European Space Policy Institute

ESPI Insights

Space Sector Watch

Issue 13
February 2021

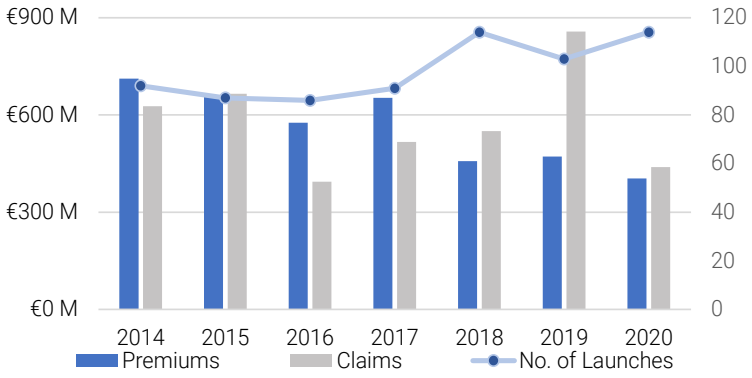
THIS MONTH IN THE SPACE SECTOR…

SPACE INSURERS LOOK FOR PROFITABILITY AFTER THREE YEARS OF LOSS

Dear Friends of ESPI,

In January 2021, the Sirius-XM-7 GEO satellite, which was launched by SpaceX last December, suffered a failure during in-orbit testing. Sirius XM had previously purchased a $225 million insurance policy, covering both the launch and the first year of commercial operation. While satellite premiums have been largely profitable for insurance companies over the past 20 years, they experienced consecutive losses in the last three years with claims exceeding premiums. In 2019, insurance claims were $800 million higher than premiums (worth $502 million), and in 2020, insurance claims were again $500 million higher than premiums. In this context, any additional insurance loss might have adverse ramifications in the space insurance market.

In fact, the situation has already led various companies to exit from the sector. Over the last two years, companies like Swiss Re and American International Group (AIG) decided to cease their space insurance services while Assure Space decided to minimize its exposure by withdrawing its policies covering LEO satellite collisions, due to the increasing risks of such events. Satellite can be covered by a property insurance, which addresses the failure of satellites during launch and in-orbit operations and which is not mandatory, and by a third-party liability insurance. Approx. 30 space insurers currently operate in the market, providing premium rates set on the basis of multiple factors (market conditions, risk assessment, amount insured).



Source: Seradata, AXA XL, ESPI

Insurance companies are highly concerned by the volatility of the space line of business and the change in demand. Important aspects to consider in this regard are the marginal increase in the total number of launches, and the low number of insured satellites due to their smaller size and value (in 2020, 52% of the launched satellites were uninsured). Underwriters staying in the space market may benefit from the exit of several competitors, as well as from the increase of premium rates in the near term, which might be justified by the rise in claims over the last few years. This might bring the sector back to profitability. On the other hand, since spacecraft insurance is not compulsory and that the competition is fierce, a continued raise in claims may lead more insurers to step out of the market.

The potential uptake of commercial space and the increasing use of innovative unproven concept represent both new opportunities and new risks, with high degree of uncertainty especially with regards to the new generation of space and launch systems. For this, space insurance will have to find a new level of flexibility and innovation in defining terms of the products and services, as well as in conducting the evaluation risk phase.

The space sector needs affordable insurance to deal with the new challenges posed by the space economy, and to do so space insurance market has to find a new sustainable profitability model.

Yours sincerely,

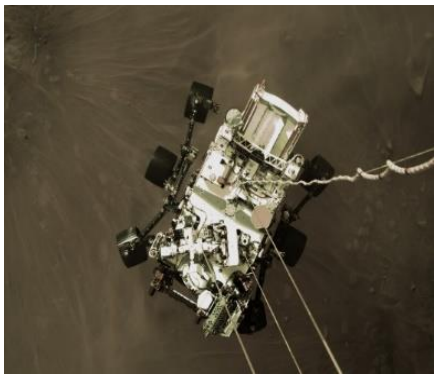
Jean-Jacques Tortora
Director of ESPI

POLICY & PROGRAMMES

Mars missions' arrival bring major successes for space exploration

February marks a historic month for deep space exploration as three missions from NASA, China and the UAE effectively reached Mars. These successes come days after NASA and three other national space agencies, including ASI, JAXA and CSA signed a statement of intent for a future mission aiming to map ice deposits located on the surface of the planet.

NASA's Perseverance rover lands on Mars



Credit: NASA

On February 18th, the Mars Perseverance rover completed its landing manoeuvre on Mars, touching down at Jezero Crater to begin its primary mission of providing new scientific data about the planet. The new data has the objective of contributing to the mapping of Martian geology and climate and the search for evidence of past life on the planet. As part of the $2.7 billion Mars 2020 mission, Perseverance is the most advanced rover ever sent to Mars, with seven primary science instruments. The rover is projected to conduct its operations for a duration of at least two years. In addition, Perseveracnce is also carrying the Ingenuity Mars Helicopter, which will attempt to complete the first powered flight on another planet.

The mission is an essential part of the collaboration between NASA and ESA in the framework of the Mars Sample Return mission, which aims to return Martian regolith back to Earth for in-depth analysis following the launch of two additional missions expected to take place as early as 2026.

The UAE reach Mars orbit and confirm high national ambitions in space

On February 9th, UAE's Al-Amal Probe completed its automated Mart Orbit Insertion manoeuvre, making the county the second nation to successfully enter Mars orbit on its first attempt. As part of the Emirates Mars Mission, the probe was launched in 2020 from Tanegashima Space Centre on board a H-IIA launch vehicle with the objective of studying the Martian weather and producing the world's first global map of the planet's seasonal cycles. The mission was designed and led by the Mohammed bin Rashid Space Centre in Dubai in collaboration with U.S. partners and cost approx. $200 million.

China's Tianwen-1 mission arrives to Mars

The Tianwen-1 mission, developed by the China Aerospace Science and Technology Corporation, reached Mars orbit on February 10th following a seven month trip from the Wengchan Spacecraft Launch Centre in Hainan. The mission is managed by the Chinese National Space Science Centre and includes a Tianwen-1 orbiter, lander and rover. It represents the first interplanetary mission fully developed by China without international cooperation. The objective of Tianwen-1 is to advance scientific research on the planet's characteristics by looking for traces of life and producing more detailed maps of the surface, as well as studying soil, water and ice composition and distribution. The mission's lander is expected to detach in April.

Credit: China National Space Administration

European Commission's Action Plan on synergies between civil, defence and space industries

On January 22nd, the European Commission published a new "Action Plan on synergies between civil, defence and space industries", which aims to "enhance Europe's technological edge and support its industrial base". The Action Plan sets three primary goals for the EU that include:

- reinforcing the synergies between EU programmes to increase their added value;
- promoting the value of spin-offs stemming from EU funding in R&D, in particular in the fields of defence and space;
- assisting the creation of spin-ins from the civil industry to the defence and space industries, in particular for civil applications that require low technology readiness levels.

To this end, the Action Plan notably highlights the role that the European Defence Fund will have to support disruptive technologies, as well as the importance of new EU Flagship programmes to enhance synergies between the three sectors. Among these, the European Commission mentions the launch of the EU initiative for a space-based global secure communication system, an EU strategy for STM and an EU drone technologies project. Their development is part of 11 listed actions in the Action Plan which will be subject to the publication of a progress report by the European Commission every two years.

UK and Australia sign agreement to increase bilateral cooperation in space sector

On February 23rd, the UK and Australia signed a new partnership agreement, the Space Bridge Framework Arrangement, which aims to increase investments, industrial cooperation and knowledge sharing in the space sector between the two countries. The partnership was signed as the two countries undergo negotiations in the framework of their projected Free Trade Agreement. Both countries aim to increase the total value of their exports, with Australia looking to maintain its continued development in the space sector and the UK looking to geographically diversify its trade in the Pacific Region.

Spain publishes new Defence Technology and Innovation Strategy

The Spanish Ministry of Defence released a new Defence Technology and Innovation Strategy with the objective of guiding new ministerial efforts in light of the growing global competition in this field. The Strategy notably highlights the importance of space technologies in the development of future Spanish objectives and makes space systems one of the eleven lines of interest for defence. In particular, the document refers to future R&D efforts by the government. As part of this line of interest, the Ministry of Defence specifically highlights the potential of small satellites in defence applications.

Thales Group selected by French Armed Forces for the delivery of Syracuse IV ground stations

Credit: Thales Group

On February 18th, the French Ministry of the Armed forces designated Thales Group as the main contractor for the delivery of ground stations in the framework of the country's Syracuse IV satellite communication system. The contract envisages the delivery of Ariane's Modem 21 transmission system, which will operate in conjunction with the Syracuse IV satellite constellation in order to enhance the French interoperable communication capabilities. The new agreement is a follow-up to previous contracts between the French Defence Procurement Agency (DGA) and Thales Group, which manufactured the Syracuse IV satellite constellation and performed the first incrementation service of the ground segment in 2019.

In other news

ESA launches call for new Astronauts for the first time in 11 years: The vacancies are expected to open in March 2021, and the six-stage selection is set to take place until October 2022. The new recruits are projected to work in conjunction with current ESA astronauts as the agency prepares for the upcoming generation of space exploration missions.

Dubai creates a Court for the settlement of commercial disputes in space: The space court is to be an arbitration tribunal part of the Dubai International Financial Centre Courts. The objective of the Court is to provide an additional framework for dispute settlements between the increasing number of commercial actors in space.

Missile Defence Agency awards L3Harris $131 million contract for missile tracking hardware: The agreement is for the delivery of additional hardware to be used in the DoD's Hypersonic and Ballistic Tracking Space Sensor (HBTSS) programme, following similar contracts signed in 2019 and 2020.

CNES and the South-African National Space Agency (SANSA) foster cooperation in space: Following the 2019 framework cooperation agreement, CNES and SANSA have signed an implementing arrangement focusing on the Space Climate Observatory and the enhancement of interoperability capabilities for climate monitoring nanosatellite constellations.

NATO chooses Toulouse to host their Space centre for excellence: The main objectives of the centre will be to assist in the elaboration of doctrines and to produce analyses regarding the space domain for NATO, as well as to provide training opportunities for NATO leaders and specialists. The centre is expected to receive 30 to 50 experts within the next years, with the first arriving in 2021.

Memorandum on Renewing the National Security Council System: The Biden administration has restructured the institutional responsibilities regarding U.S. space policy. It has replaced the Space Policy Directives (SPDs), previously under the responsibility of the National Space Council, with National Security Memorandums to be drafted by the National Security Council.

ESA and JAXA sign collaboration agreement for HERA and MMX missions: The agreement is part of a broader collaboration between the two agencies regarding Earth observation, space science and space exploration. Through the agreement, the agencies confirmed their participation in the ESA-led HERA planetary defence mission and the JAXA-led MMX mission.

U.S. Army awards $235 million contract to Comtech Telecommunications: The objective of the agreement is the supply of system refurbishment and sustainment services to some of the U.S. Army's ground satellite terminals, as well as the delivery of general baseband equipment.

Aerojet Rocketdyne and U.S. Department of Energy sign contract for future planetary missions: The contract is for the delivery of up to two Multi-Mission Radioisotope Thermoelectric Generators, which are electric power systems used in deep space missions. The systems are being considered for NASA's Dragonfly and Trident Missions.

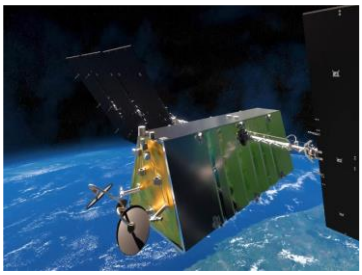
Nicaragua approves the institution of Ministry for Extraterrestrial Affairs: The objective of the Ministry will be that of ensuring the country's compliance to commitments undertaken under international space law, as well as to draft and execute national policy initiatives in the field.

Russia and China prepare future lunar collaboration: The countries are negotiating an MoU for the future development of a Chinese-developed lunar research station, with the Russian government having completed official procedures in preparation for their signature.

Industry & Innovation

Telesat awards contract to Thales Alenia Space for delivery of broadband constellation

On February 9th, Canadian satellite operator Telesat closed a deal with Thales Alenia Space for the manufacture of its 298-large satellite LEO business-to-business constellation, Lightspeed. The $3 billion agreement also outlines Thales Alenia Space's responsibility in offering end-to-end network performance for the system. Telesat is projecting a total cost of approx. $5 billion for the project, and selected Thales Alenia Space for the manufacturing process after two years of collaboration in the design phase. Commercial services for the Lightspeed constellation are expected to start in the next three years.



Credit: Thales Group

The government of Quebec also signed an MoU worth approx. CAD400 million with Telesat regarding the development of the Lightspeed constellation. The agreement foresees an investment of approx. CAD200 million in preferred equity and CAD200 million in loans, in exchange for a subsequent transfer by Telesat of a portion of the manufacturing activities for the constellation to Quebec. The transfer of activities is expected to result in the company investing approx. CAD1.6 billion in the region through its operations. Following a contract award between Telesat and MDA for the delivery of Lightspeed's Direct Radiating Array, the Government of Quebec also provided a CAD50 million loan to MDA through its government-owned company "Investissement Quebec" to support the costs of ensuing economic activities.

European New Space companies ask European Commission to update bidding procedures

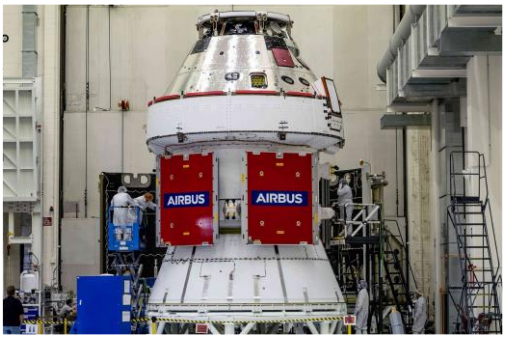
On February 24th, 26 NewSpace companies operating in various sectors of the industry sent a joint letter to the European Commission asking for an update to the bidding procedures for large EU programmes. The companies argued that current procedures virtually exclude any application from space start-ups due to the high level of requirements needed to win contract awards. The European Payload Policy was a particular area of attention: many of the small launcher companies stated they would not be able to compete for launch contracts in EU programmes because of competition from Arianespace's Ariane and Vega rockets, as could be the case for future launches in the framework of the projected European LEO constellation initiative. The joint-letter follows a similar position paper from the Confederation of European Business, which states that start-ups should have a direct and equal access to all European programmes.

The European Court of Justice suspends Galileo second generation contract

The European Court of Justice temporarily suspended the signing of Thales Alenia Space and Airbus' €1.4 billion second generation of Galileo (G2G) satellites delivery contract following OHB's allegations of trade secrets theft. The filing by OHB comes after the company's unsuccessful bid for the delivery of G2G satellites, with ESA recommending the award of the two contracts to Thales Alenia Space and Airbus Defence and Space following a selection process to determine the companies' technological readiness and considering the 2024 scheduled launch date for the first satellite. The Court determined the suspension of the contract following OHB's thesis that one or more former employees joined Airbus and disclosed sensitive information also pertaining to the ongoing bid for the G2G satellites. Although the injunction on Thales' contract has been lifted, the Court maintains the suspension on Airbus's contract signing. OHB is seeking the cancellation of the contract awards and a decision is expected in the next months.

ESA awards Airbus DS a contract for three additional European Service Modules

On February 2nd, Airbus Defence and Space won a contract for the manufacture and delivery of three additional European Service Modules (ESMs) for NASA's Orion spacecraft. The agreement follows previous contracts between ESA and Airbus for the first three ESM modules, the first of which was delivered to NASA in 2020. The cost of the three new ESMs is valued at around €650 million as ESA is projected to supply a total of nine modules to NASA in the next decade. The ESM serves as the power source for Orion and is vital for the missions' success. The ESM-1 is expected to launch in an Orion unmanned test flight in 2021 as part of the Artemis I mission, whereas ESM-3 is still in its integration phase and will be part of the Artemis III mission.



Credit: Airbus

U.S. Space Force signs $700 million worth of contracts with LinQuest

The U.S. Space Force signed two multi-year contracts worth a total of $700 million with the space systems technology company LinQuest for advisory and support services. The first contract foresees the provision of support services for the identification of promising new technologies in collaboration with the agency, and represents a $500 million extension to a previous agreement between the company and the DoD in the framework of the Small Business Innovation Research (SBIR) programme. An additional contract valued $200 million envisages a collaboration between LinQuest and the Space Force's Space Operations Command, in which the company will provide various advisory and support services to the field command for the duration of nine years.

SpaceX awarded $330 million contract for launch of two Lunar Gateway modules


Credit: NASA

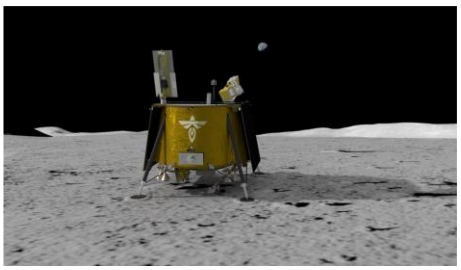
NASA and SpaceX signed a $331.8 million contract for the launch of the Lunar Gateway's Power and Propulsion Element (PPE) and Habitation and Logistics Outpost (HALO) expected to take place in 2024 on board a Falcon Heavy rocket. The PPE and HALO modules are projected to be the Gateway's foundational elements and are currently being developed by Maxar Technologies and Northrop Grumman respectively. The contract is in keeping with the agency's collaboration with commercial partners within the framework of the Artemis Programme, which also includes NASA's $7 billion valued Gateway Logistic Services contract with SpaceX.

U.S. Space Force awarded BAE Systems a contract to advance GPS capabilities

BAE Systems and U.S. Space Force signed a $247 million contract, which envisages the manufacture of advanced GPS receivers and semi-conductors for the U.S. Space and Missile Systems Centre. The new receivers will enhance the military's capabilities for specific GPS applications. The technologies are expected to be used in the framework of the development of next generation M-Code signal technology and is part of a series of contracts worth a total of $552 million signed by the Space Force to this end.

NASA awards $93.3 million contract to Firefly Aerospace for lunar delivery service

U.S. company Firefly Aerospace received a contract worth $93.3 million from NASA to provide lunar payload delivery services in the framework of NASA's Commercial Lunar Payload Services (CPLS) missions. Six CPLS contracts have already been awarded by the agency. The CLPS missions are an essential part of NASA's Artemis programme, as they are means for the agency to promptly receive science payloads on the lunar surface through a collaboration with the industry. With this new contract, Firefly Aerospace's Blue Ghost spacecraft is expected to deliver the payloads to the Moon's Mare Crisium in 2023.



Credit: Firefly Aerospace

New commercial space tourism missions planned with civilian participation

On February1st, entrepreneur Jared Isaacman purchased SpaceX's first ever all civilian mission called "Inspiration4". The mission will include four civilians in total including Isaacman, who will serve as the commander due to his background as a pilot, and it has the objective of raising funds for the St. Jude Children's research Hospital. The Dragon capsule is not projected to dock to the ISS and is instead set to spend a few days in LEO. The selection process is expected to raise roughly $100 million with the entrepreneur matching the ensuing amount.

In addition, SpaceX will also host the first ever commercial mission to the ISS carrying four private astronauts in the framework of Axiom Space's AX-1 mission which will carry a former astronaut and three civilians to the station where they will stay for eight days.

Orbex prepares to scale up production with largest European 3D printer order

On February 25th, the Scottish micro launcher start-up Orbex commissioned the manufacture of the largest 3D printer in Europe from German company AMCM, in order to be able to scale up the production of its Prime rocket. In addition to the 3D printer, AMCM will also provide Orbex a post-processing system and an automated quality "Machine Vision" inspection system. The multimillion-pound deal was concluded as the company aims to produce upwards of 35 rocket engines every year thanks to AMCM's technology, with the first launch expected to take place in 2022 from the Sutherland spaceport in Scotland.

NASA selects SpaceX for the launch of the SPHEREx scientific mission

NASA has awarded contract worth approx. $98.8 million to SpaceX for the launch of its Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer (SPHEREx) mission. The SPHEREx aims to survey regions where stars and planets are born to find essential building blocks for life and is expected to be operational for a two-year astrophysics mission. The probe is projected to survey over 300 million galaxies over its operational life and its launch is expected to be carried out in 2024 from the Vandenberg Air Force base on board a Falcon 9 rocket.

In other news

South Africa and Australia to host the biggest telescope for Square Kilometre Array observatory: The project is sponsored by 16 countries and has the objective of studying gravitational waves through the placement of an array of antennas and dishes across the two countries. The Square Kilometre Array will be the biggest telescope ever built, and it is expected to be operational in 2027.

Start-up blueShift Aerospace launches hybrid engine powered rocket: The company tested its hybrid solid fuel and liquid oxidizer engine on the Stardust 1.0 rocket which reached an altitude of roughly 1.5 kilometres. blueShift Aerospace aims to build a larger suborbital vehicle following the launch.

Eutelsat and TelOne sign agreement to provide high quality broadband to Zimbabwe: TelOne, a Zimbabwe's telecommunications providers, will be able to provide Ka-band connectivity services all over its territory through EUTELSAT KONNECT satellite.

Lockheed Martin awards contract to ABL Space System for first vertical satellite launch form UK: The UK Pathfinder mission is expected to take place in 2022 from Scotland's Shetland spaceport, as part of a previous agreement between the UK government and Lockheed Martin. The launch will be undertaken by ABL's RS1 micro-launcher, which will deploy a CubeSat-carrying payload for the U.S. company Moog.

New Light Technologies partners with Alba Orbital for provide new data solutions: Through the agreement, New Light Technologies aims to support agencies from the private and public sector to access Alba Orbital's night-time light data by optimizing its use-cases. The Scotland-based Alba Orbital provides high resolution night-time data by means of its PocketQube Satellite platform, which the company developed in collaboration with ESA.

Virgin Orbit is awarded launch deal by polish-based SatRevolution: The mission is expected to take place in 2021 as Virgin Orbit's LauncherOne is set to deploy SatRevolution's STORK-4 and STORK-5 optical multispectral small satellites. The two satellites will collect imagery for customers mainly in the agricultural and energy sector in the United States and Poland.

Lockheed Martin awards L3Harris new contracts worth $137M: The contracts are for the delivery of four additional Mission Data Units for future GPS IIIF satellites by L3Harris. Lockheed Martin is the prime contractor for the manufacture of the satellites having received the award from the U.S. Space Force, which expects the new version of the GPS III to be launched starting in 2026.

Hewlett-Packard Enterprise (HPE) and NASA collaborate for ISS connectivity: HPE's launched its Computer-2 on board the latest Cygnus resupply mission in February, through which astronauts on the ISS will be able to maintain a higher data processing power. The connection will be made with Microsoft's Azure network through NASA and Microsoft ground stations and is expected to serve the station for the next three years.

Astrobotic selects Frontier Aerospace for delivery of lunar lander propulsion system: The contract envisages the manufacture of axial engines for Astrobotic's Griffin Lunar Lander, to be launched by 2023.

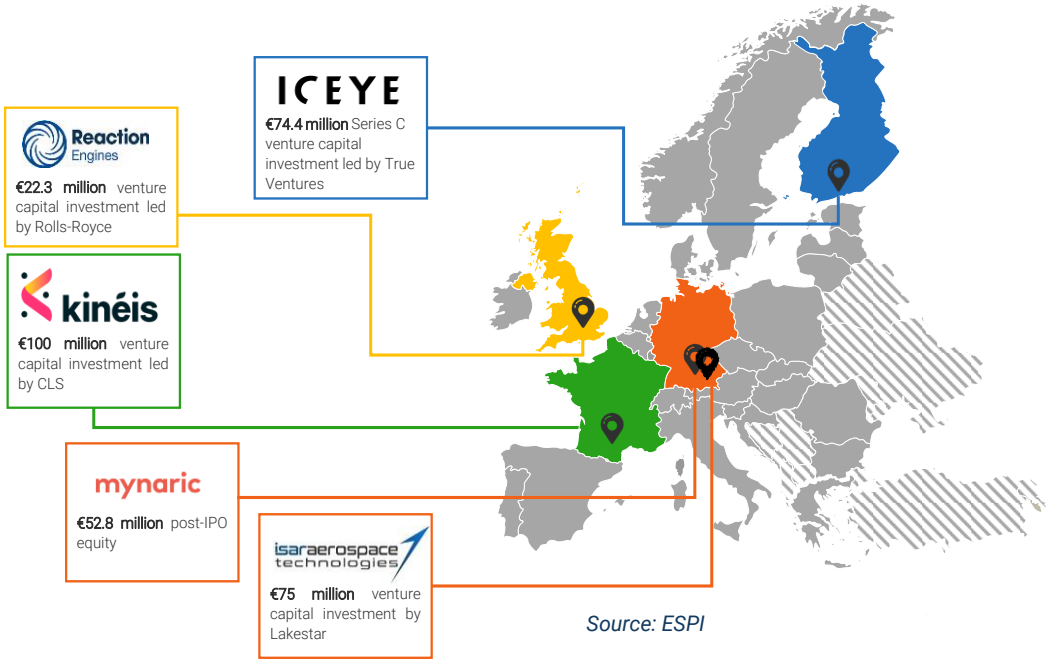
Thales Alenia Space and KT SAT partner to provide first 5G backhauling experiment: The objective of the partnership is to demonstrate the capabilities of KT SAT's Geostationary Koreasat 5A satellite in delivering 5G network even to remote areas. The demonstration is also aimed at establishing the potential of satellite 5G backhauling as a viable complement to traditional technologies.

Economy & Business

2020 European space venture ecosystem concentrated in Top 5 deals (65%)

ESPI Space Venture Europe provides every year an in-depth report of the state of European private investments in the space sector.

The total amount of investments in the top 5 deals in 2020 represented €324 million, or 65% of the overall €502 million invested in European space start-ups. The €324 million includes investments in Kinéis, Isar Aerospace, Iceye, Mynaric and Reaction Engines.



Source: ESPI

This constitutes an increase in the relative value of the top 5 deals compared to 2019, where they only composed around 37% of total investments. Results from 2017 and 2018, where the relative value of the top 5 investment deals made up approximately 65% and 62% of the total respectively, nonetheless show that 2020 is in line with a recent trend in terms of relative value of the top deals.

Space Venture Europe 2020 will be released Q2 2021.

Astra to merge with Special Purpose Acquisition Company (SPAC) Holicity

Credit: Bloomberg

The micro launcher service provider Astra and the SPAC Holicity have found a definitive business combination agreement that will lead to Astra becoming a publicly traded company on the NASDAQ following a transaction of roughly $489 million in cash expected to be completed in the Q2 2021. The merger, which will also include a $200 million private investment led by BlackRock and a $30 million Series C funding, will lead to a valuation of nearly $2 billion for the company, as it aims to expedite the growth of its operations while awaiting its first orbital placement.

In addition, Astra signed a $7.9 million contract with NASA for the launch of six CubeSats for Time-Resolved Observations of Precipitation Structure and Storm Intensity with a Constellation of SmallSats (TROPICS) mission. The three launches for the mission are expected to take place in 2022. Astra is one of the latest space companies to make a deal targeting the merger with a SPAC after Virgin Galactic's $100 million agreement with Social Capital Hedosophia in 2019 and the combined $800 million transaction for AST SpaceMobile and Momentus in December of 2020.

Isotropic Systems raises over $40 million in latest funding round

The UK satellite terminal manufacturing company, Isotropic, was awarded a $40 million contract. The deal comprises both an equity investment led by SES and a grant funding by the UK Space Agency (UKSA), bringing their total funds raised to $70 million. UKSA contributed approx. $24 million in grant funding through the UK government's Future Fund while SES was joined in the equity funding by venture capital firms Space Angels, Firmament Ventures and Boeing HorizonX Global Ventures. The company's latest funding round has the objective of supporting the development of its next generation broadband terminal technologies.

Credit: Isotropic Systems

SpaceX raises $850 million

On February 16th, SpaceX completed a $850 million equity funding round led by an American venture capital firm Sequoia Capital. The new round comes a few months following SpaceX's $2 billion fundraising last August and has the objective of supporting the company's massive capital needs as it develops Starship prototypes and continues the deployment of its Starlink constellation. The latest investment was completed at a per-share value of approx. $420, thus increasing the company's valuation to an expected $74 billion.

Swarm offers new disruptive $5 per month remote connectivity service

The Palo Alto-based IoT company Swarm started offering remote connectivity services from its 72 commercial satellites on orbit at a market price of $5 dollars per unit per month. This makes the service approx. 20 times more affordable than that of its competitors. The company is vertically integrated and aims to provide IoT services to customers who have not been able to access such connectivity services because of pricing. Swarm operates a total of 81 satellites in LEO following the latest launch of its 400 gram satellites on board SpaceX's first rideshare mission in January, with its service finding success among companies that monitor agriculture and marine data.

BlackSky to merge with SPAC company Osprey Technology

Credit: BlackSky

On February 18th, American company BlackSky concluded a business combination agreement with Osprey Technology, a SPAC resulting from the collaboration between investment firms HEPCO Capital Management and JANA Partners. The merged company is expected to obtain approx. $450 million in proceeds and is anticipated to be worth around $1.5 billion in pro forma equity value once it goes public on the New York Stock Exchange. The proceeds are projected to be used to expand future operations, which include BlackSky's objective of operating a constellation of thirty small imaging satellites. The transaction between BlackSky and Osprey Technology is expected to occur in July pending regulatory approval.

Axiom Space raises $130 million in Series B funding

On February 16th, American start-up Axiom Space received a $130 million Series B funding led by C5 Capital. The funding aims to finance the growth and future operations of the company whose objective is to manufacture and launch a private Space Station in LEO. To this end, the company signed an agreement with NASA in 2020 for the delivery of at least one commercial module to be attached to the ISS, as part of the agency's long-term plan for the commercialisation of the station. Axiom space expects to begin attaching its own modules to the ISS in 2024.

In other news

Rocket Factory Augsburg (RFA) extends ESA "Boost!" contract with Portuguese support: The German company activated a clause in their first Boost! contract, also receiving support from the Portuguese Space Agency. The contract aims to extend ESA's support in activities related to the production of the RFA ONE rocket's orbital stage demonstrator, which is being developed in collaboration with the Portuguese Space Agency, CEiiA and RFA Portugal.

Umbra raises $32 million as it readies its first SAR satellite launch: The company aims to launch the satellite this year after receiving a patent in January for a new type of small satellite antenna capable of being stowed during launch. With its new antenna, the company intends to collect imagery data with a resolution below 25 cm and reduce the cost of SAR data.

Omnispace receives $60 million from private consortium to provide 5G connectivity services: The company intends to use the funding to consolidate its technology for the provision of 5G connectivity from space using its own hybrid system, which also includes satellites built by Thales Alenia Space and NanoAvionics. The satellites are expected to be launched through a rideshare mission with Exolaunch in 2022.

UK start-up Vortexa raises €15.7 million in Series B funding: The investment is led by Brazilian venture capital firm Monashees and will serve to scale up the company's shipping and waterborne physical energy data analytical service. This additional round of funding brings Vortexa's total amount raised to around €24.9 million after it secured Series A funding in 2019.

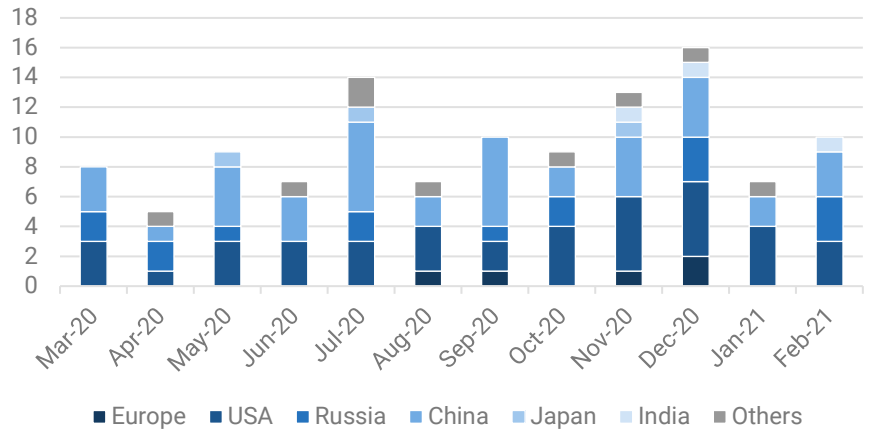
U.S. start-up LyteLoop raises $40 million investment from private consortium: The company aims to expand its operations with the newly raised funds, as it develops a new innovative means to store data using ultra-high bandwidth lasers to be employed in conjunction with satellites on orbit.

Launches & Satellites

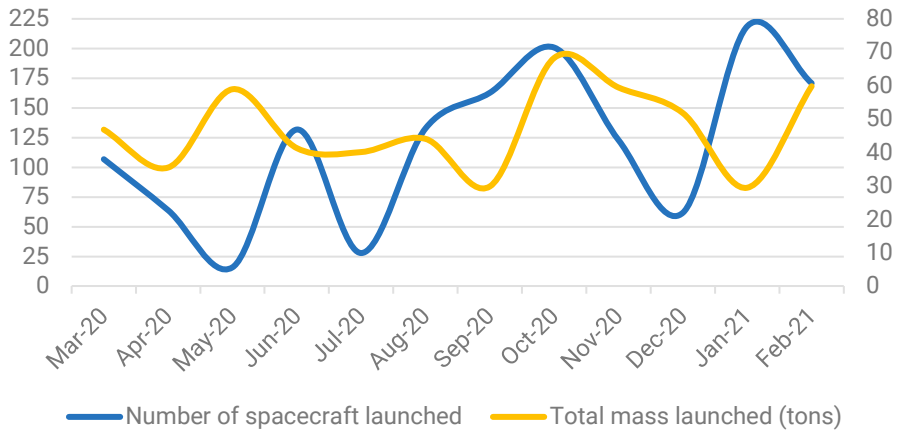
Global space activity statistics

February 2021	USA	Russia	China	India	Total
Number of launches	3	3	3	1	10
Number of spacecrafts launched	142	3	7	19	171
Mass launched (in kg)	39 243.2	15 380	4560	660.8	59 844

Launch activity over the year

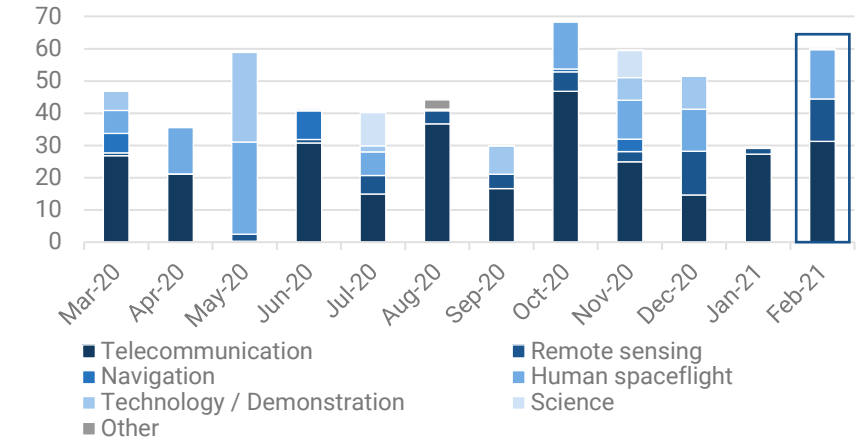


Evolution of the number of launches per launch country



Evolution of launch activity over the year 2020-2021

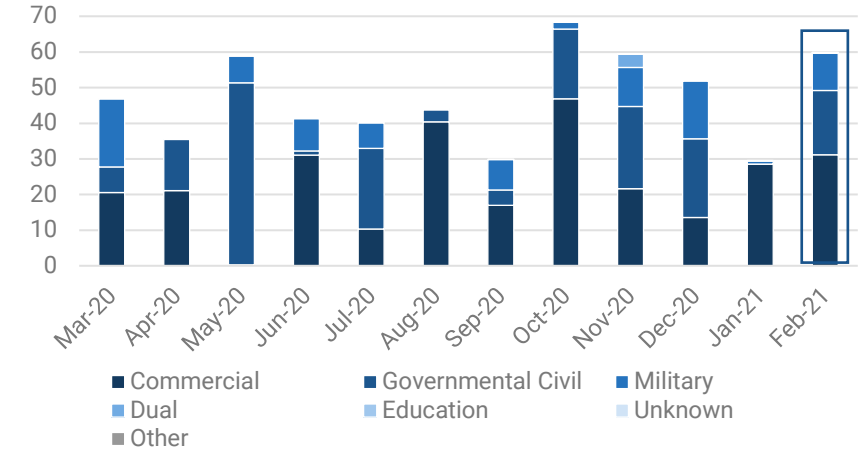
Satellite missions and markets



Evolution of the total mass launched (tons) per mission (Mar. 2020-Feb. 2021)

February 2021	Telecom	Remote sensing	Human Spaceflight	Science	Tech/Demo	Other
USA	31 204.8		8000	4	18.5	10
Russia		8100	7280			
China		4500				60
Japan					3.4	1.3
India	13				6	
Others		638		2	3	

Total mass (kg) launched by mission and customer country



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

February 2021	Commercial	Governmental Civil	Military	Education	Unknown	Other
USA	31 204.8	8004	15	13.5		
Russia		9380	6000			
China			4500		60	
Japan		2.4		1		1.3
India			10	9		
Others		637		6		

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
01/02/2021	*China*	*Hyperbola-1*	*Unknown (China) (three satellites)*	*Unknown (China, Private)*	*China*	*Unknown (China, Private)*	*China*	*20 (each)*	*Unknown*	*Unknown*
02/02/2021	Russia	Soyuz-2-1b	Lotos-S1 4	Russian Aerospace Forces	Russia	Progress Rocket Space Center	Russia	6000	Signal Intelligence	Military
04/02/2021	USA	Falcon-9 v1.2 (Block 5)	Starlink 18 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
04/02/2021	China	CZ-3B/G2(2)	TJS 6	People's Liberation Army	China	SAST	China	3000	Early Warning	Military
15/02/2021	Russia	Soyuz-2-1a	Progress-MS 16	Roscosmos	Russia	RKK Energia	Russia	7280	Cargo Transfer	Governmental Civil
16/02/2021	USA	Falcon-9 v1.2 (Block 5)	Starlink 19 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
20/02/2021	USA	Antares-230+	Cygnus CRS-15	NASA	USA	Northrop Grumman	USA	8000	Cargo Transfer	Governmental Civil
			Dhabisat	Khalifa University	UAE	Khalifa University	UAE	1	Technology / Demonstration	Education
			Guaranísat-1	Paraguayan Space Agency	Paraguay	Kyushu Institute of Technology	Japan	1	Earth Observation	Education
			Gunsmoke-J 2	US Army SMDC	USA	Los Alamos National Laboratory	USA	5	Technology / Demonstration	Military
			Hirogari	Muroran Institute of Technology	Japan	Osaka Prefecture University	Japan	2,4	Technology / Demonstration	Governmental Civil
			IT-SPINS	Montana State University	USA	Montana State University	USA	4	Earth Science	Governmental Civil
			Maya-2	DOST	Philippines	Kyushu Institute of Technology	Japan	1	Technology / Demonstration	Education
			RSP-01	Ryman Sat Project	Japan	Ryman Sat Project	Japan	1.3	Other	Amateur
			TAU-SAT 1	Tel Aviv University	Israel	Tel Aviv University	Israel	2	Space Science	Education
			ThinSat 2 (9 satellites)	Virginia Space	USA	NearSpace Launch	USA	1.5 (each)	Technology / Demonstration	Education
			Tsuru	Kyushu Institute of Technology	Japan	Kyushu Institute of Technology	Japan	1	Technology / Demonstration	Education
			TUMnanoSAT	Technical University of Moldova	Moldova	Technical University of Moldova	Moldova	1	Technology / Demonstration	Education
			Unknown (US military) (2 satellites)	Unknown (USA, Public)	USA	Unknown (USA, Public)	USA	5 (each)	Unknown	Military
24/02/2021	China	CZ-4C	Yaogan 31-03 (A, B & C)	People's Liberation Army	China	CAST	China	500 (each)	Signal Intelligence	Military
28/02/2021	Russia	Soyuz-2-1b Fregat	Arktika-M 1	Roshydromet	Russia	Lavochkin	Russia	2100	Meteorology	Governmental Civil
28/02/2021	India	PSLV-DL	Amazônia 1	INPE	Brazil	INPE	Brazil	637	Earth Observation	Governmental Civil

SAI-1 NanoConnect-2	National Autonomous University of Mexico	India	National Autonomous University of Mexico	India	2	Technology / Demonstration	Education
SDSAT	Space Kidz India	India	Space Kidz India	India	4	Technology / Demonstration	Education
Sindhu Netra	DRDO	India	DRDO	India	10	AIS	Military
SpaceBEE (12 satellites)	Swarm Technologies	USA	Swarm Technologies	USA	0.4 (each)	Telecommunication	Commercial
UNITYsat 1 / JITsat	IN-SPACe	India	Jeppiaar Institute of Technology	India	1	Telecommunication	Education
UNITYsat 2 / GHRCEsat	IN-SPACe	India	G.H. Raisoni College of Engineering	India	1	Telecommunication	Education
UNITYsat 3 / Sri Shakthi Sat	IN-SPACe	India	Sri Shakti Institute of Engineering and Technology	India	1	Telecommunication	Education

Launch Highlights

Failure of Hyperbola-1

Credit: Weibo

On February 1st, the company iSpace proceeded with the second launch of its Hyperbola-1 rocket. iSpace is the first Chinese private company to have put a payload in orbit (in August 2019), however, the second launch carried out by the company failed. According to pictures, the rocket used had undertaken significant changes compared to the very first Hyperbola, but the causes of the failure are not known. Similarly, payloads onboard the launch were not disclosed.

Two cargo spacecraft to the ISS in one month

Credit: Northrop Grumman

Two spacecraft for cargo delivery were launched to the ISS in February. On February 15th, a Progress spacecraft was launched from Baikonur and reached the Station after a two-day trip. A failure of the automated rendezvous failure at the end of the trip prompted the cosmonaut Sergey Rhyzikov to manually dock the spacecraft with the ISS. Another spacecraft, a U.S. Cygnus from Northrop Grumman, was also sent to the station on February 20th. The weight of the cargo transported by the spacecraft was of 3810 kg, making it the heaviest commercial cargo mission to the space station. The spacecraft also carried several CubeSats that will be released from the station (including the first satellites of Moldova and Paraguay) as well as a radiation detector that will fly on NASA's Orion capsule as soon as in the frame of the Artemis 2 mission in 2023, if testing aboard the ISS is successful.

A remarkable launch for India

Credit: NewSpace India Ltd.

On February 28th, a PSLV rocket carrying one primary satellite for Brazil and 18 secondary payloads for Indian and American customers was launched by ISRO from the Satish Dhawan Centre. This launch was a first for several reasons: it was the first launch of India for the year 2021; it was the first dedicated commercial PSLV mission commissioned by NewSpace India Limited (NSIL), a public company established two years ago under the Indian Department of Space; finally, the primary payload, the Amazônia-1 satellite, is the first satellite entirely developed by Brazil, which will notably be used to monitor deforestation in the Amazon region.

First launch for Russia's new weather satellites

Credit: Roscosmos

On February 28th, Roscosmos sent to orbit the first component of a new series of meteorological satellites. The spacecraft, called Arktika-M 1, will monitor weather on land and sea in the Arctic region, and is equipped with a payload providing emergency communications capacity for the COSPAS-SARSAT system. According to Roscosmos, Arktika-M will also collect space weather data and data on Earth's magnetosphere and ionosphere. To fulfil its primary mission, the satellite was launched in a Molniya orbit, a specific type of high elliptical orbit allowing it to stay multiple hours above high latitude areas and to take images every 15-30 minutes. While two satellites only were envisaged for the system, Roscosmos has floated the possibility to launch more of them in the coming years.

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