ESPI

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ESPI Insights

Space Sector Watch

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THIS MONTH IN THE SPACE SECTOR...

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A new era of Human Spaceflight

Dear Friends of ESPI,

The month of April was a particularly busy period at the International Space Station. Two crewed missions flew to the ISS within two weeks (Soyuz MS-18A/64S and SpaceX Crew-2), bringing at one point the number of crew onboard the longest operated orbital outpost to 11. While this crew rotation did not reach the all-time high of 13 crewmembers in April 2010, the ISS as well as 2 other space station programmes resonated in the news, putting the spotlight on the future of human presence in Low Earth Orbit (LEO) and beyond:

- In mid-April Russia announced plans to leave the ISS by 2025, to focus instead on the development of its own new orbital station, planned to be launched by 2030. While a more detailed vision has yet to be put forward, the announcement has major implications for the future of the ISS, which has already been subject to termination talks and to which Russia has been an instrumental partner. According to Director of Roscosmos Dmitry Rogozin, Russia would leave the ISS gradually in a coordinated manner with the remaining partner nations. The Russian modules would remain at the ISS and would be either transferred over to other partners or offered for a commercial take-over.
- The long-pursued Chinese endeavours towards sustained human presence in LEO achieved a major milestone on April 29th, when the heavy-lift Long March 5B launcher put a 22-ton core module of the new Chinese space station Tianhe into orbit. 11 more launches will follow in 2021 and 2022 to complete the assembly of this 66-ton, three-module station, which will be a significantly larger and more complex infrastructure than Tiangong-1 and 2 operated by China in the 2010s.

U.S. plans for the ISS envision an extension of the programme until 2030, with the long-term perspective of a significantly greater involvement of commercial actors in the exploitation of both ISS and potential new commercial stations. The U.S. company Axiom stands at the forefront of these endeavours. It plans to conduct the first private ISS mission in 2022 using SpaceX's Crew-Dragon capsule, and later in 2020s it will add 3 modules to the ISS. Before the ISS retirement, these modules will separate and continue to be operated as the world's first commercial space station.

While the international community will need to wait and monitor whether China, Russia and private actors are capable to successfully implement their national projects, these developments already indicate an end of one era of human presence in LEO, which has been marked by the prominence of public funding and international cooperation on one overarching project.

The Russian and Chinese developments are likely to be game-changers when it comes to international cooperation in human spaceflight in LEO. International cooperation will certainly prevail, although in a different format – with more countries seeking to position themselves in a leadership role through major national initiatives. Both Russia and China signalled the intent to open their space station projects to foreign partners, though the scope of such international involvement is not yet clear. Important to note, reports suggest that the work achieved so far by China on docking adapters appears in compliance with the important International Docking System Standard (IDSS), which is a positive sign towards broader standardisation, that would, in turn, enable greater compatibility and international cooperation across different programmes.

Yours sincerely,

Jean-Jacques Tortora

Director of ESPI

POLICY & PROGRAMMES

Adoption of EU Space Regulation paves the way to continuity in space activities in Europe

On April 28th, the Parliament formally adopted its second reading position on the proposed Regulation establishing the EU space programme for the period 2021-2027. The Regulation will enter into force retroactively from the 1st of January 2021. The document also formally establishes the EU Space Programme Agency (EUSPA), which will remain operational beyond the 7-year framework of the Regulation.

Credit: European Parliament

The adoption of the Regulation follows the adoption of the Council of the EU in the first reading on April 19th and the European Commission's release of a Communication targeting the European Parliament regarding its position on the adoption of the Regulation on April 21st. The Communication accepted the position taken by the Council and put pressure on the final adoption of the Regulation by the Parliament "to ensure the continuity of the existing operational services".

Both the position of the Council and of the European Parliament reflects the provisional political agreement reached between the two bodies after the third Trilogue meeting on 15th December 2020. Furthermore, while the entry into force of the Regulation was a prerequisite for the conclusion of the FFPA with EUSPA and ESA, the negotiation of the FFPA is still ongoing, and new mechanisms for cooperation between the two institutions, as well as with EUSPA will be embedded.

ESA publishes ESA Agenda 2025

On April 7th, new ESA Director General Josef Aschbacher presented ESA's Agenda 2025 outlining the main short-term objectives and challenges for the agency in the next years. The document is a short-term roadmap with long-term implications, highlighting the main objectives that the agency will be prioritising during Joseph Aschbacher's mandate in the next four years. ESA Agenda identifies five top priorities:

- Strengthening ESA-EU relations
- Boosting space commercialisation for a green and digital Europe
- Developing space for safety and security
- Addressing critical programme challenges
- Completing the internal transformation of ESA

Regarding the first priority, the most pressing issue highlighted in the document is the finalisation of the negotiation of the Financial Framework Partnership Agreement (FFPA). ESA Agenda 2025 also outlines a clear roadmap to reinforce ESA-EU relations centred around two priorities: establishing a high-level political dialogue to define a common vision for Europe in space and developing a concrete proposal to strengthen the current cooperation model.

The Spanish Council of Ministers approves a €32.4 million allocation for SECOMSAT

On April 13th, the Spanish Council of Ministers authorised a Framework Agreement to support the Spanish Military Communications Satellite System (SECOMSAT). The €32.4 million funding is projected to be used for the maintenance of the satellite terminals as well as to ensure the operational availability of SECOMSAT. The system allows deployed forces to access their command and logistical support organisations through the joint military telecommunications system (SCTM).

Philippe Baptiste nominated as new President of CNES

Credit: CNES

Philippe Baptiste was appointed as the new President of CNES following the parliamentary approval given on April 7th. Philippe Baptiste is an engineer and held teaching and research positions at the French National Centre for Scientific Research and the École Polytechnique, where he headed the computer science laboratory. His nomination follows two years working as the Chief of Staff at the Ministry of Higher Education and Research under Minister Frédéric Vidal and represents the government's will to appoint a fresh face in the space sector as the new head of CNES.

Preceding the Parliamentary vote, Philippe Baptiste presented five strategic challenges that he seeks to address during his mandate as President of the Agency: fostering synergies between data and space, supporting innovation and relations with industry, guaranteeing a sustainable and competitive access to space, implementing France's defence space strategy and enhancing the scientific outreach of CNES.

Philippe Baptiste also expressed his support for European initiatives related to the development of a constellation of broadband satellites in LEO, and recognised the need for a common approach to European launchers.

DLR and Lockheed Martin conclude agreement for Space Situational Awareness

On April 6th, the DLR selected Lockheed Martin's iSpace software with the objective of enhancing German space control and command capabilities in the Space Situational Awareness (SSA) domain. The German Space Situational Awareness Centre (GSAAC) is currently operated by the DLR alongside the German Air Force. The iSpace command and control system will interface with German Experimental Space Surveillance and Tracking Radar (GESTRA) space surveillance radar, and the GSSAC Optical Sensor to support monitoring space objects.

NASA awards $2.89 billion contract to SpaceX to develop the Human Landing System

Credit: SpaceX

On April 16th, NASA selected SpaceX's Starship as the only winner of their Human Landing System (HLS) Option A procurement process. Following the $2.89 billion contract award, SpaceX is expected to develop and deliver the first commercial lunar lander projected to transport astronauts from the Orion spacecraft to the surface of the Moon as part of NASA's Artemis programme. The agency awarded the new contract under their Next Space Technologies for Exploration Partnerships (NextSTEP-2). After placing third in the April 2020 first round of selection, SpaceX´s revised solution was considered the most adapted for the agency's long term objectives, with NASA's source selection authority mentioning price as one of the most important criteria.

Despite previous plans to make two contract awards, NASA opted to select only one winner citing the budget shortfalls for the HLS programme in FY2021 as a decisive factor. On the other hand, NASA is planning to give other companies the possibility to get involved and compete with SpaceX through a full and open competition for future service contracts. Blue Origin and Dynetics both filed a protest to the Government Accountability Office following this decision, which could lead to a temporary suspension of NASA's work on the HLS programme.

Biden Administration requests $24.7 billion budget for NASA in 2022

Credit: White House

The Office of Management and Budget released the President's Fiscal Year (FY) 2022 discretionary funding request on 9th April 2021. Through the request, the Biden administration proposes a budget of approx. $24.7 billion for NASA, which represents a $1.5 billion or 6.3% increase to the $23.2 billion budget for FY 2021. In particular, the document highlights key programmes having received a budget expansion, including NASA's Earth science programme (15%), Space Technology research and development portfolio (27%) and its human exploration programmes (5%). The administration is also requesting an expansion of approx. 12% for the budget dedicated to the advancement of Climate Science and 16% increase for the Office of STEM Engagement. An overall increase of $500 million in funding for NOAA's weather satellite programmes is also outlined, with the objective of supporting the next generation of weather and climate monitoring satellites.

The Administration is expected to release the President's Budget later this spring.

China multiplies plans for commercial spaceports and space clusters

The cities of Ningbo and Wenchang commit to the construction of new commercial spaceports

The Province of Zhejiang released its new Five-Year plan, which includes a call for the construction of a new commercial spaceport in the coastal city of Ningbo. The province is expecting to invest a total of approx. $3 billion in the development of this new initiative, with the objective of creating a launch site capable of operating over 100 launches every year and generating roughly $15 billion in economic activity. The initiative follows a 2020 agreement between the China Aerospace Science and Industry Corporation (CASIC) and Ningbo city for the development of a commercial launch site and a strategic cooperation framework agreement between the city and the Shanghai Academy of Spaceflight and Technology for the development of a wider industrial base in Ningbo.

Credit: Xihuan

In addition, the province of Hainan also increased its support for the advancement of the Wenchang International Space City concept, specifically by supporting the creation of a launch centre capable of meeting new commercial launch demand.

The city of Guangzhou set to establish commercial space cluster through Geely cooperation

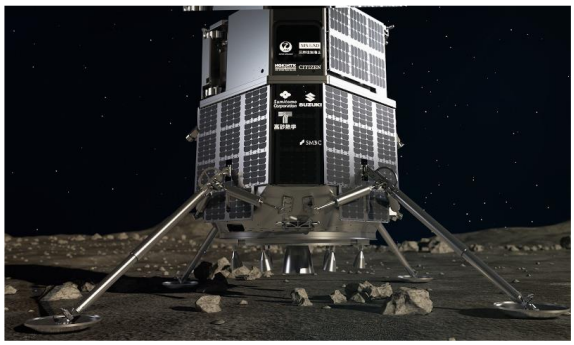
The Chinese company Geely is set to establish the headquarters of its Shikong Tansuo subsidiary focused on space activities in the Nansha district of Guangzhou, following a broader cooperation with the city initiated at the Nansha sub-forum of Guangzhou Annual Investment Conference. The collaboration is part of a much wider $40 billion investment plan by the city, which covers various fields including manufacturing and infrastructure. With its new subsidiary, Geely aims to conduct operations related to the developments of its satellite and communications services with the objective of launching a constellation of LEO satellites to supports the self-driving cars industry.

Japan Air Self Defense Force and U.S. Space Command sign new arrangement

On April 1st, the Japanese Air Self Defense Force and the U.S. Space Command (USSPACECOM) signed a new arrangement assigning a Japanese liaison officer to the command. In the framework of the new arrangement, the liaison officer is expected to provide expertise and insights to the USSPACECOM and play an active role in facilitating and strengthening the relations between the agency and the Japanese Air Self Defense Force. The agreement is in line with an enhanced collaboration between Japan and the United States in recent months, which included the signing of an MoU for the launch of U.S. payloads on Japan's Quasi-Zenith system in December 2020 and the finalisation of Japan's participation for the Lunar Gateway in January 2021.

The UAE and ispace partner to transport lunar rover to the moon by 2022

The Japanese company ispace and Dubai's Mohammed Bin Rashid Space Center (MBRSC) signed an agreement for the delivery of UAE's Rashid rover to the lunar surface in 2022 as part of ispace's HAKUTO -R commercial programme. Initially planned for 2024, the mission further strengthens UAE-Japan cooperation in space exploration, and reinforces recent efforts from the UAE to enhance its scientific and technological capabilities, in particular in the field of space. Within the scope of the agreement, ispace is also expected to provide communications services during the entire duration of the mission. The Japanese company's HAKUTO-R programme currently includes one additional mission, with a second lunar landing expected in 2023.



Credit: ispace

In other news

The FCC accepts SpaceX's request to modify Starlink license: The FCC granted a license modification request sent by SpaceX to lower the orbital altitude of part of its Starlink constellation satellites in order to better reach polar regions and facilitate their deployment. Specifically, SpaceX is expecting to reduce the altitude of 2 814 of its future satellites from the 1,100-1,300 km range to the 540-570 km range.

CNES and DLR inaugurate new P8.3 liquid propulsion research test stand: The P8.3 test stand represents an evolution of the P8 stand, which was an essential element of the collaboration between the two agencies with regard to the development of mature liquid propulsion technologies. The P8.3stand is expected to lay the foundations for the development of systems and subsystems for the next generation of European launchers aiming for reusability.

DARPA awards contracts for DRACO Programme: General Atomics, Blue Origin and Lockheed Martin were selected by DARPA to develop systems capable of demonstrating the feasibility of using nuclear thermal propulsion above LEO in 2025. The development of the Demonstration Rocket for Agile Cislunar Operations (DRACO) spacecraft has the objective of enabling the implementation of the DoD's rapid manoeuvre tenet in cislunar space.

SES and the Kazakhstan Government signed a MoU to boost Digital Kazakhstan project: The agreement was initiated by Kazakhstan's Republican Center for Space Communications (RCSC), which is a subsidiary of Kazakhstan Ministry of Digital Development, Innovation and Aerospace Industry. It aims to explore the use of SES' O3b mPOWER communications system in the framework of the country's Digital Kazakhstan project.

Inmarsat launches legal action against Dutch Government for spectrum allocation decision: The London-based Inmarsat filed a civil suit against the Dutch Government following its decision to auction the 3.5Ghz band in the country exclusively to terrestrial operators. The Dutch Government decision means Inmarsat will have to discontinue its operations in Burum, which the company argues is essential for its Global Maritime Distress and Safety System (GMDSS).

The National Geospatial Intelligence Agency (NGA) selects eight start-ups to receive grants: The NGA partnered with the Capital Innovators accelerator to offer $100 thousand in grants to eight start-ups. In addition to the grant, the companies will also benefit from coaching and work in close partnership with the NGA in the scope of the accelerator programme.

Lockheed Martin secures a $27.3 million contract modification for Blackjack satellites: After first selecting the company last year, the Defense Advanced Research Projects Agency (DARPA) increased the program funding for Phase 2 of the project. In particular, Lockheed Martin will work as satellite assembler and integrator of Blackjack satellite buses, payloads and the Pit Boss data processor for DARPA.

Italy and France sign a joint declaration on the future of European space launchers: The Franco-Italian collaboration also covers the creation of a mutual high-level working group on space launchers and their exploitation.

INDUSTRY & INNOVATION

OneWeb secures an additional $550 million in funding from Eutelsat

Credit: Roscosmos

On April 27th, OneWeb secured $550 million in additional funding from the European satellite operator Eutelsat acquired an approx. 24% equity stake in the company. The acquisition means that Eutelsat is now one of the leading shareholders in OneWeb together with the UK government and Bharti Global who jointly acquired the company following their Chapter 11 filing last year. The latest investment in OneWeb brings the total funds raised by the company to approx. $1.9 billion after Softbank's and Hughes Network Systems' $400 million contribution in January 2021. OneWeb is expecting to be fully funded for the complete deployment of its first generation 648-large LEO constellation by 2022, as its latest launch brought the number of satellites currently in orbit to 182. The company expects to reach annual revenues of over $1 billion ensuing the full deployment of its constellation. Eutelsat's investment is anticipated to be completed in the second half of 2021 and will be fully cash financed.

Lockheed Martin selects ABL Space Systems for up to 58 launches

On April 5th, Lockheed Martin selected ABL Space systems to supply routine launches through its RS1 launch vehicles for various payloads being developed by the company. The company is expecting to purchase the launches in two phases, with the first phase projected to result in the acquisition of up to 26 vehicles until 2025 and the second phase resulting in the purchase of 32 additional launches until 2029. ABL Space System is expecting to supply its launch services through the RS1 launch vehicle and its GS0 deployable launch system, which are currently still under development. The agreement is part of an enduring partnership between the two companies, as Lockheed Martin recently selected ABL for the inaugural launch of its UK Pathfinder launch programme and has been a strategic investor in the company since 2019.

New major achievements of Mars 2020 mission and Perseverance rover

Following a few weeks of operation since its landing on February 18th, the Perseverance rover and NASA's Mars Helicopter Ingenuity have made significant progress with two scientific demonstrations. Firstly, on April 19th, NASA's Ingenuity Mars Helicopter performed the first powered and controlled flight on another planet. The helicopter reached a maximum height of 3 meters during its first flight and proceeded to hover for approx. 30 seconds. The achievement serves as a technology demonstrator for eventual future Mars exploration missions. Secondly, on April 20th, the Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE) instrument of the Perseverance rover became the first instrument to convert Martian atmosphere into oxygen. The experiment is part of a technology demonstration mission to study the possibility of producing and storing oxygen on the red planet.

Credit: NASA

Isar Aerospace wins DLR competition and signs multiple agreements

Credit: Isar Aerospace

On April 30th, German micro launcher company Isar Aerospace was selected by the DLR as the winner of the second phase of its Microlauncher competition. As part of the award, the company received an additional €11 million in funding from the DLR and is set to obtain a letter of recommendation for ESA as part of the agency's Boost! Commercial Space Transportation Services and Support Programme. As part of the Programme, Isar could be considered eligible for future European launches alongside Ariane 6 and Vega-C.

Isar Aerospace also signed a multi-year agreement with Andoya Space granting the start-up exclusive access to one of the orbital launchpads under development in the Andoya Spaceport. The agreement gives Isar Aerospace exclusive access to the launchpad and its related orbital launch facilities for a period of up to 20 years. The deal represented a major boost for the company to win DLR's Microlauncher competition, as the DLR considered agreements for the use of spaceports as one of the criteria for the selection of a winner.

The start-up also signed its first contract with Airbus and Space for the launch of an Earth Observation satellite, which is expected to be carried out by its Spectrum launch vehicle in 2023. Isar Aerospace is projecting to hold the Spectrum's maiden flight in 2022.

Northrop Grumman successfully carries out MEV-2 satellite life extension mission

On April 12th, Northrop Grumman successfully carried out the first docking manoeuvre for an on-orbit satellite servicer on an operational satellite in GEO with its Mission Extension Vehicle-2 (MEV-2). The manoeuvre was conducted by the company's subsidiary SpaceLogistic as it docked the MEV-2 on an Intelsat commercial communications satellite in its final GEO operational orbit location, which had never been accomplished before. Northrop Grumman previously performed a similar manoeuvre in February 2020 with its MEV-1. Contrary to its successor, however, the MEV-1 docked on an Intelsat satellite outside of its GEO orbit before inserting the satellite back into service. The MEV-2 is expected to provide life extension services to Intelsat's satellite for a period of 5 years in accordance with the life-extension servicing contract between the two companies.

Exolaunch launches its new space tug programme with new Orbital Transfer Vehicles (OTVs)

The German start-up Exolaunch releases a new line of OTVs making use of a green propulsion system capable of launching satellites in custom orbits. Their solution aims to be one of the most environmentally friendly in the industry and offers the possibility of deploying satellites in multiple orbits. The new line's qualification is expected to begin in 2022 following a Falcon 9 rideshare mission.

Rocket Factory Augsburg (RFA) signs launch contracts with OHB Cosmos and LuxSpace

OHB Cosmos and LuxSpace have both selected the German launch service provider Rocket Factory Augsburg (RFA)'s RFA ONE launcher to carry their payloads to orbit in 2024 and 2025 respectively. These two additional contracts represent an addition to RFA's growing launch manifesto, with the company having secured a first contract form OHB Sweden Ab in March 2021.

Court of Justice of the European Union rejects Eutelsat and Viasat challenge against Inmarsat

On April 15th, the Court of Justice of the European Union (CJEU) rejected Eutelsat and Viasat challenge against Inmarsat's European Aviation Network (EAN). In 2018, Eutelsat and Viasat filed a case to challenge the over-reliance of Inmarsat's in-flight connectivity service on the ground segment - developed and operated by Deutsche Telekom and SkyFive -, after Arcep authorized the access. Eutelsat and Viasat considered Inmarsat´s operations a misinterpretation of the European concept of "complementary ground components (CGCs)". However, the CJEU stated that no relevant information emerges from the definition to be able to measure the relationship and grade of dependency between the ground and the space segment. Although the Court ruling is "final and binding" at EU-level, Eutelsat and Viasat announced they will keep pursuing legal claims in national courts.

Amazon selects ULA for Project Kuiper satellite constellation launches

Credit: NASA

On April 19th, Amazon awarded the first contract for the launch of its Project Kuiper satellite constellation to ULA. Specifically, the company secured nine Atlas V launches to support the deployment of its 3236-large constellation, which Amazon expects to have in orbit by 2029. The company has committed $10 billion to the project so far, with the objective of offering more affordable low-latency and high-speed broadband services to underserved areas globally. Amazon aims to reach approx. 50% of the satellites in-orbit by 2026.

Intellian signs a $73 million contract to supply user terminals to OneWeb

The California-based company Intellian signed a contract worth $73 million with OneWeb to develop and supply user terminals to the London-based company. After a shift in OneWeb´s strategy in January to reduce the size of its constellation from 47,884 as initially envisioned to 6,372 satellites, the company is now focusing on the launch of the 648 first-generation LEO satellites. The shift was the result of changes in vision and approach from the UK Government and Bharti Global. Intellian will contribute to this first-generation satellite system providing high bandwidth and low latency connectivity with their terminals.

In other news

Airbus selects ArianeGroup's SPRINT antenna reflectors to equip their OneSAT: The latest generation of SPRINT reflectors will be equipped on all new OneSAT satellites. OneSAT is Airbus' new satellite product and can be completely reconfigured while in orbit in order to enable satellite operators to adapt their satellite's initial mission.

Serco Germany signs framework agreement with EUMETSAT: Serco Germany will support EUMETSAT in the management of EUMETSAT's Polar System (EPS) and Polar System-Second Generation (EPS-SG) satellite family. The new contract has a value of over €20 million and will be valid for a period of over six years.

AST SpaceMobile and OneWeb sign MoU for supply of connectivity in maritime sector: The two companies will partner in order to accelerate the deployment of LEO satellite connectivity services, in particular for the offshore and global shipping industries. The services would serve as an alternative to the current VSAT internet solutions.

Voyager Space Holdings completes acquisition of The Launch Company: The objective is to complete the vertical integration transformation process it is currently undertaking. The latest acquisition follows that of Altius Space and Pioneer Astronautics, in 2019 and 2020 respectively.

ESA awards operations deal for European Space Operations Centre to Telespazio Germany: Telespazio Germany is projected to supply preparation and operation engineering services for ESA's Earth Observation missions Biomass and the FLEX missions within the framework of the agreement. The company will provide the FLORIS instrument to support the missions with a global map of vegetation fluorescence as well as measurement of global carbon cycles.

Thales Alenia Space and Microsoft partner to advance cloud powered innovation in space: Through the partnership, Thales Alenia Space's DeeperVision service will be combined with Microsoft's Azure Orbital platform. The DeeperVision software will be used to analyse downlinked Earth Observation satellite imagery through AI as soon as the data is produced.

AAC Clyde Space acquires Omnisys Instruments: The Swedish start-up entered in a conditional agreement with the space instruments manufacturer Omnisys Instruments to purchase the company for approx. €7.3 million. Through the acquisition, AAC Clyde aims to integrate Omnisys' experience in advanced sensor technology to its own small satellite design capabilities as it scales up.

QinetiQ and HyperSat awards Virgin Orbit with a Constellation Launch Contract: the California-based company will use its LauncherOne system to launch six hyperspectral satellites to LEO starting from 2023.

Economy & Business

Telesat issues $500 million in senior secured notes in order to fund Lightspeed Constellation

Credit: Telesat

The company issued senior secure notes due in 2026 in order support the funding efforts of its Lightspeed LEO satellite network constellation. The notes are part of a debt package issued by the company and account for around 60% of the total package, with remainder financed through equity. The company expects to raise approx. $500 million in debt financing with the issue of the bond, with the total investment for the development of the Lightspeed constellation projected to be worth roughly $5 billion.

In addition, Telesat concluded an agreement with CloudOps for the supply of cloud infrastructure services for the Telesat Lightspeed LEO satellite network currently under development. In the framework of this agreement, the Canadian company CloudOps will provide the Lightspeed constellation's cloud infrastructure as well as the development of system operations and the cloud-native data platforms. To this end, the company will take on the role of the software prime contractor for the Lightspeed constellation. The latest agreement follows the investment agreement concluded by the Canadian government and Telesat earlier this year.

Astranis secures $250 million to accelerate small GEO satellite development

Credit: Astranis

On April 14th, U.S. start-up Astranis secured a $250 million Series C funding round that valued the company at approx. $1.4 billion. Funding was led by funds managed by BlackRock and included the participation of new investors such as Fidelity Management and Research Company, Koch Strategic Platforms and Monashee Investment Management. The latest investment follows the $90 million debt and equity round closed by the company in February, which was led by Venrock and TriplePoint Capital. Astranis has raised more than $350 million in the last trimester, allowing the company to boost research and development on their small geostationary satellite as well as to support the development of their next generation telecommunication microsatellites and platforms. The company is also planning to expand to higher frequency Q- and V-band. These investments are part of the Astranis' entrepreneurial objective to expand connectivity in unserved areas.

MDA raises $324.5 million with the completion of its IPO

On April 7th, the Canadian company MDA completed its IPO of common shares through a syndicate of underwriters that included BMO Capital Markets, Scotiabank and Morgan Stanley. The company raised approx. $400 million through the sale of its common shares, and has granted the underwriters the exercisable option of acquiring roughly 15% of its shares in order to cover their eventual over-allocation position. The IPO follows the recent contract award by Intelsat for the delivery by MDA of its Lightspeed constellation's phased array antennas. MDA recently contracted the American company Analog Devices for the delivery of the Beamforming Integrated Circuit (BFIC) that will be integrated in the Lightspeed constellation's phased arrays.

Korea Aerospace Industries to invest $880 million to expand space business new growth plan

Korea Aerospace Industry (KAI) published its latest five-year growth plan and expects to invest a total of approx. $880 million to expand its space business and activities in the next years. The company aims not only to expand its business through satellite production but also expects to use the new funding to engage in new strategic partnerships or to complete acquisitions in the sector. KAI has previously been one of the main actor behind the successful launch and development of South Korea's CAS500-1 remote sensing satellite in March, and expects to continue developing its satellite production services in particular in the South East Asian market.

SpaceX raises additional $314 million in latest funding round

SpaceX revised its latest securities filing, adding approx. $314 million to the $850 million it raised in February. The new round brings the total equity raised by SpaceX in 2021 to roughly $1.1 billion, as the company progresses on the deployment of its Starlink satellite constellation and the development of its Starship vehicle.

Unseenlabs closes €20 million Series B funding round

Credi: Unseenlabs

The French start-up Unseenlabs closed its €20 million Series B round on April 27th with the objective of supporting the development and deployment of their nanosatellite constellation. The funding round was led by Avolta Partners and also included the participation of investors such as 360 Capital Partners, Definvest and Breizh-up. Unseenlabs aims to provide a solution that lets users geolocate any ship at sea by intercepting their electromagnetic signals with their satellites.

Unseenlabs was founded in 2015 and is now one of the leaders in the provision of satellite radio frequency maritime geolocation services in Europe. The start-up launched their first nanosatellite in 2019 and currently has three spacecrafts in orbit, as it projects to use the new funds to grow its constellation to approx. 20-25 satellites providing global coverage by 2025.

Hawkeye closes new Series C funding round worth $55 million

On April 12th, the American space based-radio frequency data provider Hawkeye raised $55 million in new funding in a Series C round led by NightDragon. The company plans to use the new funding to support the development of its current planned satellite constellation through the production and launch of three new satellite cluster. The company is projecting to launch the new satellite cluster by the end of 2022, bringing the total number of operational clusters in orbit for its constellation to 9. In addition to NightDragon, investors such as Advance, Shield Capital and Razor's Edge Venture also participated in the latest round, which brought the total amount raised by the company to over $155 million since its foundation.

In other news

The European Commission opens the first calls for newly created European Commission Council: The European Commission issued the first calls for both the EIC Accelerator and the EIC Pathfinder components of its newly created €1billion EIC. The call is projected to support eligible start-ups and SME's, including in the space industry, scale up and commercialise their solutions with €1 billion in funding.

Nikon completes $91 million deal to acquire majority ownership of Morf3D: Through the agreement, The Japanese company Nikon has the objective of gaining a better foothold in the space sector and in particular in the satellite industry as a result of Morf3D's experience in the manufacture of 3D printed materials for the aerospace industry.

AXA selects SpaceAble to gain critical information for their insurance services: The two companies have established a global partnership with the objective of enhancing AXA's insurance solutions for operators. Through the agreement, AXA will have access to the French start-up's SSA solutions, which collect data on the orbital congestions to enhance the operational safety of activities in LEO.

LiveEO raised €5.2 million in new round funding: The German start-up closed its Series A funding round with the objective of supporting the development of its services and accelerating its global expansion. Venture capital companies such as btov Partners, Helen Venture and DvH ventures participated in the latest round.

Orbital Sidekick completes $16 million Series A: The round of funding was led by the Singapore-based Temasek and has the objective of supporting the start-ups activities as it aims to expand its advanced monitoring services to new industries and conclude new strategic partnerships. The company was recently awarded a $16 million contract by the U.S. Space Force to support the GHOSt constellation.

The Swiss start-up OneSoil raises €4.1 million in Series A funding round: The funding round was led by the U.S. venture capital firm Almaz Capital and the start-up projects to use additional investment to expand its satellite-imagery powered agriculture analytics business in Europe and in the Americas.

Canadian company C-Com started trading in the U.S. equity market: The ground antenna builder is also traded on the Toronto Venture Stock Exchange, but recently began trading on the U.S. equity market as it aims to raise new funds to raise liquidity.

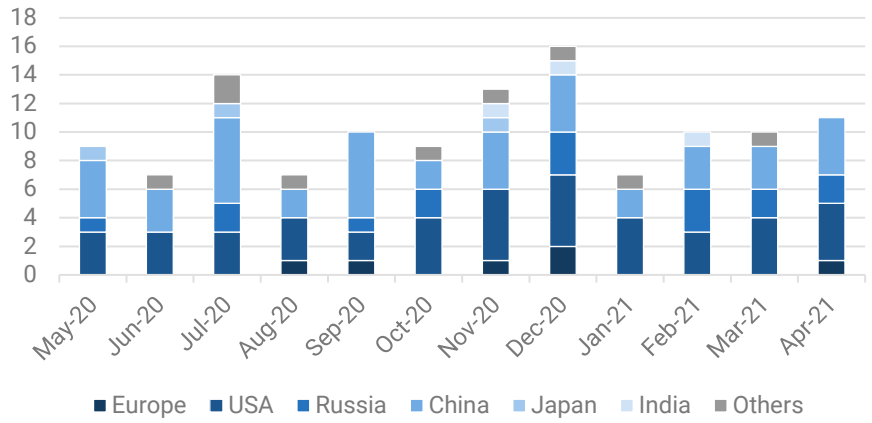
Phantom Space Corporation raises $5 million in funding round led by Chenel Capital: The AZ-based company, whose first orbital launch is planned for 2023, aims to use the new seed funding to increase its workforce and reach its corporate goals related to the democratisation of space and the expansion of space commerce.

Launches & Satellites

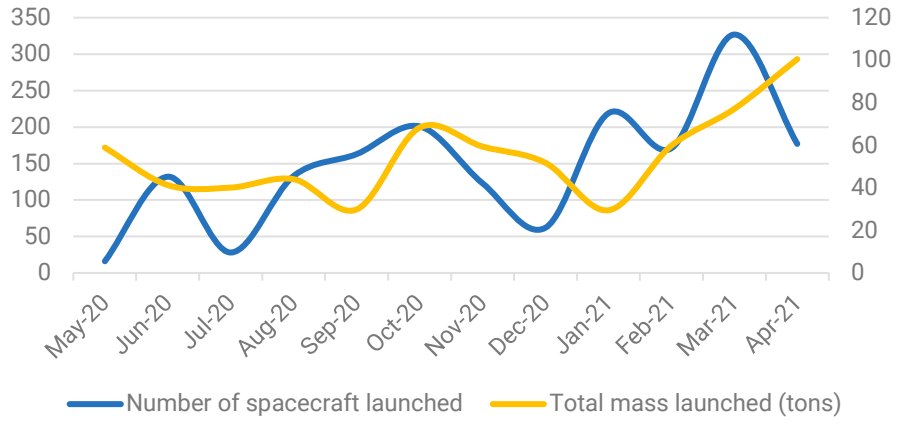
Global space activity statistics

April 2021	Europe	USA	Russia	China	Total
Number of launches	1	4	2	4	11
Number of spacecrafts launched	6	122	37	12	177
Mass launched (in kg)	955	60 255	12 372	26 977	100 559

Launch activity over the year

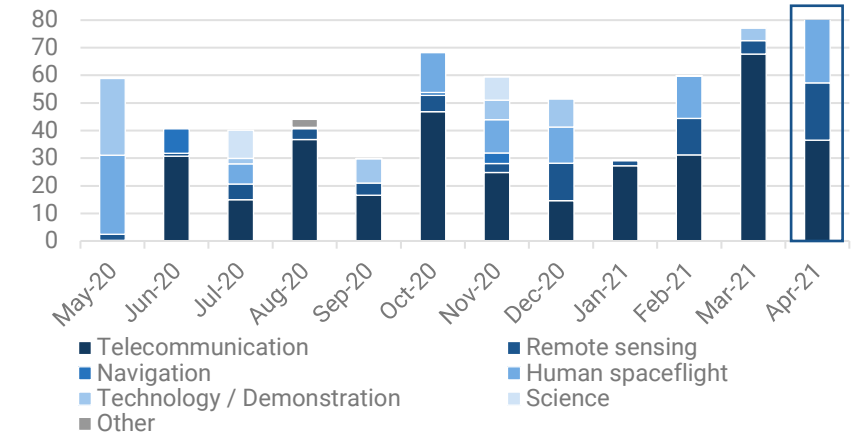


Evolution of the number of launches per launch country



Evolution of launch activity over the year 2020-2021

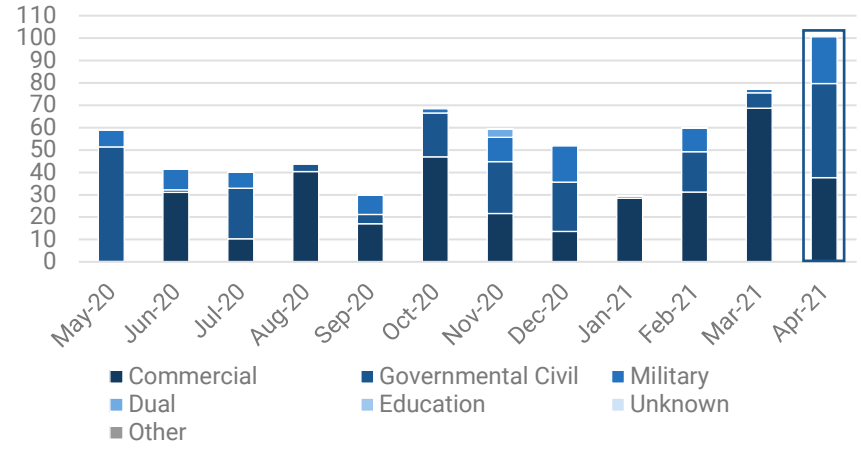
Satellite missions and markets



Evolution of the total mass launched (tons) per mission (May 2020-Apr. 2021)

April 2021	Telecommunication	Remote sensing	Human Spaceflight	Technology/ Demonstration
Europe	5307	920		6
USA	31 200	17 008	12 055	6
Russia			7080	
China	50	2797	22 500	1630

Total mass (kg) launched by mission and customer country



Evolution of the total mass launched (tons), per market (May 2020-Apr. 2021)

April 2021	Commercial	Governmental Civil	Military
Europe	6218	15	
USA	31 214	12 055	17 000
Russia		7080	
China	240	22 937	3800

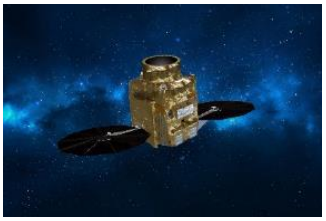
Total mass (kg) launched by market and customer country

Launch Log

Launch date	Launch country	Launcher	Spacecraft name	Main customer	Customer country	Prime manufacturer	Manufacturer country	Mass (kg)	Mission	Market
07/04/2021	USA	Falcon-9 v1.2	Starlink 23 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecom	Commercial
08/04/2021	China	CZ-4B	Shiyan 6-03	PLA	China	CAS	China	1500	Tech / Demo	Military
09/04/2021	Russia	Soyuz-2-1a	Soyuz-MS 18	Roscosmos	Russia	RKK Energia	Russia	7080	Crew Transfer	Governmental
23/04/2021	USA	Falcon-9 v1.2	Crew Dragon USCV-2	NASA	USA	SpaceX	USA	12055	Crew Transfer	Governmental
25/04/2021	Russia	Soyuz-2-1b Fregat	OneWeb L6 (36 satellites)	OneWeb Ltd.	United Kingdom	OneWeb Satellites (USA)	USA	147 (each)	Telecom	Commercial
26/04/2021	USA	Delta-4H	KH-11 18	NRO	USA	Lockheed Martin	USA	17000	Earth Observation	Military
27/04/2021	China	CZ-6	Foshan 1	Ji Hua Laboratory	China	Gengyu Muxing Space Technology	China	100	Tech / Demo	Governmental
27/04/2021	China	CZ-6	Jinzijing / Golden Bauhinia 1-01 & -02	HKATG	China	ZeroG Lab	China	50 (each)	Earth Observation	Commercial
27/04/2021	China	CZ-6	NEO-1	Origin Space	China	Shanghai ASES Spaceflight Technology	China	30	Tech / Demo	Commercial
27/04/2021	China	CZ-6	Qilu 1 & 4	Shandong Industrial Technology Research Institute	China	Shandong Industrial Technology Research Institute	China	150 (each)	Earth Observation	Governmental
27/04/2021	China	CZ-6	Taijing-2 01	MinoSpace Technology	China	MinoSpace Technology	China	60	Earth Observation	Commercial
27/04/2021	China	CZ-6	Tianqi 9	Guodian Gaoke	China	Shanghai ASES Spaceflight Technology	China	50	Telecom	Commercial
27/04/2021	China	CZ-6	Zhongan Guotong 1 / Hangsheng 1	Hunan Hangsheng Satellite Technology Co.	China	Zhongan Guotong Satellite Technology Development Co.	China	37	Earth Observation	Governmental
29/04/2021	USA	Falcon-9 v1.2	Starlink 24 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecom	Commercial
29/04/2021	France	Vega	BRAVO	Aurora Insight	USA	NanoAvionics	Lithuania	6	Tech / Demo	Commercial
29/04/2021	France	Vega	ELO Alpha	Eutelsat	France	Tyvak Nano-Satellite Systems	USA	6	Tech / Demo	Commercial
29/04/2021	France	Vega	Lemur-2 138 & 139	Spire	USA	Spire	USA	4 (each)	Earth Observation	Commercial
29/04/2021	France	Vega	NorSat-3	Norwegian Space Agency	Norway	UTIAS/SFL	Canada	15	AIS	Governmental
29/04/2021	France	Vega	Pléiades Neo 3	Airbus	France	Airbus	France	920	Earth Observation	Commercial
29/04/2021	China	CZ-5B	Tianhe	CNSA	China	CASC	China	22500	Space Station Infrastructure	Governmental
30/04/2021	China	CZ-4C	Yaogan 34	PLA	China	CAST	China	2300	Earth Observation	Military

Launch Highlights

Return to flight for Vega



Credit: Airbus

On April 28th, the European launcher Vega performed its first flight since a failure in November 2020. The launch proceeded without any issue. Its primary payload was the first satellite of Airbus' Pléiades Neo constellation. These optical imagery satellites will provide images with a resolution of 30 centimeters to the commercial market, a quality that only Maxar is currently offering. Pléiades Neo is an important project for Airbus, as the constellation costed €600-700M in investment and will be used for the next 10-12 years. In addition to this satellite, five small spacecraft benefitted from the rideshare flight.

China launches Tianhe

Credit: China Space Report

On April 29th, a Long March 5B rocket sent in low-Earth orbit Tianhe, the core module of the new Chinese Space Station. Tianhe weighs 22 tons and its length is of 16.6 meters. Tianhe is a next step for China in human spaceflight, as the previous manned laboratory of the country weighed only 8 tons. Tianhe will be complemented by two experimental modules, called Wentian and Mengtian. Moreover, Xuntian, a Hubble-class space telescope, will also be launched and be able to dock to the station. Overall, eleven launches will be necessary to build the whole space station, which will weigh around 66 tons. Though the launch proceeded without major problems, the uncontrolled reentry of the core stage of the launcher created some concern. This problem also happened in May 2020, after the first launch of the Long March 5B rocket.

The United States launches a spy satellite

Credit: US Space Force/Michael Peterson

On April 26th, a KH-11 satellite was launched by ULA for the U.S. National Reconnaissance Office. The KH-11 series is an old system for the NRO, with the first one being launched in 1976. These are Hubble-class spacecraft providing optical imagery satellite and weighing more than ten tons. The launch was one of the last of ULA's Delta-IV Heavy rocket, which will be replaced by Vulcan. There are now only three launches planned before its retirement.

Two spacecraft send crews to the ISS

Credit: NASA TV

April 2021 was a busy month for the International Space Station. Indeed, two crewed transfer vehicles flew to the ISS, carrying seven new inhabitants to the orbital outpost. For a few days, the station hosted 11 astronauts, which created a few issues regarding sleeping beds. However, four of them left the ISS at the end of the month and went back to Earth. The two spacecraft used in April were a Soyuz from Russia and a Dragon spacecraft from the United States, thus showing the increased turnaround time at the station following the recovery of its manned spaceflight capability by the United States.

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