



ESPI

European Space Policy Institute

ESPI Insights

Space Sector Watch



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FOCUS: EU SPACE BUDGET – A GLASS HALF FULL?



Dear Friends of ESPI,

Following the recent space budget approval by the European Council in July 2020 (MFF 2021-2027), many estimates were given regarding the size of the space budget reduction. With the original proposal being given in constant prices and the outcome in current prices, general assessments about the budget reduction were in a large majority stated in an erroneous manner. As such, the reduction between the initial European Commission proposal and its final approved version is €1.1 billion rather than the widely mentioned €2.8 billion.

The primary reason behind the confusion in estimates is that the MFF sets a maximum spending amount for the EU budget in both current and constant (2018) prices. Both indicators are important as current prices are often publicly communicated while official negotiations are done in constant (2018) prices. On one hand constant prices express the purchasing power allocated to policy programmes throughout the duration of the MFF, and on the other, current prices are adjusted each year to ensure that the initial purchasing power is maintained. The current price adjustment is established using a fixed 2% annual inflator. A good way to understand the origin of the confusion is to follow step by step developments of the interinstitutional negotiations over the past two years.

- **June 2018:** The European Commission presents the “New Space Programme” and proposes a space budget of €16 billion (current) / **€14.2 billion (constant)** for the MFF 2021-2027.
- **March 2019:** The European Parliament requests an increase of the EU Space Programme budget to €16.9 billion (current) / €15 billion (constant)
- **December 2019:** The Finnish Presidency revises the MFF budget to consider Brexit and sets a ceiling at 1.07% of EU Gross National Income (GNI). As a result, the budget of the EU Space Programme is proposed to be reduced to €14.3 billion (current)/ €12.7 billion (constant).
- **May 2020:** Following the COVID-19 pandemic, the Commission presents a revised MFF proposal, of which €14.9 billion (current) / €13.2 billion (constant) are allocated to the EU Space Programme.
- **July 2020:** the European Council accepts the revised proposal of the European Commission.

The initial proposal of €14.2 billion and the European Council 2020 approval of €13.2 billion in constant prices correspond respectively to €16 and €14.9 billion in current prices. As a result, the reduction of the EU Space Programme budget amounts to €1.1 billion (current), which represents a reduction of 7%. This contrasts with the widely cited €2.8 billion reduction which originates from comparing the initial proposal in current prices (€16 billion) with the outcome in constant prices (€13.2 billion).

While the final revised budget remains lower than the original proposal, the overall space envelope still represents a €3.8 billion increase compared to the **previous MFF 2014-2020** (€11.1 billion, current). This highlights a 36% increase of the space envelope compared to the previous MFF. Furthermore, the percentage of the space budget in proportion to the entire MFF envelope has also risen. While only worth 1% of the past MFF, the revised 2020 space budget represents 1.2% of the total MFF. This actually underlines a growing interest and investment of the European Union in the space sector.

Sincerely yours,

A handwritten signature in black ink, appearing to be 'JJ Tortora', written over a horizontal line.

Jean-Jacques Tortora
Director of ESPI



POLICY & PROGRAMMES

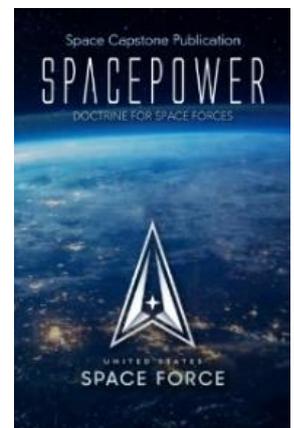
ULA and SpaceX selected to launch U.S. military and intelligence satellites

On August 7th, the U.S. Air Force awarded ULA and SpaceX with the National Security Space Launch (NSSL) Phase 2 contracts for the launch of national security satellites for the U.S. military and intelligence agencies. ULA received a \$337 million contract for two missions (USSF-51 and USSF-106) and SpaceX received a \$316 million contract for one mission (USSF-67), all planned for 2022. The two companies will collectively conduct 34 missions (60% ULA and 40% SpaceX) between 2022 and 2027. To launch the satellites, ULA plans to use its new Vulcan Centaur launch vehicle, currently under development, while SpaceX will rely on the Falcon 9 and Falcon Heavy. The ULA shift to a new launch vehicle is compelled by a legislative mandate to end the DoD's reliance on ULA's Atlas 5 rocket which uses Russian RD-180 engine, by the 31st of December 2022.

SpaceX and ULA have not yet been officially debriefed on the reasoning behind the selection criteria and an official press release is expected shortly. The award is in line with the **U.S. intention to foster competition within the rocket industry**, servicing both government and commercial customers, and reducing the launch cost for the Pentagon. NASA did not select the proposal submitted by Blue Origin and Northrop Grumman, and both companies have expressed their disappointment in the result of the competition. The two companies will still provide equipment for the national security launches, respectively building the BE-4 main engines and supplying solid rocket boosters for ULA's Vulcan Centaur rocket.

Release of first U.S. Space Force doctrine

On August 10th, the U.S. Space Force released its first doctrine, **the Space Capstone Publication (SCP), called "Spacepower"** which considers spacepower as a vital element for the U.S. prosperity and security, and a distinct form of military power. Following the creation of U.S. Space Force as a separate branch of the armed services, and the recognition of space as a warfighting domain, the Space Force wanted to create its own guidelines on the use of space in military operations. The new space doctrine points out that the success of the Space Force depends on its **ability to coordinate strategy and operations with the other U.S. military services and international allies**. As such, it was reviewed by the U.S. Department of Defense and shared with leaders of allied nations before its release.



Credit: U.S. Space Force

It identifies three "Cornerstone Responsibilities of Military Space Forces": preserve freedom of action, enable joint lethality and effectiveness and provide independent options. **The document is divided in five sections**, which are the key competencies of the Space Force: space security, combat power projection, space mobility and logistics, information mobility, and space domain awareness. The SCP also reconfirms the necessity to have military capabilities in space to protect national assets. Covering the relation between national and military space power, it states that the access and control of space is also seen as a national concern, especially due to the role of space in the global economy and the world's increasing dependence on space for critical products and services. The doctrine is subject to the wider government policies and strategies that inform its implementation, and it is considered the base upon which to build additional doctrines.



New FCC licensing procedures for small satellites

On August 19th, the new “streamlined” licensing procedures for small satellites - released by U.S. FCC in July 20th - came into effect. In comparison to the traditional licensing approach served by Part 25 of the FCC regulations, the new system provides a faster and less expensive approach for commercial applications.

The new optional set of streamlined procedures is applicable to small satellites with specific features: having a short on-orbit lifetime, a maximum wet mass of 180 kg, and having a mission profile designed to produce a low risk of orbital debris and spectrum interference. The conformed satellite will be eligible for significantly reduced fees (from \$471,575 to \$30,000). The goal is to accommodate this fast-growing segment of the space sector, allowing for a less burdensome licensing process.



Credit: NASA

UAE will launch a navigation satellite in 2021

Following the successful launch of a Mars probe on July 19th, the UAE will launch navigation satellites in 2021 and a second one will be launched the following year. These satellites will be funded by the UAE Space Agency. These satellites will aim to demonstrate technological strength and capability build up without replacing existent GNSS.

The UAE satellite navigation project is part of the Science and Technology Roadmap created by the UAE Space Agency and the NSSTC to develop new technologies. It is the first project of **Satellite Assembly, Integration and Testing (AIT) Centre**, which a collaboration formed by Tawazun Economic Council with Airbus and the National Space Science and Technology Center (NSSTC) of the UAE University, in Al Ain region. The new center will start operations at the beginning of 2021, with Airbus support with design, outfitting and commissioning of the facility. The second project of the Satellite AIT Centre is the development of “813”, a satellite for Earth Observation.

Independent study concludes Department of Commerce best suited to take on STM leadership

On August 20th, an independent review on space traffic management (STM) commissioned by the U.S. Congress and published by the National Academy of Public Administration (NAPA) concluded that the U.S. Department of Commerce is best equipped and positioned to take STM responsibilities. Following the publication of the White House Space Policy Directive 3 in 2018, conflicting views regarding the agency best suited to take leadership over STM matters emerged across U.S. policy-makers, which eventually slowed down the allocation of mandates and budgets.

The NAPA report examined the ability of the Office of Space Commerce (OSC), the Department of Defence, NASA and the Federal Aviation Agency (FAA) to take responsibility over various STM-related activities. As a result, the Panel determined the OSC to be the most suitable office for performing these tasks. The Department of Commerce hopes that the transition of responsibilities to OST for the civil STM will be reason enough to agree on the \$15 million proposed for the FY2021 budget, representing a considerable increase compared to the \$2.3 million received for FY2020.

On August 24th, at the AIAA conference panel, several industry officials expressed their support to NAPA recommendations. Now that an independent study gave the green light to the Department of Commerce, industry officials hope for a quick approval by the congress approval to put an end to a long political debate on the agency best suited to take leadership over future STM developments in the U.S.



UK proposes UN resolution calling for a global discussion on responsible behaviour in space

The UK proposed a draft UN resolution with the aim to initiate a global open discussion on the idea of responsible behaviour in space. Countries around the world will be invited to submit their views on responsible and threatening behaviour to the UN Secretary General which will be included in a report to the UN General Assembly. The UK proposal is due to the urgent necessity of a new approach on the matter to increase trust and confidence between countries operating in space and to avoid conflict in space.

7th comprehensive dialogue on space between the US and Japan

On August 26th, Japan and the U.S. agreed to further strengthen their cooperation in space. They welcomed the approval of the implementing arrangements regarding the plan for Japan's Quasi-Zenith Satellites to host U.S.-provided SSA payloads and concurred to enhance the bilateral defence cooperation between the U.S. Space Command and Space Force and the Japan Air Self-Defense Force's Space Operations Squadron. They reconfirmed their intention to cooperate in several areas such as space security, international rulemaking, SSA, space exploration, commercial space activities, GNSS, as well as reaffirmed their commitment to Artemis activities. The 8th meeting of the dialogue will be held in the U.S. in 2021.



Credit: The Japan Times

Starliner first crewed mission no earlier than June 2021

NASA and Boeing announced on August 28th that they plan to fly the Starliner Orbital Flight Test (OFT) 2 not before December this year. OFT2 is a repeat of the unsuccessful test OFT1 in December 2019, which experienced technical problems that prevented the spacecraft from docking with the ISS. An independent NASA/Boeing review concluded with 80 recommendations for Starliner development, of which 75% have now been implemented. Following the OFT-2 mission, the Crew Flight Test (CFT) is expected to launch around June 2021. This will then be followed by the operational mission Starliner-1 which is aiming to launch before the end of 2021.

Further increase in SLS development costs

In an August 27th blog post, Kathy Lueders, the NASA associate administrator for human exploration and operations stated that NASA had increased the cost estimate for both the SLS and the Exploration Ground Systems (EGS) to respectively \$9.1 billion and \$2.4 billion. They represent an approximate 4% and 3% increase in comparison to the data expressed in the U.S. Government Accountability Office report published in April 2020. With the new estimates being 30% more expensive than the original baseline set in 2014, a threshold has been met forcing congressional notification and rebaselining.

Portuguese Space Agency opens constellation competition for sustainable development

On August 11th, the Portuguese Space Agency announced the first round of the InCubed+ programme, which has a total value of €4 million (€200k per project). The project aims to support a constellation of satellites for the protection and sustainable socio-economic development of the Atlantic. It is a co-financed programme under the ESA Blue Worlds initiative. The first round of applications, named Investing in Industrial Innovation, will finance the development of innovative and commercially viable products and services that use EO satellites. The InCubed+ program is in line with the Nation Strategy Portugal Space 2030 which aims to promote space abilities in Portugal.



In other news

- **New NASA office to coordinate rideshare launches of smallsat science mission:** NASA's Science Mission Directorate (SMD) new office provides a point of contact for all NASA SMD rideshare-related inquiries, and it is part of a larger project to promote the usage of CubeSats and other smallsats to carry out a wide range of missions.
- **U.S. and UK agree on sharing key technical foundation for space operations:** On August 14th, the U.S. Space Force signed an agreement allowing to share the Standardized Astrodynamics Algorithm Library (SAAL) with the UK MOD. The SAAL is part of the U.S. Strategic Command's Operations OLYMPIC DEFENDER (OOD) and it is a collection of the Space Force's understanding of orbital physics and algorithms for the prediction of the locations and trajectories of satellites and debris in orbit.
- **UK Space Agency announces £3.4 million for sustainable development:** UKSA has announced £3.4 million in funding for 10 sustainable development projects, including using satellites for anti-trafficking, mosquito tracking and wildlife conservation. The funding comes from the Global Challenges Research Fund (GCRF) and will form part of UKSA's International Partnership Programme (IPP), worth £30 million annually.
- **NASA calls for Artemis Science White Papers:** To aid the Science Definition Team (SDT), which is working on developing the detailed science objectives for the Artemis III mission to the Moon's South Pole in 2024; NASA is soliciting the submission of White Papers on the science to be accomplished with the Artemis III human crew. The objectives are in line with the goals released by the Human Exploration and Operations Mission Directorate in the Artemis Science Plan.
- **Five space science missions shortlisted by NASA:** With the intention to enhance the global awareness about the space environment and Solar dynamics, Nasa has short-listed 5 mission proposals which will receive \$1.25 million for preliminary concept studies. Two of these proposals will be selected and will receive a total capped budget of \$250 million funded by NASA's Heliophysics Explorer's programme.



INDUSTRY & INNOVATION

FCC approves OneWeb constellation expansion

On August 26th, the **FCC approved OneWeb access to the U.S. market** with its NGSO V-band satellite constellation. While 720 Ku- and Ka-band satellites were already approved by the FCC in 2017, OneWeb is now expanding its satellite constellation with an additional 1,280 MEO satellites. The FCC requires OneWeb to launch and operate half of the maximum number of proposed satellites by August 2026 with the remaining satellites to be launched and in operation by August 2029.

SpaceX conducts successful Starship test flight

SpaceX Starship **made its first test flight** on August 4th, ascending to about 150 m above the launch pad in Texas in a flight lasting just less than a minute. The spacecraft also moved horizontally, testing the thrust vectoring system, before deploying and landing on its 'legs'. This comes a year after the previous prototype, Starhopper, conducted a similar test. **This Starship prototype, the sixth** since the programme began, was 30 m tall and lacked many elements necessary for the final starship design; yet it proved that core functions could survive through initial liftoff as well as the success of the thrust vectoring control system. The final Starship version will have six Raptor engines, rather than just one. In time, the goal of Starship is to pair with the Falcon Super Heavy, to carry large payloads into and beyond Earth orbit, including to Mars.



Credit: SpaceX / CNBC

Virgin Galactic announces further delays

On August 3rd, Virgin Galactic **announced a delay** in the first commercial flights of the suborbital vehicle SpaceShipTwo, now expected in 2021. In its Q2 results, the company also announced it is raising \$460 million for general use. Virgin Galactic has ceased powered flights of SpaceShipTwo since February 2019. It is now expecting to perform two more test flights before the commercial flight, including one with experimental payloads as part of NASA's Flight Opportunities programme and one with 'mission specialists' to evaluate the flight experience. Furthermore, Virgin Galactic expanded on previous announcements regarding point to point travel. **It presented a preliminary** design of a Mach 3 airliner, and an MoU with Rolls-Royce to study engine concepts for such an aircraft.

Small launch start-up HyImpulse targets 2022 launch

DLR spinoff HyImpulse **is targeting 2022 for the first launch** of its hybrid propulsion small launch vehicle. The three-stage rocket is designed to send 500 kg to 400 km LEO, using a paraffin-based fuel and liquid oxygen. It is expected that this hybrid fuel system will make the rocket less complex than liquid rockets but safer than solid fuels. The company is funded by Rudolf Schwarz, chairman of German technology company IABG, and also has received a €2.5 million grant from the European Commission. HyImpulse will test their engine on a sounding rocket launched from Sweden in March, eventually aiming for a price point of €10 million per launch.



Key updates in US C-Band clearing

Thales Alenia Space selected for last two SES C-band replacement satellites

Following the decision of the FCC to clear 300 MHz of North American C-band spectrum for 5G cellular networks, **SES selected Boeing and Northrop Grumman** to manufacture two replacement satellites each. They will be all launched on American rockets from ULA and SpaceX respectively in 2022. The all-American selection by SES triggered some discussions, notably about the intense political pressure by the US government on the FCC to benefit the US space manufacturing industry.



Credit: Thales Alenia Space

Following the SES and Intelsat decision to participate in the accelerated program, on August 7th, **SES selected Thales Alenia Space** for the final two GEO satellites. TAS will manufacture two “contingency satellites”, SES-22 and 23, which will ensure that SES complies with the tight FCC deadlines of December 5th 2023 (two years earlier than the 2025 deadline). As part of the program, SES will earn up to \$3.97 billion in an accelerated allocation payment.

SES is the first satellite operator to order all its C-band replacement satellites, and, as result of its selection, TAS is the only European manufacturer to win two of 12 replacement satellite orders in 2020 for the FCC’s C-band spectrum clearing.

Eutelsat revises its transition plan and raises competitive concern

In June, **Eutelsat Communications disclosed in its transition plan** to retire and replace one GEO satellite (the Eutelsat-113 West A) out of the four satellites currently serving U.S. customers in the C-band spectrum. For this single satellite, it estimated a total expenditure of \$172 million. On August 17th, Eutelsat issued its revised transition plan, communicating that **it no longer intended to buy a C-band replacement satellite**. The reasoning was that Eutelsat already had enough bandwidth to reallocate its additional capacity onto three other GEO satellites, and continue to offer C-band communications services in the U.S. without delays affecting customers. As such, the new estimated clearing costs are of \$14.9 million instead of the \$172 million initially expected in the first transition plan.

Eutelsat, like Hughes and Inmarsat, have questioned the SES and Intelsat usage of the reimbursement payments to subsidize satellite capacity in other spectrum bands and neighboring markets outside the U.S., which could potentially lead to an unfair competitive advantage.

Intelsat includes non-C-band payloads in its transition plan

On August 14th, **Intelsat presented to the FCC its final C-band transition plan**, outlining the schedule and cost of its compliance with the FCC order. Intelsat has already ordered four satellites from Maxar Technologies and two from Northrop Grumman, while the seventh will be awarded in September. Intelsat estimated it will spend about \$1.18 billion for all required satellites, comprising manufacturing, launch, insurance and other costs. While meeting the 2023 deadline will permit Intelsat to receive \$4.9 billion in incentive payments.

The operator intends to add non-C-band payloads to some of the seven satellites. As mentioned above, Intelsat have been accused by the other satellite operators (Eutelsat, EchoStar, Hughes Network Systems and Inmarsat) of **distorting the competitive landscape**, and that the reimbursable satellites should be C-band only, to serve the U.S. continental and should not be spares.



Rocket Lab improves Electron capability and aims for reusability

Rocket Lab announced on the August 4th that they have improved the battery efficiency of their rocket motors, increasing the payload capacity of their Electron rocket from 150 to 200 kg to 500 km SSO and 300 kg to lower orbits. The improvement also allows flights beyond Earth orbit, including interplanetary missions. Furthermore, Rocket Lab are planning for the recovery of an electron first stage booster in 2020, following a successful first stage drop test in early August. In time, they will use a parachute system to recover first stages in midair, aiming for full reusability.

Blue Origin delivers mockup lunar lander to NASA

Blue Origin announced on the August 20th that it had delivered a mock-up of its lunar lander for NASA to evaluate as part of the Artemis Programme. Blue Origin lead the Human Landing Systems (HLS) National Team, which also includes Lockheed Martin, Northrop Grumman and Draper, and received a \$579 million HLS award in April to develop the lunar lander. The 12 m tall model was built by Lockheed Martin and will be used by NASA to evaluate the layout of the vehicle and provide critical feedback so Blue Origin can improve the design ahead of final a selection by NASA.



Credit: Blue Origin

SpaceBel forms hyperspectral satellite imaging spinoff

Belgian Company SpaceBel have created a spinoff to operate a small constellation of 5 to 10 hyperspectral imaging satellites. SpaceBel provides software for ESA missions, including the asteroid mission Hera and the Proba-3 satellites. It also led a consortium of companies to develop a hyperspectral satellite for Vietnam back in 2014, but the programme ended due to financial difficulties. The new company, ScanWorld, was formed with Belgian investment firm SRIW, and will raise €10 million in 2021 to initiate development of the constellation, which will comprise satellites of 100 - 200 kg capable of better than 30 m resolution.

First multisignature blockchain transaction executed in space

On August 18th, SpaceChain UK Limited, supported by the ESA Kick-start Activity program, executed its first multisignature transaction through a ground station to the blockchain hardware installed on the ISS. The Nanoracks payload containing the blockchain hardware wallet technology from SpaceChain was shipped in a SpaceX cargo Dragon in December 2019. The onboard computer, supplied by GomSpace, demonstrated the receipt, authorization, and retransmission of blockchain transactions through its private key. The result of the test is a milestone in the broader SpaceChain aim to lay the foundation for a new generation of products built on Distributor Ledger Technology (DLG), and in the long-term goal to create a decentralized orbital constellation for fintech applications and business transactions.

Northrop Grumman tests solid rocket motor

Northrop Grumman performed a static fire test of the GEM 63XL solid rocket motor. The 63XL variant is the booster will be used on the ULA Vulcan Centaur, expected to fly in 2021. GEMs (Graphite Epoxy Motors) were first developed in the 1980s, and the GEM 63 was developed with funding from the US Air Force. The 63XL variant is 6 ft longer, at 72 ft.



In other news

- **Spacecom, Gilat Telecom offer new satellite service in Africa:** Spacecom, an Israeli satellite company, and Gilat Telecom, an Israeli global communication service provider, have rolled out a high-speed, low-cost satellite service across Africa. Spacecom provides its AMOS-17 digital High Throughput Satellite (HTS), on both C- and Ku-band. While Gilat Telecom contributes with its SD-WAN MAX technology and intelligent routing, potentially expanding the Spacecom satellite capacity by up to 20%. The end-consumer will be able to use their existing equipment on existing or new terminals.
- **Orbit Fab to develop In-space Xenon Pumping for U.S. Air Force:** The in-space fluid transfer system of the San Francisco-based Orbit Fab, the Rapidly Attachable Fluid Transfer Interface (RAFTI), **is becoming** the most common refueling interface for the satellite servicing industry. Orbit Fab is the first private company to resupply the ISS with water. The emerging satellite servicing market is forecast by NSR to be valued at more than \$4.5 billion in the next 8 years.
- **Voyager Space Holdings launches IP exchange:** Space private equity group Voyager Space Holdings has **released the VSIPX**, a marketplace for space IP. This will allow IP holders to sell or license underutilised patents for additional revenue.
- **Skyrora successfully tests suborbital vehicle:** UK small launch startup Skyrora has successfully launched its Skylark Micro rocket in a suborbital launch from Iceland. The two-stage rocket reached a peak altitude of 27 km. Skyrora are working towards the launch of the Skyrora XL orbital launch vehicle in 2023.
- **Hungary's first commercial satellite to launch in 2024:** The telecoms satellite will launch in 2024, when the current lease on Hungary's GEO orbital slot expires. CarpathiaSat CPLC, a joint venture between IT company 4iG, telecoms company Antenna Hungária and satellite manufacturer New Space Industries, will lead the venture, which will involve close cooperation between the state, the private sector and ESA.



ECONOMY & BUSINESS

China's iSpace raises \$172 million in series B funding round

Private Chinese launch start-up iSpace **has raised \$172 million in a series B funding** round. The funding was announced on August 25th and led by Beijing Financial Capital Operation Center and will be used to develop their Hyperbola launch vehicles. The company has now raised over \$270 million to date. Hyperbola-1, a 21 m tall three-stage solid fuel rocket, was the **first private Chinese launch vehicle to successfully reach orbit** in 2019. The larger Hyperbola-2 will be 28 m tall, use liquid oxygen methane engines and have a reusable first stage; its first orbital flight is planned for late 2021.

SES orders four more O3b mPower satellites from Boeing

SES **have ordered four more O3b mPower** broadband satellites from Boeing and two launches from **SpaceX at a cost of approximately €450 million**. SES currently operates 30 first generation O3b satellites, and contracted Boeing to build seven mPower second-generation satellites in 2017. SES has now decided to expand the new constellation to 11 satellites. The satellite constellation will be launched between 2021 and 2024 and will have a design life of 12 years. The additional satellites will be more advanced than the initial seven, increasing the throughput of the whole constellation by 90%. SES has also announced it will collaborate with Boeing on interoperability between O3b satellites and U.S. military satellites.

Airbus to build Arabsat BADR-8 satellite

On August 18th, **Airbus announced it has been contracted** by Arabsat to build the telecommunications satellite BADR-8. The 4.5 tonne satellite will be based on the all-electric Eurostar Neo platform with a C and Ku-band payload. It also has a TELEO optical communications demonstrator payload, which features optical feeder links. The satellite will launch in 2023 and operate at 26° E, and has a design life of 15 years. The satellite, including launch, insurance and ground systems, will cost around \$300 million.



Credit: Airbus

Airbus to build Yahsat Satellite

Abu Dhabi based communications satellite operator **Al Yah Satellite Communications Company (Yahsat) has contracted Airbus to build** and launch their Thuraya 4-NGS L-band satellite based on their electric Eurostar Neo platform. The satellite will aim to deliver the next generation mobile telecommunication systems. It is scheduled to launch in 2024. The contract is part of a \$500 million investment by Yahsat into subsidiary Thuraya, which includes an upgraded ground segment, and may be increased to include a second satellite.

SpaceX raises \$1.9 billion in private equity round

SpaceX has so far **raised \$1.9 billion in an equity fundraising round** filed with the SEC on August 18th, following a fundraising of \$346 million in May. The round is not complete with \$165 million left to be sold; if both rounds are completed then SpaceX will have raised \$2.41 billion this year. 75 investors were involved in the \$1.9 billion round, which was the largest equity financing of SpaceX to date. It gives SpaceX a post money **equity valuation of \$46 billion**, placing it amongst the most valuable venture backed companies in the U.S..



ABL Space System secures \$93.5 million in financing

On August 3rd, Californian small launch company **ABL Space Systems** was awarded two U.S. DoD contracts worth \$44.5 million to demonstrate its rocket technology. It also closed a funding round worth \$49 million, led by VC firm Venrock, on March 31st. The contracts were awarded by the Air Force Research Laboratory and the Air Force AFWERX Programme, the latter of which aims to foster innovation in the Air Force. The financing will fund ABL through three demonstration launches in 2021.

Exolaunch signs contracts for multiple small satellite launches

German launch service provider Exolaunch has signed contracts to launch two CubeSats for **Kepler Communications** and 24 PicoSats for **Swarm Technologies**. The Kepler satellites will launch on a **Soyuz scheduled for September**, and the Swarm satellites on a Falcon 9 scheduled for December. Exolaunch have also **signed an MoU** with Rocket Factory Augsburg (RFA), to provide end-to-end launch services on RFAs upcoming launch vehicle.

ispace raises \$28 million and updates lunar lander

Japanese lunar lander start-up ispace **has raised \$28 million in a Series B** funding round announced August 20th, bringing the total funding raised by the company to approximately \$125 million. The new funding, led by Japanese VC Incubate Fund, will allow ispace to complete its first mission. Furthermore, at the end of July, ispace **updated its Hakuto-R lunar lander design**. The lander will now be 1050 kg and use less propellant, whilst maintaining a payload capacity of 30 kg. ArianeGroup will provide the main and smaller thrusters for the lander. The flight has also been delayed by a year and will launch on a Falcon 9 in 2022.



Credit: ispace

Reaction Engines receives £20 million investment from Rolls-Royce

Rolls-Royce **has agreed to invest £20 million** in Reaction Engines, as well as announcing a new strategic partnership. The funding comes after the two companies began working together in 2018, when Reaction Engines **raised £26 million**, and the latest partnership will allow Rolls-Royce to explore opportunities for high speed travel and using Reaction Engine's **thermal management technology** in their own engines. Rolls Royce are increasingly exploring opportunities in super and hyper sonic travel, including partnerships with Virgin Galactic and Boom Technology Inc.

Kymeta raises \$85 million in new funding round

Kymeta **announced on August 25th** that they have raised \$85 million in a funding round, bringing their total funding to over \$300 million. The new funding allows Kymeta to acquire the satellite service provider Lepton Global Solutions LLC for an undisclosed amount. It also enables them to proceed with the development of its second-generation Ku-band flat panel electronically steered antenna, the "u8". The short-term main market focus is defence and government.



In other news

- **Earth Observant receives U.S. Air Force contract:** The contract is funded under the Small Business Innovation Research (SBIR) programme. The payload will feature an edge-computing architecture to process images in situ, reducing data downlink requirements and the latency from image capture to actionable intelligence on the ground.
- **Gilat Satellite Networks secures \$10 million contract:** The contract is to provide 4G backhaul services in Latin America, and will provide coverage for half a million people, Gilat is working with government and the private sector, and expects to connect 400 additional villages next year.
- **SES expands partnership with COMNET:** COMNET will now use SES-14 as well as SES-10 to provide broadband services across Central and Latin America.
- **Speedcast announces potential acquisition for \$395m:** One of Speedcast's largest debt holders has offered to acquire Australian satellite telecoms provider Speedcast. The deal has yet to be finalized and would allow the company to exit Chapter 11 bankruptcy.
- **LinQuest receives \$76 million contract:** The U.S. Space Force Space and Missile Systems Center (SMC) awarded the contract for LinQuest to provide systems engineering and integration support to SMC. LinQuest provides security solutions to defence and security services in the U.S..
- **KBR to acquire Centauri for \$827 million:** U.S. military contractor KBR will acquire Centauri for \$827 million in cash. Both companies work as contractors for various U.S. intelligence agencies including the NRO; over 75% of Centauri's 1750 employees hold top secret clearance. Centauri works in various applications across defence and space including missile defence, ISR and cyber security.
- **AAC Clyde, Orbcomm and Saab partner for VDES CubeSat:** The Swedish Transport Administration has funded 72% of the €1.6 million contract for AAC Clyde to build, launch and perform initial operations of a 3U satellite with a VHF Data Exchange (VDES) payload built by Saab. VDES is an improved AIS ship tracking system, with two-way communications. The satellite will launch in 2022 and could lead to a constellation of VDES satellites.
- **AXESS Networks receives €36 million financing:** European/ Latin American satellite telecoms service provider AXESS Networks has received €36 million in financing from Spanish development fund COFIDES and debt fund ALANTRA. The funding will be used for further international expansion, including acquisitions.
- **Maxar losing faith in Telesat contract** In a Q2 investors earnings meeting, Maxar signaled that it does not expect to receive the Telesat LEO contract to manufacture 300 satellites. Maxar's CEO Dan Jablonsky said that the company is "not expecting active participation" in the project, and cited delays in the announcement by Telesat.
- **OHB selects Rocket Lab launch vehicle:** OHB Group has signed a contract to launch a communications satellite for a customer using the Rocket Lab Electron. The satellite will launch in early 2021, representing a turnaround time of six months from contract to launch.

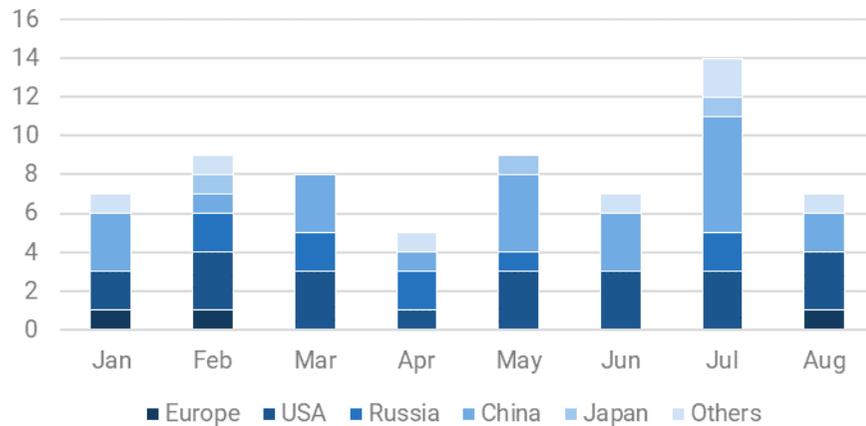


LAUNCHES & SATELLITES

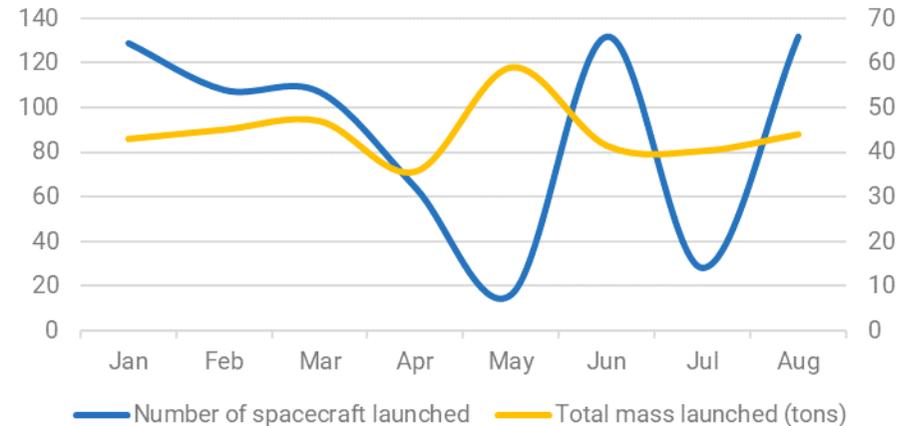
Global space activity statistics

August 2020	Europe	USA	China	Others	Total
Number of launches	1	3	2	1	7
Number of spacecrafts launched	3	123	5	1	132
Mass launched (in kg)	9 705	32 008	2 080	100	43 893

Launch activity over the year



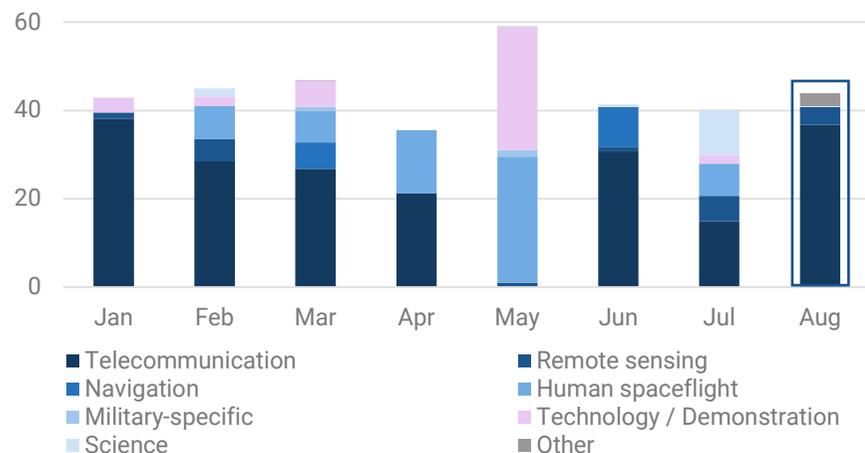
Evolution of the number of launches per launch country



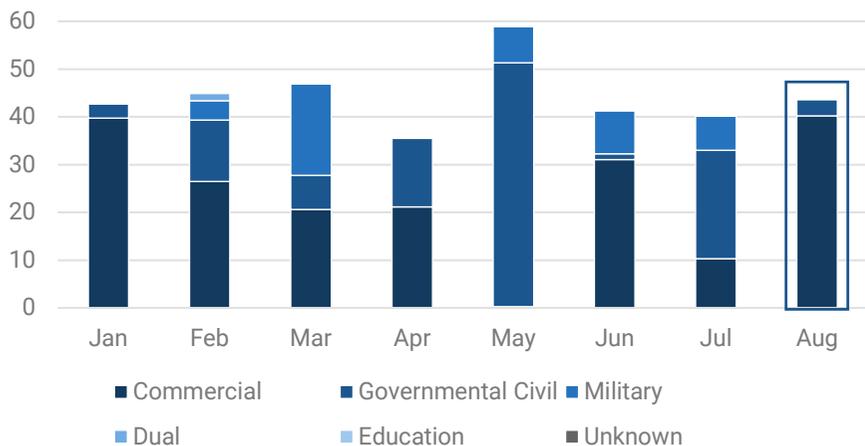
Evolution of launch activity over the year 2020



Satellite missions and markets



Evolution of the total mass launched (tons) per mission



Evolution of the total mass launched (tons), per market (January-July 2020)

August 2020	Telecom	Remote sensing	Tech/Demo	Science	Other
USA	33 200	600			2 875
China		1 830	100	150	
Japan	3 530				
Others		1 600			
Unknown					8

Total mass (kg) launched by mission and customer country

August 2020	Commercial	Governmental Civil	Military	Education	Unknown
USA	36 675				
China		1 830	25	225	
Japan	3 530				
Others		1 600			
Unknown					8

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
06/08/2020	China	CZ-2D(2)	Gaofen 9-04	CNSA	China	CAST	China	1080	Earth Observation	Governmental Civil
			Tsinghua Kexue Weixing	Tsinghua University	China	SSTL	United Kingdom	150	Earth Science	Education
07/08/2020	USA	Falcon-9 v1.2 (Block 5)	Starlink 9 (57 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
			BlackSky Global (7 & 8)	BlackSky Global	USA	LeoStella	USA	55 (each)	Earth Observation	Commercial
15/08/2020	France	Ariane-5ECA+	BSat 4B	B-SAT	Japan	Maxar	USA	3530	Telecommunication	Commercial
			Galaxy 30	Intelsat	USA	NGIS	USA	3300	Telecommunication	Commercial
			MEV-2	SpaceLogistics	USA	NGIS	USA	2875	In-Orbit Servicing	Commercial
18/08/2020	USA	Falcon-9 v1.2 (Block 5)	Starlink 10 (58 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
			SkySat (19, 20 & 21)	Planet	USA	Maxar	USA	120 (each)	Earth Observation	Commercial
23/08/2020	China	CZ-2D(2)	Duo Gongneng Shiyan Weixing	Academy of Military Science	China	Academy of Military Science	China	25	Technology / Demonstration	Military
			Gaofen 9-05	CNSA	China	CAST	China	750	Earth Observation	Governmental Civil
			TianTuo 05	National University of Defense Technology	China	National University of Defense Technology	China	75	Technology / Demonstration	Education
30/08/2020	USA	Falcon-9 v1.2 (Block 5)	GNOMES 1	PlanetIQ	USA	Blue Canyon Technology	USA	30	Meteorology	Commercial
			SAOCOM 1B	CONAE	Argentina	INVAP	Argentina	1600	Earth Observation	Governmental Civil
			Tyvak 0172	Unknown (Private)	Unknown	Tyvak Nano-Satellite Systems	USA	8	Unknown	Unknown
31/08/2020	New Zealand	Electron KS	Capella 2 (Sequoia)	Capella Space	USA	Capella Space	USA	100	Earth Observation	Commercial



Mission highlights

First flight of Ariane 5 since COVID-19 outbreak



Credit: Arianespace

On August 15th, Arianespace carried out **its first flight** since the start of the COVID-19 pandemic in March. The launch is also the first one from the Guiana Space Centre since the reopening of the facility in May. An Ariane 5 rocket launched two GEO telecommunication satellites as well as the MEV-2, the second in-orbit servicer developed by Northrop Grumman. It is the first time that an Ariane 5 transports three spacecraft to a geostationary transfer orbit, making this rocket the most powerful Ariane 5 ever launched. **Other upgrades were** present on the launcher, such as modified pressure vents on the fairing, a lighter vehicle equipment bay (allowing it to lift 85 kg more) and a new autonomous location system.

New reusability record for SpaceX

On August 18th, a Falcon 9 rocket delivered in orbit **the eleventh batch** of SpaceX's Starlink satellites. All Starlink satellites launched in August are equipped with sunshade visors reducing their reflectivity. The launch marked the first time that a first-stage booster was used for six times (the first flight of the booster took place in September 2018). Moreover, both halves of the payload fairing were also reused, and they were retrieved after launch. Finally, on top of the 58 Starlink satellites, 3 SkySat satellites were launched for Planet, using the rideshare service offered by SpaceX. This allowed the company to complete its SkySat constellation of 21 satellites, which provide images of Earth with a 50 cm resolution.



Credit: Trevor Mahlmann

Crew Dragon returns NASA astronauts to Earth



Credit: SpaceX

On August 2nd, SpaceX's Crew Dragon **successfully splashed down** off the coast of Florida, marking the end of its full test flight. The Demo-2 mission lasted just under 64 days, following its launch on May 30th. The landing was the first American crewed water landing since 1975, and had no major problems, though the convergence of private boats with the landed spacecraft concerned the NASA administrator Jim Bridenstine. The flight was the first to carry U.S. astronauts on a U.S. spacecraft since the retirement of the Space Shuttle in 2011.

Satellite servicing spacecraft MEV-2 launches

Northrop Grumman's **satellite servicing vehicle MEV-2 has launched on an Ariane 5 rocket**. It is the second autonomous life extension satellite to launch, following the successful docking of MEV-1 with Intelsat IS-901 in February. MEV-2 is then expected to dock with Intelsat IS-1002 in 2021.

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