



ESPI

European Space Policy Institute

ESPI Insights

Space Sector Watch



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FOCUS: ARTEMIS ACCORDS AND NEW DIPLOMATIC REALITIES



Dear Friends of ESPI,

October 2020 saw one of the first major outcomes of U.S. diplomatic engagement in support of the Artemis programme. At the 71st IAC, the **United States signed the Artemis Accords** with Australia, Canada, Italy, Japan, Luxembourg, the United Kingdom and the United Arab Emirates. More countries are **anticipated to join** soon. **The 7-page Accords** present a broad vision on “principles for cooperation in the civil exploration and use of the Moon, Mars, comets and asteroids”, envisioned here as an “operationalisation” of the 1967 Outer Space Treaty. Some principles agreed upon by the signatories, for instance on space resources or deconfliction of space activities, raised some eyebrows already in May 2020, **when NASA announced** the initiative.

The Accords are a major space governance initiative with landmark legal and diplomatic features:

- The Accords establish a new practice and set a precedent in space exploration governance, but so far lack a global support (**no Russian, Chinese, Indian and pan-European support as of now**).
- Considered as a precondition for third-party involvement in the Artemis programme, the Accords seem to impose U.S.-developed norms of behaviour to potential international partners.
- Signed by ministers or heads of space agencies, the Accords are meant to serve as a preamble to bilateral government-to-government agreements between participating nations and the USA.
- The Accords are not legally binding, but rather express a political commitment of involved parties, without the need for national parliamentary ratification.

Parallels can be drawn between the Artemis Accords, the **Lunar Gateway**, the ISS and its cooperation regime. However, the ISS framework (Intergovernmental Agreement (IGA), bilateral MoUs with NASA and other implementing arrangements) does not fully match the Artemis/Gateway approach pursued by the United States. The Accords are a U.S. diplomatic instrument based on bilateral agreements between international partners and one overarching leader – the United States. The Accords also go beyond the programme itself with potential implications for other and future space exploration endeavours. The multilateral IGA regime is envisioned for an extension (through new MoUs) to address Lunar Gateway development and operations. A rather **reserved stance of Roscosmos** on a Russian involvement in the Gateway highlights that reaching a U.S.-led international consensus will come gradually, if ever.

Where does Europe stand in this new lunar exploration landscape? At the moment, primarily at programmatic level through ESA engagement. Europe has been a long-standing partner to the U.S. lunar plans, supplying for example the European Service Module to the Orion spacecraft. October 2020 saw the **signing of ESA-NASA MoU** on Lunar Gateway cooperation and ESA awarding **industry contracts** for two European-built modules of the Gateway. ESA is also progressing with independent efforts, having recently kicked-off **European Large Logistics Lander (EL3) concept studies**. At a political level, however, the Artemis Accords stressed the urgent need for a joint European space diplomatic posture. While three European countries have signed the Artemis Accords, there seem to be other European Member States with **diverging views**, and prospects of a joint European position on the Accords are unclear.

Sincerely yours,

Jean-Jacques Tortora

Director of ESPI

A handwritten signature in black ink, appearing to be 'JJT', with a horizontal line underneath.



POLICY & PROGRAMMES

New developments for micro-launchers and launch sites in Europe

New microlauncher initiatives have recently emerged in Europe, joining the existing global launch service market solutions for small satellites. After the BDI proposal to establish a German launch site for micro-launchers in the North Sea, in October **OHB has endorsed the proposal**. Rocket Factory Augsburg, an OHB start-up, is developing the RFA ONE micro-launcher, which is planned to be ready in 2022. **RFA is also working with CNES** to launch its orbital rockets from the Diamond complex in the Guiana Space Centre (CSG) in Kourou.

Isar Aerospace and CNES have signed an agreement to launch Isar Aerospace's orbital rockets for small and medium-sized satellites from the CSG in 2021. In Sweden, as part of a broader plan within the 2018 Space Strategy to modernise the Esrange Space Centre, the Minister for Higher Education and Research inaugurated a test facility for next-generation rocket technology. The Swedish Government also announced its plan to invest around **€9 million** to establish additional **infrastructure to launch small satellites from the Esrange Space Centre** by 2022.

Furthermore, the Italian Civil Aviation Authority (ENAC) has approved the regulatory framework for the operation of the Airport of Taranto Grottaglie as a spaceport. The new regulatory framework is part of a larger set of rules on commercial suborbital flights.

Utilising Public-Private Partnerships to Advance Tipping Point Technologies

Following the NASA's Tipping Point solicitation released in January 2020, NASA announced on October 14th the selection of **fourteen small and large U.S. businesses, awarding a total** amount of \$370 million. NASA's Space Technology Mission Directorate will now negotiate contracts lasting up to five years to develop a range of innovative technologies in support of Artemis operations. The selected companies are divided into **three topic areas**. The first, "Cryogenic Fluid Management Technology Demonstration", is led by Lockheed Martin, SpaceX, and ULA; the second area, "Lunar Surface Innovation Initiative Technology Demonstration", comprises ten companies, including Alpha Space Test and Nokia, for technological development and demonstration related to in-situ resource utilisation. Finally, Masten was awarded a contract to demonstrate Guidance, Navigation and Control (GNC) capabilities.



Credit: NASA

Space included in the G20 agenda for the first time

In the framework of **Space20**, the first conference on the global space sector organized by the G20, UNOOSA delivered a keynote speech on how space agencies are supporting both the global response to, and recovery from, COVID-19. G20 space agencies and UNOOSA will sign a joint statement, which will include recommendations on how to promote space technology and share space data and know-how to increase global resilience in future crises. G20 is also considering the creation of a dedicated Space20 Working Group, potentially led by UNOOSA, which would be a new G20 hub, ensuring space sector becomes a stable component of the G20 architecture.



Russia announces Amur reusable rocket programme

On October 5th, Roscosmos announced the development of its **first reusable carrier rocket with a methane propellant** under the Amur rocket programme. Roscosmos and the Progress Space Rocket Center signed a contract on the conceptual design of the new launch vehicle, which will include reusable first stage and a non-recoverable second stage. About \$880 million will be invested in the design and manufacture, including \$22 million for the estimated launch in 2026. The rocket will have a take-off mass of about 360 tonnes and will be 55 m high and 4.1 m in diameter.

New U.S. space launch regulation streamlines launch process

The FAA Office of Commercial Space Transportation (AST) issued on October 15th its **Streamlined Launch and Re-entry Licensing Requirements 2 (SLR2)**. The new set of rules aims to update and streamline the operational approval process for the launch of commercial rockets. It allows for a single licence to have multiple launches and landing, from multiple launch sites. The new approach was encouraged by the U.S. SPD-2, which was released in 2018 and requested a regulatory review for commercial space flight launch. The main goal is to boost innovation and incentivise the involvement of the industry in the licensing process, while ensuring adherence to safety standards.

UK to launch new international space projects

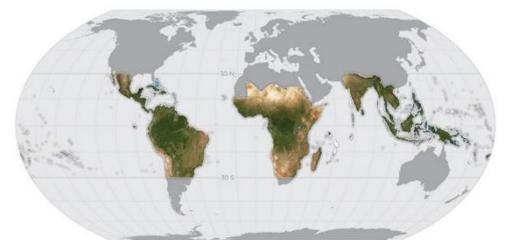
Through the UK government's National Space Innovation Programme (NSIP), the **UK Space Agency will fund international space collaborations** worth £5 million which support UK trade, science and security, and attract foreign investment. The projects – funded from £250,000 to £2.5 million – cover a broad range of space activities, including robotics, disaster relief assistance and space debris tracking systems. The call invites UK organisations to submit project proposal that involves collaboration with a selected list of countries (including Australia, Japan, Canada, France and India). The overall goal of the UK Government is to increase the UK share in the global space market by 10% by 2030.

NATO announces new space center in Germany

NATO announced on October 22nd the **building of a new space facility** at the Ramstein Air base. The base will form part of NATO air force high command and will serve as a coordination center for space observation. The center will gather information about possible threats to satellites and could be developed further into a command center for defensive measures. Furthermore, NATO is reported to plan the development of a space think-tank in Germany or France.

Norway funds free global tropical forest map

On October 23rd, the **Norwegian government awarded €38 million** to Airbus, Planet and KSAT to provide imagery for a global tropical forest map. The project is funded through the government's International Climate and Forests Initiative (NICFI). Updated monthly, the high-resolution satellite imagery covers 64 countries. The initiative will help NGOs, communities and academia with the fight against deforestation.

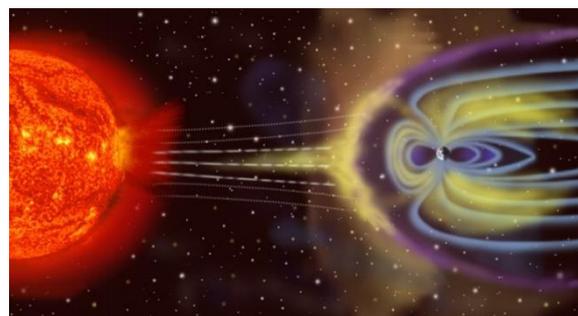


Credit: Planet



U.S. space weather bill signed into law

Following the approval of the U.S. House of Representatives in September 2020, the **space weather bill** has been signed into law by the U.S. President on October 21st. The “Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow” (PROSWIFT) Act is a bipartisan space weather legislation, which aims to strengthen the U.S.’s ability to predict space weather threats and mitigate them. The new legislation establishes the specific role taken by the federal agencies involved in the matter (NASA, NOAA, NSF, DoD, FAA).



Credit. NASA

Further bilateral space collaboration

Following a meeting between the heads of **CNES (France) and ISRO (India)**, the two organisations will continue to jointly develop a range of remote sensing satellites, including Oceansat-3 and TRISHNA. Furthermore, France will provide an instrument for ISRO’s mission to Venus, scheduled for 2025.

ASI and JAXA have signed an MoC to further collaborate on space activity matters. The Memorandum of Cooperation aims to renew and extend an on-going bilateral collaboration initiated in 2010. It will include cooperation in areas such as space transportation, EO (e.g. utilisation of radar data from COSMO-SkyMed and Alos-2), and space science (e.g. CALorimetric Electron Telescope).



In other news

The China Manned Space Agency (CMSA) selects a group of 18 taikonauts: For the first time the selection process was opened not only to air force pilots, but also to civilians. It is the third cohort after 1998 and 2010. The seven pilots, seven spaceflight engineers and four payload specialists will participate in the country's upcoming space station project.

Monaco deploys first nationally made satellite: OSM-1 CICERO was produced by Monegasque start-up Orbital Solutions and has been registered by UNOOSA as Monaco's first satellite. The nanosatellite was launched from French Guiana, by Arianespace Vega VV16 rocket in September 2020 to collect weather, climate and atmospheric data using radio occultation.

New UNOOSA Office in Israel: The new Regional Support Office (RSO) was created in the Earth and Planetary Imagine Facility (EPIF) of the Ben-Gurion University of the Negev through the framework of an MoU between the latter and UNOOSA. The MoU was concluded in support of the UN-SPIDER programme.

Estonian government and Defense Industry Association sign cooperation agreement: The agreement aims to improve cooperation between the government and space and defense companies to promote the Estonian space industry, particularly in areas such as cybersecurity.

Airbus forms "Team Maier" to provide defense satellite system: The team comprises Australian space and technology companies as well as academia which will partner with Airbus. It aims to provide a sovereign military communication satellite system for the country.

NASA and the Department of Energy sign an MOU: signed on October 20th, it aims to continue and extend cooperation in "energy-related civil space activities". Three strategic working groups will be created, which will report to an executive committee. They will focus on lunar surface activities, space nuclear power, and space science and innovation, planetary defense and space weather.

UNOOSA provides launch opportunities using Vega C launcher: UNOOSA and Avio signed an MoU to cooperate on "Access to Space 4 all" in July. The initiative aims to provide institutions from UN Member States, in particular developing countries, with the opportunity to access space using available slots in a Vega-C launcher. Under the recently announced opportunity, one launch for a CubeSat or aggregates of CubeSats is provided, with Avio bearing the costs of launch.



INDUSTRY & INNOVATION

NASA OSIRIS REX spacecraft completes historic sample mission

On October 20th, NASA's OSIRIS-Rex spacecraft approached Benu, a near-Earth asteroid, and successfully performed a "Touch-And-Go" operation to collect a sample from the surface. It was performed through the spacecraft's sampling arm, the Touch-And-Go Sample Acquisition Mechanism (TAGSAM), and images show the **collection of at least 60g of material**. OSIRIS-Rex is an asteroid sample-return mission launched in 2016 and the spacecraft is expected to return to Earth on September 2023.



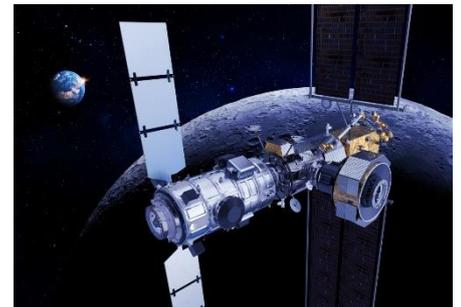
Credit: NASA

Airbus awarded €491 million Mars sample return contract

On October 14th, Airbus was selected by ESA as prime contractor for the Earth Return Orbiter (ERO) in a contract worth €491 million. The mission is part of the joint ESA-NASA Mars Sample Return mission, which will last five years and aims to return Martian soil to Earth. Airbus will design and build the Earth Return Orbiter and has study contracts for the Sample Fetch Rover. The mission is expected to launch on an Ariane 6 in 2026. Thales Alenia was selected by Airbus to supply the communication system, Orbit Insertion Module, and conduct assembly, integration and testing of the ERO.

Thales Alenia wins €327 million Lunar Gateway contract

On October 14th, Thales Alenia was awarded €327 million by ESA to develop **two modules for the Lunar Gateway**. The 40 tons Lunar Gateway is a key part of NASA's Artemis programme, and is aiming to be operational from 2024. Thales Alenia will develop the International Habitat (I-HAB) and the European System Providing Refueling, Infrastructure and Telecommunications (ESPRIT) module.



Credit: Thales Alenia Space

Microsoft enters space business for cloud services

Following the inauguration of Microsoft's Azure Orbital ground station service, Microsoft announced on October 20th that **it would use space to expand its cloud computing service**. It will offer mobile data centers that connect to both SpaceX Starlink and SES O3b broadband satellites. The service will fall under Microsoft's new space business, Azure Space. Furthermore, as part of SpaceX's contract for the SDA Tracking Layer Tranche 0 constellation, **SpaceX will use Microsoft Azure's orbital emulator**. The software will allow the visualization and development of satellite architectures and testing of AI algorithms.

First EO images processed in space using Artificial Intelligence

In late September, the Φ-sat-1 6U CubeSat **returned the first image from space that was processed using AI**. The ESA satellite was launched on the September 3rd Vega launch, to test AI technologies. The Hyperscout-2 instrument takes images in Hyperspectral, TIR and optical bands before processing using an Intel Movidius board. It uses a deep neural network algorithm to identify clouds in images of the Earth's surface and remove cloudy images. The mission was originally presented at the 2017 Copernicus masters and was developed by a consortium of European organisations.



Germany inaugurates GESTRA space radar

On October 13th, the **German Experimental Space Surveillance and Tracking Radar (GESTRA)** was inaugurated. It is Germany's first space radar system and is based at the Schmidtenhöhe military area near Koblenz; however, the system is designed to be transportable, and the data collected will be sent to the German Space Situational Awareness Centre (GSSAC) in Eudem. GESTRA will begin operating in 2021 after testing is completed.

New Shepard completes successful suborbital flight

On October 13th, Blue Origin's **New Shepard completed its first flight of the year**, reaching a peak altitude of 105 km before landing. The flight carried various science and technology demonstration payloads, including a NASA payload to demonstrate systems to be used by future lunar landers. Blue Origin anticipates further missions prior to their first crewed flight.

ESA requests additional funds for Ariane 6, first launch in 2022

ESA announced on October 29th that it will ask **ESA member states for an additional €230 million** to develop Ariane 6. The 6% increase in funding for development of Ariane 6 will cover delays brought about by COVID-19 shutdowns and technical issues. The first flight is expected in the second quarter of 2022. Meanwhile, the **first upper stage of Ariane 6 was fully integrated**, equipped with the Vinci liquid rocket engine. On October 7th ArianeGroup and AVIO have also **successfully tested the P120C motor**. The test was the third and final static fire test of the solid rocket motor. It will be used on variants of the Ariane 6 and Vega C rockets, the latter of which is now expected to have the maiden launch in June 2021.



Credit: ESA

Inmarsat and Hughes jointly develop GX+ North America

Inmarsat **announced on October 20th that the two companies have collaborated** for the development of Inflight connectivity solution, which will benefit North American airlines. The new solution will provide a worldwide coverage, combining the Hughes JUPITER High-Throughput Satellite (HTS) constellation over North America with the Inmarsat's Global Xpress (GX) HTS satellite network. Prototype flights could start this year and commercial use is planned in 2021.

D-Orbit completes first in-orbit transportation mission

On October 28th, D-Orbit **successfully deployed the last of 12 Planet CubeSats** transported by its In-Orbit Now (ION) carrier after launch in early September. It is the first demonstration of a new in-orbit transportation service, or last mile delivery, whereby operators of satellites on rideshare missions use intermediate spacecraft to transport their satellites into preferred orbits.

Thales Alenia Space receives contract for three SSA satellites

On October 27th, Canadian startup **Northstar Earth and Space contracted Thales Alenia Space** to build three small satellites. The satellites will form part of a 12 satellite "Skylark" LEO constellation that will catalogue space objects for SSA purposes, available to customers via a subscription service. Founded in 2015, Northstar has raised \$63 million to date. The satellites will be built Thales Alenia Space and Blacksky Joint Venture LeoStella LLC, in the United States.



NASA detects water on the sunlit part of the Moon

On October 26th, NASA announced that the Stratospheric Observatory for Infrared Astronomy (SOFIA) **detected the presence of water** molecules on the sunlit surface of the Moon. It was found on the Moon's southern hemisphere, in the Clavius Crater. Previous missions, such as NASA's Lunar Crater Observation and Sensing Satellite, Cassini and Deep Impact had already found evidence of H₂O in sunnier regions and in the Moon's poles. This new information evidence comes along the development of the Artemis programme and raises potential questions regarding water utilisation on the Moon.

Boeing selected by U.S. Space Force for the Evolved Strategic SATCOM (ESS) programme

Under the **first phase of the Evolved Strategic SATCOM (ESS) programme**, the U.S. Space Force selected Boeing for one of the three contracts to build a satellite payload prototype and develop the next-generation satellite communications architecture. The \$298 million development contract is part of the U.S. Space Force's strategy to increase security and resilience through the new military satellite communications (MILSATCOM) system. Northrop Grumman received an ESS contract in September. The ESS manufacturing contracts are expected to be awarded in 2025.



Credit: Boeing

Chinese company plans the development of a new LEO satellite constellation

A Chinese company named "GW" filed a spectrum application with the ITU for two constellations, named GW-A59 and GW-2, for a total of 12,992 satellites ranging from 30 to 85 degrees inclination. The size of the constellations implies the aim to reach a global end-user broadband service market, potentially becoming a competitor of SpaceX and OneWeb. GW may be able to cooperate with China's "Digital Silk Road" (DSR) projects, as part of the China's Belt and Road initiative with infrastructure projects in around 70 nations.



In other news

NASA doubts Starliner test flight schedule: The Aerospace Safety Advisory Panel recognized that Boeing is making “substantial progress” on implementing changes for the CST-100 Starliner commercial crew vehicle, while it questions the feasibility of the Orbital Flight Test (OFT) 2 by the end of the year.

NASA and Northrop Grumman complete JWST environmental test: The completion of the test, which comprised acoustic and sine-vibration tests, demonstrates the James Webb Space Telescope’s capability to withstand the harsh environment which will be experienced during the rocket launch.

Argotec selected by ESA for the MARS COMMS/NAV project: Argotec is the prime contractor of a consortium of European companies which will focus on a one-year study in the field of Mars communications and navigation activities. The outcome of the study will be taken into consideration by ESA for development of future Mars missions.

NASA announces delay of the Crew-1 launch: The Crew-1 mission scheduled for October 31st was postponed to mid-November in order to proceed with the data review of a first-stage engine concern which emerged during a recent Falcon 9 launch attempt.

Kineis’ Angels satellite becomes operational: The first prototype of Kinéis nanosatellites was developed by CNES, HEMERIA and Thales Alenia Space, and it is now operational and part of the ARGOS network.

FCC approves Kymeta u8 terminal: The Ku band electronically steered flat panel terminal will be launched in Q4. It will be available in a monthly subscription of \$999 including hybrid connectivity and support.

Earthcube partners with Airbus: The two companies will develop a site monitoring solution for defence applications. Earthcube will contribute its expertise using AI for automatic identification and Airbus will provide high resolution imagery from its Pléiades satellites.

GITAI partners with JAXA for space robotics: Japanese startup GITAI will work with JAXA under the J-SPARC initiative to develop a new business concept for robot technologies. GITAI will perform a technology demonstration of its robot carrying out tasks on a model ISS module in partnership with Nanoracks, and JAXA will provide technical support.

D-Orbit to launch two Eutelsat satellites: D-Orbit signed an agreement with AAC Clyde Space to launch two Eutelsat LEO for Objects (ELO) CubeSats in 2021. D-Orbit will use their ION Satellite Carrier to launch the IoT satellites.

ESA selects Airbus to complete Moon Lander study: Airbus is one of two primes for the definition phase (A/B1) of the European Large Logistic Lander (EL3). The lander will transport up to 1.7 tonnes of cargo to the moon, starting in the late 2020s. The mission is part of the Global Exploration Roadmap, agreed by 14 space agencies.

NASA selects human payload for Virgin Galactic flight: Following an announcement in January that NASA would allow researchers to fly with payloads, NASA have selected an experiment comprising a person who will test operation of a camera and biomedical sensors. It is one of 30 payloads that will fly on a Virgin Galactic launch expected before the end of the year.

Vega begins regular small satellite service: Following the September Small Spacecraft Mission Service (SSMS) launch, Vega’s next SSMS launch and first Vega C flight are both scheduled in 2021.



ECONOMY & BUSINESS

Astroscale raises \$51 million in additional funding

On October 13th, **Astroscale concluded a Series E Funding Round** and raised \$51 million in additional funding, reaching total fundraising to date of \$191 million. The investment round was led by aSTART and comprises Hulic, I-NET, SHIMIZU CORPORATION and SPARX Space Frontier Fund as further investors. The “End-of-Life Service by Astroscale demonstration” (ELSA-d), a twin small satellite In-Orbit Servicing mission, is due for launch in 2020.

Mynaric to provide terminals for U.S. defence constellation

Mynaric announced on October 21st that it was selected by Telesat to **provide its CONDOR optical inter-satellite link terminals** for the DARPA Blackjack Track B programme. It will be the first in-space demonstration of the terminals. In July, Mynaric announced an export to China of its laser terminals had been blocked by the German government, and subsequently decided to withdraw from China and focus on the U.S. To fund its U.S. expansion, **Mynaric raised €52.8 million**



Credit: Mynaric

on October 28th from existing shareholders and institutional investors, bringing their total funding to date to €110 million. The new funding will be used, amongst other things, to establish a laser testing lab at the company facility in Los Alamos.

Bankruptcy court and FCC approve OneWeb sale

On October 2nd, the **U.S. bankruptcy court approved OneWeb’s reorganisation** plan, allowing the company to exit bankruptcy and **resume full business operations**. Furthermore, the **FCC approved the sale** on October 27th. The UK government and Bharti Global’s acquisition of OneWeb still requires CFIUS approval and is expected to complete before the end of the year. Furthermore, OneWeb has **terminated its stake in its joint venture with Roscosmos** subsidiary Gonets, formed in 2015 to access the Russian market. OneWeb’s next batch of 34 satellites is expected to be launched on a Soyuz rocket in December.

AAC Clyde Space expands through two acquisitions

AAC Clyde Space announced on October 7th that **it will acquire the Dutch satellite component supplier Hyperion Technologies**. Hyperion Technologies was founded in 2013, and its shareholders will receive €2.1 million in shares (7.5% of AAC Clyde Space) and €100k in cash; it will become a fully owned subsidiary of AAC Clyde Space.

Furthermore, on October 15th, AAC Clyde Space announced **it would acquire U.S. company SpaceQuest for \$8.4 million**, pending regulatory approval. SpaceQuest was founded in 1994 and designs and manufactures small satellites and systems. The acquisition represents an expansion by AAC Clyde Space into the U.S. market to grow their “Space as a Service” business.



Telesat selected by DARPA for in-orbit demonstration of LEO spacecraft

Within the DARPA's Blackjack programme, Telesat U.S. Services will **develop and demonstrate different Blackjack Phase 2/3 Track B technology**, including the Optical Inter-Satellite Links (OISLs). As a follow up of the 2018 Phase 1 contract, Telesat will in the Phase 2 receive \$18.3 million to deliver two spacecraft buses to test low latency OISLs in the Blackjack constellation. Up to \$175.6 million may successively be awarded for the development of spacecraft buses to fully populate the Blackjack constellation. Furthermore, **Telesat will work with Lockheed Martin** on the SDA Transport Layer constellation by demonstrating interoperability between the SDA constellation and Telesat's future LEO constellation.

SpaceX and L3Harris win SDA constellation tracking layer contract

The U.S. Space Development Agency (SDA) **announced on October 5th contracts worth over \$342 million** for L3Harris and SpaceX to develop four satellites each to detect and track missiles. The satellites, collectively known as Tracking Layer Tranche 0, will be delivered by September 2022. It is the first time that SpaceX, which was awarded \$149 million, has been contracted to build satellites for another organisation. They will base their design on the Starlink satellites. The payload is an overhead persistent infrared sensor, which detects and tracks ballistic and hypersonic missiles from LEO. It is the second contract awarded for SDA's planned constellation, following a September announcement of contracts worth over \$280 million for 10 data relay satellites to be built by Lockheed Martin and York Space Systems.



Credit: SpaceX

FCC enables satellite industry to connect rural America

On October 13th, the U.S. **FCC approved satellite companies**, including Viasat, Hughes and SpaceX, to bid for part of \$20.4 billion made available by the FCC under the Rural Digital Opportunity Fund (RDOF). The funding is to provide broadband to rural communities in the U.S., and notably SpaceX is eligible despite not yet providing a commercial service. The reverse auction to allocate the funding began on October 29th. Separately, on October 27th, the FCC **created the "5G Fund for Rural America"** fund worth \$9 billion over the next decade. The fund will also be distributed by reverse auction. Satellite services with latency of under 100ms will be eligible for the funding.

Ansys acquires AGI for \$700 million

U.S. company Ansys announced on October 26th it **will acquire Analytical Graphics, Inc (AGI)** in a deal worth \$700 million. AGI operate the Commercial Space Operations Centre, tracking and performing conjunction analysis of objects in orbit. They are also well known for Systems Toolkit, a software that simulates aerospace missions and systems, which will add to Ansys's large portfolio of engineering simulation software.



In other news

Exolaunch plans U.S. expansion: Berlin based Exolaunch has announced plans for a U.S.-located office to expand its U.S. customer base. It has also signed a long-term launch agreement with SpaceX for capacity on SpaceX's SmallSat Rideshare Program in 2020 and 2021. Moreover, Exolaunch recently arranged a launch for 15 satellites on a Soyuz rocket in September.

Comtech and Gilat terminate merger: Comtech has agreed to pay Gilat \$70 million to terminate their merger agreement which was signed in January. The companies cited COVID-19 as a factor in their decision to terminate the merger.

Virgin Orbit seeks to raise up to \$200 million: Virgin Orbit is looking to raise the funding by the end of the year to cover capital expenditures and satellite launches. The funding would value the company at around \$1 billion.

Maxar extends contract with ESRI: Maxar and ESRI have partnered for over 20 years, and have now extended their contract until 2023. Maxar provides EO imagery for ESRI's ArcGIS software.

EO start-up Prométhée raises €2.2 million: HEMERIA, ADF Group, and COMAT invested in Prométhée, a recently founded French start-up, with the aim to support the development of its EO nanosatellites constellation and of a digital platform to deliver space data. The constellation is planned to be launched into orbit by 2023. Prométhée's goal is to become a major actor in European NewSpace, providing "Space Data as a Service".

Starburst Aerospace, plans to expand its presence in India: Following the increasing support by the Indian government and space agencies to the local entrepreneurs, Starburst plans to establish an innovation center in Mumbai to connect young companies with its global network of partners in government and industry and to conduct outreach in Delhi, Bangalore and Hyderabad.

GomSpace receives €4 million ESA contract: GomSpace will develop smallsat systems and subsystems for science missions in deep space, which require higher resilience and reliability than standard CubeSat systems. The contract is funded under the ESA Science Programme.

ThrustMe wins ESA ARTES contract for alternative electric propulsion: ThrustMe will continue to develop their iodine based electric propulsion system for CubeSats, which was created partly in response to an unsustainable rise in the use of Xenon for propulsion systems.

Airbus signs a contract with Launchspace to test Debris Collection payload: The in-orbit demonstration of the Orbital Debris Collection and Spacecraft Shielding payload on the ISS Bartolomeo platform will last one year, beginning in 2022. The payload will record debris information such as the orbital location.

LeoLabs partners with SpaceX: LeoLabs will support SpaceX with its Launch and Early Orbit service, tracking Starlink satellites in the initial phase of their mission. Starlink satellites launch in batches of 60 units, making tracking difficult as they disperse.

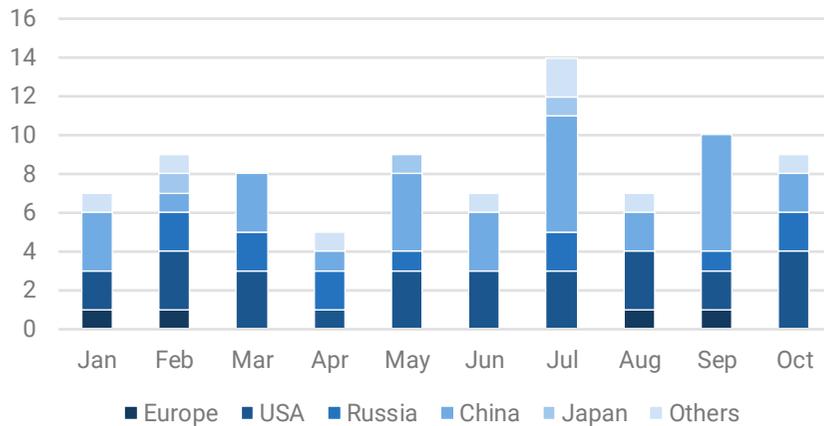


LAUNCHES & SATELLITES

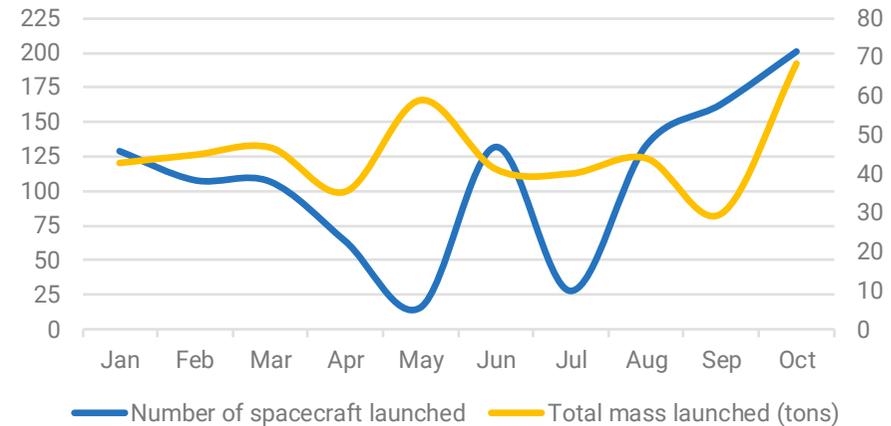
Global space activity statistics

October 2020	USA	Russia	China	Others	Total
Number of launches	4	2	2	1	9
Number of spacecrafts launched	184	5	5	10	201
Mass launched (in kg)	54 303.5	8042	5908	81	68 334.5

Launch activity over the year



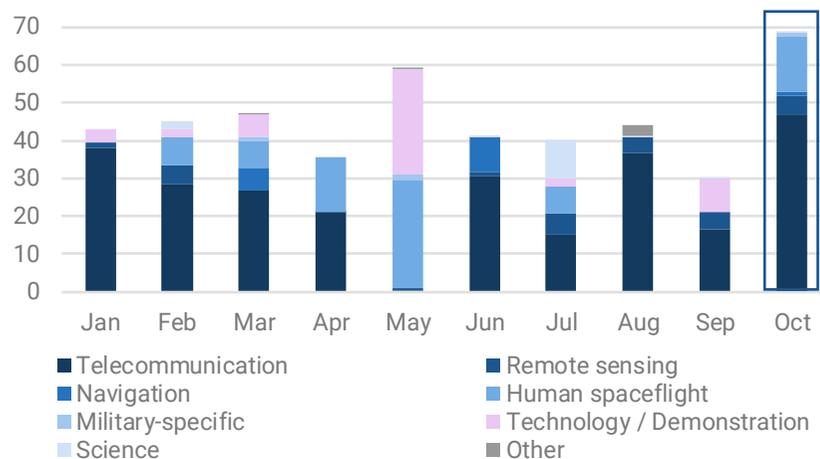
Evolution of the number of launches per launch country



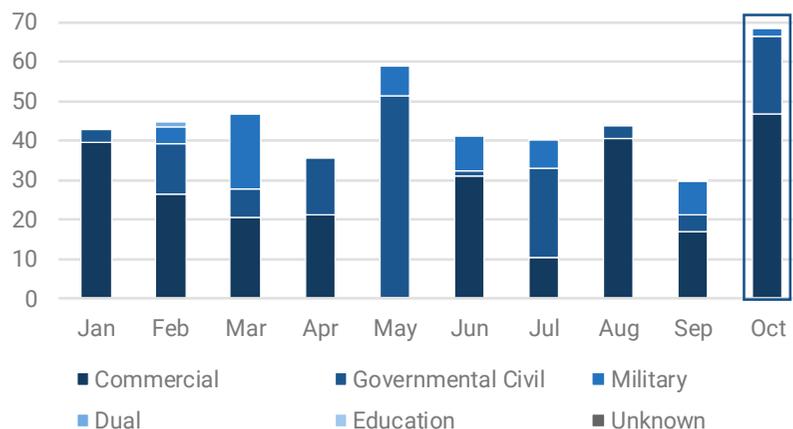
Evolution of launch activity over the year 2020



Satellite missions and markets



Evolution of the total mass launched (tons) per mission (Jan.-Oct. 2020)



Evolution of the total mass launched (tons), per market (Jan.-Oct. 2020)

October 2020	Telecom	Remote sensing	Navigation	Human Spaceflight	Military	Tech/ Demo	Science
USA	46 800	45		7 492		8	3.5
Russia			962	7 080			
China	8	5 000			900		
Japan		36					

Total mass (kg) launched by mission and customer country

October 2020	Commercial	Governmental Civil	Military
USA	46 845	7 503.5	
Russia		7 080	962
China	8	5 000	900
Japan	36		

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
03/10/2020	USA	Antares-230+	Cygnus CRS-14	NASA	USA	Northrop Grumman Innovation Systems	USA	7492	Cargo Transfer	Governmental Civil
			Bobcat 1	Ohio University	USA	Ohio University	USA	4	Technology / Demonstration	Governmental Civil
			NEUTRON 1	Hawaii Space Flight Laboratory	USA	Hawaii Space Flight Laboratory	USA	3,50	Space Science	Governmental Civil
			SPOC	University of Georgia	USA	ÅAC Clyde Space	Sweden	4,00	Technology / Demonstration	Governmental Civil
06/10/2020	USA	Falcon-9 v1.2 (Block 5)	Starlink 12 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
11/10/2020	China	CZ-3B/G3	Gaofen 13	CNSA	China	CAST	China	5000,00	Earth Observation	Governmental Civil
14/10/2020	Russia	Soyuz-2-1a	Soyuz-MS 17	Roscosmos	Russia	RKK Energia	Russia	7080,00	Crew Transfer	Governmental Civil
18/10/2020	USA	Falcon-9 v1.2 (Block 5)	Starlink 13 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
24/10/2020	USA	Falcon-9 v1.2 (Block 5)	Starlink 14 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
25/10/2020	Russia	Soyuz-2-1b Fregat-M	GLONASS-K1 03	Roscosmos	Russia	ISS Reshetnev	Russia	962,00	Navigation	Military
26/10/2020	China	CZ-2C(3)	Yaogan 30-07 (-01, -02 & -03)	People's Liberation Army	China	CAS	China	300 (each)	Signal Intelligence	Military
			Tianqi 6	Guodian Gaoke	China	Guodian Gaoke	China	8,00	Telecommunication	Commercial
28/10/2020	New Zealand	Electron KS	CE-SAT 2B	Canon Electronics	Japan	Axelspace	Japan	36,00	Earth Observation	Commercial
			Flock-4e' (9 satellites)	Planet	USA	Planet	USA	5 (each)	Earth Observation	Commercial



Launch Highlights

Soyuz beats a record in reaching the ISS



Credit: Space Facts

On October 14th, the Soyuz-MS 17 spacecraft **transported** a crew of two Russian cosmonauts and one U.S. astronaut to the International Space Station. The flight was remarkable because of its speed: docking to the Station took place only three hours after the launch, while approximately six hours are usually required. It thus established a new record for the fastest trip to the outpost. This gain of time is due to the use of an “ultrafast” method which allows Soyuz to catch the ISS in two orbits instead of four. The method was employed for the first time in a crewed mission, after having been tested with the Progress-MS 15 cargo transfer mission.

China launches Gaofen-13 to GEO

On October 11th, China **launched** Gaofen-13, a multi-ton Earth observation satellite, to GEO. It was the first launch from Xijiang since the space centre underwent renovations aimed at increasing the rate of launches there. Moreover, the Long March-3B that was used also benefitted from improvements regarding its fairing, transport systems and other elements.

Gaofen is a series of satellites currently being put in orbit by China to constitute the CHEOS (China High-resolution Earth Observation System) programme, that is promoted by China as a programme for civilian purposes (including land surveys and environmental management). However, it is to note that GEO is an orbit that is rarely used for Earth observation missions.



Credit: NASASpaceFlight

SpaceX carries out its 100th successful launch



Credit: William Harwood/CBS News

On October 24th, SpaceX **deployed** the 15th batch of its Starlink satellites, making it the third Starlink mission carried out by the company in less than two weeks (two other launches occurred on October 6th and October 18th). SpaceX has now approximately 840 functional Starlink satellites in orbit and has already started the beta-testing of its constellation. This launch was especially significant because it marks the 100th successful launch for SpaceX, which **has flown** until now 95 Falcon 9s, 3 Falcon Heavys and two Falcon 1s. Moreover, the company has landed 63 Falcon first stage boosters and relaunched a booster 45 times.

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