



**ESPI**

European Space Policy Institute

# ESPI Insights

Space Sector Watch



Issue 16  
May 2021

# THIS MONTH IN THE SPACE SECTOR...

<b>MARS LANDING CEMENTS CHINA'S POSITION AS MAJOR SPACE POWER</b> .....	<b>1</b>
<b>POLICY &amp; PROGRAMMES</b> .....	<b>2</b>
ESA awards €150 million in contracts to continue development of Prometheus and Phoebus.....	2
European Commission targets second study for its space-based secure connectivity project .....	2
South Korea joins Artemis accords and strengthens partnership with the U.S. ....	2
May marks busy month in UK space sector.....	3
NASA temporarily suspends SpaceX's HLS contract following protests on the award .....	3
Spain eyes creation of a National Space Agency .....	3
Space Force awards \$228 million GPS contract extension to Raytheon Intelligence and Space .....	4
China officially establishes company to develop and operate broadband mega constellation .....	4
Lithuania signs Association Agreement with ESA .....	4
CNES and Bundeswehr University Munich (UniBw) launch SpaceFounders accelerator .....	4
The Brazilian Space Agency selects Virgin Orbit to provide orbital launches from Alcântara.....	5
NASA invests a total of \$105 million in its Small Businesses Innovation Research (SBIR) .....	5
EUSPA is officially established following the adoption of the EU Space Programme:.....	5
In other news .....	6
<b>INDUSTRY &amp; INNOVATION</b> .....	<b>8</b>
Progress in the development of ESA's Space Rider.....	8
Google wins SpaceX's cloud deal for Starlink internet connectivity .....	8
EU General Court dismisses OHB application for interim relief against Galileo contract award .....	8
Mynaric and Spacelink sign agreement to form new partnership .....	9
Thales Alenia Space awards €58 million contract to OHB for ESPRIT elements.....	9
SpaceX Starship successfully completes suborbital test flight .....	9
UK Space Agency publishes 2020 Size and Health of the UK Space Industry report .....	9
Airbus Defence and Space selects Northrop Grumman to supply solar arrays for OneSat.....	9
In other news .....	10
<b>ECONOMY &amp; BUSINESS</b> .....	<b>11</b>
New ESPI Space Venture Europe report is out .....	11
UK start-up Arqit to merge with SPAC and raise \$400 million to launch quantum satellites .....	12
The newly founded European Innovation Council (EIC) launches €100 million EIC Transition.....	12
Two Indian start-ups raise \$11 million in Series A funding rounds.....	13
Axelspace raises \$24 million in Series C funding round .....	13
Pangea Aerospace and Alba Orbital complete Seed rounds to boost commercial objectives .....	13
In other news .....	14
<b>LAUNCHES &amp; SATELLITES</b> .....	<b>15</b>
Global space activity statistics .....	15

Launch activity over the year.....	15
Satellite missions and markets.....	16
Launch Log.....	17
Launch Highlights.....	18
<b>ABOUT ESPI.....</b>	<b>19</b>

*Sign in ESPI Newsletter and get ESPI Insights directly in your mailbox*

**<https://espi.or.at/newsletter>**



## MARS LANDING CEMENTS CHINA'S POSITION AS MAJOR SPACE POWER



Dear Friends of ESPI,

China's Zhurong rover **landed on Mars' Utopia Planitia** on May 14<sup>th</sup>, making it only the second country after the United States to successfully achieve the demanding feat of landing and maintaining operations on the planet. The event represents an additional milestone for China as it recently carried out the **launch of the core module** of its planned space station and continues to progress in accomplishing increasingly complex space exploration missions. In this regard, China finds itself in exclusive company as it is now also the second country to have successfully performed soft landings on both the Moon and Mars.

The country's achievements are the result of a two-decade long series of plans, missions and continued support from the central government that have transformed the country into a major space power in terms of effective capacity. In 2019, the likely under-estimated budget for China stood at \$8.16 billion, making it third largest behind the U.S.'s and the consolidated European budget that stood at approx. \$11.5 billion, also considering it is largely biased by the Yuan to Dollar conversion. In addition to forging its capacity to carry out successful space exploration missions, which now include the first soft landing on the far side of the moon in 2019 and completing a challenging lunar samples recovery mission in 2020, China has also steadily built a comprehensive industry centred around space activities.

After becoming the fifth country to achieve independent launch capabilities in 1970, the country has since developed a series of launch vehicles that covers a wide range of capacities and orbital destinations within its Long March family of launchers and, in 2020, was the first country in terms of number of launches having carried out a total of 39. The country's space industry conglomerates are also estimated to have one of the highest relative number of employees, **counting approx. 300 000 FTE's** in 2020.

Whereas much of the support is coming from the central government and the China National Space Administration (CNSA), regional governments have also recently enhanced their efforts to support the growing industry through massive investments, notably in spaceports and space industrial clusters. The provinces of Zhejiang, Hainan and the city of Guangzhou have in this regard recently announced new measures to support the development of **commercial spaceports** and to **strengthen the industrial base** of the space manufacturing industry. In addition, private funding has similarly played an increasingly important role in complementing public efforts since the adoption of a 2016 White Paper, with private investments estimated at approx. \$500 million in 2020<sup>1</sup>, or roughly half of total investments that year.

Likewise, China is taking steps to cement its status as a regional and international leader in particular through its now fully operational Beidou Navigation Satellite System, which the country has inserted into its overarching Belt and Road Initiative, and more recently with initiatives such as the lunar space station it is developing in collaboration with Russia. In consideration of the recent updates, although there is still a significant mismatch in comparison to the U.S. space programme, it makes no doubt today that the effective ability and pace shown by the Chinese space industry has transformed the country into the second biggest spacefaring nation in terms of capacity, and questions can be raised as to when it will also be the case in terms of capability.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'JJ Tortora', written over a white background.

Jean-Jacques Tortora

Director of ESPI

<sup>1</sup>Figures taken from Euroconsult's China Space Quarterly **report**.

## POLICY & PROGRAMMES

### ESA awards €150 million in contracts to continue development of Prometheus and Phoebus

On May 17<sup>th</sup>, ESA awarded contracts worth a total of €149.6 million to ArianeGroup, MT Aerospace and the DLR in order to advance the development of the Prometheus and Phoebus projects. In particular, the agency signed a €135 million contract with ArianeGroup for the development of six Prometheus engines as well as an additional €14.6 million contract with the company and MT Aerospace for the development of the Phoebus upper stage engine. The contract signed for Prometheus is a continuation of previous work initiated in 2017 and aims to push forward efforts to build both a liquid methane/liquid oxygen version and a LOX/hydrogen version of the engine, with the objective of providing the future European launch solution with a significantly more cost-effective solution. The second contract aims to continue the cooperation between ESA, ArianeGroup and MT Aerospace for the development of Phoebus, which is expected to optimise Ariane 6's payload capacity to GEO by approx. 2 tons.



Credit: ESA

### European Commission targets second study for its space-based secure connectivity project

Commissioner Thierry Breton called for a new study to be conducted in the framework of the European Commission's planned secure connectivity project following the initial assessment of the first consortium's interim report. The second study is expected to be led by start-ups and small companies that are part of the "European New Space ecosystem", with the Commission thus electing to adopt a different approach from the first study led by established leaders of the European space industry such as Eutelsat, SES, Airbus and Thales Alenia Space. The objective of the second study is to explore potentially more innovative solutions to those proposed in the first interim report.

In addition, Thierry Breton also raised questions on the future participation of Eutelsat in the development of the future project following the company's decision to invest \$550 million in OneWeb and acquire c.24% of equity in the company. The Commissioner underlined issues related to a potential incompatibility between the company's involvement in OneWeb and security requirements of the Commission's project.

### South Korea joins Artemis accords and strengthens partnership with the U.S.



Credit: ROK Minister of Science and ICT

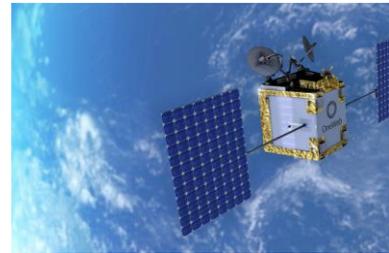
South Korea signed the Artemis Accords on May 24<sup>th</sup>, officially becoming the tenth country to do so. The signing of the accords is part of a broader set of efforts to which South Korea and the United States have committed to in a joint Summit held this month, which also includes additional cooperation in the fields of civil space, aeronautics and threat-response activities in space. The two countries have also pledged to undertake joint-efforts in support of South Korea's projected satellite navigation system, in particular with the objective of enhancing its future compatibility and interoperability with the GPS. The country is expected to build and launch seven satellites to complete its satellite navigation system by 2035, which is expected to be valued a total of approx. \$3.56 billion.



## May marks busy month in UK space sector

### UK Space Agency (UKSA) awards £32 million to support development of beam-hopping satellite

On May 24<sup>th</sup>, the UK Space Agency awarded £32 million to an industrial consortium led by OneWeb in order to develop a new generation of satellites capable of switching its coverage area in real time. The funding was awarded in the framework of ESA's Sunrise programme and aims to advance satellite technologies to better adapt to possible surges in demand in different coverage areas. The first so called "Joey-Sat" demonstration satellite is expected to ensue from the pilot programme and is **due to be launched** in 2022. To develop the satellite, OneWeb will lead a consortium of UK companies that includes SatixFy, Celestia UK and the satellite servicing start-up Astroscale UK.



Credit: OneWeb

### Isotropic Systems wins €18.5 million co-funding from UKSA in ARTES development contract

The UK Space Agency supported the **award of a development contract** from ESA to UK broadband services start-up Isotropic Systems with €18.5 million in funding. In particular, the co-funding commitment from UKSA is made in the framework of an ESA **ARTES Competitiveness & Growth** contract. Isotropic Systems projects to use the funding to secure its production roadmap until 2022 for a new generation of antenna technology capable of facilitating the use of new high throughput satellite systems. The company also expects to use the contract to expand its workforce and facilities.

### The UK government lays new regulations providing for licensing and regulation of spaceports

The UK government **laid its Space Industry Act before Parliament** on May 24<sup>th</sup>, which provide for the future licensing and regulation of spaceports as the country expects the first commercial launches from its territory to be carried out as early as 2022. The new regulations were developed by the government in collaboration with UKSA and the UK Civil Aviation Authority, and the related Parliament legislation is projected to come into force during summer.

### NASA temporarily suspends SpaceX's HLS contract following protests on the award

NASA temporarily **suspended progress on the HLS contract** it awarded to SpaceX last month following protests from Blue Origin and Dynetics with the U.S. Government Accountability Office (GAO). The suspension entails that SpaceX should halt the work it is currently undertaking on the lunar lander within the scope of the \$2.9 billion contract award, pending an official ruling from the GAO at the latest in August.

In addition, the U.S. Senate has started to **discuss the United States Innovation and Competition Act** on May 19<sup>th</sup>, which incorporates key amendments to the 2021 NASA Authorization Act recently approved by the Senate's Commerce Committee. The amendments have significant implications for the HLS contract award as they recommend Congress to commit a budget of \$10 billion to the HLS programme over FY 2021-2015 and recommend NASA to maintain competitiveness in the programme, which could lead the agency to select a second company to carry out work on the HLS.

### Spain eyes creation of a National Space Agency

On May 27<sup>th</sup>, the director of the Cabinet of the Prime Minister Iván Redondo, asserted the Government's intentions to **create a Spanish Space Agency** after a change in budgetary strategy. The decision follows demands from members of the Spanish aerospace industry enhancing the strategic capacity of the country in the sector. The initiative will be presented for approval with the new National Security Strategy before summer and is not expected to significantly modify the current role played by the Centre for the Development of Industrial Technology (CDTI).



## Space Force awards \$228 million GPS contract extension to Raytheon Intelligence and Space

On May 5<sup>th</sup>, the U.S. Space Force (USSF) awarded a \$228 million **contract** to Raytheon Intelligence and Space for the development of the operational control systems for the latest generation of GPS 3 satellites. The new contract represents an extension of the work that is currently provided by the company in the framework of the Next Generation Operational Control System (OCX) GPS constellation. The company initially received a contract in 2010 to work on the approx. \$6.2 billion-valued OCX programme. Raytheon Intelligence and Space first delivered the OCX's Block 0 in 2017 and is **now expected to deliver the Block3F in 2025** in the scope of the latest contract extension.



*Credit: Raytheon Intelligence and Space*

## China establishes company to develop and operate broadband mega constellation

On May 26<sup>th</sup>, the Chinese State-Owned Assets Supervision and Administration Commission (SASAC) established the **creation of China Satellite Network Group**, a company that is tasked with developing and operating a LEO satellite broadband mega constellation. The development comes a few month following the submission of a **filing from China** to the ITU for spectrum allocations for two constellations totalling 12,992 satellites. The development is in line with recent efforts from the Chinese government to insert satellite broadband services into broader objectives undertaken for instance under its Belt and road Initiative and its 14th Five-year Plan. China Satellite Network Group's LEO mega constellation is expected to be independent from the development of the Hongyan and Hongyun constellations by CASC and CASIC respectively.

## Lithuania signs Association Agreement with ESA

ESA and Lithuania **signed an Association agreement**, which came into force on 21 May 2021 and will have a duration of seven years. The agreement provides for the accession of Lithuania to ESA as an Associate Member, allowing direct Lithuanian participation in the ESA's optional programmes, subject to approval of other participating states. The General Support Technology Programme (GSTP), Future-EO and ARTES 4.0 have been identified as best matching Lithuanian capabilities. The establishment of an ESA Business Incubation Centre (BIC) in the future is also now envisaged. Lithuania has collaborated with the agency through various forms since signing a Cooperation Agreement in 2010, followed by a 2015 European Cooperating State (ECS) Agreement and now aims to continue its successful integration through associate membership.

## CNES and Bundeswehr University Munich (UniBw) launch SpaceFounders accelerator



CNES and the Bundeswehr University Munich partnered to **launch the SpaceFounders acceleration programme**, which will be focused on supporting European space start-ups. The new programme has the objective of supporting leading space start-ups in Europe in becoming world leaders in their field in the coming years and it is essentially focused on providing non-financial support. In particular, the SpaceFounders programme offers strong backing in terms of infrastructure and network from CNES as well as form partner Agencies such as the DLR and ESA. While most of the acceleration phase is centred on strengthening business models and the establishment of action plans, the programme also envisages two demo days to help start-ups find funding and investors. The launch of the programme is **in accordance with recent efforts** from CNES to support the growing space start-up ecosystem as well as with the agency's roadmap.



## The Brazilian Space Agency selects Virgin Orbit to provide orbital launches from Alcântara

Virgin Orbit was selected by the Brazilian Space Agency (AEB) to provide orbital launch capabilities to the country from the Alcântara Launch Centre. Specifically, the AEB and the Brazilian Air Force are projecting to carry out orbital launches from Alcântara with the company's LauncherOne system. The provision of orbital launches in the centre by Virgin Orbit are set to transform Alcântara into the **second orbital class spaceport in South America**, with its position relative to the equator opening possibilities to launch payloads in all categories of orbits. The latest progress reinforces efforts undertaken by AEB president Carlos Moura since his nomination in 2019 to turn the Alcântara Launch Centre into one of the main spaceports on the continent and internationally. The AEB expects the first orbital launches to take place in the first half of 2022.



Credit: Virgin Orbit

## NASA invests a total of \$105 million in its Small Businesses Innovation Research (SBIR)

On May 13<sup>th</sup>, NASA provided **140 new awards for a total of \$105 million** in the framework of its SBIR programme's Phase II. The awards have been granted to 127 small businesses and aim to support their efforts in turning innovative ideas into commercially ready solutions. All companies selected in the second phase of the programme have been provided with \$750 000 in funding to support their growth, and had previously been selected by the agency in the scope of the SBIR's Phase I. The selected companies are now projected to develop prototypes of their proposed solutions for a duration of up to two years.

## ESA Directorate of Commercialisation, Industry & Procurement

On May 21<sup>st</sup>, ESA opened a selection process aiming to **name a new Director of Commercialisation Industry & Procurement** who will be expected to join the executive board of the agency. The new Director will oversee the implementation and the elaboration of the agency's industrial policy and will be responsible for managing the agency's negotiations and procurement activities. In addition, the Director is projected to oversee the commercialisation of space products and services. The new position supports and reinforces the objectives that were set in the **ESA Agenda 2025** following the nomination of Joseph Aschbacher as new ESA DG, with a particular emphasis on the priorities related to commercialisation highlighted in the document.

## EUSPA is officially established following the adoption of the EU Space Programme:



Credit: EUSPA

On May 12<sup>th</sup>, the European Union Agency for the Space Programme (EUSPA) **was officially established** following the adoption of the Regulation establishing the new EU Space Programme last month. The programme provided for the evolution of the former European GNSS Agency (GSA) into EUSPA, while also expanding the role and responsibilities previously held by the GSA. Among the new responsibilities, the agency will be in tasked with managing the increasing exploitation of services provided by the EU's programmes, with a focus on Copernicus, Galileo and EGNOS. The new agency will additionally be responsible with collaborating with Member States to coordinate user-related aspects linked to the implementation of GOVSATCOM.



### In other news

**Biden administration requests \$715 billion defence budget for FY2022:** The new budget proposal includes a \$2.2 billion increase for the Space Force compared to the \$15.2 billion enacted by congress for FY2021. The new budget also seeks to appropriate \$1.2 billion for military space systems in LEO, in particular through the Space Development Agency, the Missile Defence Agency and DARPA who are requesting \$936.7 million, \$292.8 million and \$42 million respectively for their programmes.

**ESA awards contracts to two industrial consortia for Moonlight initiative:** The contracts were awarded to Telespazio and Surrey Satellite Technology and have the objective of developing concept studies in the framework of the agency's Moonlight initiative. The initiative aims to place a network of satellites in lunar orbit to support future human and robotic missions on the Moon. The two contracts are expected to run for a duration of 12 to 18 months and will include both a feasibility study and the presentation of a business case from each consortium.

**CNES awards €750 000 to companies working on reusable second stage:** The award followed a pitch-day event where companies ranging from star-ups to large industrial groups proposed innovative ideas centred on the development of a reusable second stage for the next generation of European launchers. The agency selected 10 winners who each obtained grants ranging from €50 000 to €100 000 to develop their ideas.

**NOAA awards €51.2 million contract to KBR :** The contract is for the development and deployment of the agency's Space Weather Follow-On (SWFO) Antenna Network. Specifically, the company is expected to maintain a network of antennas to ensure communication of mission data between the agency's SWFO-L1 spacecraft and its ground segment, with the satellite's launch expected in 2024.

**Spain's Council of Ministers approves investment from Enaire in newly founded Startical:** The funding is part of the new partnership between Enaire and the Spanish company Indra, which formed the public-private initiative Startical. The government's approval is set to cover developments over a three-year R&D period that is expected to cost approx. €29.2 million. In addition, Startical awarded a 14.5 million contract to GomSpace to deliver a large-scale demonstration project.

**UK awards £2 million to companies to enhance national position, navigation, and timing solutions:** The objective of the funding is that of developing new solutions within the framework of the UK Space Agency's Space Based Positioning, Navigation and Timing Programme. It additionally aims to reduce the country's dependence on external solutions to support critical national infrastructure, and Airbus, Inmarsat, QinetiQ and CGI are among the companies selected for funding.

**European Commission awards strategic contract to Thales Alenia Space:** The contract's objective is to assess the feasibility of implementing an integrity service to complement the current EGNSS High Accuracy. In particular, Thales Alenia Space expects to assess the possible extension of the integrity and safety of life services for aviation to the road, maritime and rail sectors.

**DoD awards \$35 million contract to SES Government Solutions (SES GS):** The contract provides for the support one of the DoD's combatant commands in a geostationary (GEO) satellite communications program. In particular, SES GS will deliver a VSAT network solution to support reach back operations from units stationed in remote locations to Europe.



**ESA selects Space Applications Services to head consortium to produce oxygen on the Moon:** The Belgian company will head a consortium composed of members of the industry and research institute in the scope of the ESA ISRULAB contract. The consortium is set to design and develop an FFC system capable of transforming lunar soil into oxygen to support future lunar missions.

**CNES and ONERA sign new agreements for cooperation on launchers, satellites, and space data:** In particular, the two institutions are continuing their cooperation in these fields by signing the COSOR-2 and the LEONIDAS agreements. While the first agreement represents the second phase of the COSOR programmes and is set to have a duration of five year, LEONIDAS is focused on studying new models to reduce space debris and risks related to spacecraft re-entry.

**LatConnect 60 and Surrey Satellite Technology (SSTL) sign first Space Bridge partnership:** The two companies have signed a new contract under the recently formed "Space Bridge" partnership between the UK and Australia. In the scope of the contract, SSTL will lease satellite imagery to LatConnect 60 and allow operational access to its SSTL S1-4 satellite. The contract opens the Australian market to SSTL and will support the Australian company's operations.

**NASA increases prices of private astronaut missions on the ISS:** The agency released a revised version of its commercial and marketing pricing policy, which reflects an increase in the cost of private astronaut missions on the ISS. NASA aims to capitalise on the current and expected market growth for these service as well as anticipate the emergence of similar services to be offered by commercial entities in the near future.

**NigComSat signs MoU with Nigerian Communications Commission (NCC) for spectrum use for 5G:** The MoU aims to regulate the use of the C-band spectrum for the future deployment of 5G services. The NCC emphasised the importance of using the C-band to provide for an early adoption of 5G in Nigeria as the majority of commercial 5G global network deployment is currently in the band.

**DoD awards Responsive Launch II mission contract to ABL Space System:** The company was awarded a contract to support the Pentagon's Defence Innovation Unit (DIU) within the scope of the Responsive Launch II mission. Specifically, ABL Space System will assist the DoD in reaching their objective of reducing the risk of delays in the launch of military payloads through their RS1 launcher and GS0 ground system.

**SES GS awarded \$11.8 million from U.S. government:** The contract is for the delivery of support activities to certain U.S. combatant services through the company's O3b Medium Earth Orbit (MEO) reachback capabilities, which it developed in collaboration with an undisclosed U.S. government customer.

**ESA selects OQ Technology to lead consortium aiming to develop 5G satellite network:** The award comes in the framework of the ESA ARTES programme and has the objective of developing a network over satellites in LEO, MEO and GEO. The Luxembourg-based company will lead a consortium composed of Leaf Space and SigCom Research Group.

**U.S. Airforce awards Arctic broadband contract to Hughes Network System and OneWeb:** In the framework of the agreement, the two companies will demonstrate the functionality of using LEO satellite systems in order to provide high speed and low latency broadband services to remote locations such as the Arctic. The \$3.4 million contract is part of the DoD's Defence Experimentation Using the Commercial Space Internet (DEUCSI) programme.



## INDUSTRY & INNOVATION

### Progress in the development of ESA's Space Rider

On May 13<sup>th</sup>, Thales Alenia Space Italia and the Italian Aerospace Research Centre (CIRA) announced the signing of a **€12.8 million contract** to develop the heat shield that will protect ESA's Space Rider. The thermal protection system is expected to be made of ISiComp and aims to dissipate the energy accumulated during the re-entry phase from temperatures of 1,600 degrees to just over 100 degrees.



*Credit: ESA*

In addition, two Spanish companies, IberEspacio and SENER Aeroespacial will collaborate with Thales Alenia Space Italia in the Space Rider program. IberEspacio won a **contract with ESA** and is expected to operate in the field of thermal technologies. SENER Aeroespacial signed a **contract with Thales** and will be the design authority for the guidance, navigation and control (GNC) system of the Space Rider reentry module. SENER had already been selected as prime contractor for the GNC system of the Intermediate eXperimental Vehicle (IXV) and the supplier of the navigation system for VEGA-C rockets. The Space Rider GNC will pilot the vehicle from when it detaches the orbital module to when it returns to Earth.

### Google wins SpaceX's cloud deal for Starlink internet connectivity

On May 13<sup>th</sup>, **Google was awarded a deal by SpaceX** to enhance Starlink's internet connectivity through its cloud services. The agreement will both allow SpaceX to install connected ground stations and allow Google to offer its private fibre-optic network to allow future customers devices to have a quick and direct access to applications using Google's cloud services or other geographically nearby. With this system, Google data centres are set to become channels where data flows from Starlink's satellites to end users and back. While Google has already invested **\$900 million in SpaceX** in 2015, the current deal is expected to run over seven years and SpaceX is projecting to expand at international level.

### EU General Court dismisses OHB application for interim relief against Galileo contract award



*Credit: ESA*

On May 26<sup>th</sup>, the General Court of the European Union has set aside its previous orders and dismissed the **application for interim relief** that OHB lodged to suspend ESA's decision to award second generation Galileo satellites contract to Airbus Defence and Space. With the latest decision, the General Court held that the requested interim measure would have major technical and financial consequences for the space programme of the European Union and that rapid conclusion of that contract is therefore an important public interest.

Following the court's decision, ESA finalised the signing of the **€698 million contract award** to Airbus for six Galileo satellites on May 28<sup>th</sup> on behalf of the European Commission. In addition, the €772 million award to Thales Alenia Space, itself not contentious in OHB's action, was also finalised by the Agency, with the first satellites expected to be launched in the next four years. The General Court noted it will deliver a final judgment on the substance of this case, beyond the application for interim relief, at a later date.



## Mynaric and Spacelink sign agreement to form new partnership

Mynaric and Spacelink **signed a term sheet** outlining the framework of a new partnership between the two companies, which focuses on the integration of Mynaric's laser communication services with Spacelink's data relay network. Mynaric is expected to deliver more than 40 optical inter-satellite link (OISL) terminals that will complement the services carried out by Spacelink's future MEO satellite constellation. The constellation, called Always In Sight, aims to provide the infrastructure necessary to build a communication superhighway to facilitate the transmission of increasingly large amounts data between satellites and Earth.



*Credit: Mynaric*

## Thales Alenia Space awards €58 million contract to OHB for ESPRIT elements

Prime contractor Thales Alenia Space awarded a **€58 million subcontract** to OHB System AG to deliver elements for ESPRIT, the European module for the Lunar Orbital Platform Gateway. OHB is set to develop the module's unpressurised structure, thermal subsystem up to flight readiness, as well as a xenon refueling system for the Lunar Gateway's electric propulsion system in the framework of the contract. The ESPRIT module is currently being developed under an ESA contract and is scheduled for launch in 2027.

## SpaceX Starship successfully completes suborbital test flight

On May 5th, SpaceX's Starship SN15 prototype **successfully completed a suborbital test flight** by reaching an altitude of about 10km and safely performing its landing manoeuvre at the company's Boca Chica test site in Texas. Starship SN15 is the upper stage prototype of SpaceX's next generation **fully reusable crew and cargo transport system**, which will also include the first stage of the rocket that is currently still under development and is known as the Super Heavy. The SN15 represents the first successful attempt to land the Starship's second stage prototype following attempts from four previous vehicles.

## UK Space Agency publishes 2020 Size and Health of the UK Space Industry report

On May 19<sup>th</sup>, the **"Size and Health of the UK Space Industry 2020"** report was issued by the space economics consultancy company "know.space". The survey-based report was commissioned by the UK Space Agency and primarily covers the period 2017 to 2019, with forecasted estimates for 2019/2020. The bi-annual report, which provides facts and figures of the UK space industry, highlights a growth in jobs of 3,200, an increase in income from £14.8 to £16.4 billion, and an 18% increase in investment in R&D bringing it to £702 million.

## Airbus Defence and Space selects Northrop Grumman to supply solar arrays for OneSat



*Credit: Airbus*

Northrop Grumman was **awarded a contract from Airbus Defence and Space** for the delivery of 24 ship sets to power Airbus' new GEO OneSat satellite family. Northrop Grumman expects to use its Compact Telescoping Array (CTA) design in the development of the solar arrays, especially due to its limited volume requirements which make it a prime candidate for missions such as the OneSat that require very compact storage volumes. In addition to the solar arrays, Northrop

Grumman will also supply heat pipes for payload thermal management and propellant tanks for the communication satellites' mono-propellant propulsion system.



### In other news

**SpaceX launches first space mission entirely paid with cryptocurrency:** The Canadian company Geometric Energy Corporation (GEC) plans to launch a 40-kilogram CubeSat on a rideshare SpaceX's Falcon 9 rocket to the Moon in the first quarter of 2022. The payload is expected to obtain lunar-spatial intelligence through "onboard sensors and cameras with integrated communications and computer systems".

**Airbus integrates its IoT communications solution into Astrocast's nanosatellites:** The company's Universal Network for IoT solution developed with the Swiss space start-up will deliver services worldwide and allow customers to have two-way communications, reaching the most remote and challenging of environments.

**Starfish and Benchmark form a strategic partnership to advance on-orbit servicing capabilities:** In the framework of this agreement, Starfish will be integrating Benchmark's Halcyon thrusters with its CEPHALOPOD rendezvous, proximity operation and docking (RPOD) software. The objective of the integration is to optimize the accuracy of on-orbit precision manoeuvres in view of future on-orbit refuelling demonstrations.

**Thales Alenia Space Italia awards Orion ESM Life Support contract to Cobham:** The contract is a follow-up of a previous agreement between the two companies and is for the delivery of regulators and latch valves that will be integrated in the life support systems of NASA's Orion spacecraft.

**Astra signs first commercial launch contract with Planet:** The Micro-launcher company has partnered with Planet for a multi-launch mission expected for 2022. The deal marks an important step for Astra since the company has never launch before. Furthermore, Astra has recently announced its intention to go public in a \$2.1 billion blank-check deal before July 2021.

**Omnisys awards Arctic Weather Satellite (AWS) contract to RUAG Space:** In the scope of the contract, RUAG Space will deliver the power system for ESA's AWS prototype whose objective is that of enabling short term and precise weather forecasting services in the Arctic region. Omnisys is the instrument prime contractor for the AWS mission.

**Canada Space Agency invests \$3 million in technology initiatives under Canada's lunar program:** Mission Control Space Services is due to receive funding to test cutting-edge computer technology and AI software to be used in lunar orbit and the Moon's surface in a mission planned to launch in 2022.

**Lockheed Martin and General Motors collaborate on the development of Moon rovers:** The two companies stated that their lunar rovers will support NASA's Artemis program. Lockheed Martin will lead the team, as the two companies aim to develop a vehicle with innovative capabilities that can support astronauts by extending the range of their lunar exploration activities.

**Astroscale UK awards £260,000 contract to AAC Clyde Space to support space debris mission:** AAC Clyde Space will co-engineer a satellite platform for Astroscale's ELSA-M, the End-of-Life Services space debris removal programme. In the scope of the contract, which is set to run until the start of 2022, Astroscale is expected to update some of its current systems such as the Starbuck power sub-system and its Sirius avionics.



## ECONOMY & BUSINESS

### New ESPI Space Venture Europe report is out

ESPI Space Venture Europe provides every year an in-depth report of the state of European private investments in the space sector. This year, the **ESPI Space Venture Europe 2020** statistics highlight an outstanding year for investment and entrepreneurship trends in the European space sector.

The year was marked by multiple announcements and new initiatives from European public institutions to further support these trends, suggesting that 2020 will not be an extraordinary year but rather a new milestone for Europe. In 2020 ESPI recorded a new high of €502 million raised for European space start-ups over 57 deals (conservative estimate as 8 deals were undisclosed). Over the period of 2014-2020, over €1.249 billion has been raised through almost 300 investment deals.



Investment value and number of deals per year 2014-2020



Investment type 2014-2020

In terms of types of investments, Venture Capital accounted for the vast majority of the deals in 2020 (30 deals representing 75% of the total volume of investments) followed by equity investments, which totalled €64 million, and debt financing. More marginal in 2020 were the Seed/Prize/Grant and acquisition financing structure which, while representing a third of the total deals, was only worth 4% of the total volume of investment.

With regards to the category of investors that have most contributed to financing European space start-ups in 2020, the participation of European and national public institutions continued to grow through new instruments and funds developed to support the ecosystem.

In 2020, 8% of the total investment originated purely from institutional investors such as public investment banks or regional development funds. This accounted for €40 million directly invested into European space start-ups. The real change in 2020 occurred on the front of mixed investments (public/private). An investment is considered mixed when the investment round counts with at least one public institution and one private company. In 2020, this share reached 52% of the total volume.



Public support to New Space investments

This means that out of the €502 million invested into the European space start-ups ecosystem in 2020, €260 million came from consortiums with at least one public backer.

More detailed information on definitions applied and investors and investment categories used for the purposes of this research are available in the **Space Venture Europe 2020 report**, free for download.



## UK start-up Arqit to merge with SPAC and raise \$400 million to launch quantum satellites

The UK-based quantum technology encryption start-up Arqit Ltd. and the publicly traded SPAC Centricus Acquisition Corp. **are expected to merge** at the end of the third quarter of 2021. While the new Arqit Quantum Inc. resulting from the merge is set to be listed on the US Nasdaq stock market, Arqit will remain a UK company. Centricus values the transaction at \$1.4 billion of which \$1 billion will be Arqit's enterprise value. The latest SPAC deal is also expected to provide Arqit with up to \$400 million in gross proceeds of which \$70 million are set to be secured from investors such as Sumintomo Corporation and Virgin Galactic, which are participating in Arqit's PIPE.



*Credit: Arqit*

In addition, on May 16th, Arqit and BT extended their past collaboration by signing a contract that sees **BT as the exclusive reseller** for Arqit in the UK, incorporating its products into BT's wider portfolio of security solutions. Arqit also signed a **long-term distribution contract** with Sumitomo Corporation in the scope of which the Tokyo-based company secured the rights to distribute Arqit's technology to the Japanese public and private sectors. **Virgin Orbit is also expected to launch** two small satellites in 2023 that Arqit will have integrated with its new quantum encryption technology, QuantumCloud.

## The newly founded European Innovation Council (EIC) launches €100 million EIC Transition

On May 20<sup>th</sup>, the EIC launched the **first calls worth a total of €100 million** for its EIC transition programme. The EIC Transition calls are a new funding and support mechanism for European start-up and SMEs that aim to help applicants mature their technologies beyond the experimental proof of principle in laboratories. Eligible companies, amongst which are also included start-ups and SMEs operating in the space sector, are expected to receive an EU contribution of up to €2.5 million in grants as well as non-financial supports. The EIC transition is part of the wider funding programme carried out by the newly created EIC together with the EIC Accelerator and the EIC Pathfinder programmes, with a total budget of €1 billion.

## Firefly Aerospace raises \$75 million in Series A round



*Credit: Firefly Aerospace*

On May 4<sup>th</sup>, the U.S. start-up Firefly Aerospace **closed a Series A funding round** worth approx. \$75 million. The round was led by the investment and management company DADA Holdings, and included the participation of other investors such as Astera Institute. The latest financing round valued the company at over \$1 billion and exceeded the \$75 million in equity that was initially offered by Firefly Aerospace. In order to compensate for the oversubscription, the start-up's seed investor Noosphere Ventures sold roughly **\$100 million of its holdings** to investors having participated in the funding round. Firefly Aerospace expects to raise an additional \$300 million this year following the inaugural launch of its small Alpha rocket planned for June 2021 to support the continued growth of the company and the gradual scaling up of its activities.

Firefly Aerospace also signed an contract to launch its **first lunar lander Blue Ghost** on a SpaceX Falcon 9 with the objective of landing on the Moon's Mare Crisium in 2023. Among others, Blue Ghost will carry 10 payloads for NASA's Commercial Lunar Payload Services (CLPS) program based on a contract Firefly closed with the space agency in February.



## Two Indian start-ups raise \$11 million in Series A funding rounds

The Indian spacetech start-ups Skyroot Aerospace Pvt and Agnikul Cosmos raised \$11 million in respective Series A funding rounds. **Skyroot's round** was led by Greenko Group founders. Among other investors, former WhatsApp global business chief Neeraj Arora also participated in the funding. The raised funds are expected to be allocated in Skyroot's rocket programme and to launch its flagship vehicle, Vikram-1. The Hyderabad-based company developing private space launch vehicles has already signed an agreement with ISRO and has also announced its intention to raise further \$40 million to meet their ambitious growth plan.



Credit: Skyroot

On the other hand, **Agnikul Cosmos' funding round** was led by the global venture capital company Mayfield India. The Chennai-based start-up is developing a small satellite launcher capable of carrying 100 kg of payload to LEO and since December 2020 is working with ISRO after signing an agreement with the Department of Space under IN-SPACe. It is expected the Series A raised capital will be used to strengthen Agnikul's technology infrastructure, increasing the size of their team and ground testing efforts.

## Axelspace raises \$24 million in Series C funding round

The Japanese firm Axelspace Holdings Corporation raised approx. **\$24 million in a Series C** funding round. The funding is expected to finance the production and launch of five additional optical microsatellites called GRUS in 2023 and foresees the acquisition of new shares by SPARX's Space Frontier Fund and other venture capital groups managed by Global Brain Corp. The set of satellites would complement the AxelGlobe EO platform developed by Axelspace to obtain high frequency images of Earth's mid-latitude regions.

## Maritime Launch Services raises \$10.5 million

The Canadian-owned commercial aerospace company Maritime Launch Services Ltd. (MLS) raised **\$10.5 million in gross proceeds**. The funding was led by the early-stage capital and advisory services investor PowerOne Capital Markets Limited and the Toronto-based merchant banking organisation Primary Capital Inc. MLS is planning to build the first Canadian commercial orbital launch site in Canso, Nova Scotia to provide rocket launch services to customers. MLS stated that part of the funding will be allocated for this purpose while it projects to allocate the second portion to obtain a launcher and launch vehicle for their planned maiden launch in 2023.

## Pangea Aerospace and Alba Orbital complete Seed rounds to boost commercial objectives

On May 20<sup>th</sup>, Pangea Aerospace raised **€3 million in a Seed round** bringing the company to a total of more than 6 million in mixed public and private funding. The capital is expected to be used for manufacturing and testing an aerospike propulsion technology. Pangea's funding round was led by Inveready, one of the leading asset-manager in Spain investing in early-stage technology-based companies, with the participation of CDTI Invierte, Dozen Investments, Primo Space and E2MC.

The British company Alba Orbital also closed a **\$3.4 million Seed round** to deliver its next series of less than a kilogram solar-powered EO satellites into orbit. The financial round was led by the early-stage investment firm Metaplanet Holdings, and saw the participation of Y Combinator, Liquid2, Soma, Uncommon Denominator, Zillionize and numerous other investors. Alba Orbital ambition is to deliver a constellation of nanosatellites to provide EO images every 15 minutes.



### In other news

**SES puts into place a €100 million share buyback programme:** Within the scope of the programme, the company expects to acquire up to 12 million A-shares and 6 million B-shares maintaining the required proportion between the two shares. The programme aims to reflect the confidence the company in its activities and to raise the price of each share to reflect their value.

**PLD Space wins €1 million ESA contract to study reusability of its MIURA 5 boosters:** The contract was signed in the framework of the agency's Future Launcher Preparatory Programme (FLPP) and is set to fund the Liquid Propulsion Stage Recovery 2 (LPSR 2) project. The award is a continuation of a previous contract signed between PLD Space and ESA in 2017

**Ramon.Space raises \$17.5 million in Series A funding round for supercomputers solutions in space:** The Palo Alto-based company is planning to use the funds to keep developing its computing systems that allow software and hardware to have in space the same capabilities they have on Earth. In the funding round participated StageOne Ventures, Deep Insight, WorldQuant Ventures, UMC Capital, and existing investor Grove Ventures.

**Voyager Space Holdings acquires majority control in X.O. Markets and Nanoracks:** Voyager announced its intention to acquire a majority stake in X.O. Markets and its subsidiary through the injection of significant growth capital into the business back in December 2020. With this acquisition, Voyager expands its list of vertically integrated NewSpace capabilities by adding industry-leading commercial space services.

**OneWeb acquires TrustComm and creates new government subsidiary:** Under the terms of the definite agreement, it is expected that OneWeb will offer its LEO network and connectivity services to the U.S. government and TrustComm customers. Furthermore, TrustComm will lead a recently acquired proxy subsidiary of OneWeb.

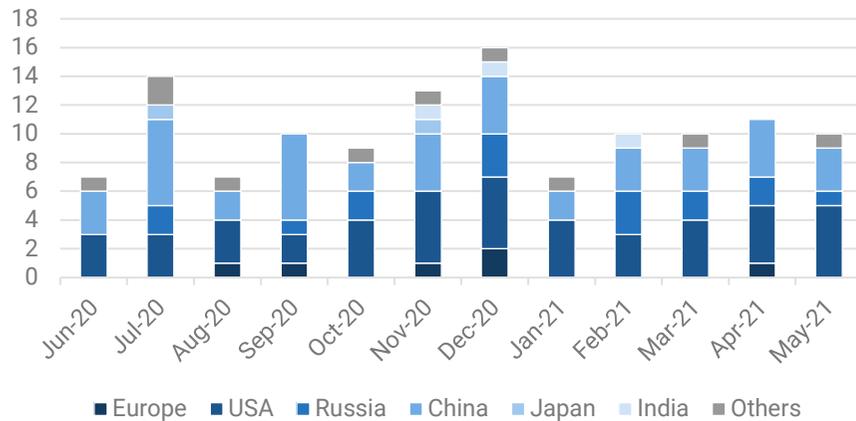


# LAUNCHES & SATELLITES

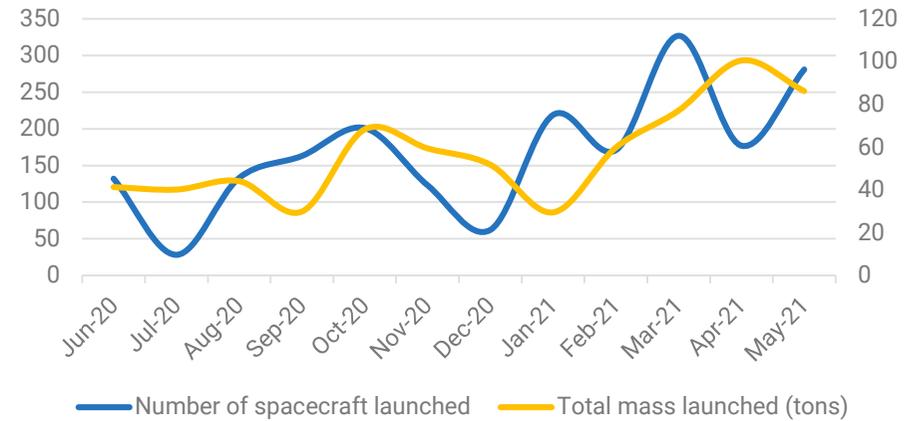
## Global space activity statistics

March 2021	USA	Russia	China	Others	Total
Number of launches	5	1	3	1	10
Number of spacecrafts launched	237	36	6	2	281
Mass launched (in kg)	65 333	5292	15 525	112	86 262

## Launch activity over the year



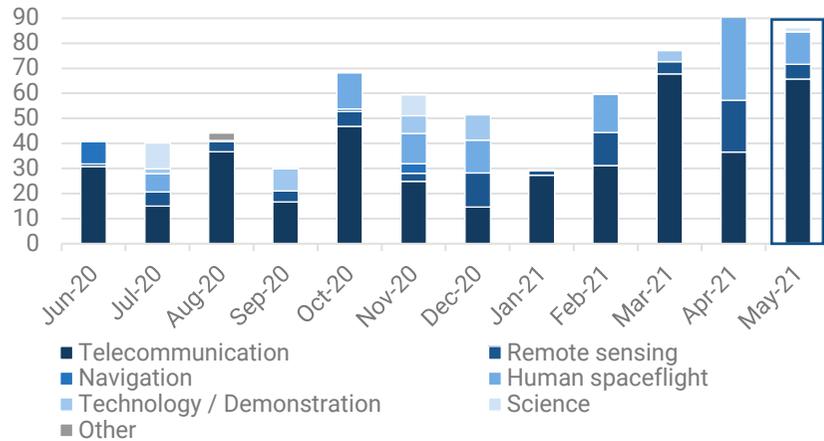
Evolution of the number of launches per launch country



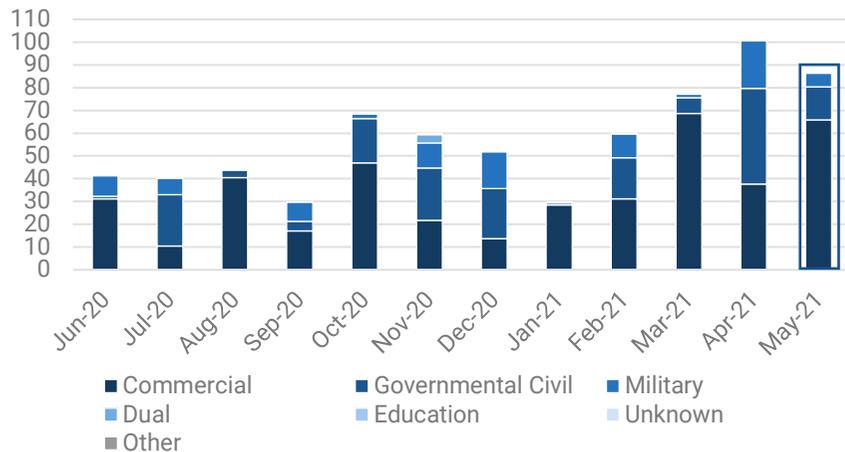
Evolution of launch activity over the year 2020-2021



### Satellite missions and markets



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



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

May 2021	Telecom	Remote sensing	Human Spaceflight	Science	Tech/Demo
Europe	5292				
USA	60 320	5074			51
China	50	900	13 000	1575	

Total mass (kg) launched by mission and customer country

May 2021	Commercial	Governmental Civil	Military
Europe	5292		
USA	60 555		4890
China	50	14 575	900

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
04/05/2021	USA	Falcon-9 v1.2 (Block 5)	Starlink 25 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
06/05/2021	China	CZ-2C(3)	Tianqi 12	Guodian Gaoke	China	Shanghai ASES Spaceflight Technology	China	50	Telecommunication	Commercial
			Yaogan 30-08 (-01, -02 & -03)	People's Liberation Army	China	CAS	China	300 (each)	Signal Intelligence	Military
09/05/2021	USA	Falcon-9 v1.2 (Block 5)	Starlink 27 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
15/05/2021	USA	Falcon-9 v1.2 (Block 5)	Starlink 26 (52 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
			Capella 6	Capella Space	USA	Capella Space	USA	112	Earth Observation	Commercial
			Tyvak 0130	Tyvak Nano-Satellite Systems	USA	Tyvak Nano-Satellite Systems	USA	11	Technology / Demonstration	Commercial
15/05/2021	New Zealand	Electron KS	BlackSky (8 & 9)	BlackSky Global	USA	LeoStella	USA	56 (each)	Earth Observation	Commercial
18/05/2021	USA	Atlas-5(421)	SBIRS-GEO 5	US Space Force	USA	Lockheed Martin	USA	4850	Early Warning	Military
			TDO (3 & 4)	USAF Academy	USA	DNet Engineering & Integration	USA	20 (each)	Technology / Demonstration	Military
19/05/2021	China	CZ-4B	HaiYang 2D	National Satellite Ocean Application Service	China	DFH Satellite Co.	China	1575	Earth Science	Governmental Civil
26/05/2021	USA	Falcon-9 v1.2 (Block 5)	Starlink 28 (60 satellites)	SpaceX	USA	SpaceX	USA	260	Telecommunication	Commercial
28/05/2021	Russia	Soyuz-2-1b Fregat	OneWeb L7 (36 satellites)	OneWeb Ltd.	United Kingdom	OneWeb Satellites (USA)	USA	147	Telecommunication	Commercial
29/05/2021	China	CZ-7	Tianzhou 2	CNSA	China	CAST	China	13000	Cargo Transfer	Governmental Civil



## Launch Highlights

### SpaceX reaches two major milestones



*Credit: Stephen Marr/NASASpaceflight.com*

On May 9<sup>th</sup>, SpaceX launched a new group of 60 Starlink satellites and recovered the booster used for the launch. This launch is a milestone for the company, as this is **the 10<sup>th</sup> time** that a booster of the Falcon 9 rocket was used, an objective set in 2018 by the company for its reusability efforts. Thus, it was explained at the time that a booster should fly ten times before requiring significant maintenance. However, more recently, Elon Musk announced that Falcon 9's first stages could now be launched until they fail, to be able to identify their limits. They would nonetheless be used on Starlink launches to avoid losing the payload of a customer.

Moreover, on May 26<sup>th</sup>, SpaceX launched **the last batch of satellites**, thus achieving the completion of the first "shell" of its constellation. The company has now around 1600 working satellites in orbit for its constellation (while its competitor OneWeb reached **200 satellites** in May). After the satellites of the latest launch enter their operational orbit, SpaceX will be able to deliver high-speed broadband to 80% of the world, including in some remote areas. The launch was also the 100<sup>th</sup> consecutive successful launch of a Falcon 9 rocket.

### Electron fails to reach orbit

On May 15<sup>th</sup>, an Electron launcher from Rocket Lab **failed to send in orbit its payloads**, two satellites for the geospatial intelligence company BlackSky Global. This launch, which was the 20<sup>th</sup> of the launcher, is the second failure for the company in less than a year. Rocket Lab had also planned to recover the first stage of the launcher (equipped with an upgraded heat shield), and managed to do so, as the failure happened on the second stage after their separation. The technical issue with the second stage was traced back to **an engine issue**, whose cause still has to be determined. The company precised that changes on the first stage did not play a role in the loss of the mission.



*Credit: Rocket Lab*

### Virgin Galactic gets closer to starting commercial operations



*Credit: Virgin Galactic*

On May 22<sup>nd</sup>, Virgin Galactic carried out its **first successful suborbital flight in more than two years**, leading the VSS Unity (or SpaceShipTwo) vehicle to the edge of space (at a maximum altitude of 89.2 km). The flight was advertised as the first human launch from New Mexico. However, beyond the two pilots, no human beings were onboard as the spacecraft was actually carrying payloads for the NASA Flight Opportunities programme. The latest successful flight for the company was in February 2019.

Since then, various tests took place with mixed results due to several technical issues. Three other flights are planned this year for the SpaceShipTwo, one transporting employees of the company, another one carrying Richard Branson, and the last one being a commercial flight for the Italian Air Force.

## ABOUT ESPI



Policy &  
Strategy



Economy &  
Business



Security &  
Defence



International &  
Legal

ESPI is the European think-tank for space. The Institute is a not-for-profit organization based in Vienna, World capital of space diplomacy, providing decision-makers with an informed view on mid to long-term issues relevant to Europe's space activities since 2003.

ESPI is supervised by a General Assembly of member organizations and supported by an Advisory Council of independent high-level experts.

ESPI fulfils its objectives through various multi-disciplinary research activities leading to the publication of books, reports, papers, articles, executive briefs, proceedings and position papers, and to the organisation of conferences and events including the annual ESPI Autumn Conference.

Who we are		What we do	
Independent think-tank specialised in space policy			Research and analysis on major space policy issues
Multinational team with interdisciplinary expertise			Monitoring of global space trends and policy developments
Part of a network of European and international partners			Organization of thematic conferences and workshops

*Download our reports, check our events and subscribe to our newsletter online*

[www.espi.or.at](http://www.espi.or.at)

