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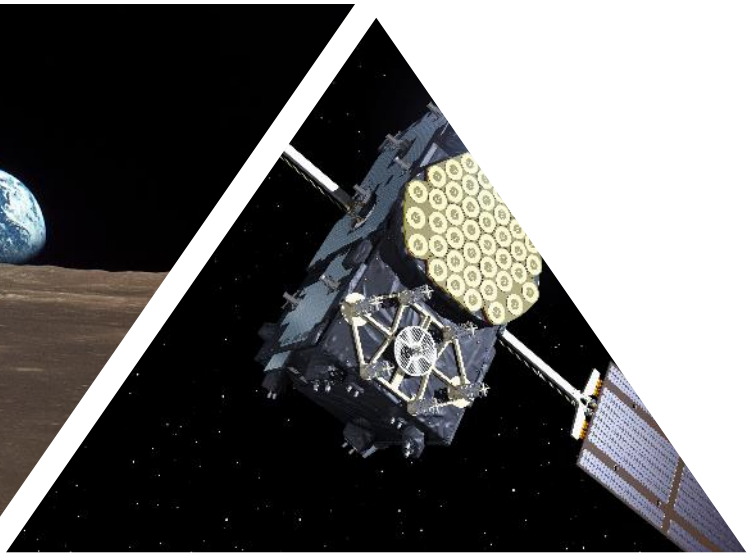

ESPI Insights

Space Sector Watch

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THIS MONTH IN THE SPACE SECTOR…

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IAC AND WSBW 2022: PART OF OUR BEST ENERGIES AND SKILLS

Dear Friends of ESPI,

The 12th of September marked the 60th anniversary of the JFK Moon speech. What then was a governmental initiative of geo-political dimension was also set out to *"serve to organize and measure the best of our energies and skills"*. Today, while the Moon again has become a destination, and while new geo-political challenges are emerging, new ambitions in space need to address also its commercial dimension in an emerging U.S. $1T space economy.

September also saw two major space communities come together in Paris at Euroconsult's World Satellite Business Week (WSBW) and at the IAF's International Astronautical Congress (IAC). While WSBW and its Summit for Satellite Financing and Earth Observation Business mainly addresses the commercial satellite community including private investors, the IAC traditionally is host to governmental actors, policy makers, space industry and academia with more focus on institutional space missions and public investments. WSBW 2022 addressed major commercial announcements such as the planned Eutelsat-OneWeb merger, SpaceX's Starlink partnership with T-Mobile and Globalstar bringing satellite communications to Apple's iPhone, while at IAC institutional flagship programs such as the success of the James Webb telescope or ambitions for Destination Moon and Mars were more prominent.

However, more than ever both events also demonstrated that governmental objectives and commercial ambitions in space increasingly become intertwined. Entrepreneurs respond to sustainability concerns, and an Artemis generation will exist next to a Digital generation, where much of the venture capital also in space is directed to edge-computing, mobility, cybersecurity, AI and quantum or data fusion and where ITC leaders such as Microsoft and Amazon have entered the space race. This trend is also visible with the nomination of the new IAF President, Clay Mowry. For the first time this position will be held by a profile active in commercial space venture, bringing new impulse and an agenda to IAF to help secure continued investment in space to enable a sustainable space environment. This acknowledges a U.S. $9B investment of venture capital in space in 2021 and that private and government financing in space both will grow and play an important role in the evolution of space. Similarly, the ESA Director General, Josef Aschbacher at WSBW presented the ESA proposal for its Ministerial Council 2022 with €2B earmarked as support to commercialization, in line with ESA Agenda 2025 ambitions, the establishment by ESA of a NewSpace Advisory Board and of the European Centre for Space Economy and Commerce (ECSECO).

Private and governmental actors are engaging to explore new ways to increase the socio-economic impact that space can have well beyond the traditional space eco-system, in support to energy transition, and in domains such as health and telemedicine, climate and NetZero, autonomous vehicles and smart cities, aviation and maritime, digital divide and Internet and space for peace and progress. **New branches of government and of the economy become users and investors in space.**

It may be the challenge of the decade ahead of us to bring these actors together to optimize synergies between entrepreneurial ambitions and policy goals. As an example, the planned EUTELSAT-OneWeb merger next to its commercial ambitions raises questions from governmental European stakeholders, including the role of shareholders from outside Europe. Also in Europe, governmental stakeholders and established industrial players will need to adapt to the speed of the market, to shortened innovation cycles and lifetime of space infrastructures, to more effectively

work with NewTech/NewSpace mechanisms. Next to other measures, public procurement schemes will need to evolve to allow industries to compete for new markets, which predominantly are global in scope and where access to public contracts, e.g. as anchor customer and for support to innovation remains one of the key challenges. This can be expected to be accompanied by a shift of governance towards more public-private schemes. In turn, industrial commercialization schemes will need to acknowledge increasing governmental ambitions for autonomy, resilience and security.

As the new Director of ESPI since 1st of September, it will be an honor together with the ESPI team to join and support you in this endeavor for a Europe as a strong global partner in space. ESPI may help identify why governments and private actors shall go to space together to bring most value to the challenges of our time. ESPI may help in providing direction for a shared mission and for programs for their realization. ESPI may contribute research how and under which governance the public and private stakeholders can be symbiotic while stimulating competition. All together we can help to organize and *bring together the best of our energies and skills*.

Yours sincerely,

Hermann Ludwig Moeller
Director of ESPI

POLICY & PROGRAMMES

ESA will request €18B funding from its members at the ESA Ministerial Meeting

Credit: ESA

On September 12th, ESA DG Josef Aschbacher announced in a speech at the World Satellite Business Week (WSBW) Conference that **ESA will request more than €18.7B from its member states at the Ministerial Meeting in November** – approx. a 25% funding increase compared to 2019, where ESA received €14.5B at the last Ministerial Meeting Space19+. The package is still under negotiation with the member states. He **specified** that the focus will be on climate and sustainability (incl. space debris removal) and on commercialisation, with a €2B investment in support of new growth markets.

France announces €9B space budget for the next three years

During the IAC 2022 Opening Ceremony, French Prime Minister **Elizabeth Borne announced that France is about to invest more than €9B in the space sector over the next three years.** This includes the budget allocated to space as part of the France 2030 investment plan, the research budget, the budget of CNES, and the defence budget, as well as France's contribution to ESA.

U.S. FCC's proposal for 5-year deadline for LEO satellites deorbiting approved

On September 8th, the **Federal Communication Commission (FCC) issued a draft order setting a five-year deadline rule for post-mission disposal of LEO satellites**, designed to limit the creation of orbital debris. The **draft order** requires LEO satellite operators to deorbit their satellites at the end of their missions by disposing their spacecrafts through reentry into the Earth's atmosphere within a five-year deadline - a much shorter timeframe than the currently required 25-year timeframe.

Credit: FCC

On September 29th, the FCC took up the order at its open meeting where the **proposal for the rule was approved**, passing unanimously. This new rule will apply to satellites launched two years after adoption of the order and would concern satellites licensed by the U.S. as well as satellites addressing the U.S. market.

The **U.S. Office of Space Commerce considers that the FCC is pushing aggressively the limits of its authority**, questioning whether the addition of debris mitigation rules to FCC's licensing procedure should be part of the FCC's mandate. Richard DalBello, Director of the Office of Space Commerce stated that in his view "the FCC, for their part, has pushed the boundaries of their authorities pretty aggressively", highlighting remaining issues regarding the distribution of responsibility on STM in the United States. The House Science Committee also questioned the FCC's authority for this attempt, calling it a "unilateral action", and **sent a letter to FCC Chairwoman Jessica Rosenworcel**, asking to delay the vote on the proposal.

Earlier this month, **the DoC and the DoD signed a MoU defining their cooperation on civil/commercial STM**, in line with the U.S. National STM Policy (SPD-3), which directed the DoC to take over the provision of SSA data and services relevant to STM and that are currently provided by the U.S. military.

ESA and NASA sign agreement on lunar cooperation

Credit: ESA

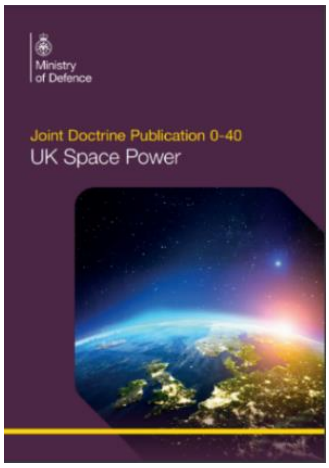
During the IAC, ESA DG Josef Aschbacher and NASA Administrator Bill Nelson **signed a joint statement for cooperation on current and potential lunar exploration activities** which could enable additional roles and contributions of ESA in Artemis and NASA-ESA cooperation on human space flight activities (ISS, Gateway, ESM for Orion).

For the contributions to Artemis, ESA is considering for instance "Moonlight", which proposes to establish a communications and navigation network around the moon, and the "European Large Logistics Lander which could deliver heavy payloads to the lunar surface for science and exploration missions" – for both ESA will seek funding at the Ministerial Meeting. In exchange, ESA plans to negotiate flights of ESA astronauts in the frame of Artemis with NASA.

Meanwhile, the launch of Artemis I was **postponed multiple times**, this month, **due to the Hurrican Ian,** so that the **launch will not be before middle of November**.

UK releases various space policy documents this month

UK government unveils military "UK Space Power" doctrine



Credit: Ministry of Defence

The **UK Government published** the first edition of the **Joint Doctrine Publication (JDP) 0-40 "UK Space Power"**, which provides a UK military perspective on space and highlights the relevance of space as an operational domain. The doctrine, which aims to support the defence sector, government departments, and UK allies, combines the principles guiding space operations, government policy, strategy, higher-level doctrine and space power knowledge. The doctrine outlines four key space power roles: (1) space domain awareness, (2) space control, (3) space operations support, (4) space service support.

UK releases UK Space Agency Framework Document (UK-BEIS)

The UK released the UK Space Agency (UKSA) Framework Document which was agreed between the UK Department for Business, Energy and Industrial Strategy (BEIS) and the UK Space Agency in accordance with HM Treasury's handbook Managing Public Money and was approved by HM Treasury. The document sets out the governance framework within which UKSA and BEIS operate. It sets out UKSA's core responsibilities and describes the governance, financial and accountability framework.

Scotland publishes Space Sustainability Roadmap for Scotland

Space Scotland published the **Space Sustainability Roadmap for Scotland** which traces the direction and to work towards a more sustainable Scottish space sector through a series of 11 detailed work packages in the areas of leadership, in-orbit, environment and Net Zero, including recommendations for the sustainable development of the sector. The roadmap sets three goals for the space sector to be achieved by 2045 through short-, medium-, and long-term actions, focusing on sustainability on the ground and in orbit, and on reducing emissions.

NASA's DART Mission successfully impacts Dimorphos

On September 26th, the **NASA DART Mission successfully impacted Dimorphos**, natural satellite of asteroid (65803) Didymos, marking the first ever planetary defense technology demonstration. The first images of the impact arrived from the Italian minisatellite LICIACube, which had been **previously released in space on September 12th**. LICIACube studies the deflection of the asteroid, the formation of the debris created by the impact, the size and morphology of the crater and observes the non-impacted hemisphere, with a view to measure the size and volume of the target.

U.S. DoD adopts 5 tenets of responsible behavior, while Japan and Germany join ASAT ban initiative promoted during UN OEWG second session

Credit: United Nations

The **U.S. DoD released an updated space policy document** (**DoD Directive 3100.10, "Space Policy"**) signed by Deputy Secretary of Defence Kathleen Hicks, which replaces a previous document issued in 2012 and updated in 2016. The new document recognises space "as a priority domain of national military power" and formally adopts the 5 "tenets of responsible behavior in space" which Defense Secretary Lloyd Austin introduced in a **memo** last year.

Moreover, the U.S, government announced to look for new ways to encourage more countries **to join the U.S. self-imposed direct-ascent anti-satellite ASAT test ban** in the frame of the second session of the UN OEWG on reducing space threats, which took place this month. The **U.S. introduced a resolution at the UNGA** to get more support for the initiative and increase political pressure on countries planning future ASAT tests, and - in the long-term - to develop a legally binding agreement. During the session, **Japan and Germany announced to "join" the ASAT ban**.

DLR and ASI sign an implementation agreement for EO hyperspectral mission

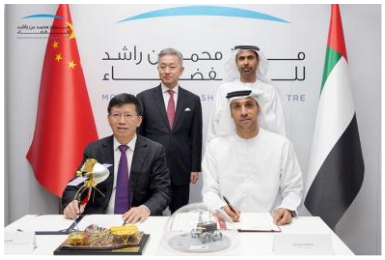
During the IAC, the President of the ASI, Giorgio Saccoccia and the Head of the German Space Agency at DLR, Walther Pelzer, signed **an eight-year agreement in the context of the previous framework agreement between the parties, dated back to 2007**. ASI and DLR committed to share information, strategies, and results of their hyperspectral missions PRISMA and EnMAP. In addition, the agencies will organise workshops and events, promoting public awareness of the capabilities of the two missions.

Credit: ASI

UK Space Agency awards ClearSpace and Astroscale £4M for debris removal

In September, the **UK Space Agency awarded the UK-based companies ClearSpace and Astroscale Limited in total £4M for space debris removal and in-orbit manufacturing**. The two companies are designing space debris removal missions, leading a consortium. After the design completion, the consortium could receive additional funding to launch the UK's first national space debris removal mission in 2026. **Astroscale received £1.7M**, while ClearSpace received £2.3M. Furthermore, the UK launched a new £15M Enabling Technology Programme (ETP), **with the first six funding calls already open for projects on in-orbit servicing and manufacturing projects**. The UKSA committed £102M over the next three years for SST.

UAE and China sign MoU to fly UAE rover on China's Chang'e-7 mission



Credit: MBRSC

On September 16th, H.E. Salem Humaid AlMarri, DG of the UAE's Mohammed bin Rashid Space Center (MBRSC) and Wu Yanhua, Vice Administrator of the China National Space Administration (CNSA) **signed a MoU on future moon mission**, including to fly the UAE's Rashid 2 rover, which will be developed by the MBRSC in Dubai, on China's Chang'e-7 multi-spacecraft lunar south pole mission in 2026. The aim of the Chang'e-7 mission is the exploration of shadowed craters. The agreement marks the first space mission cooperation the UAE and China.

China prepares the launch of the final space station module Mengtian

China prepares to complete the construction of its Tiangong space station, starting the launch campaign for the final module for the space station. The 30-meter-long **core stage of the fourth Long March 5B heavy-lift rocket arrived at Wenchang spaceport** for assembling and preparation for launch of the Mengtian experiment module in early October. The Mengtian module will join the Tianhe core module and Wentian experiment module in orbit, completing the space station.

Axiom Space sign MoU with Saudi Arabia at the IAC to fly astronauts in space

During the IAC, **Axiom Space CEO Michael Suffredini signed an agreement with the Saudi Space Commission (SSC) to fly two astronauts of Saudi Arabia** to space on a future Axiom mission next year. Axiom announced to work with the SSC on an additional future flight opportunity after 2023.

Credit: Saudi Space Commission

Additionally, Axiom announced an agreement with the Turkish Space Agency to fly a Turkish astronaut on a future mission and a MoU with the CSA to investigate opportunities for future space cooperation, also including to fly Canadian astronauts on Axiom missions.

NASA signs agreement with Axiom Space for second private astronaut mission and finalises commercial crew contract extension with SpaceX

NASA signed a "mission order" agreement with Axiom Space for a second private astronaut mission (PAM) to the ISS (Ax-2 mission), scheduled for the second quarter of 2023 to fly four private astronauts to the ISS for a 10-day mission on a SpaceX Crew Dragon spacecraft. In December, NASA selected Axiom Space for the second PAM. The first PAM mission Ax-1 took place in April. Moreover, **NASA is requesting proposals until October 27th for the third and fourth PAMs** to the ISS in between late 2023 and mid-2024,

Furthermore, **NASA awarded Axiom Space a task worth $228.5M to develop the spacesuit for the first Artemis crew landing mission on the Moon** (Artemis 3 mission), including design, development and production of the spacesuits. In June, **NASA awarded Axiom Space and Collins Aerospace Exploration Extravehicular Activity Services (xEVAS) contracts for spacesuits** used in Artemis missions and ISS spacewalks, from then competing for specific task orders for spacesuit development and services. Reportedly, NASA received proposals from both companies for this task order, but selected Axiom, not disclosing details about the reason.

Credit: NASA

Furthermore, NASA extended its commercial crew contract with SpaceX, **adding $1.44B to the existing Commercial Crew Transportation Capabilities (CCtCap) contract for five additional Crew Dragon missions to the ISS** ($288M per mission). The total value of SpaceX's CCtCap contract, awarded in 2014, is now $4.93B.

The Crew-5 launch, initially scheduled for early September but was delayed in July, is now scheduled for October 3rd with NASA astronauts Nicole Mann and Josh Cassada, JAXA astronaut Koichi Wakata and Roscosmos cosmonaut Anna Kikina.

Space Force builds ground station in Alaska to launch EPS-R payloads

The U.S. Space Force started with the construction of a ground station , evaluated to cost $4M, at the Clear Space Force Station in Alaska, where two new polar secure communications (Enhanced Polar Systems-Recapitalization - EPS-R) payloads will be operated, scheduled to launch in 2023 in frame of Space Norway's Arctic Satellite Broadband Mission (ASBM) on a SpaceX Falcon 9 from Vandenberg Base. The Satellite terminals in Alaska will be the main connection to the EPS-R payloads developed by Northrop Grumman, which will fly to highly elliptical orbits onboard of two ASBM satellites. The gateway construction is a joint project led by the Space Force, the Naval Information Warfare Center and the U.S. Army Corps of Engineers.

In other news

ESA astronaut Samantha Cristoforetti becomes first European female commander of the ISS: She took over the command from the Russian commander Oleg Artemyev. The Ceremony for the change of command took place on September 28th.

NASA Associate Administrator for Science Thomas Zurbuchen will resign by the end of the year: After having been in charge of NASA's Science Mission Directorate for the past six years.

The Galileo satellite GSAT0224 named "Shriya" entered into service: Shriya has passed extended in-orbit testing at the beginning of the year and an in-orbit validation for EUSPA and ESA's finalised testing campaign.

ESA selects Harmony as the tenth Earth Explorer mission in the FutureEO programme: The mission includes twin EO satellites accompanied by a Copernicus Sentinel-1 satellite. Its high-resolution system including SAR and multiview thermal-infrared instruments, will carry out motion observation and provide information about oceans, ice, earthquakes and volcanoes.

ESA selects Astrobotic and Lunar Logistics Services to fly ESA LandCam-X to the Moon: The landing sensor camera will fly as payload on Astrobotic's Griffin Mission One (GM1) in 2024. The LandCam-X which is part of ESA's lunar exploration campaign, will take pictures during landing to enhance precision and safety.

JAXA selects Astroscale as contractor for CRD2 phase of Front-Loading Technology Study: The Commercial Debris Removal Demonstration (CRD2) Phase II entails testing of ground key hard- and software tech. The results will provide a reference for Phase II's technical feasibility.

Space Force extends Saber Astronautics' contract for development of space visualisation software: The SDA tool designed for operators was used by Space Force units in classified and unclassified systems. The contract serves for the upgrades to the orbit propagation algorithms in support of cislunar spaceflight and adds the space collision warning system "Sentinel".

IISL, IAA and IAF conclude joint report on STM: The initiative, which started in 2018, aimed to develop approaches and proposals for STM to assist policymakers on national and international levels. More than 130 members from the three organisations contributed to the report.

ESA unveils members of the New Space Advisory Board that were appointed in April: The NAB is comprised of high-level representatives from companies with a New Space approach and aims to share lessons learned, supporting ESA in the elaboration of a commercialisation policy and the transformation process to adapt to the New Space needs and requirements.

China's space nuclear reactor passes performance evaluation: According to a report, the reactor can generate one megawatt of electricity for spacecraft power supply and propulsion, while plans or technical details for the use of the nuclear power system are not unveiled.

European Rover Challenge 2022 winners announced: First prizes were awarded to AGH Space Systems (Poland) and DJS Antariksh (India), second place to EPFL Xplore (Switzerland) and Mars Rover Manipal (India) and the third place went to ITU Rover Team (Turkey) and Project RED (Italy).

South Korea's first robotic lunar orbiter Danuri conducts critical trajectory correction maneuver: having passed this milestone to enable fuel-efficient and on-time travel to the moon, the Korea Pathfinder Lunar Orbiter was looping back to the moon from the L1 Lagrange point.

INDUSTRY & INNOVATION

ESA and SES sign contract for space-based QKD system Eagle-1

Credit: European Commission

During the IAC, **ESA DG Josef Aschbacher and SES CEO Steve Collar signed the contract for Eagle-1**, which will be **a European space-based quantum key distribution (QKD) system**. The mission is co-funded by ESA (under ARTES program) with total costs valued €130M. The mission will be implemented by SES, leading a consortium of more than 20 European companies. ESA member states Austria, Belgium, Czech Republic, Germany, Italy, Luxembourg, the Netherlands, and Switzerland are contributing to the **public-private partnership.** The mission is planned for launch in 2024 with a European launcher and will complete a 3-year in-orbit validation supported by the EC under Horizon Europe.

SES and UNIO consortium establish new company UNIO Enterprise

On September 5th, the Luxembourg-based satcom operator SES and the UNIO consortium, comprised of Isar Aerospace, Mynaric AG and Reflex Aerospace, **founded the UNIO Enterprise**. **SES holds a share of 25% in the new company** headquartered in Munich and will assist its three German partners with the creation of a set of sub-constellations that will provide connectivity solutions to different users. Together, they will result in a meta-constellation with sufficient capacity for secure commercial and governmental applications. The first satellite demonstration will be launched in 2023.

The UNIO consortium was originally established in the framework of the European Commission's call for proposals on an EU secure connectivity satellite constellation. Subsequently, the consortium stated that it would pursue its constellation even if not selected by the Commission for the secure connectivity programme.

Likewise, SES is a member of a nine European company consortium established in 2021, to submit a proposal for an EU secure connectivity satellite constellation. SES CEO Steve Collar stressed that SES is part of the UNIO Enterprise, but not the UNIO consortium and emphasised SES' willingness to invest in the EU-led secure connectivity project, while at the same time being part of like-minded partners within the UNIO joint venture.

Credit: UNIO

OneWeb plans second-generation constellation with Eutelsat


Credit: UNIO

On September 12th, OneWeb and Eutelsat unveiled that **the companies are planning for a joint second-generation constellation**, in parallel with their ongoing merging process which could take up to nine months to get approved by the regulators. The companies seek to leverage their LEO and GEO satellites to build a multiorbital connectivity solution.

Eutelsat CEO Eva Berneke stated that, in this new setup, OneWeb, which so far deployed two-thirds of the original 648 satellite constellation, "might not need quite as many new satellites in order to address peak capacity". The CEO further mentioned that the companies are also studying the possibility of jointly developing the ground network for the constellation.

Regarding the deployment of the satellites, OneWeb and Eutelsat are planning to merge their launch reservations, the latter having between four or five launches in reserve over the next five to six years. Eva Berneke indicated that the launch of the second generation of OneWeb satellites should start in 2026.

ArianeGroup unveils SUSIE

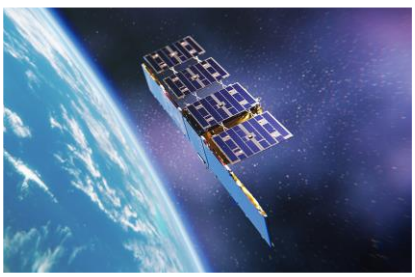

Credit: ArianeGroup

During the International Astronautical Congress (IAC) in Paris, ArianeGroup **unveiled the Smart Upper Stage for Innovative Exploration (SUSIE)** spacecraft concept. The spacecraft, which aims to provide Europe with independent crew and cargo access to LEO, would be launched aboard an Ariane 64. To that end, it will be able to carry up to 7.000kg of cargo or a crew of five people to LEO and will have a total weight of 25.000 kg. Beyond capabilities for LEO, there is also the possibility of adding a Space Transfer Module to SUSIE, which is a system to provide the necessary propulsion, energy, and air supply to reach lunar orbit.

OneWeb reaches launch agreement with Arianespace

Following Russia's invasion of Ukraine, OneWeb suspended the activities to launch its broadband satellites on the Soyuz rocket from the Baikonur Cosmodrome. According to the **OneWeb Annual Report 2022**, the suspended launches resulted in an impairment of $229.2M. OneWeb has since then been trying to find alternative launch providers to deploy its satellites, having reached deals with SpaceX and ISRO. On September 13th, the **company reached another launch agreement**, this time with Arianespace, to launch its satellites aboard Ariane 6 Launch Vehicle, designed to replace the heavy-lift Ariane 5.

ICEYE to provide military SAR technology for BAE Systems


Credit: ICEYE

The ICEYE, a Finnish company dedicated to radar satellite imaging, **is partnering with the British BAE Systems** to supply advanced Synthetic Aperture Radar (SAR) technology as part of the first BAE Systems' military multi-sensor satellite cluster Azalea. The four-satellite constellation will be launched in 2024 and will deliver SAR, optical, RF signals, analysis, and will be able to process data in space to provide digital intelligence.

European launch companies sign contracts at the IAC

German RFA signs two launch agreements


Credit: Rocket Factory Augsburg

The German Rocket Factory Augsburg (RFA) signed two launch agreements during the IAC. The **first agreement** will allow the American launch service Spaceflight to fly its Sherpa orbital transfer vehicles (OTVs) and other payloads on upcoming RFA missions from various European spaceports, including from the UK and in French Guiana.

While the companies are targeting mid-2024 for their first launch, there is no further information on how many missions are scheduled. The **second agreement**, signed with the Indian SSA company Digantara, includes the launch of two Digantara satellites aboard RFA ONE. The Indian company wants to deploy a constellation totalling 40 satellites. The deal also establishes a strategic partnership for RFA to integrate Digantara's Space-Mission Assurance Platform for space operations.

Italian SAB-LS establishes two contracts for future missions

The Italian company SAB-Launch Services (SAB-LS) also reached two agreements during the IAC. It signed a **contract with the Finnish company ICEYE** to fly two Synthetic Aperture Radar (SAR) satellites in the Vega-C rideshare system Small Spacecraft Mission Service, maiden flight in Q1 2023. Furthermore, it reached a **multi-year framework agreement** with Arianespace for the supply of hardware, mission preparation and integration services for CubeSats, and the transportation of SAB-LS payloads to Europe's Spaceport, in French Guiana.

Huawei and SpaceX enable texting via satellite communications

Credit: BeiDou

On September 7th, Huawei unveiled that its new smartphone series Mate 50 will be able to **send short text messages, limited to 30 per day, and utilize satellite navigation** through China's global BeiDou satellite network, allowing for communication in areas without mobile phone signal. One day after Huawei's announcement, Apple revealed that its next iPhone 14 series will include an **emergency SOS feature**, through which its users will be able to send emergency messages via satellite when out of terrestrial network coverage. To that end, Apple reached an agreement to use 85% of Globalstar's satellite network capacity.

Meanwhile, SpaceX requested the US Federal Communications Commission (FCC) a **license request to share Globalstar's spectrum** in the 1.6 and 2.4GHz bands, which the latter challenged by arguing it would cause "harmful interference" with its mobile satellite service network and customers. SpaceX on the other end argues that the FCC "did not provide Globalstar with perpetual exclusive use of the bands" and thus it should open the spectrum to share with competitors.

Sateliot and Amazon Web Services partner in cloud 5G connectivity

The Spanish satellite telecommunication operator Sateliot is partnering with Amazon Web Services (AWS) to build a **cloud-native 5G service** designed to provide narrowband IoT (NB-IoT) connectivity over non-terrestrial network using its LEO satellite constellation. The company stated that with this partnership, its customers will be able to connect to its constellation with the same hardware that they already use with their terrestrial network. Sateliot's constellation deployment is scheduled to begin in 2023.

Credit: Sateliot

Lynk Global receives regulatory approval to operate direct-to-mobile service

The U.S.-based Lynk Global **received its first regulatory approval from the Federal Communications Commission** (FCC) to operate 10 "Lynk Tower" LEO satellites, which will provide basic connectivity directly to mobile phones.

Nevertheless, the authorization comes with certain conditions, such as a limit to the start-up's use of the spectrum interfering with other operators. The FCC further ruled that Lynk will not have "exclusive right" for bands allocated to terrestrial mobile services, in order to maintain a competitive market. Currently, Lynk Global has one satellite in orbit, "Lynk Tower 1", and is scheduled to deploy two more by the end of the year.

The company needs at least four to start offering its services, which will begin by enabling users to send a limited amount of text messages per day, receive emergency alerts and provide connectivity for IoT, to be available in 18 countries, including the U.S. Furthermore, the company also needs to secure landing rights before it starts operations, which the CEO Charles Miller anticipates will happen in the near term.

Microsoft scales up its presence in space with software tools and strategic partnerships

Credit: Microsoft

On September 14th, during the World Satellite Business Week in Paris, Jason Zander, Microsoft's Strategic Missions and Technologies Executive Vice President unveiled that the company **will start to offer a closed preview of the Azure Orbital Cloud Access**. The solution aims at providing low latency applications through its cloud service by leveraging the Starlink constellation and Azure ground infrastructure.

Regarding Microsoft's strategy, Jason Zander stated that the company aims to provide its "hyperscale cloud" services, therefore complementing cellular connectivity with satellite links to reach a global scale. To that end, Microsoft does not aim to invest in its own satellite network and instead prefers to establish partnerships.

Moreover, Microsoft opened for the general public Azure's Orbital Ground Station as a service, which was previously available only in a private preview format. The ground station allows operators to communicate and control satellites in LEO and MEO by exchanging information with space assets using the cloud.

SpaceX signs first resell deal of Starlink's broadband services with Speedcast

On September 13th, the Australian remote communications provider Speedcast reached an agreement with SpaceX to become **the first company** to sign a distribution deal to resell SpaceX's Starlink broadband services to enterprise and maritime customers. James Trevelyan, in charge of Speedcast's global enterprise business, stated the company would start providing Starlink services in the near-term globally. Moreover, on September 22nd, the Norway-based company dedicated to maritime connectivity **Marlink and its OmniAccess subsidiary** also announced a deal with SpaceX to offer Starlink connectivity to its customers.

SpaceX Vice President of Starlink sales Jonathan Hofeller, speaking at the World Satellite Business Week, provided some context to these deals stating that even though SpaceX typically prefers to sell directly to customers, it is exploring international partnership opportunities for its Starlink services.

Satlantis expands strategic partnerships

Credit: Satlantis

On September 14th, the Finnish microsatellite manufacturer ICEYE unveiled plans to partner with **Satlantis to launch the Tandem4EO constellation**, which will acquire high-resolution SAR and optical imagery for environmental security, disaster risk management and infrastructure development. In addition, **Satlantis and OHB Sweden have signed a contract** to supply together two submetric EO microsatellites that will be launched in 2024, tasked with detecting methane emissions.

LeoLabs launches collision risk assessment software for space insurers

The U.S.-based startup **LeoLabs released a "beta version" of its space insurance tool**. The new software analysis and visualisation solution calculates collision risk and can also be used for "forensic analysis" after a collision, with the data from the company's network of ground-based tracking radars. The company stated it consulted with the insurance industry while developing this system.

In other news

Skyrora and Maritime Launch Service unveil new partnership: The UK-based launch start-up Skyrora and the Canada-based Maritime Launch Services signed a letter of intent to launch Skyrora XL from Spaceport Nova Scotia. Under the agreement, Skyrora will supply launch vehicles to Maritime Launch clients as well as host their own clients under a lease agreement.

KT SAT signs contract with Thales Alenia Space for GEO satellite: Korean company KT SAT contracted Thales Alenia Space for the delivery of the KOREASAT 6A to replace KOREASAT 6 and continue to offer broadcasting satellite services to South Korea. The GEO satellite is expected to be delivered in late 2023 and to remain operational for 15 years.

Telespazio and NorthStar sign service distribution partnership on SSA data: Under the new agreement, Telespazio will serve as the Canada-based SSA company NorthStar's exclusive distributor for European ministries of defence, governments, agencies, and institutions. NorthStar expects to launch its first payloads fully dedicated to SSA in 2023.

Avanti Communications and Turksat establish five-year partnership: The five-year partnership will combine satellite capacity across Africa and the Middle East. This is the first time UK-based Avanti is partnering with another regional operator to access its capacity. Accordingly, Avanti's Hylas 2 and Hylas 4 will provide broadband services in conjunction with Turksat-5B in areas, offering more than 100 Gbps of Ka-band capacity.

Cshark and Sidereus Space Dynamics sign launch agreement: The Italian companies Cshark and Sidereus Space Dynamics agreed to deploy Cshark's constellation of satellites dedicated to IoT applications over multiple launches aboard Sidereus' single-stage-to-orbit EOS rocket.

ANYWAVES and Space Machines Company (SMC) announce partnership: The France-based manufacturer of space applications and equipment ANYWAVES partnered with the Australian in-space transportation and logistics company SMC to support the latter's first mission in 2023. ANYWAVES will supply its S-band antennas to provide SMC's Optimus Orbital Transfer Vehicle communications with ground stations.

ArianeGroup contracts Thales Alenia Space to produce safeguard system for Ariane 6: The range safeguard system serves to neutralise the launcher in case it takes a wrong trajectory that would endanger people or property.

D-Orbit signs hosted payload contract with Zenno Astronautics: D-Orbit's ION space tug will carry a prototype of Zenno's magnetic torquer named Z01 to a 550km Sun-synchronous orbit. The launch is scheduled for the end of 2023.

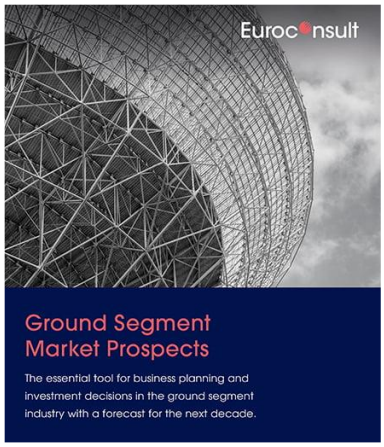
Mangata Networks requests regulatory approval to connect UK user terminals: Initial services are expected to begin in North America and Northern Europe by 2025 and will be followed by two launches of a total of eight satellites in 2024 to highly elliptical orbit (HEO).

Rocket Lab and USTRANSCOM explore in-orbit rockets to deliver cargo around Earth: The agreement seeks to probe new concepts for sending supplies and equipment across Earth via space, relying on Neutron and Electron launch vehicles. Under the agreement, Rocket Lab will study the use of the Photon spacecraft to establish on-orbit cargo depots and deliver re-entry capability.

ECONOMY & BUSINESS

Euroconsult estimates ground segment market to reach $3.8B by 2031

On September 1st, Euroconsult released its latest **Ground Segment Market report**, forecasting it to remain steady over the next decade with a year-on-year growth of 1.4%, led by an increase in demand for data and services, reaching $3.6B by 2031.



Credit: Euroconsult

Furthermore, the report underlines an ongoing transformation of this segment of the space market. It states the demand for satellite communications has been growing due to the increasing adoption of very high throughput connectivity and non-geostationary (NGSO) constellations. Nevertheless, competition from terrestrial video services is curtailing its growth, after a temporary rise resulting from the C-band reallocation process in the U.S. Moreover, NGSO constellations are expected to drive a surge in the commercial user segment market, resulting in a projected 7.8% compound annual until 2031.

Regarding the defence segment, there is also a significant uptick in demand. Ground segment contracts have already been signed in several European countries, ahead of new satellite deployments. In the U.S. it is more likely that demand will focus on the augmentation and renewal of existing terminals.

Likewise, the Ground Segment as a Service (GSaaS) market has been growing proportionally with the deployment of small satellites and is estimated to reach its plateau at $250M by 2026, to then see a small decline to $200M as it matures by 2031.

Intuitive Machines to merge with SPAC

Credit: Intuitive Machines

The U.S.-based company Intuitive Machines unveiled it is pursuing a **merger with the Special Purpose Acquisition Company (SPAC) Inflection Point Acquisition** Corp. The SPAC merger values the company at $815M and is hoping to generate $330M in gross proceeds subject to redemptions, including $105M from private investment in public (PIPE). The deal is expected to close in the first quarter of 2023, after which Intuitive Machines will be listed on Nasdaq under the ticker symbol "LUNR".

This SPAC comes as a surprise to most, following the widespread use of this investment vehicle in 2021 but which saw a sharp decline in 2022. Experts highlight the risks associated with pursuing a SPAC, given that most space SPACs are **currently underperforming**. Nevertheless, Intuitive Machines management argues that now is the time to "**capitalize on the momentum to outpace the competition**", by establishing itself as a major commercial player in the Lunar economy. Considering the company is already relying on public-private contracts, such as the Commercial Lunar Payload Services (CLPS) from NASA, it seeks to take advantage of the increasing geopolitical importance of space, which is pushing institutions to rely on the private sector to accomplish their strategic goals.

UK ADS publishes UK Space Sector Outlook

Credit: ADS

The UK Trade Association for Aerospace, Defence, Security, and Space Organisations (ADS) published the **UK Space Sector Outlook**, produced with the support of UKspace and the UK Space Agency. The report provides an overview of the UK space sector and its contribution to the UK's economy. Accordingly, in 2021 the space sector's contribution to the UK economy reached $19.2B in turnover and 47.000 direct employees. Furthermore, it highlights new business opportunities for the UK space industry, such as in in-orbit servicing and manufacturing, Earth Observation, and launch systems.

Viasat-Inmarsat merger passes UK national security review

On September 16th, the UK Government decided that the proposed Viasat-Inmarsat merger **does not pose a threat to the kingdom's national security**. The review was made under the terms of the UK National Security and Investment Act 2021, which came into force in January 2022. The companies still need approval from the U.S. Federal Communications Commission and the Justice Department. Moreover, the EU Commission is also evaluating the deal and stated that it needs its antitrust approval before it can be completed. Mark Dankberg, Viasat CEO, stated that the acquisition will be finalized either in 2022 or 2023.

SpinLaunch raises $71M in Series B

On September 20th, the U.S.-based start-up SpinLaunch **closed a $71M Series B investment round** comprised of debt and equity, led by ATW Partners. The latest funding round brings the total funding to $150M. With the investment, the company will continue to develop its launch system, which uses kinetic energy as its primary method to lift off the ground.

Skyroot Aerospace secures $51M in a Series B funding round

The Indian start-up **Skyroot Aerospace closed $51M in a Series B round** led by the global investment firm GIC. The investment will be used to fund developmental launches and build the necessary infrastructure. Skyroot Aerospace's Vikram launch vehicles will be able to launch up to 800kg to LEO. The first solid-fuel rocket of the Series, called Vikram 1, is scheduled to perform its maiden launch demonstration this year and will be able to carry 500kg to LEO. Moreover, the company expects to start commercial operations in 2023.

Albedo raises $48M in a Series A funding round

Credit: Albedo

On September 7th, the U.S.-based Earth observation start-up **Albedo raised $48M in a Series A investment round** led by Breakthrough Energy Ventures and Shield Capital. The company aims to operate a small constellation of satellites in Very Low Earth Orbit (VLEO), that is, between 450 and 650km above Earth, in order to collect images with a 10cm resolution and 2m thermal infrared. This remote sensing technology would serve markets such as precision agriculture, mapping, insurance, and defence, among others. The raised capital will be used to develop and test its first satellite.

Morpheus Space secures $28M in Series A round

Credit: Morpheus Space

On September 14th, the German company dedicated to electric propulsion systems for satellites **secured $28M in a Series A funding round** led by Alpine Space Ventures. With the capital, Morpheus Space will build a new factory in Dresden to upscale its production of propulsion systems as well as develop its business to accrue more sales and contracts.

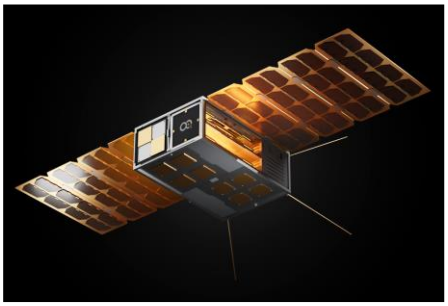
Taranis closes $40M Series D funding round

On September 7th, the Israel-based crop intelligence provider Taranis **closed a $40M Series D round of funding** led by Inven Capital, with the participation of Seraphim Space Investment Trust and Farglory Group. Taranis' solution acquires various remote sensing data, including from satellites, and then analyses it with an AI engine to identify actionable insights for its customers. The company will use the capital to expand its operations.

ATLANT 3D Nanosystems raises $15M in a Series A investment round

ATLANT 3D Nanosystems (ATLANT 3D), a Denmark-based company **raised $15M in a Series A funding round** led by West HillCapital. The funds will be used to continue the development of its advanced manufacturing infrastructure. ATLANT 3D uses a micro and nanofabrication platform to manufacture advanced materials and electronics at an atomic level.

OQ Technology closes €13M Series A funding round



Credit: OQ Technology

On September 1st, the satellite IoT operator **OQ Technology raised €13M in a Series A funding round** led by Wa'ed Ventures and Phaistos Investment Fund. The Luxembourg-based company will use the investment to continue developing its technology, acquire more spectrum licences and expand its 5G IoT constellation.

In other news

Sateliot seeks to raise $10M in pre-Series B: The Spanish satellite operator focusing on IoT connectivity opened a solicitation to raise $10M in a pre-Series B. Sateliot also disclosed that the round of funding is part of a larger $100M Series B to take place in 2023, which the company will use to build its 250-satellite constellation.

Cloud to Street secures $12M funding round: The U.S.-based company focused on data analytics to track floods had $100.000 remaining to be sold in the funding round. So far, the company has raised a total of $21.3M.

Planet Watchers raises $11M in Series A funding round: The UK-based geospatial intelligence company focused on crop monitoring will invest the funds in the development of its Synthetic Aperture Radar (SAR) data analytics and expand its team to address market demand. The funding round was led by Seraphim Space and Creative Ventures.

Starburst Ventures reveals new investment fund: The U.S.-based VC fund dedicated to the aerospace industry launched a new early-stage fund to focus on aerospace, defence, security, and enabling science and technology. The fund will invest both in software and hardware companies.

U-Space closes €7M seed round: The French manufacturer of nanosatellites raised €7M in a seed round with the participation of Karot Capital, Bpifrance (through Definvest) and BNP Paribas Développement. The company will use the funds for R&D, optimization of design processes, streamlining production, and expanding personnel.

Avio acquires Temis: Avio closed the acquisition of the total share capital of Italian aerospace and defence company Temis and 5% of its parent company ART SpA. Regarding the deal, considering that Temis is a supplier of Avio's Vega program, the company emphasized the acquisition of skills and internalization of a significant part linked to the costs of supply for Vega launch vehicles.

Leanspace closes €6M in oversubscribed seed round: The French start-up dedicated to cloud services for space missions raised €6M in the second closing of a seed round from Herius Capital. The company raised a combined €12M in its seed round.

Federal Bankruptcy Court approves sale of Masten Space Systems assets to Astrobotic: Astrobotic disbursed $4.5M for Masten's assets, a company previously dedicated to end-to-end mission solutions to the Moon. Intuitive Machines also offered $2.7M, but it was not enough to acquire the company.

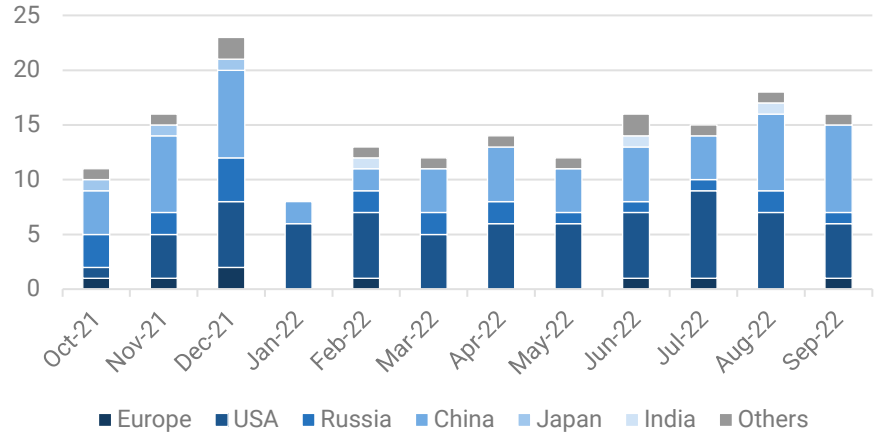
GalaxySpace raises an undisclosed amount of funding: The China-based startup secured an undisclosed amount of funding led by CCB International. According to the company, it sets its value at $1.58B, up from $1.2B. GalaxySpace will use the investment to accelerate the development of its planned 13.000 satellite broadband constellation and to do R&D on satellite internet-related technologies.

LAUNCHES & SATELLITES

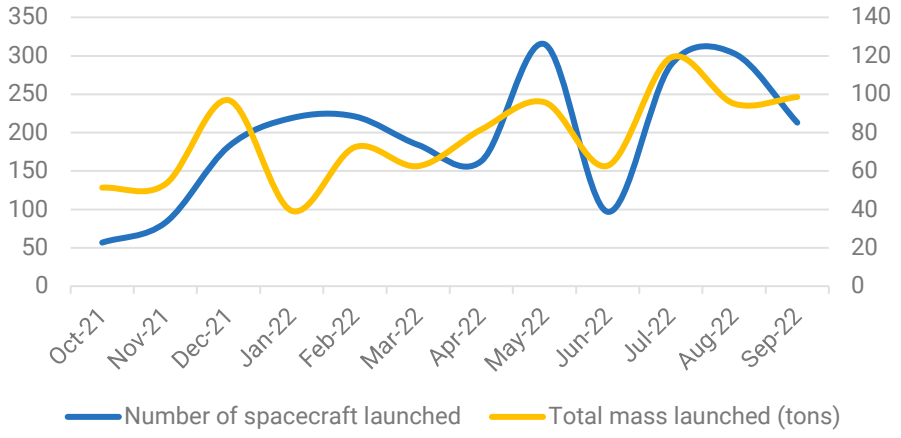
Global space activity statistics

September 2022	Europe	USA	Russia	China	Others	Total
Number of launches	1	5	1	8	1	**16**
Number of spacecraft launched	1	194	1	16	1	**213**
Mass launched (in kg)	6396	73 025	7080	12 004	100	**98 605**

Launch activity over the year

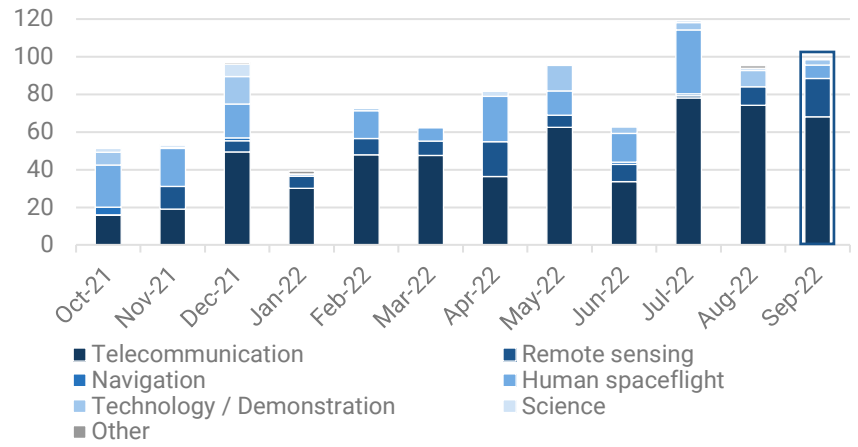


Evolution of the number of launches per launch country



Evolution of launch activity over the year 2021-2022

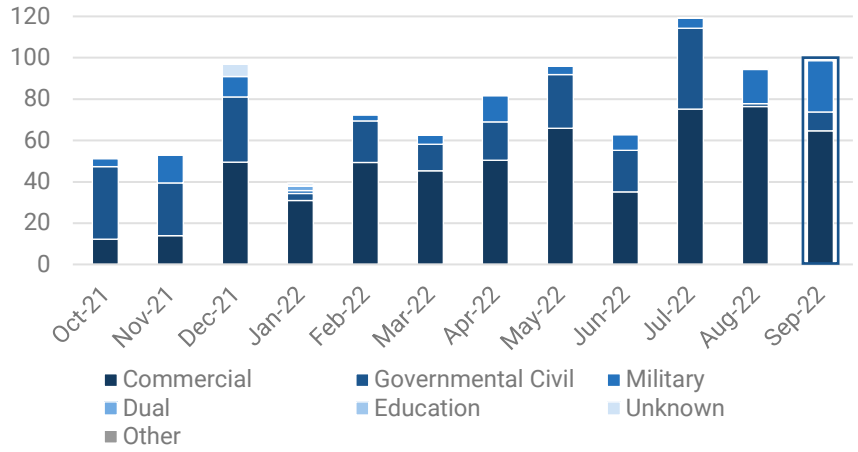
Satellite missions and markets



Evolution of the total mass launched (tons) per mission (Oct. 2021-Sep. 2022)

September 2022	Telecom	Remote sensing	Human Spaceflight	Technology/ Demonstration	Other
Europe	6396				
USA	56 345	15 000		1500	180
Russia			7080		
China	5320	5340		1344	
Japan		100			

Total mass (kg) launched by mission and customer country



Evolution of the total mass launched (tons), per market (Oct. 2021-Sep. 2022)

September 2022	Commercial	Governmental Civil	Military
Europe	6396		
USA	58 025		15 000
Russia		7080	
China	194	2000	9810
Japan	100		

Total mass (kg) launched by market and customer country

Launch Log

Launch date	Launch country	Launcher	Spacecraft name	Main customer	Customer country	Prime manufacturer	Manufacturer country	Mass (kg)	Mission	Market
02/09/2022	China	CZ-4C	Yaogan 33-02	People's Liberation Army	China	SAST	China	1040,00	Earth Observation	Military
05/09/2022	USA	Falcon-9 v1.2 (Block 5)	Sherpa-LTC 2	Spaceflight Inc.	USA	Spaceflight Inc.	USA	180,00	Other	Commercial
			Starlink (51 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
06/09/2022	China	Kuaizhou-1A	CentiSpace-1 (S3 & S4)	Future Navigation	China	CAS	China	97 (each)	Tech / Demo	Commercial
06/09/2022	China	CZ-2D(2)	Yaogan 35-05 (A, B & C)	People's Liberation Army	China	DFH Satellite Co.	China	750 (each)	Earth Observation	Military
07/09/2022	France	Ariane-5ECA+	Eutelsat Konnect VHTS	Eutelsat	France	Thales Alenia Space	France	6396,00	Telecom	Commercial
11/09/2022	USA	Falcon-9 v1.2 (Block 5)	BlueWalker 3	AST SpaceMobile	USA	AST SpaceMobile	USA	1500,00	Tech / Demo	Commercial
			Starlink (34 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
13/09/2022	China	CZ-7A	ZhongXing 01E / FengHuo 02E	People's Liberation Army	China	CAST	China	5320,00	Telecom	Military
15/09/2022	New Zealand	Electron KS	StriX 1	Synspective	Japan	Synspective	Japan	100,00	Earth Observation	Commercial
19/09/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (54 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
20/09/2022	China	CZ-2D(2)	Yunhai-1 03	Unknown (China, Public)	China	SAST	China	750,00	Earth Observation	Governmental Civil
21/09/2022	Russia	Soyuz-2-1a	Soyuz-MS 22	Roscosmos	Russia	RKK Energia	Russia	7080,00	Crew Transfer	Governmental Civil
24/09/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (52 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecom	Commercial
24/09/2022	China	Kuaizhou-1A	Shiyan 14	Unknown (China, Public)	China	CAST	China	100,00	Tech / Demo	Governmental Civil
			Shiyan 15	Unknown (China, Public)	China	SAST	China	100,00	Earth Observation	Governmental Civil
24/09/2022	USA	Delta-4H (upg.)	KH-11 19	NRO	USA	Lockheed Martin	USA	15000,00	Earth Observation	Military
26/09/2022	China	CZ-6	Shiyan 16 (A & B)	Unknown (China, Public)	China	SAST	China	350 (each)	Tech / Demo	Governmental Civil
			Shiyan 17	Unknown (China, Public)	China	CAST	China	350,00	Tech / Demo	Governmental Civil
26/09/2022	China	CZ-2D(2)	Yaogan 36-01 (A & B)	People's Liberation Army	China	CAST	China	400 (each)	Earth Observation	Military
			Yaogan 36-01C	People's Liberation Army	China	SAST	China	400,00	Earth Observation	Military

Launch Highlights

Eutelsat Konnect VHTS is launched by Ariane 5

Credit: Thales Group

On September 7th, Arianespace launched the **Eutelsat Konnect VHTS** satellite, built by Thales Alenia Space with the support of CNES and ESA, to geostationary Earth orbit. The satellite has a capacity of 500 Gbps, which makes it the most performant GEO communications satellite ever built in Europe. It relies on a fully electric propulsion and carries a powerful digital processor allowing it to be more flexible. With this spacecraft, Eutelsat will provide high-speed Internet to remote areas in Europe and fill the needs for fixed and mobile telecommunications networks, including to governments and public administrations through **Telespazio**. A first Eutelsat Konnect satellite was launched in January 2020, but VHTS has a capacity seven times more important than this one. The launch was one of the latest for Ariane 5, and only three launches are left for the European rocket. This was only the **third time** that a single satellite was launched to GEO on an Ariane 5, as the rocket usually conducts dual launches to this orbit.

Credit: AST SpaceMobile

The first satellite of AST SpaceMobile is deployed in orbit

On September 11th, SpaceX launched 34 Starlink satellites in orbit with a Falcon 9. The unusually limited number of spacecraft on this launch was due to the presence of another payload, BlueWalker 3, onboard the rocket. BlueWalker is the first satellite launched for AST SpaceMobile, a company that plans to provide direct satellite-to-phone services. The spacecraft, which is a prototype, will help test applications such as voice and video. The satellite, which weighs 1.5 ton, is particularly remarkable for its size. Indeed, it measures around 64 square meters, making it the **largest commercial antenna** ever deployed in LEO. However, the commercial constellation that AST wants to deploy will be made of spacecraft (the BlueBirds) that are expected to be even larger. The first batch of BlueBirds is planned for launch in 2023.

Delta IV launches for the last time from Vandenberg

Credit: ULA

On September 24th, the launch of a Delta IV Heavy from the Vandenberg Space Force Base marked the **last flight** of this family of rocket from the U.S. West Coast. Indeed, the rocket will soon be terminated to be replaced by the next launcher of ULA, Vulcan, and its few remaining launches will be conducted from Cape Canaveral. It is also expected that the launch complex (SLC-6) will not be used anymore in its current configuration.

The flight required a heavy variant of the Delta IV due to the high mass of the payload, a Keyhole-11 electro-optical satellite that will be used by the NRO for intelligence purposes. A new engine variant was used on the rocket, which will also be used for remaining Delta IV launches and future SLS missions.

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