomes part of the fabric that shapes the future of our world. The publication of the report at ESA Council on March 23rd incidentally almost coincided with NASA’s presentation of the Artemis II astronauts as “humanity’s crew” on April 3rd. It might as well have coincided with China’s completion of its space station end of 2022, or the announcements related to the construction of commercial space stations in the U.S. It could also be seen as mere paperwork when space powers are already in full action.

While comments on the HLAG report expressed doubts about the readiness of European policy leaders for visionary leadership or were concerned with industrial policy, NASA’s presentation in the presence of Senator Ted Cruz, emphasised the event as a “message to the world”, to push boundaries of human achievement and realise opportunities of the space economy. While comments on the HLAG report were introspected, more occupied with European space governance such as the role of ESA vs. EU actors, across the Atlantic talk focused on the DNA of the U.S. as “frontiers people”, the “who we are” and the Moon as a symbol of a “can do attitude”, carrying dreams of students and as inspiration to children. In contrast, European reflex to the HLAG led to an “either or” discussion, to a debate on priorities, to preserving the lead in Copernicus, while ignoring how leaders successfully approach space as a set of inseparable elements, from rockets to markets in LEO, on the Moon and beyond. Such a comprehensive strategy of Space as one is illustrated across the Atlantic, notably by NASA’s role in SpaceX’s success and the resulting development of Starlink, the commercial LEO game-changer and basis for approx. 80% of SpaceX’s valuation.

None of the above comes as a surprise. Still, it is revealing that so far few were those in Europe who fully embraced the vision offered by the group, as a call and a chance for a European new beginning in a sector shaping the future. Not many showed understanding that the HLAG report indeed is not just about rockets or the Moon, that it is about more than exploration and indeed about more than a space programme. It is about Europe’s place in space and about Europe’s geopolitical influence, future economic gain, societal cohesion and identity. That greater autonomy reinforces Europe’s prospects for meaningful partnerships and freedom of action strengthens European voice in ensuring a more stable multi-polar world. The economic dimension, the significance of transformative action to ensure the prosperity of future generations is more clear than ever, as Europe’s share of global wealth is decreasing. Like the Internet revolution 20 years ago and AI today, space is a transformative force, which will affect all domains of life. Not only through direct impact but notably through too-often overlooked induced and catalytic benefits. The Apollo Programme mobilised talent across the entire U.S. economy, and its global and domestic effects still resonate more than half a century later.

More positive reactions to the Report, certainly provided with best intentions, often too hastily outline technical solutions, like the adaptation of Ariane 6 and underline existing industrial capability. They are not elaborating on “what is at stake” for Europe and arguments required to embark to new frontiers. They also fall short of addressing the transformation of the industrial eco-system and the underlying public-private relations and procurement strategy, a key request voiced by the HLAG. At places, they go as far as to argue that Europe is already engaged as European industry is building parts of U.S. commercial stations. In fact, at the ARTEMIS II event, while European industry was mentioned, ESA and Europe were not. Such industrial perspective may not resonate well with some countries, where the suspected drivers are associated much more with the industrial policy of a few countries than with the true drivers identified by the HLAG in support of a wider European ambition.

Europe deserves a chance to give this ambition a true reflection, including and beyond the perimeters of the space industry and ESA. European political leadership and European citizens need to be better informed about what is at stake for Europe. Only this can prepare a 2023 Space Summit, which can be a demonstration that Europe is fit for the future.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'HLM', with a stylized flourish at the end.

*Hermann Ludwig Moeller
Director of ESPI*



POLICY & PROGRAMMES

Revolution Space: Europe's mission for space exploration – Report of the HLAG released



Credit: HLAG/ESA

On March 23rd, the Report “[Revolution Space: Europe’s Mission for Space Exploration](#)” on Europe’s state and future in space exploration [was presented to the 315th ESA Council session in Paris](#) and accordingly published. The report is based on the work and reflections of the High-Level Advisory Group (HLAG) on Human and Robotic Space Exploration for Europe established. The HLAG, which included 12 high-level representatives from industry, government, academia, and civil society, was established in the summer 2022 following a mandate given by ESA Council “to provide an independent and objective assessment on the (1) *geopolitical*, (2) *economic* and (3) *societal* relevance of human and robotic space exploration for Europe”. [ESPI supported and accompanied the HLAG](#) in their elaboration of key messages and recommendations for the report. The report highlights the strategic importance of independent European access to space and the absence of European independent human launch capacity. It culminates in a set of recommendations directed at ESA & Europe at large, calling relevant actors to act:

1. Visionary

- Establish autonomy in Earth orbit, on the Moon and beyond with complementary human and robotic capabilities.
- Extend leadership in space applications and science into exploration with sustainability as the differentiating factor.
- Increase the level of public investment to stimulate private funding to ensure that Europe protects its geostrategic interests in space, being part of future market opportunities and catch one the global space economy by 2040.

2. Differently

- Unleash entrepreneurship and intra-European competition to stimulate transformation of the whole European ecosystem and ESA itself.
- Pursue symbiotic public-private partnerships with an increased risk and reward-sharing culture, lowering the entry cost, reducing bureaucracy and fostering new sources of investment.
- Integrate bottom-up industrial and academic innovation, education, and lead in international partnerships.

3. Now

- Need to act now, despite current challenges as postponing will increase the gap between Europe and international space powers (U.S., China).
- Address and respond to acute security challenges and safeguard peace and stability in Earth orbit and lunar environments.
- Ensure European values are reflected in its strategic culture for space exploration, and secure a prominent role in international governance discussions.

The HLAG calls on ESA to prepare for the 2023 Space Summit:

- Transformation and Invigoration Plan of the European space ecosystem and processes including a quantification of the induced and catalytic economic impact.
- A scenario for independent and sustainable European human landing on the Moon in the 2030s.
- Proposals for new transformative European space flagship projects for the 2030s and beyond.

In the run up to the release of the report, [ESA DG Josef Aschbacher also addressed questions related to the modification of the geo-return policy towards a “fair contribution” principle.](#)



EU Space Strategy for Security and Defence is released

On March 10th, the [European Commission and the EU External Action Service released the EU Space Strategy for Security and Defence \(EU SSSD\)](#). The EU Member States called for the new strategy to increase synergies in space, security and defence and it was first announced in the Strategic Compass. The Strategy outlines counterspace capabilities and threats in space that risk space systems and their ground infrastructure and the EU's approach to dealing with these developments. The EU SSSD has the following objectives grounded on 4 pillars:



Credit: EU

1. Actions to strengthen the resilience and protection of space systems and services in the EU

- Setting-up an Information Sharing and Analysis Centre (ISAC), bringing together commercial entities, and relevant public entities (e.g. European Space Agency)
- Launch preparatory work to ensure long-term EU autonomous access to space, by increasing the responsiveness and versatility of launch systems.
- Reducing strategic dependencies by enhancing the technological sovereignty of the EU and ensuring security of supply for space and defence, in close coordination with EDA and ESA.
- Considering a proposal of an EU Space Law for a common framework for security, safety, and sustainability in space.

2. Responding to space threats

- Expanding the existing space threat response mechanism (already used for the protection of Galileo) to all space systems and services in the EU.
- Efficient and timely mobilisation of relevant EU tools to respond to space threats.
- Appropriate access to SDA information through national space commands to characterise irresponsible behaviours in orbit and protect EU assets.
- Space exercises with EU MS (and partners) to test and develop EU response to space threats.

3. Use of space for security and defence

- Maximising the use of space for security and defence purposes.
- Launch of two pilot projects: (1) delivery of SDA services building upon capacities of MS; (2) New Copernicus EO governmental service.
- Better connecting space, defence and security at EU level and ensure synergies, especially in R&D, and proposing measures for more cooperation between space and defence start-ups.

4. Partnering for responsible behaviours in space

- The EU will strengthen its engagement in multilateral fora to promote norms, rules and principles of responsible behaviours in outer space.
- Call for developing space security dialogues with third countries, in particular with the U.S.
- EU-NATO cooperation will be further developed.

ESPI published an [Executive Brief](#), based on [input submitted following the EC's public call for evidence](#), on ESPI's expectations and recommendations for the strategy.

The EU conducts the Space Threat Response Architecture (STRA) 2023 exercise

From March 6th to 10th, the [EU conducted the Space Threat Response Architecture \(STRA\) 2023 exercise at the EEAS HQ](#), organised by the EEAS in coordination with EU Member States, EUSPA and the EC's DG DEFIS, simulating the EU's space threat response mechanism triggered by a simulated cybersecurity incident affecting Galileo. On March 15th, the Political and Security Committee (PSC) explored potential EU response and activation of the EU mutual assistance clause [article 42(7) TEU] for a space incident.



The European Defence Fund €1.2B Work Programme for 2023 allocates €125M to space



Credit: EDF

On March 30th, the **2023 European Defence Fund (EDF) work programme** was released, which will provide €1.2B for defence research, development and innovation through its **annual calls for proposals**, open from June 15th until November 22nd. The programme is structured in **7 calls** (4 thematic calls + 3 calls for SMEs and disruptive topics) in 17 topic areas and 34 topics. Space is one of the 17 topic areas

and was allocated a €125M budget, which makes it the second highest funded area (after Naval Combat with €154M). The two topics within space are: (1) Threat surveillance and protection of space-based assets (R) and (2) Initial operational capacity for SSA C2 and sensors (D).

Moreover, the Chair and the two Directors of the NATO Innovation Fund, launched at the 2022 Madrid NATO summit, announced that the HQ of the **fund's investment management arm will be in the Netherlands and that the fund will be fully established by NATO's Vilnius Summit in July.**

The Council of the EU gives final approval for IRIS²

On March 7th, the **Council of the EU gave the final approval** for the **regulation on the EU's secure connectivity programme for 2023-2027**, the **"Infrastructure for Resilience, Interconnectivity and Security by Satellite" (IRIS²)**, which marks the last step in the decision-making procedure, finalised by the signature of the regulation text by President of the European Parliament and the President of the Council. The Council of EU's adoption paves the way for manufacturers to submit bids to build, launch, and deploy **IRIS²**, with the **call for tender published**. Initial services are planned to start in 2025. On March 30th, the **EC organised an Industry Information Day**.

With regard to GOVSATCOM as part of IRIS², the ENTRUSTED **consortium demonstrated four operational GOVSATCOM use cases**, showcasing real-time satellite connections in an operational environment. The use cases demonstrated secure SATCOM services for land vehicles and fixed ground terminals, simulations of natural disasters and armed conflicts, highly secured video conferences, and pooling and sharing services for EU military operations.

Spain's National Space Agency formally established

On March 7th, the Spain's Council of Ministers approved Royal Decree 158/2023, which **approves the statute of the Spanish Space Agency (Agencia Espacial Española - EEA)**. The EEA is a public agency under the supervision of the Spanish Ministry of Science and Innovation and the Ministry of Defence, located in Seville. Miguel Belló Mora is the provisional Head of the Agency. The EEA has a €700M budget in 2023, and 40 staff, to be increased up to 75. The EEA's objective is to coordinate and centralise Spain's space policy and it will be responsible for managing Spain's strategic space direction. In particular, the EEA's mandate covers technological development and the use of space for application areas such as security, EO, connectivity, and PNT services.



Credit: Crea

On this occasion, Spain's Minister of Science and Innovation Diana Morant highlighted a recent **commitment from the Ministry of Science and Innovation of €45M funding for the development of a domestic micro-launcher**, funded through the national €4.5B Strategic Project for Aerospace Economic Recovery and Transformation initiative and supporting Spanish companies, incl. PLD Space, which is developing the Miura 5 launch vehicle.



Vega C launch failure investigation results receive criticism by the Ukrainian government



Credit: ESA/CNES/Arianespace

The investigation of the launch failure of the Vega C VV22 mission of December 2022 conducted by an independent committee established by ESA was concluded. The investigation resulted in a conclusion that the cause of the failure was a gradual deterioration of the Zefiro 40's nozzle. The reason for this deterioration was a flaw found in the carbon-carbon material of the nozzle which caused the launch failure. Therefore, Vega C is set to attempt [a new launch by the end of 2023](#). In the meantime,

with a view to limit disruptions to the vehicle's launch manifest, Arianespace concluded to reassign a Vega C mission to one of its two remaining Vega launchers.

The component connected to the failure was manufactured by a Ukrainian company. The [Ukrainian government responded to ESA's investigation results and stated that the investigation committee was "premature"](#) in concluding that a component from a Ukrainian company was the root of the failure. The [State Space Agency of Ukraine released on a statement on March 6th](#), stating that the investigation results "casts a shadow over the reputation of the space industry of Ukraine" and argued that the issue may still require further investigation to identify if there could be additional factors. On March 7th, [ESA DG Josef Aschbacher reacted with a statement](#), clarifying that the conclusions were not meant to "to place blame on Ukraine or on the integrity of the Ukrainian space industry, an industry that has been gaining much deserved clout in recent years".

ESA and Italy award Avio €285M for development of environment-friendly engines

In March, [the Italian government \(Ministry of Enterprises and Made in Italy\) and ESA awarded Avio €285M in two contracts](#) to improve Italian industry's access to space and create environmentally friendly engines for European space launchers. ESA's Space Transportation System €181.6M contract targets the development of new technology for a launcher with eco-sustainable engines. Specifically, the development of a prototype small launch vehicle using methane-oxygen engines. For this a version of the M10 engine is used which will carry a payload of about 200kg to LEO and which will be ready for its first launch in 2026. The second contract awarded by Italy, as part of the High Thrust Engine (THE) program, financed with €103M, will create a new high thrust engine with low environmental impact, a larger version of Avio's M10 engine, the M60, which uses methane and liquid oxygen propellants and is similar to SpaceX's Raptor engine - with a first ground qualification test by 2026.

ESA awards Astos contract to develop GNC tools for micro-launcher start-ups

In March, ESA awarded the [German space tech company Astos Solutions a contract through ESA's Future Launcher Preparatory Programme \(FLPP\) for the "Reconfigurable Control Design Framework for Micro-Launcher" project](#). In this contract, Astos will partner with the German university TU Dresden to develop tools designed to enable robust control analysis, design and verification and validation with the objective to boost and support the development of the next generation of micro-launchers. Beyond (and not limited to micro-launchers) the tools will also be offered to industrial actors to advance GNC development at large.



Credit: ESA, Astos Solutions



NASA and Canadian Space Agency will assign Artemis II astronauts in April

In March, [NASA and the Canadian Space Agency \(CSA\)](#) stated that they will announce the 4 astronauts for the Artemis II mission on April 3rd, including three NASA astronauts and one CSA astronaut. Artemis II is the first crewed mission of the Artemis Program and builds on the successful Artemis I uncrewed flight test.

Axiom Space unveils new spacesuit for NASA's Artemis III

On March 15th, [Axiom Space unveiled the prototype spacesuit for NASA's Artemis III mission](#) during an event at Space Centre Houston in Texas. Axiom Space was selected by NASA to deliver the mission's moonwalking system, which includes the design, development, qualification, certification, and production of flight training spacesuits (the Axiom Extravehicular Mobility Unit (AxEMU)) and support equipment. Prior to the mission, Axiom Space will test the spacesuit in a spacelike environment. The AxEMU spacesuit aims to enhance mobility and to provide protection from hazards on the Moon.



Credit: Axiom Space

NASA selects Axiom Space for third private astronaut mission Ax-3 to the ISS

On March 14th, [NASA signed a mission order with Axiom Space](#), approving plans by Axiom Space to fly a third private astronaut mission (Ax-3) to the ISS by November this year. In September 2022, NASA solicited proposals for a third and fourth PAM, following a previous selection of Axiom for the Ax-1 mission to the ISS in April 2022 and the Ax-2 mission which is scheduled for launch in May 2023. In the Ax-3 will be launched (like Ax-1 and Ax-2), with SpaceX's Crew Dragon spacecraft. The crew for Ax-3 was not yet disclosed and will be formally announced after the approval of NASA and the other ISS partners – but (as Ax-1 and Ax-2) the crew commander will be a former NASA astronaut.

Crew-6 launches to the ISS, Crew-5 returns to Earth



Credit: Twitter/@SpaceX

On March 2nd, the [Crew-6 mission was launched to the ISS](#) with SpaceX's Falcon 9, and the Crew Dragon spacecraft Endeavour, from Kennedy Space Center - after a first launch attempt on February 27th. The Crew-6 mission brought 4 astronauts, namely NASA astronauts Stephen Bowen and Warren Hoburg (mission commander and pilot), Roscosmos cosmonaut Andrey Fedyaev and UAE astronaut Sultan Alneyadi, to the ISS for an approx. 6-month stays. The four-person Crew-5 mission comprised of the NASA astronauts Nicole Mann and Josh Cassada, JAXA astronaut Koichi Wakata and Roscosmos cosmonaut Anna Kikina, [returned from the ISS on March 11th](#).

JAXA selects two new astronauts for ISS missions

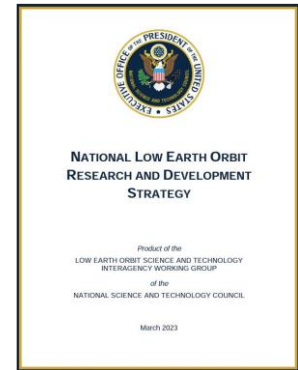
[JAXA selected two new astronaut candidates](#) (for the first time again after 14 years), to join JAXA from April 1st for ISS missions and to support the NASA-led Artemis program: Makoto Suwa and Ayu Yoneda. Makoto Suwa is a disaster prevention specialist at the World Bank, and Ayu Yoneda, is a surgeon at Japan's Red Cross Medical Center. JAXA started the selection process in April 2022 with 4,127 applicants.



White House releases National Low Earth Orbit Research and Development Strategy

On March 31st, the [White House Office of Science and Technology Policy](#) released the [National Low Earth Orbit Research and Development Strategy](#), which highlights the U.S. approach for the realisation and institutionalisation of the scientific, economic, diplomatic, and educational benefits of LEO research platforms for the future, pointing out 5 policy objectives and action items for U.S. leadership in LEO:

- Advance groundbreaking science and technology
- Strengthen U.S. government collaboration and partnerships
- Promote market opportunities, innovation, and sustainability
- Expand international cooperation
- Stimulate STEM education and workforce development



Credit: White House

NASA's new draft strategy for long-term robotic exploration of Mars

End of March, [NASA released a draft strategy for long-term robotic exploration of Mars](#) called “[Exploring Mars Together](#)”, following committee meetings of the National Academies' Space Studies Board. The strategy outlines a plan for a series of “sustainable” low-cost missions (between \$100M and \$300M) and – these missions being competitively selected – with potential commercial partnerships. Apart from NASA's Mars Sample Return, NASA is currently only developing the small satellite mission robotic Mars mission ESCAPEDE scheduled to be launched in late 2024. The new plan is not foreseen in NASA's FY2024 budget proposal (which only includes “Mars Future Missions”, including NASA's support for ESA's ExoMars mission). In the next steps, the new plan is unveiled for feedback from scientists to refine and specify the strategy.

UK Space Agency invests £1.6M and £2.9M in Moon and Mars R&D projects



Credit: UK Space Agency

On March 7th, the Mars Day, the [UK Space Agency will invest £1.6M into projects supporting future Moon and Mars missions](#). The 8 projects are funded by the UK's Enabling Space Exploration Fund through remote technologies and resources found in space to sustain astronauts and will be led by universities and companies across the UK.

Moreover, the [UK government signed a £2.9M contract with Rolls-Royce to investigate how nuclear power could be used to support a future Moon base](#), in order to extend the future mission duration to the Moon. Specifically, Rolls-Royce plans to send a nuclear reactor to the Moon by 2029. Rolls-Royce will jointly work on the project with the University of Oxford, University of Brighton, University of Bangor, University of Sheffield's Advanced Manufacturing Research Centre (AMRC) and Nuclear AMRC.

ASI and NASA agreed to partner on Air Pollution Mission “MAIA”

In January, [ASI and NASA announced a partnership to build and launch the Multi-Angle Imager for Aerosols \(MAIA\) mission](#), an effort to investigate health impacts of tiny airborne particles. Set to launch before the end of 2024, the MAIA observatory will consist of a satellite known as PLATiNO-2 provided by ASI and a science instrument built at NASA JPL. The mission will collect and analyse data from the observatory, sensors on the ground, and atmospheric models.



ESA's Earth Explorer missions extended to 2025 while Biomass passed crucial tests



Credit: ESA

In March, ESA's second, third and fourth Earth Explorer missions "Soil Moisture and Ocean Salinity mission" (SMOS), the Ice Mission CryoSat and the Swarm mission were **extended at least until the end of 2025**. The data of the missions are used in weather forecasting and climate reporting.

Moreover, **ESA's Earth Explorer Biomass satellite successfully passed testing** to check the ability to liftoff and deploy its solar array. The Biomass mission aims to deliver new information on forests and their carbon storage. As a next step, tests to prove the

satellite's resilience for the space environment will be conducted. The Biomass satellite will be launched in 2024 from Kourou on a Vega rocket.

ICAO adopts international standards for the use of Galileo for aircraft

The Council of the **International Civil Aviation Organisation (ICAO)** adopted **international standards for Galileo and future satellite-based augmentation systems**, which enables Galileo to provide advanced navigation capabilities for aviation to further enhance the services' availability, resilience and reliability as well as to decrease the risk of signal loss or the risk of interference. In addition, the evolution to EGNOS v3 augmenting Galileo will further enhance vertical guidance to enable Precision approach and landing capabilities for aircrafts in Europe. These international standards were defined jointly by European Commission DG DEFIS and DG-MOVE, EUSPA, EASA and ESA.

China and UAE jointly build Abu Dhabi Space Tech Centre

Mid of March, China (start-up Origin Space and University of Hong Kong's Laboratory for Space Research) and the UAE (University's National Space Science and Technology Centre) **signed a letter of intent to build a joint research and development centre in Abu Dhabi**, bringing together researchers and engineers from China and the UAE. The centre will support the development of remote-sensing satellites to monitor agricultural systems, oil and border security for the UAE, will enable the provision of data services for both country's benefit, and will build space telescopes for the detection of asteroids and space debris as well as to support STM.

Moreover, the **UAE National Center of Meteorology (NCM)** signed a **cooperation agreement with the China Meteorological Administration (CMA)** for cooperation in meteorological science and technology for mitigation of damages due to meteorological disasters. Moreover, China **launched four meteorological satellites of the Tianmu-1 constellation** from Jiuquan Satellite Launch Center.



Credit: UAE handout



ESA, IAU and the SKAO submit petition to UN COPUOS



Credit: ESO

In March, UN COPUOS received a petition paper submitted by the European Southern Observatory (ESO) in collaboration with the International Astronomical Union (IAU) and the Square Kilometer Array Observatory (SKAO) and an international astronomy group comprised of Chile, Spain, Slovakia, Bulgaria, Dominican Republic, Peru, and South Africa, which **proposes a new Expert**

Group reporting to the UN COPUOS Scientific and Technical Subcommittee (STSC), to deal with the protection of dark and quiet skies by monitoring the impacts of satellites on astronomy and how to mitigate these. The petition paper was discussed at the UN COPUOS STSC.

Prior, on February 9th, **ESPI organised and hosted a UN COPOUS STSC side event “Dark & Quiet Skies: The Way Ahead”** jointly with the IAU, ESO and the SKAO, at the sidelines of the UN COPUOS STSC session held from February 6th- 27th.

U.S. DoD unveiled updated guidance on responsible behaviours in space

On March 3rd, the **U.S. DoD published updated guidelines for responsible behaviours in space**, targeting military (not civilian/commercial) space operations and activities.

The updated guidelines are based on the memo on five tenets of responsible behaviour in space that was **first published in July 2021** and specify behaviours for the five tenets:

- Operate in, from, to, and through space with due regard to others and in a professional manner
- Limit the generation of long-lived debris
- Avoid the creation of harmful interference
- Maintain safe separation and safe trajectory
- Communicate and make notifications to enhance the safety and stability of the domain.

The guidelines have the objective to provide “transparency about U.S. military space activities in order to reduce the risk of misunderstanding and miscalculation”.



Credit: U.S. DoD



In other news

Senegal will establish a national space agency: Senegal's President Macky Sall announced the establishment of the Senegalese Space Study Agency to be led by Maram Kaïre as head.

Kazakhstan impounds the property and seizes control of the Biaterek launch complex of Baikonur spaceport due to an ongoing debt dispute with Russia: Reportedly, the Kazakh government impounded Russian assets at the Roscosmos subsidiary Center for Utilisation of Ground-based Space Infrastructure (TsENKI) and prevents the leaving of Russian officials.

Egypt and Belgium sign MoU for space cooperation: The agreement includes cooperation in space exploration for peaceful purposes, space science and development of satellites and has the objective to strengthen cooperation frameworks between the countries, exchange, visits, joint activities, training and capacity building.

Canada formally agrees on ISS extension to 2030: During a summit in Ottawa, attended by Canadian Prime Minister Justin Trudeau and President Joe Biden, the Canadian government formally committed to the extension of Canada's participation in the ISS, as part of a renewed commitment to space exploration, including contributions to the lunar Gateway.

Germany's Future Research and Innovation Strategy was published: The strategy includes a chapter which includes space, specifically on (1) improving understanding of the world through space exploration and space exploration and creating benefits for all, and (2) Space research and space exploration carbon neutral and design environmentally friendly.

Italy and India agreed to expand space cooperation: the areas for potential cooperation include remote sensing, satellite communications, space science, lunar exploration, and practical applications of space technology between ISRO and ASI.

DLR and ESA scientists and mission teams present results of Cosmic Kiss mission experiments: Led by the ESA astronaut Matthias Maurer, the teams presented their experiment results from the Cosmic Kiss mission at the German Space Operations Center at DLR.

The UK launches Earth Observation Climate Information Service (EOCIS): The new service, which is a national project funded by the UK government through the Natural Environment Research Council (NERC), aims to transform EO measurements into data and create climate information to support actions in response to i.a. heatwaves and flooding.



INDUSTRY & INNOVATION

Industrial leaders at the head of the Italian IRIDE Constellation



Credit: Thales Alenia Space

On March 14th, [Arianespace announced it has signed an agreement with ESA](#) on behalf of the Italian government to launch the national remote sensing IRIDE constellation of satellites. The contract includes two Vega C launches, starting in late 2025, with an option for a third launch. This is the first contract for Vega C since the results of the investigation of the rocket's second mission's failure were released. In the course of the investigation, on [February 1st, South](#)

[Korea signed a contract for Vega C launch of the KOMPSAT-6 satellite.](#)

Moreover, [ESA has contracted Thales Alenia Space](#) to supply a first batch of six small satellites with synthetic aperture radars (SAR) and one optical imager for the upcoming Italian constellation. The contract for the six SAR satellites is worth €112M and includes an option on a second group of four satellites, worth €75M. The optical satellite contract is worth €30M and includes an option on an additional satellite for €19M.

Ultimately, the French engineering and security solution company [RHEA System, part of RHEA Group, announced it is supporting the Italian aerospace engineering company Argotec](#) in the design and the implementation of the security strategy of the IRIDE constellation. The security strategy includes the preparation and maintenance of the Security Management Plan (SMP), which encompasses all security principles, information security, organization, controls, and best practices.

Raytheon wins \$250M contract to build missile tracking satellite

The U.S.-based aerospace manufacturer [Raytheon Technologies has won a more than \\$250M contract from the U.S. Space Development Agency \(SDA\)](#) to manufacture seven missile warning and tracking satellites. The contract was awarded due to a funding boost from the fiscal 2023 defence appropriations act, which includes \$250M for Indo-Pacific Command to monitor Chinese missile launches.

The spending bill earmarked the new funds for "INDOPACOM missile tracking demonstration expansion". The new satellites will be added to SDA's first operationally capable low Earth orbit (LEO) satellite group (Tranche 1), that includes missile warning and tracking satellites for the Tracking Layer and data relay satellites for the Transport Layer of the Proliferated Warfighter Space Architecture.



Credit: Raytheon Technologies



Redwire wins NASA contract to advance In-Space manufacturing capabilities



Credit: NASA

The American developer of mission critical solutions **Redwire Corporation** has been awarded a **\$5.9M contract from NASA** to finalise the design of the Advanced Manufacturing Facility (AMF) FatLab, an in-space multi-material manufacturing 3D printer. The system is expected to be tested onboard the ISS and will serve as a precursor for future missions to the Moon and Mars, enabling a sustainable human presence in deep space.

BlackSky secures contracts from national agencies

The U.S.-based provider of real-time geospatial intelligence (GEOINT) technologies **BlackSky** has won a multi-year contract worth over **\$150M** from an international Ministry of Defence (MoD) customer to provide advanced space-based tactical GEOINT-as-a-service. Through the contract, BlackSky will be able to provide tactical GEOINT derived from space-based assets in real-time, helping governments and commercial partners to expedite the value of the data they receive from hours to minutes. This is in contrast to traditional static mapping approaches to mission-critical GEOINT, which are limited in their utility.

In addition, **BlackSky, and other five remote-sensing industry firms and start-ups, were awarded five-year agreements by the U.S. National Reconnaissance Office (NRO)** under the Strategic Commercial Enhancements (SCE) Programme created to support the agency understand the capabilities of the commercial remote sensing industry. Under the contracts, the companies will focus on increasing knowledge and understanding of current and expected hyperspectral imagery technologies, their availability, quality, and operational utility.

Intelsat partners to expand satellite connectivity networks

The U.S.-based telecommunication company **Intelsat** has chosen **NOVELSAT's satellite connectivity technology to provide high-speed trunking and backhaul connectivity** for wireless and wireline networks. The partnership aims to strengthen Intelsat's AgileCore UX offering, which is a performance-optimised trunking solution that combines high performance and reliability with managed wireless wide-area networks (WAN) optimisation. By using NOVELSAT's high-speed satellite technology, Intelsat will be able to enhance its network's performance and capabilities to meet the growing customers' demands.

Furthermore, **Intelsat announced to expand global reach for Deutsche Telekom IoT**, intending to integrate Intelsat FlexEnterprise into Telekom's cloud-based Internet of Things (IoT). Intelsat's FlexEnterprise satellite platform allows mobile network operators to offer services, similar to terrestrial networks regardless of geographic location. The two companies will offer to extend "easy-to-use" IoT solutions to locations regardless of the availability of fibre or cellular connectivity options.



Credit: Intelsat



Intelsat and Eutelsat sign contract to expand OneWeb services

In March, [Intelsat and Eutelsat signed a multi-orbit contract](#) to improve connectivity solutions across Europe, the Middle East, and the Pacific, incorporating OneWeb services. The 7-year multi-million-euro capacity agreement will make use of Eutelsat's High-throughput satellites (HTS) in the Ku-band, including the recently launched EUTELSAT 10B satellite, as well as OneWeb's constellation. The new capacity agreement, which envisages a gradual roll-out of assets throughout 2023, combines OneWeb's LEO solution with a larger portion of Eutelsat's HTS GEO assets, creating a hybrid offering that provides enhanced connectivity capabilities to Intelsat.

Mynaric wins 3 quantum communication projects of German QuNET initiative



Credit: Mynaric

The German laser communication company [Mynaric was selected to conduct 3 quantum communication technology development projects](#) of the second phase of the 7-year QuNET initiative funded by the Federal Ministry of Education and Research (BMBF), which has the objective to develop the technological basis of a resilient quantum communication network ensuring highly secure data transmission between federal agencies. The initiative will co-fund Mynaric's technology development with up to €5.6M between 2023 and 2025 in total.

L3Harris awarded 2 major contracts

In March, the Florida-based [L3Harris Technologies announced it has been awarded a contract from Maxar Technologies](#) to construct reflector antennas for two geostationary communication satellites. These nine meters long unfurlable antennas will enhance signal strength and service quality over the satellites' coverage regions.

Furthermore, [L3Harris secured a \\$765.5M contract from the National Oceanic Atmospheric Administration \(NOAA\)](#), to develop the imager for NOAA's Geostationary Extended Observations (GeoXO) satellite. The programme includes end-to-end support for 10 years of on-orbit operations and five years of on-orbit storage, with work to be completed at L3Harris facilities, NASA's Goddard Space Flight Center, and Kennedy Space Center. The primary instrument, the GeoXO Imager (GXI), is a multi-channel, passive imaging radiometer that will provide real-time, high-resolution visible and infrared imagery for monitoring the Western Hemisphere's weather, ocean, and environment.



Credit: L3Harris

Kongsberg NanoAvionics to build 5G Narrowband-IoT Constellation in LEO

Kongsberg NanoAvionics, a smallsat mission integrator and bus manufacturer has secured an [order for three additional satellites from the 5G telecoms operator OQ Technology](#). These satellites will be added to the OQ Technology's existing constellation, aiding the company in its goal of becoming the world's largest 5G NB-IoT (narrowband Internet of Things) satellite operator. Under the contract, OQ technology will provide the 5G payload, the cell tower stack, which it developed in-house, and handle launch, satellite operations, spectrum licensing, service, and market access. This marks the fourth collaboration between NanoAvionics and OQ Technology, with NanoAvionics having supplied Tiger-2, Tiger-3, and MACSAT missions previously.



Viasat extends critical partnerships

Viasat has partnered with [Ligado Networks](#) and [Skylo](#) to expand its satellite services to consumer smartphones and other devices. Viasat currently uses L-band from Ligado's SkyTerra-1 satellite for mobile satellite services in North America, which includes connectivity for IoT devices and other machines. The partnership with Skylo will enable standard consumer devices to connect with geostationary satellites, allowing the operators to expand their services across consumer smartphone, automotive, and defense markets. The companies have signed non-binding Memoranda of Understanding (MoU) but did not provide more details. The services will initially be limited to low-bandwidth applications, such as two-way messaging.

In addition, [Viasat has launched its Trusted Cybersecurity Services \(TCS\) solution](#), which is a hosted intrusion detection service that incorporates classified government threat intelligence to identify existing and potential threats on an organisation's network. The TCS solution leverages cyber threat intelligence provided by the U.S. Department of Homeland Security through the Cybersecurity and Infrastructure Agency's Enhanced Cybersecurity Services program to protect U.S.-based organizations from malicious cyber threats. The service also uses Viasat's National Security Agency certified technology and machine learning to actively monitor network traffic and is designed to augment organizations' current cyber monitoring, detection, and incident response practices.

Share My Space wins ESA contract to advance air and maritime safety

[Share My Space has partnered with ESA to develop an end-to-end software](#) that models the impact of space operations failures on air and sea traffic. The French company will team up with Quasar Science Resources and the German Aerospace Center (DLR) to develop fragmentation, trajectory, and response models for space traffic launch and re-entry applications.

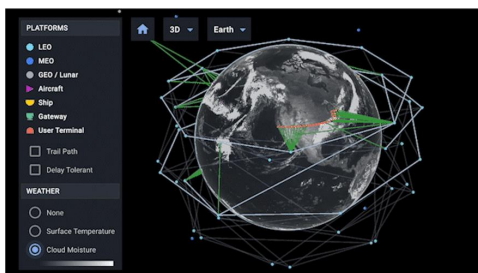


Credit: Share My Space

Rivada Space Networks contracts SpaceX for 12 Falcon 9 launches

German start-up [Rivada Space Networks has signed a contract with SpaceX](#) to launch 300 satellites into LEO between April 2025 and June 2026 onboard 12 Falcon 9 rocket flights, as a result of a **\$2.4B contract signed with Terran Orbital's Tyvak Nanosatellite Systems** to manufacture the advance communication satellites in February. The launch was the only viable option for Rivada as other heavy-lift rockets from Arianespace, United Launch Alliance, and Blue Origin are behind schedule, and Amazon's Project Kuiper has fully booked the new rockets.

Rivada Space Networks signed agreement with Aalyria



Credit: Aalyria

The German company [Rivada Space Networks signed an agreement with Aalyria to use Aalyria's network orchestration technology "Spacetime" for Rivada's planned communications constellation in LEO](#) for reliable and secure communications. The software platform Spacetime is designed to orchestrate networks across land, sea, air, and space and ensures secure communications through the continuous analysis of possible data paths.



OneWeb and Amazon Web Services sign letter of intent



Credit: OneWeb

OneWeb and Amazon Web Services signed a letter of intent to expand both horizontal and vertical services and provide integrated and customizable solutions for edge-to-edge operations. Their goal is to offer a fully integrated satellite constellation management solution as a service and create the next generation of virtual network functions for global LEO connectivity. The partnership will focus on business continuity, virtualisation of mission operations, space data analytics, and user

terminals & edge integration. Moreover, **OneWeb's LEO technology has also attracted the Dutch connectivity service provider VEON Group** to further enhance its 4G connectivity network. Ultimately, the **British company is committed to join forces with the French Orange** to broaden global connectivity and backhauling in hard-to-reach areas.

Airbus wins Angola contract for Earth Observation satellite Angeo-1

Airbus Defence and Space was awarded a contract by the Angolan government for the development of the EO optical satellite Angeo-1. Beyond the development of the satellite and Angola's use of the data i.a. for urban planning, management of mineral resources and mapping of natural resources, the development of infrastructure, and maritime surveillance, and for agriculture, the agreement aims to strengthen the bilateral cooperation, for example by Airbus offering a training programme for Angolan engineers to develop domestic competencies through knowledge transfer. Angola is already using satellite imagery from Airbus, including land use mapping, agriculture monitoring, and maritime surveillance, and operates Airbus telecommunications satellite Angosat-2.

Share My Space signs contract with Airbus for space safety

The French space surveillance and operations safety start-up **Share My Space signed a contract with Airbus Defence and Space** to evaluate the effectiveness of Share My Space's optical data in improving the reliability of collision alerts and overall risk management practices in LEO. Share My Space provides insights into object trajectories, which not only enables collision avoidance but also helps detect manoeuvres and refine the understanding of behaviours critical to space operations.



Credit: Share my Space

Exolaunch and constellr sign multi-launch agreement

In March, the **German Exolaunch announced a Multi-Launch-Agreement with the German constellr** for the launch of its high precision versatile ecosphere monitoring (HiVE) microsats constellation. The HiVE constellation is designed to provide advanced warning to AgTech companies for plant stress from temperature-induced water evaporation, allowing them to minimise water waste whilst maximising crop output. Exolaunch will oversee the entire launch mission management, including integration, and Launch and Early Orbit phase. Exolaunch will be using its separation system CarboNIX, for a first launch scheduled in 2024. Thales Alenia Space to lead European stratospheric capabilities.



In other news

Italian e-GEOS reconfirmed as head of the EMS consortium: The company has been awarded a fourth €36M contract from the European Commission to provide on-demand satellite maps of areas affected by natural and humanitarian disasters.

Kayhan Space releases Pathfinder 2.0: The latest space traffic management platform includes a decision-making framework built around the concept of Coordinated Optimal Avoidance Manoeuvres (COAMs) to minimise human error.

ReOrbit partners with AAC Clyde Space for Space Data Flow: The companies will collaborate in developing a small satellite core avionics and flight software product to simplify the customers' supply chain and satellite integration.

Andre-Hubert Roussel steps down as ArianeGroup CEO: Former Safran Electronics & Defense President Martin Sion will be his predecessor. So far, ArianeGroup did not unveil the reasons for his replacement.

HAKUTO-R Mission 1 lander enters Moon orbit: The ispace's spacecraft will attempt a landing in Atlas Crater, located on the edge of Mare Frigoris in the northeastern quadrant of the near side of the moon, around the end of April.

ANYWAVES partners with Maxar Technologies: ANYWAVES will provide Maxar Technologies with its navigation, telemetry, and remote-control antennas, as well as the associated test caps, in support of its proliferated low Earth orbit (LEO) product line planned for launch in 2025.

Cognitive Space and Terran Orbital to advance SaaS and AI: The companies have onboarded the GeoStare SV2 spacecraft onto Cognitive Space's CNTIENT software platform, marking a world-first in Software-as-a-Service (SaaS) Artificial Intelligence (AI)-driven automated mission management. The software allows constellation operators optimise collection planning and link management, while balancing order priority, fleet, spacecraft, and system resources and constraints.

CesiumAstro wins Space Domain Awareness contract: The company will advance its multi-beam L-Band active electronically scanned array antenna to support the Transport Layer mission requirements of the Proliferated Warfighter Space Architecture global satellite network, providing U.S. and allied military forces with a common operating picture across the global battlespace.

EnduroSat and Aegenium Space partner for AI in space: The companies will join forces to develop an in-space AI technology on board in-space edge computing spacecrafts capable of processing images on board micro and nanosats.

Pale Blue operates water-based propulsion system in orbit: The Japanese start-up has successfully developed and operated a water-based thruster, taking a step forward towards orbit insertion for the STAR SPHERE Project.



ECONOMY & BUSINESS

Isar Aerospace raises €155M in Series C funding



Credit: Isar Aerospace

On March 28th, **Isar Aerospace** has declared the completion of its **Series C round**, which raised €155M, making it one of the biggest DeepTech fundraising events in Europe and one of the most extensive SpaceTech financing rounds worldwide. The round included private and public actors. On the private side, it was supported by 7-Industries Holding, Bayern Kapital through its Scale Up Fund Bavaria, Earlybird Venture Capital, HV Capital, Lakestar, Lombard Odier Investment Managers, Porsche Automobil Holding SE (Porsche SE), UVC Partners, and

Vsquared Ventures. From the public side the European Investment Fund, through programs such as InvestEU and the German Future Fund joined the round. The financing obtained will allow Isar Aerospace to continue developing its Spectrum launch vehicle, increase production to meet strong demand for small and medium-sized satellite launches, and invest in new initiatives and products. The funding will also enable the firm to expand its vertical integration and automated production capabilities, which significantly lowers the cost of constructing rockets. This comes after, on March 23rd, **Isar Aerospace unveiled progresses on the development of its Aquila engine**.

South Korea supports space start-ups by launching \$39M fund

The **South Korean government announced on March 9th the plan to establish a \$39M fund that will support** startups involved in the space industry. The fund, which is expected to reach 50B won (approx. \$38.5M) by 2027, will be managed by the Korea Venture Investment Corp and will exclusively invest in private space enterprises. Starting from April 3rd to 7th, interested parties can submit their applications to become potential asset operators for the fund. The ultimate goal is to raise a fund-of-funds worth 10B won this year, with an initial investment of 5B won. The initiative aims to stimulate the growth of Korea's space industry, with a focus on private enterprises. It is the first of its kind in Korea and open to all space-related companies that meet the investment criteria.

ArianeGroup invests additional €6M into MaiaSpace

In March, it was unveiled (according to public filings) that **ArianeGroup invested €6M into its subsidiary MaiaSpace in January**. As part of the agreement, MaiaSpace issued an additional €1.5M shares, which brings the total amount of ArianeGroup's investment in MaiaSpace to €10.9M. MaiaSpace was officially announced in late 2021 as a subsidiary of ArianeGroup and with the intention to build a reusable microlauncher "Maia" with a debut planned in 2026. The new investment aims to support MaiaSpace's growth. Another measure to accelerate the Maia's development, is the company's utilisation of the Prometheus rocket engine which ArianeGroup is developing under an ESA contract.



Credit: European spaceflight



Virgin Orbit files for bankruptcy

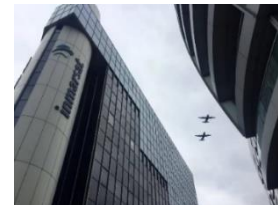


Credit: Reuters

The U.S. small satellite launch service provider Virgin Orbit encountered continued financial difficulties in March, ending up with filing for bankruptcy. The story began to unfold on March 5th when **Richard Branson has put additional \$5M into the struggling launch provider** through a convertible note, which adds up to overall \$60M that the billionaire provided Virgin Orbit with. Virgin Orbit has faced difficulties increasing the number of flights for its LauncherOne system, while also managing limited financial resources. The company's cash and cash equivalents decreased from \$194.2M in 2021 to \$71.2M by the end of the third quarter of 2022. In the past two years, Virgin Orbit only managed to carry out four launches. The company's most recent launch from Spaceport Cornwall in England was unsuccessful in January, rendering LauncherOne inoperative until investigations are completed and changes implemented. Only ten days after the convertible note, the company announced that it would seek additional funding and would **pause its operations and furlough the majority of its employees** on March 15th with reports of imminent risk of bankruptcy. On March 20th a potential investor bailed out the company. Virgin Orbit's shares experienced a 30% decline in trading, resulting in a closing price of \$0.71 per share. Since its introduction at nearly \$10 per share in December 2021, the stock has gradually decreased. On March 22nd, Virgin Orbit announced that the search for a new investor was indeed successful: Texas based venture capitalist **Matthew Brown invested \$200M** through a private share placement. On the same day, the company announced that a small set of employees will return to work and the company will initiate an **incremental resumption of its operations**. On March 30th, the tide turned again: **Virgin Orbit failed to raise additional funding and in consequence laid off the majority (675) of its employees which is 85% of its workforce**. On April 4th, **Virgin Orbit filed for bankruptcy**. Virgin Orbit CEO Dan Hart said in a statement: "At this stage, we believe that the Chapter 11 process represents the best path forward to identify and finalise an efficient and value-maximising sale,"

The UK CMA provisionally approves Inmarsat acquisition by Viasat

On March 1st, **the Competition and Markets Authority (CMA) of the UK cleared Viasat's plan for the acquisition of the UK-based Inmarsat** aimed at the provision of inflight connectivity (IFC) on board planes, announced back in November 2021. The CMA, which launched the investigation on October 14th, 2022, stated that the impact on the IFC market will be compensated by the significant competition from other satellite operators such as OneWeb or Starlink, which was recently awarded its first contract with the European airline airBaltic. Nevertheless, Viasat's plan to close the deal by March 8th had to be disregarded because of three main reasons: (1) CMA's provisional approval is subject to a public consultation closing on March 21st, (2) on February 13th, **the EU has launched a similar scrutiny of the impact of the deal on the IFC market**, to be concluded by June 29th, and (3) Viasat still needs regulatory approval in the U.S. to finalise the deal.



Credit: Inmarsat

Black Sky raises \$29,5M in private placement offering

On March 7th, **BlackSky Technology Inc. confirmed that it has raised approximately \$29.5M through a private placement offering**. The company has finalised agreements with a group of new and existing institutional investors offering 16,403,677 shares of the company's Class A common stock, along with warrants to buy up to an additional 16,403,677 shares of common stock. BlackSky plans to use the financial resources for general corporate purposes and investments in its space and software platforms.



Globalstar receives \$252M loan from Apple

On February 28th, [Globalstar announced that Apple has lent the company \\$252M](#) to help with the initial costs of replenishing its low Earth orbit constellation. Globalstar will use the fresh money to fund the initial 17 satellites of its constellation, build by MDA and Rocket Lab. The loan by Apple was made as a prepayment for using the network to upgrade satellite services for its latest iPhone, which can use Globalstar's existing 24 satellites in LEO for emergency services when outside cellular coverage. Therefore, the need for Globalstar to raise third-party financing before reimbursement by Apple has now effectively been lifted. Globalstar will fund any additional upfront costs beyond Apple's prepayment with its own financial resources. Apple had agreed to reimburse Globalstar for 95% of the overall costs of the constellation.

ZIN technologies acquired by Voyager Space

Voyager Space, a US-based space technology company, acquired ZIN technologies Inc. (ZIN), an engineering and design company that specialises in human-related spaceflight systems and monitoring solutions for an undisclosed amount. This acquisition is part of Voyager Space's efforts to expand its space infrastructure and technology capabilities, specifically in support of the Starlab development project. ZIN has provided engineering solutions to multiple launch vehicles, low-Earth orbit infrastructure projects, and spacecraft, including the U.S. Space Shuttle, the MIR space station, the International Space Station (ISS), Dream Chaser, and Starlab. Its acquisition is the seventh by Voyager Space since January 2020 and is its largest to date.



Credit: Voyager Space

Datapath acquired by Gilat Satellite Networks

On March 09th satellite industry supplier [Gilat Satellite Networks announced that it has signed an agreement to acquire DataPath](#). DataPath is a U.S.-based company which offers systems engineering, software development, and mechanical engineering solutions with a strong focus on contracts with the DoD and other U.S. governmental institutions. With the acquisition, Gilat Satellite hopes to strengthen its presence in the U.S. defence market and increase the company's annual revenue by \$50M. Gilat's shares at the stock market increased by more than 5% with the news of the acquisition.

Axiom Space to build joint venture with Boryung

On March 21st [Korea-based pharma company Boryung announced that they are going to establish a joint venture with Axiom Space](#). The move elevates the relationship between the two companies after Boryung invested \$50M in Axiom space last December and both companies co-hosted the "Care In Space" Challenge. Boryung aims to expand its knowledge at the nexus of health and space, especially the technological preconditions for human survival in space and drug development in space. The joint venture will focus on businesses in LEO in South Korea, but the concrete direction of action of the joint venture has not been decided yet.



Starfish space raises \$14M in Series A funding

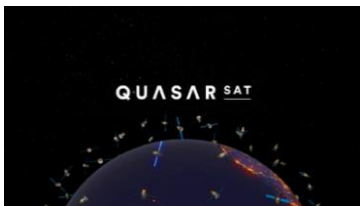
Satellite service manufacturer **Starfish Space** announced on March 8th that it has raised \$14M in its Series A funding round. The round was led by Munich Re Ventures with participation from PSL Ventures, NFX and MaC VC. The company will use the funding to complete the development of the Otter Pub, a prototype satellite servicing vehicle, and towards its Otter spacecraft. Otter pub will be launched this summer onboard the SpaceX Transporter 8 mission. Additionally, Starfish will use the fresh money to expand their staff of currently 26 employees.



Quadsat raises €9M Series A funding round

Quadsat, a startup based in Denmark, has secured €9M in a Series A funding round to expand its business of using drones as substitutes for satellites to test and calibrate ground antennas. The funding round was led by IQ Capital, a British early-stage investor, with participation from other investors, including Seraphim Space, Danish state-backed fund Vækstfonden, and angel investors. Quadsat has raised a total of €12.5M from venture capital since its establishment in 2017 or €16M, including government grants. The funding will help the company accelerate the production of its antenna testing kits and expand its coverage of different frequency bands.

Quasar announced \$6M pre-series A funding



Credit: Quasar Satellite Technologies

Quasar Satellite Technologies, a space ground station firm based in Australia, has announced that it has secured pre-Series A funding worth \$6M. The latest round was led by Main Sequence Ventures, and it also included PAN Group, and Climatech Group. This funding comes just after Quasar's announcement of a \$5.3M contract with the Defence Innovation Hub, which invests in innovative technologies to enhance defence capabilities. The funding will

enable Quasar to maintain its pace of developing more efficient and powerful phased arrays in multiple RF bands, as well as to fast-track its defence contract. The company is planning to expand its ground segment with arrays that will serve the increasing number of satellites that require communication with Earth.

QPS raises 1B yen in Series B funding

Japan-based space company **QPS Research Institute** has announced additional 1B yen (\$7.5M) in a Series B funding on March 9th. The funding was supported by various companies such as: SKY Perfect JSAT Corporation, Nippon Koei Co., Ltd, Mitsui Sumitomo Insurance Capital Co., the Investment Business Limited Liability Union, NAMY Co., Ltd and Ibis Capital Partners. Previous Series B funding was raised in December 2021 and February 2022 which accumulates to an overall funding of 9.2B yen (\$69M). The fresh money will be used to implement the launch plan of the QPS-SAR satellites and the expansion of a new factory to establish a mass production system for satellites.



Lonestar raises \$5M in seed round

On March 6th, U.S.-based **Lonestar Data Holdings** has secured **\$5M in seed funding** to create lunar data centers, with Scout Ventures leading the round and other investors including Seldor Capital, 2 Future Holding, The Veteran Fund, Irongate Capital, Atypical Ventures, and KittyHawk Ventures. The company plans to send a proof-of-concept data center to the moon on Intuitive Machines' IM-2 lunar mission later this year. This initial mission will be followed up by larger data centers for data storage and edge processing in the future to support commercial, government, and academic lunar missions. Lonestar envisions disaster recovery services as an early market opportunity for its services.

In other news

Space startups have been relieved to find out that the U.S. government's safeguards all deposits made with the Silicon Valley Bank: Previously, only deposits up to \$250K were protected by the Federal Deposit Insurance Corp, leaving launch companies Rocket Lab and Astra Space, as well as numerous private space firms, exposed to significant risk.

BofA Securities downgrades its price target on Virgin Galactic Holdings Inc (NYSE:SPCE) from \$4.00 to \$3.00, while maintaining an Underperform rating: The decision was based on the firm's expectation of reduced flight volumes, anticipation of fewer passenger seats available in the coming years, and due to Unity being the only operational vehicle until 2026.

Lunar exploration company ispace announces that the Tokyo Stock Exchange has approved its listing on the Stock Exchange Growth Market: The listing will take place on April 12th.

Synthetaic successfully completes a Series A funding round raising \$13M: The investment was led by Lupa Systems, with participation from TitleTown Tech, Betaworks, Booz Allen Hamilton, and Esri. To date, Synthetaic has raised a total of \$17.5M.

Varda Space receives a significant boost in funding through a "strategic funding increase" agreement: The funding agreement worth \$60M, from the U.S. Air Force, alongside private matching funds. The Air Force has expressed its intent to leverage Varda Space Industries' reentry capsules as test platforms for hypersonic flight.

Singapore-based Equatorial Space Systems successfully raises a \$1.5M seed round of funding: The funding will be used to develop its Dorado commercial-sounding rocket family. The funding round was led by lev8.VC, with Seeds Capital and Masik Enterprises also participating.

Intelsat purchases a substantial amount of capacity from the Amazonas Nexus satellite: The satellite was recently launched, to cater to the growing demand for connectivity in the U.S., Brazil, and the North Atlantic Ocean. The company has entered into a lease agreement with Spanish operator Hispasat to access the satellite's high-throughput Ku-band capacity.

Propulsion technology company Frontier Aerospace raises \$10M Series A funding: the funding aims to accelerate its engine development activities. The round was led by AEI HorizonX, a corporate venture between private equity firm AE Industrial Partners and Boeing.

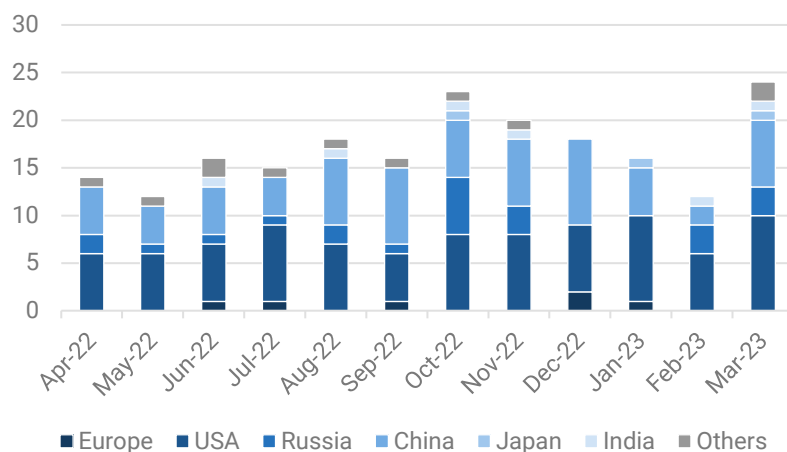


LAUNCHES & SATELLITES

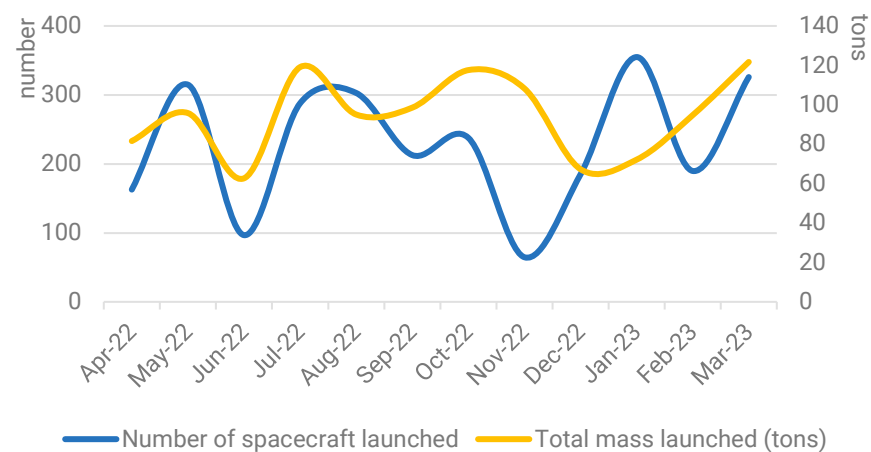
Global space activity statistics

March 2023	USA	Russia	China	Japan	India	Others	Total
Number of launches	10	3	7	1	1	2	24
Number of spacecraft launched	269	3	14	1	36	3	326
Mass launched (in kg)	97 017	7150	8960	3000	5292	372	121 791

Launch activity over the year



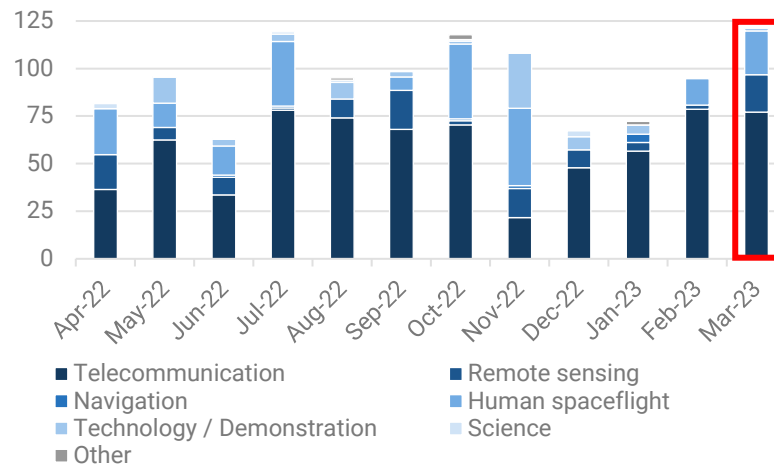
Evolution of the number of launches per launch country



Evolution of launch activity over the year 2022-2023

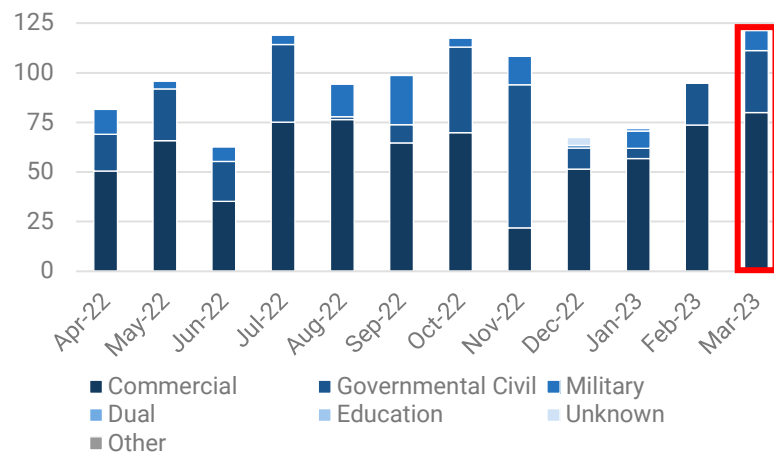


Satellite missions and markets



March 2023	Telecom	Remote sensing	Human Spaceflight	Technology/ Demonstration	Science	Other
Europe	13 591					
USA	63 425	336	23 055	1501		501
Russia		7150				
China		8660				
Japan		3000				
Others		560			2	10

Evolution of the total mass launched (tons) per mission (Apr. 2022-Mar. 2023)



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

Total mass (kg) launched by mission and customer country

March 2023	Commercial	Governmental Civil	Military	Education	Unknown
Europe	13 591				
USA	65 261	23 056	500	1	
Russia			7150		
China	1210	4600	2500		350
Japan		3000			
Others		564		8	

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
02/03/2023	USA	Falcon-9 v1.2 (Block 5)	Crew Dragon USCV-6	NASA	USA	SpaceX	USA	12055	Crew Transfer	Governmental Civil
03/03/2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (51 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
06/03/2023	Japan	H-3-22S	ALOS 3	JAXA	Japan	Mitsubishi Electric	Japan	3000	Earth Observation	Governmental Civil
09/03/2023	USA	Falcon-9 v1.2 (Block 5)	OneWeb (40 satellites)	OneWeb Ltd.	United Kingdom	OneWeb Satellites (USA)	USA	147 (each)	Telecommunication	Commercial
09/03/2023	China	CZ-4C	Tianhui 6 (A & B)	People's Liberation Army Federal Security Service	China	CAST	China	1000 (each)	Earth Observation	Military
12/03/2023	Russia	Proton-M Briz-M (Ph.3)	Luch-Kh/Olimp-K 2		Russia	ISS Reshetnev	Russia	3000	Signal Intelligence	Military
13/03/2023	China	CZ-2C(3)	Horus 2	EgSA	Egypt	DFH Satellite Co.	China	300	Earth Observation	Governmental Civil
14/03/2023	USA	Falcon-9 v1.2 (Block 5)	ARKSAT 1	University of Arkansas	USA	University of Arkansas	USA	1	Technology / Demonstration	Governmental Civil
			AuroraSat	Aurora College	Canada	Aurora College	Canada	4	Radio Amateur	Education
			Dragon CRS-27	SpaceX	USA	SpaceX	USA	11000	Cargo Transfer	Governmental Civil
			Ex-Altia 2	University of Alberta	Canada	University of Alberta	Canada	4	Other	Governmental Civil
			LightCube	Arizona State University	USA	Arizona State University	USA	1	Radio Amateur	Education
			NEUDOSE	McMaster University	Canada	McMaster University	Canada	2	Biology	Education
			STP-Hg	US Space Force	USA	NASA	USA	500	Other	Military
			YukonSat	Yukon College	Canada	Yukon College	Canada	2	Other	Education
15/03/2023	China	CZ-11	Shiyan 19	Unknown (China, Public)	China	SAST	China	350	Earth Observation	Unknown
16/03/2023	USA	Electron KS	Capella (9 & 10)	Capella Space	USA	Capella Space	USA	112 (each)	Earth Observation	Commercial
17/03/2023	USA	Falcon-9 v1.2 (Block 5)	SES 18	SES	Luxembourg	Northrop Grumman	USA	1139	Telecommunication	Commercial
			SES 19	SES	Luxembourg	Northrop Grumman	USA	1280	Telecommunication	Commercial
17/03/2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (52 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial



Launches & Satellites

17/03/2023	China	CZ-3B/G3	Gaofen 13 (02)	CNSA	China	CAST	China	4600	Earth Observation	Governmental Civil
22/03/2023	China	Kuaizhou-1A	Tianmu-1 (4 satellites)	Xiyong Microelectronics	China	Xiyong Microelectronics	China	20 (each)	Meteorology	Commercial
23/03/2023	USA	Terran-1 (Block 1)	Good Luck, Have Fun (GLHF)	Relativity Space	USA	Relativity Space	USA	1500	Technology / Demonstration	Commercial
23/03/2023	Russia	Soyuz-2-1a	Kosmos 2567 / Bars-M4	Russian Aerospace Forces	Russia	Progress Rocket Space Center	Russia	4000	Earth Observation	Military
24/03/2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (56 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
24/03/2023	New Zealand	Electron KS	BlackSky (18 & 19)	BlackSky Global	USA	LeoStella	USA	56 (each)	Earth Observation	Commercial
26/03/2023	India	GSLV Mk.3(2)	OneWeb (36 satellites)	OneWeb Ltd.	United Kingdom	OneWeb Satellites (USA)	USA	147 (each)	Telecommunication	Commercial
28/03/2023	Israel	Shavit-2	Ofeq 13 / TECSAR 3	Tsahal	Israel	IAI	Israel	260	Earth Observation	Governmental Civil
29/03/2023	USA	Falcon-9 v1.2 (Block 5)	Starlink (56 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
29/03/2023	Russia	Soyuz-2-1v	Kosmos 2568	Ministry of Defense of the Russian Federation	Russia	VNIIE	Russia	150	Earth Observation	Military
30/03/2023	China	CZ-2D(2)	PIESAT-1-A	PIESAT	China	Galaxy Space	China	320	Earth Observation	Commercial
			PIESAT-1-B	PIESAT	China	Galaxy Space	China	270	Earth Observation	Commercial
			PIESAT-2-B	PIESAT	China	Galaxy Space	China	270	Earth Observation	Commercial
			PIESAT-3-B	PIESAT	China	Galaxy Space	China	270	Earth Observation	Commercial
31/03/2023	China	CZ-4C	Yaogan 34-04	People's Liberation Army	China	SAST	China	500	Earth Observation	Military



Launch Highlights

Two rocket failures on maiden flights

On March 7th, JAXA's new H3 rocket failed during its first flight.

According to investigations, the cause of the malfunction was likely caused by an excessive electric current inside the second-stage engine, which caused it to shut down. H3 carried the Advanced Land Observation Satellite (ALOS) 3,

manufactured by Mitsubishi Electric. ALOS 3 intended purposes were cartography, regional observation, disaster monitoring, and resource surveying. The H3 rocket is set to replace JAXA's current launcher the H-2A by offering a higher capacity (28.3 metric tons compared to H-2A's 10-15 tons) at lower costs. Hence, the current setback delays Japan's future space ambitions.



Credit: JAXA

Another second stage malfunction caused the (partial) failure of the maiden flight of the **Terran-1 rocket and its test payload on March 23rd**. While the rocket managed to launch, it did not reach the designated orbit. Terran-1 is an innovative launcher as it is the first one predominantly manufactured through 3D-printing. Despite the failure, the main objectives of the mission, i.e. flying through max-q and be the first 3D-printed and first methane-fueled rocket to reach orbit, were achieved. California-based manufacturer Relativity Space had entered a five year contract with the U.S. Air Force to use the Cape Canaveral Launch Complex 16 (CC SLC-16), which had seen its last launch in 1988.



Credit: Roscosmos

Luch-KH/Olimp-K 2 launch from Baikonour

The Russian **Luch-KH/Olimp-K 2 successfully launched on March 12th** on a Proton-M rocket from the Baikonour Cosmodrome.

The satellite's main objectives have not been publicly disclosed but reports link it to either SIGINT, communications or navigation purposes. Its predecessor, the Luch-KH/Olimp-K1, launched in 2014, is well known for having caused some diplomatic friction

in recent years. The United States and France accused Russia of using the satellite to eavesdrop on other nations' spacecraft, including some used for sensitive missions. The accusations began when Luch made a series of suspicious orbital maneuvers after it reached its final orbit, allowing it to get closer to neighboring satellites. The launch took place only two days after Kazakhstan seized Roscosmos property worth \$26M at the Baikonur launch site in order to recover debt from Russia

Two SES satellites launched by SpaceX

On March 17th, **SpaceX successfully launched the final two SES satellites** that the Luxembourg-based company requires to receive approximately \$4 billion in proceeds from the U.S. Federal Communications Commission for clearing their share of the C-band spectrum in due time. SES confirmed that it has established communication with both SES-18 and SES-19, which were delivered into geosynchronous transfer orbit by a Falcon 9 rocket that launched from Cape Canaveral Space Force Station in Florida. SES-18 is intended to replace SES-3, an aging satellite located at 103 degrees west, while SES-19 will be joining SES-22, which was launched by SpaceX last year and is currently stationed at 135 degrees west. The clearing was necessary after the FCC decided in 2019 to transition parts of the C-band spectrum from satellite operations to 5G mobile applications and promised the satellite operators reimbursement for relocation costs.

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