



ESPI

European Space Policy Institute

ESPI Insights

Space Sector Watch



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10TH EU-ESA SPACE COUNCIL OUTCOME: NEED FOR AN 11TH COUNCIL



Dear Friends of ESPI,

On November 20th, the 10th EU-ESA Space Council took place for the 2nd year in a row, under the German Presidency of the EU Council and the Portuguese and French co-chairs of the ESA Ministerial Council. The 10th meeting built upon the **EU Council conclusions on key principles for the global space economy**, which set European objectives to enhance competitiveness and innovation, foster European security, resilience and autonomy in space, as well as recover from the COVID-19 crisis. Although a joint declaration has not yet been published, **EU and ESA representatives outlined some key messages** during the press conference, underlining that Europe must:

- **Maintain its role as a global space power** in a fast-changing environment, retaining that this requires a coordinated effort supported by solid budgets.
- **Address new challenges and move forward with new flagship projects**, such as building a regulatory and technical framework for STM and foster the development of a European telecom constellation for institutional and commercial purposes, which already gave way to the **launch of a call for study by the EU**.
- **Boost innovation and enhance competitiveness**, in particular by fostering private investment, in coordination with public schemes, leveraging contributions that could come from start-ups, fostering new markets uptake of downstream products in non-space sectors.
- **Consolidate its autonomy in access to space**, taking stock of different views and goals across European countries, such as assuring the support and reinforcement of the Guyana Space Centre, promote the democratisation of access to space, bringing in new alternatives regarding launching facilities as well as launcher portfolio.

Despite a clear willingness to further improve collaboration between ESA and the EU, the visions of the two European institutions still seem to be looking in different directions somehow, probably because of a comparable situation at Member States level. Deputy DG Pierre Delsaux recalled that a “long engagement can be necessary for a happy marriage”. The most recent strategic document signed by the EU and ESA is the **Joint statement on shared vision and goals for the future of Europe in space**, from 2016. ESA and the European Commission still seem far away from finalising a new **Financial Framework Partnership Agreement** establishing their future relations. These negotiations are reportedly complicated by frictions regarding budget management and responsibilities breakdown, in particular with regards to the role of EUSPA.

Ultimately, the outcome of the Council was somewhat disappointing regarding a much-needed progress on a shared vision and enhanced collaboration in Europe, which is becoming increasingly critical to strengthen the European space sector and prepare for new challenges ahead. Nevertheless, the (potential) joint document agreed upon at the 10th ESA-EU Space Council could contribute to further steps in this direction and constitute a relevant basis upon which the upcoming Portuguese Presidency could build. Stakes and expectations are high to consolidate a European common position, to strengthen an enduring dialogue between all actors involved and shape future space policies in a coordinated manner.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'JJ Tortora'.

Jean-Jacques Tortora

Director of ESPI



POLICY & PROGRAMMES

Negotiations for EU space programme and MFF budget progress

On November 5th, the **European Council approved the proposal for a regulation establishing the space programme of the Union and the European Union Agency for the Space Programme**. The German Presidency now has the mandate to negotiate with the European Parliament on the remaining parts of the document which were not agreed upon in the common understanding reached between the Romanian presidency and the European Parliament on March 13th, 2019. A series of trilogues will lead to the negotiation of the final text by the end of the year.

In addition, on November 10th, the European Council and the European Parliament reached a **political agreement concerning the MFF 2021-2027**. The total envelope in 2018 prices comprises €1.074 trillion for the MFF 2021-2027, €750 billion for the Next Generation EU 2021-2023 as well as €79.9 billion (2018 prices) for Horizon Europe. The financial package includes €143.4 billion (2018 prices) for the heading of Single Market, Innovation and Digital but details regarding the European Space Programme have not been released yet. Negotiations are currently stalled and further meetings will be necessary at the EU Council to finalise the agreement on the MFF and on the 2021 annual budget, with a deadline on December 7th.

ESA awards €1.3 billion contracts for three Copernicus missions

On November 3rd, ESA signed a contract for the **key design phases of three Copernicus satellites**, as part of the six Copernicus High-Priority Sentinel Expansion missions approved during ESA's Council at Ministerial Level Space19+. The mission will be complementary to the existing Copernicus satellites. A €455 million contract was awarded to Thales Alenia Space France for the development of the Copernicus Hyperspectral Imaging (CHIME) Mission, which will support agriculture and biodiversity management with **involvement of OHB**. In addition, €495 million was assigned for the development of the Copernicus Imaging Microwave Radiometer (CIMR) mission to Thales Alenia Space Italy for the sea-surface observation. Finally, a contract, worth €380 million was signed with Airbus Spain for the Copernicus Land Surface Temperature Monitoring (LSTM) mission. The prototype missions are co-financed between EC and ESA, and the approval to move from Phase B2 to Phase C/D will occur in late 2021.

Launch of the Sentinel-6 Michael Freilich mission

On November 21st, **SpaceX launched the Sentinel-6 Michael Freilich mission** on a Falcon 9 rocket from the Vandenberg Air Force Base. The mission is the result of a cooperation between NASA, NOAA, ESA, EUMETSAT and CNES. The data collected will be crucial for climate change analysis, operational oceanography, weather forecasting, and will support the Copernicus Marine Environment Monitoring Service (CMEMS). **Sentinel-6 is an oceanography satellite** to continue measurements made by the Jason and Topex/Poseidon satellites. It will use a high-precision radar altimeter to assess the height and shape of the oceans; in addition, it will use GNSS Radio Occultation to assess temperature changes and support Numerical Weather Prediction (NWP) method. Originally scheduled on November 10th, the launch was **postponed due to NASA investigation** on the engines which power the first stage of the Falcon 9 rocket. The satellite will be operational until 2030. Sentinel-6B is planned to be launched in 2025.



Credit: NASA/JPL-Caltech



China's Chang'e-5 successfully launched

On November 23rd, the **Chang'e-5 spacecraft was launched on a Long March 5 rocket**. The mission aims to return the first lunar samples to Earth since the 1970s. China would potentially become the third country to deliver lunar samples to Earth, by mid-December, when the spacecraft is planned to land in Mongolia. The lander also features a panoramic camera, lunar penetrating radar and imaging spectrometer, to better analyse the surrounding area.



Credit: China National Space Administration

UN resolution to agree on preventing outer space arm race

On November 6th, the First Committee for the UN Disarmament and International Security (DISEC) space. Among them, the UNDISSEC committee adopted the draft on "Reducing space threats through norms, rules and principles of responsible behaviours" (A/C.1/75/L.45/Rev.1). The international discussion in regard to the demand to reduce space threats through responsible behaviours in outer space was **initiated by the UK in August 2020**.

Ukraine national space agency signs Artemis Accords

Ukraine is the ninth country to sign the Accords and aims to give broad contribution to the Artemis Programme. A few days after, the Head of the space agency, Volodymyr Usov, was replaced by the First Deputy Head of the agency, Mykhailo Lev. While no reasoning has been given, Usov's was pursuing a significant renovation of the state-run defense and aerospace industries and increasing the role of the agency in space affairs.

New draft of Indian space policy



Credit: ISRO

On October 15th, the draft **Space Based Communication Policy of India-2020** (Spacecom Policy-2020) was released by the Department of Space of the Indian government for comments, together with draft Norms, Guidelines and Procedures for implementation of Spacecom Policy-2020 (Spacecom NGP-2020), and it is now under consideration. The approval of the law is meant to **facilitate the relations between ISRO and the private sector**, noticeably by allowing private companies to launch from ISRO's facilities and to operate satellite communications services.

Airbus selected by ESA for mission related to traceability of EO data

On November 3rd, **ESA awarded Airbus UK** with a contract for the System Feasibility Studies and Pre-Developments (A/B1) of the Traceable Radiometry Underpinning Terrestrial- and Helio- Studies (TRUTHS) satellite mission, as part of the Earth Observation Earth Watch programme. The TRUTHS mission was proposed by the UK government during the ESA's Space19+ Ministerial Council and is planned to be operational by 2023. It aims to collect measurements of solar radiation and light reflected off Earth's surface. The data will be helpful to better understand climate change and will be used as a standard reference to calibrate other satellite sensors (e.g. Copernicus). **The overall contract includes awards to companies and institutions** in the UK space industry, as well as other countries, such as the Czech Republic, Greece, Romania and Switzerland, and it has a value of approximately €16 million.



U.S. elections and first implications for space

Following the elections, the new President-elect of the U.S. Joe Biden nominated several “**agency review teams**”, including for NASA, whose team will be led by Ellen Stofan. Ms. Stofan who is a former NASA chief scientist, comes from the Smithsonian’s National Air and Space Museum and worked also under the Obama administration on science policy. The team will be responsible of ensuring the transition of powers. Other teams have been appointed to the Department of Defense and State, the National Security Council (thus also the National Space Council) and the Department of Commerce, whose review team includes the former NASA astronaut and NOAA Administrator Kathryn Sullivan.

After the elections, the current NASA Administrator **Bridenstine commented that he would not serve under the Biden administration**. Despite the change of administration, the Congress remains pivotal in shaping the future of NASA, noticeably through the approval of its budget. As of now, the U.S. Senate appropriation bill does not match the funding requests on the Human Landing System (HLS). The composition of the majorities will be decided on a run-off election for two Senatorial seats on January 5th; a divided Congress may bring to more difficult negotiations on budgets and potential further delays. Noteworthy is the **election of the former astronaut Mark Kelly for the U.S. Senate**. Kelly has served on four space shuttle missions during his career, between 2001 and 2011, and will be the 4th astronaut elected to the Congress.



Credit: buildbackbetter.gov

U.S. Senate progresses on NASA FY2021 appropriation bill

On November 10th, the **Senate Appropriations Committee released all 12 of its recommendations for the FY2021 bill**. The bill includes \$23.5 billion for NASA, a reduction of \$1.75 billion in comparison to what was requested by the **White House’s budget proposal on February 10th** (\$25.246 billion for NASA, a 12% increase in comparison to FY2020). Regarding the Human Landing System (HLS) programme, while NASA estimated \$3.2 billion to meet the 2024 Artemis Programme goal, the Senate and the House bills are both lower than NASA’s request. The bill represents the base for the negotiation with the House of Representatives. Currently, the U.S. already entered formally the FY2021, with a Continuing Resolution approved by the President on October 1st and that will last until December 11th.

U.S. Senate Committee starts reforming the STM governance

The **Space Preservation and Conjunction Emergency (SPACE) Act** will need the approval from the Senate and then from the House of Representative. The SPACE Act attempts to reform the U.S. STM governance, following the SPD-3 of 2018, bringing it with the Department of Commerce. However, the bill approved by the Committee does not elevate the NOAA’s Office of Space Commerce to a Bureau of Space Commerce directly under the Secretary of Commerce, as proposed by initial legislators, but includes wording that can facilitate further discussions.

Canada eager to use LEO constellation broadband services

On November 9th **the Canadian government agreed to pay Telesat US\$ 462 million** to use the company’s planned LEO constellation to provide broadband in Canada. Canadian internet service providers and mobile network operators would have access to Telesat LEO capacity at reduced rates to serve rural households. Telesat has yet to select a contractor for its constellation but aims to launch the first operational satellites in 2022. Meanwhile, on November 6th, the **Canadian government granted approval for SpaceX** to provide its Starlink service in Canada.



In other news

UK announces new Space Command: The UK government, as part of a larger defence spending boost, announced that it would set up a Space Command. The new unit would lead UK military space operations and capability, working alongside the Ministry of Defence Space Directorate.

Pierre Delsaux appointed as Deputy Director-General in the DG Health and Food Safety (SANTE): Delsaux served as Deputy Director-General in DG Defence, Industry and Space (DEFIS). Within DEFIS, François Arbault has been appointed as the new Director for Defence and Ekaterini Kavvada as the new Director for Development and Innovation.

The Australian government appoints Enrico Palermo as new head of the Australian Space Agency: Mr Palermo was the Chief Operating Officer of Virgin Galactic, and he will succeed Dr Megan Clark.

New Japanese law for sample ownership: The Liberal Democratic Party approved a law to allow the ownership of space resources by domestic private businesses. The property rights of the samples will be adjudicated after the previous submission and approval of the exploration plan by the prime minister, and the collection of the sample. The bill is still subject to further consultation and final approval.

Canada plans to become a launching state: During a national space conference, a representative of the Ministry of Transport confirmed the government's intention to become a launching state, and to implement a legal framework for launching services. The plan is in line with the 2019 Canadian Space Strategy.

Taiwan plans to create a National Space Centre: The new centre is part of the draft of the Space Development Act, which is currently open for public consultation. The bill also supports the reorganisation of the National Space organisation into an independent agency, separated by the Ministry of Science and Technology. It estimates an expenditure of NT\$2.5 billion (US\$87.4 million) for space initiatives, 5% of which is frozen until the final approval.

U.S. promotes satellite servicing with new initiative: The On-Orbit Servicing, Assembly and Manufacturing (OSAM) National Initiative is intended to foster partnerships between industry, government agencies and academia and act as a "knowledge center" to share information on satellite servicing.

South African National Space Agency (SANSA) and the Brazilian Space Agency (AEB) signs an MoU: The partnership agreement will provide important opportunities for the two agencies, as well as for the space industries of the two countries.

NASA announces new partnerships for Moon technologies: NASA has selected 17 U.S. companies in 20 partnerships to develop space technologies for the Moon and other missions, backed by over \$15 million in agency resources. Projects include designing a 3D printing system for the Artemis programme and a rocket recovery system for small launchers.

NASA objects to a U.S. constellation project: NASA has formally commented on an FCC application by startup AST & Science, which is planning a constellation of 240 satellites. Mentioning concerns related to the security of existing satellites, the comment suggests a lower altitude for the AST constellation, as the currently proposed altitude of 720 km is close to orbits used by satellites operated by NASA, CNES, and JAXA, amongst others.



INDUSTRY & INNOVATION

UK Space Agency and ESA fund UK nanosatellite constellation

ESA and UKSA on November 18th funded €9.9 million as part of a €19.7 million public private partnership led by AAC Clyde Space for a satellite constellation. The project, named xSPANCION and lasting 3 years, will see the manufacture of 10 CubeSats, including the demonstration of 4, for a range of services. AAC Clyde Space will then operate the constellation under the next phase of the programme. D-Orbit UK, Bright Ascension, the Satellite Applications Catapult and other UK organisations are also involved in the project.

Arecibo Telescope to be scrapped

The U.S. National Science Foundation announced on November 19th that the **Arecibo radio telescope will be decommissioned**. The telescope, situated in Puerto Rico, was damaged earlier this year after supporting cables failed in two separate incidents, risking the collapse of the whole structure. 305 m in diameter, the telescope operated for nearly 60 years, supporting radio astronomy, atmospheric science and the search for extra-terrestrial intelligence.



Credit: University of Central Florida/Arecibo Observatory

ESA continues to support developments of European small launchers

On November 3rd, **ESA awarded €500k each to three German launch start-ups** under the Boost! programme. Isar Aerospace, Rocket Factory Augsburg and HyImpulse Technologies received the funding to variously advance the status of their small launch technologies. Two further awards of €11 million each are available under the programme. The companies were **progressed by DLR in July**, and nominated to the ESA, where they have now received the awards. The Boost! Programme is under the ESA Commercial Space Transportation Services and Support Programme. Furthermore, on October 31st, **ESA awarded €385k to Dawn Aerospace** under the Future Launcher Preparatory Programme. The Dutch and New Zealand company is developing 3D printed combustion chambers for its planned Aurora spaceplane.



Credit: ESA

ESA and ClearSpace sign contract

Following the announcement at the ESA Space 19+ Ministerial Council held in Seville and the allocation of funding for the procurement of ADR service, on December 1st **ESA signed a €86 million contract with the swiss start-up ClearSpace** for the first Active Debris Removal (ADR) mission, expected in 2025.

DESTINY+ Japanese-German asteroid mission is announced

During the bilateral Strategy Dialogue annual meeting on November 11th, **DLR and JAXA signed a cooperation agreement** for the Demonstration and Experiment of Space Technology for Interplanetary voyage with Phaethon flyby and dust science (DESTINY+) mission. The Japanese spacecraft is planned to be launched in 2024 on an Epsilon S from the Uchinoura Space Centre. During the four-year journey to Phaethon, the German DESTINY+ Dust Analyzer (DDA) instrument will collect cosmic dust particles. They will be analysed to find interconnection between those particles and the creation of life on Earth.



Crew-1 mission successfully launched

The SpaceX Crew-1 mission to the ISS was launched on November 15th, successfully docking with the ISS the day after and realizing the first operational commercial crew flight. The **“Resilience” spacecraft carried three NASA astronauts and a JAXA astronaut**. The astronauts will stay in the ISS for six months, before returning to Earth. The mission was scheduled for the previous day, but postponed due to weather condition in Atlantic area close to the launch site, which delayed the arrival of the dronship to the landing zone. The Crew-2 mission is planned to be launched in March 2021.



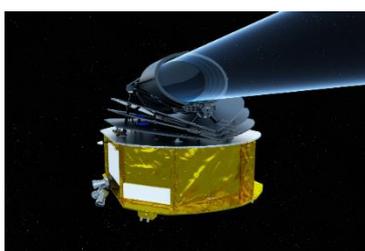
Credit: NASA

Several initiatives for the development of quantum technologies

As a result of the BRICS Civil Forum 2020 (September 23rd – September 25th), Brazil, Russia, India, China and South Africa (BRICS) concluded an agreement for a three-year research project on quantum communication. The goal of **“Satellite and fibre-optic communication of quantum communications”** is to develop an intercontinental satellite quantum communication channel. The initiative is led by Rostec State Corporation and includes the participation of an international consortium of universities and institutions.

Besides that, on November 6th, the results of the **Quantum Technologies Competition** organized by UK Research and Innovation (UKRI) and the Natural Sciences and Engineering Research Council of Canada (NSERC), were announced. The industry-led partnership is the outcome of an agreement between the UK and Canada signed in 2017 and comprises £2 million from UKRI and CAD\$ 4.4 million from NSERC for the awarded eight projects.

Furthermore, **Quantum Telecommunications Italy (QTI)**, a spin-off of Centro Nazionale di Ricerca (CNR), was launched on November 5th. The aim is to reconfigure the quantum key distribution architecture through the use of quantum mechanics to secure communications for private companies, governments and research institutions.



Credit: ESA/RAL
Space/UCL/UKSA/ATG Medialab

ESA exoplanet mission Ariel progresses

On November 12th, the **ESA exoplanet mission Ariel** moved from **study to implementation phase**, as it has been officially “adopted” by the ESA Science Programme Committee. The mission is scheduled to launch on Ariane 6 in 2029. From the Sun-Earth Lagrange point L2, it will study the chemical composition and thermal structures of exoplanets. The payload module will be developed by a consortium of over 50 institutes, including NASA, and the prime contractor will be selected in mid-2021.

Kick-off for the European Space Resources Innovation Centre

Launched on November 18th, the **European Space Resources Innovation Centre (ESRIC)** aims to become a centre of expertise across all aspect related to space resources for human and robotic exploration. It will support start-ups with business incubation and facilitate technology transfer between adjacent industries. ESRIC is a joint initiative of the Luxembourg Space Agency and Luxembourg Institute of Science and Technology (LIST) with ESA as a strategic partner.



In other news

Inmarsat awarded ESA contract for government satcom platform: The contract will last three years, with an overall value of €22.4 million, and aims to provide a new platform called International Virtual Satellite Operators Network (INVISION) to government users for monitoring and managing satellite communication services. The INVISION programme is part of the ESA's ARTES programme.

Eutelsat KONNECT High Throughput Satellite (HTS) is operational: The satellite was built by Thales Alenia Space and launched by Arianespace in January 2020, and it will now provide fixed broadband service in areas of Europe and Africa, reaching full capabilities in March 2021.

Canadian Space Flight Laboratory (SFL) contracted with GHGSat to build three satellites: SFL will develop three additional microsatellites for the GHGS greenhouse gas monitoring constellation. SFL is part of the University of Toronto Institute for Aerospace Studies (UTIAS).

EnduroSat cooperates with Orbital Space to enhance the use of space technologies and services: The two space companies entered into a partnership to develop smallsat technology in the Middle East and share market insights.

MDA contracted by Maxar Technologies for SPIDER technology demonstration: The SPIDER demonstration is part of NASA's OSAM-1 servicing demonstration mission, scheduled in 2024. MDA will provide robotic hardware and software to Maxar in mid-2021.

Astroscale announce March 2021 launch of ESLA-d: The Japanese start-up's first commercial active debris removal demonstration mission was previously scheduled for 2020. It will launch on a Soyuz rocket.

First SNC Dream Chaser mission delayed: Sierra Nevada Corporation's has delayed the first flight of its Dream Chaser spacecraft, which is aiming to travel to the ISS, until 2022. COVID-19 is cited as the reason for the delay.

Arianespace announces Ariane 5 contract: the communication satellite of an unidentified operator will be launched in 2022. There are 8 Ariane 5 rockets left before Ariane 6 is operational, also scheduled for 2022.

Space technologies for ventilation system: DLR have tested a new ventilation system on behalf of a consortium led by OHB. The system filters the air, including viruses, and is similar to that used in clean rooms for satellite manufacture. Tests will follow to investigate the system's potential future adoption.

SpaceX's Starship completes static fire test: the SN8 prototype conducted its fourth static fire test. The next test is a 15 km 'hop' to test, among other things, ascent with 3 engines.

ESA selects Leaf Space for the CARES project: The Italian start-up will conduct a trial for a satellite tele-diagnostic platform on COVID-19 patient medical data, to enable remote diagnosis based on real-time data. The health platform was previously developed by H&S and will be combined with mobile Home Health Gate (HHG) devices.

Spaceit signs a contract with ESA for a cyber-security satellite simulator: The Estonian cybersecurity start-up will work together with CybExer Technologies and CGI Estonia to enhance cybersecurity and cyber-defence for satellite communication systems.

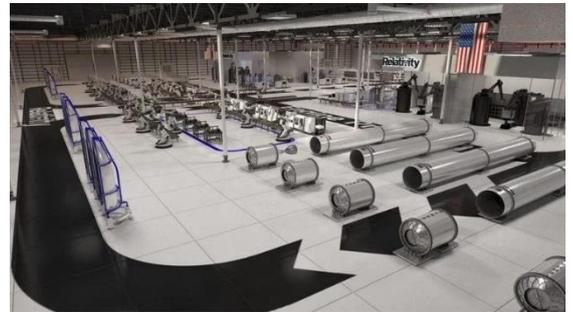
U.S. satcoms company Omnispace selects Exolaunch for launch: The two satellites will launch in 2022 on a SpaceX Falcon 9. Omnispace is aiming to build a hybrid satellite-terrestrial 5G network.



ECONOMY & BUSINESS

Relativity Space raises \$500 million

On November 23rd the U.S. based rocket manufacturer **Relativity Space** raised \$500 million in series D funding round, bringing their total funding to over \$185 million to date. The start-up, founded in 2015, now has a valuation of \$2.3 billion, making it the second most valuable VC funded private space company after SpaceX. The funding was led by Tiger Global Management and will be used to complete Relativity's Terran 1 rocket, which is aiming for a price point of \$12 million per launch. Its first launch is expected in 2021.



Credit: Relativity Space



Credit: OneWeb

OneWeb emerges from bankruptcy

The acquisition of OneWeb by the UK government and Bharti Global **closed on November 20th**, allowing the company to emerge from Chapter 11 bankruptcy. Also announced was a new CEO, Neil Masterson, replacing Adrien Steckl, who will advise on the board. All regulatory approvals were acquired. The company has raised over \$3 billion to date but will require over \$2 billion further to complete the constellation of 648 satellites. The next flight of 36 OneWeb satellites is scheduled for a Soyuz launch on 17th December.

Kleos Space raises \$13.8 million

Luxembourg start-up **Kleos Space** raised \$13.8 million on **November 11th**. Kleos Space is listed on the Australian stock exchange and raised the funding as equity. The financing follows the launch of its first satellite cluster on November 7th and will be used to launch the second cluster in mid-2021 and develop the third cluster scheduled before 2022. Kleos Space uses clusters of four CubeSats to detect RF signals from space.

APT Satellite orders small GEO satellite

On November 6th, Hong Kong based satellite operator **APT Satellite** contracted **China Great Wall Industry Corp. to build its Apstar-6E** telecommunications satellite, joining six satellites in orbit. The small GEO satellite, with a mass of around 1,300 kg, will be developed by the China Academy of Space Technology (CAST) and launch in 2023. The contract is worth \$137.6 million including launch and insurance.

Third ESS contract awarded to Lockheed Martin

On November 11th, **Lockheed Martin** was selected by the **U.S. Space Force** as the third of three contractors to develop a prototype payload for the Evolved Strategic Satcom (ESS) programme, the successor to AEHF. The \$258 million contract follows similar awards to Northrop Grumman and Boeing earlier in the year. The full ESS system contracts are expected to be awarded in 2025.



Preligens raises €20 million

French Earth observation start-up Preligens (previously named Earthcube) has **raised €20 million in a series A funding round**, bringing their total funding raised so far to at least €24 million. The round was led by ACE management and included previous investor 360 Capital and government funding from Definvest (Bpifrance). The start-up develops AI Earth observation solutions for defence and intelligence markets.

Telesat to become publicly listed

Telesat announced on November 24th that **it would merge with Loral Space & Communications** and become publicly listed on the Nasdaq stock market. The new company, Telesat Corporation, will continue to be Canadian controlled. The listing is expected to provide more funding, specifically for the planned LEO constellation. The deal is expected to close mid-2021, subject to regulatory and stockholder approval.

In other news

Chinese rocket company raises \$30 million: Galactic Energy has raised \$29.9 million in a Series A funding round, which will be used for development of its “Pallas 1” liquid rocket. Furthermore, its solid rocket “Ceres 1” launched to orbit for the first time in November.

Raytheon acquire Blue Canyon Technologies: U.S. company Blue Canyon Technologies manufactures small satellites and will be integrated into Raytheon Intelligence and Space following regulatory approval, expected by early 2021. The value of the transaction is unknown.

Redwire acquires Rocco: Founded in 2021, Rocco, a U.S. satellite technology supplier is the fourth company to join Redwire this year. Redwire was founded in June 2020 through the merger of Deep Space Systems and Adcole Space, organized by AE Industrial partners, a private equity firm.

Slingshot Aerospace raises \$8 million: The company concluded a Series A funding round, reaching total fundraising to date of \$17.1 million. The round was led by ATX Venture Partners. The fund will enable the company to continue to focus on and developing technology in the SSA area.

Viasat acquired Euro Broadband Infrastructure (EBI), a Viasat- Eutelsat joint venture: Viasat bought the Eutelsat EBI share of 51%, as well as of the Eutelsat’s KA-SAT satellite platform, the related ground infrastructure and the wholesale business for a total amount of €140 million.

Emxys receives €2 million investment for satellite platforms: The Spanish government entity CDTI committed €284k as part of the financing round, along with Alma Mundi fund II, a venture capital firm. Emxys are developing small satellite platforms with optical communication links.

Voyager Space Holdings acquires The Launch Company: The U.S. rocket and spacecraft component supplier will be the U.S. private equity group’s third acquisition, once approved by regulators.

Vector Space restarts operations under new ownership: Vector Space, a U.S. small launch start-up, raised over \$100 million before filing for bankruptcy in December 2019. It will now restart operations under new management, focusing on suborbital launch.

Virgin Orbit takes stake in Sky and Space Global: Virgin Orbit will take a 14.7% stake in Sky and Space Global (SAS), which declared voluntary administration in April. SAS plan to raise \$2.2 million through share sales. SAS will sign a launch contract with Virgin Orbit worth \$3 million.

Space Capital launches new Space Capital II fund: The New York based venture capital firm now manages three funds totaling over \$60 million in assets under management, specifically targeting space startups.

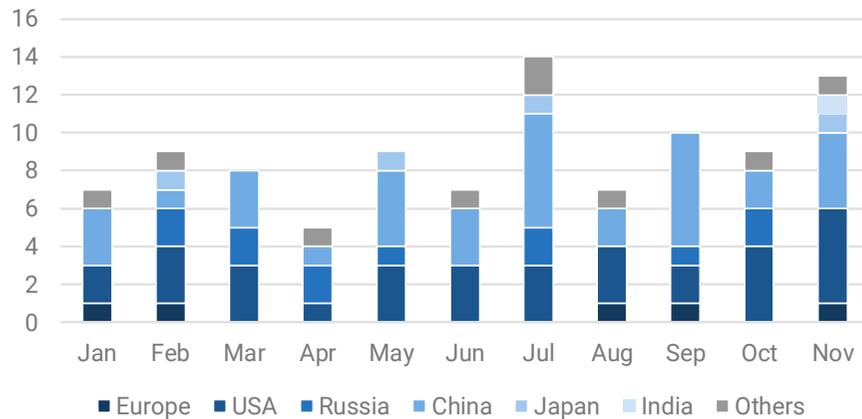


LAUNCHES & SATELLITES

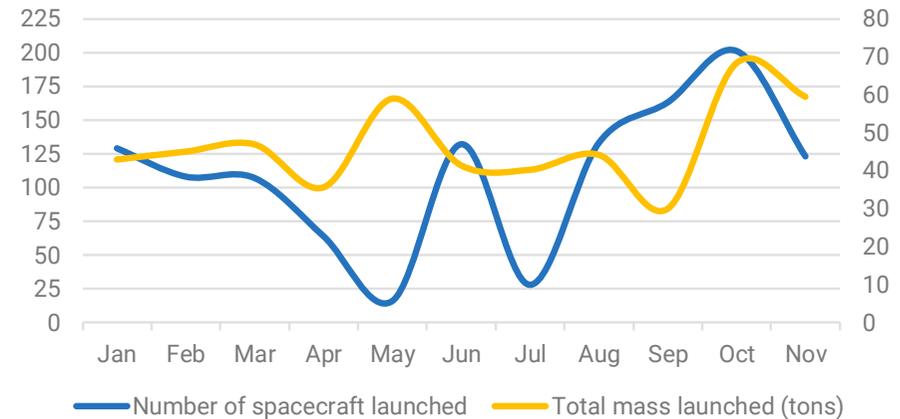
Global space activity statistics

November 2020	Europe	USA	China	Japan	India	Others	Total
Number of launches	1	5	4	1	1	1	13
Number of spacecrafts launched	2	64	16	1	10	30	123
Mass launched (in kg)	1005	39 727	14 162	3800	686	64	59 444

Launch activity over the year



Evolution of the number of launches per launch country

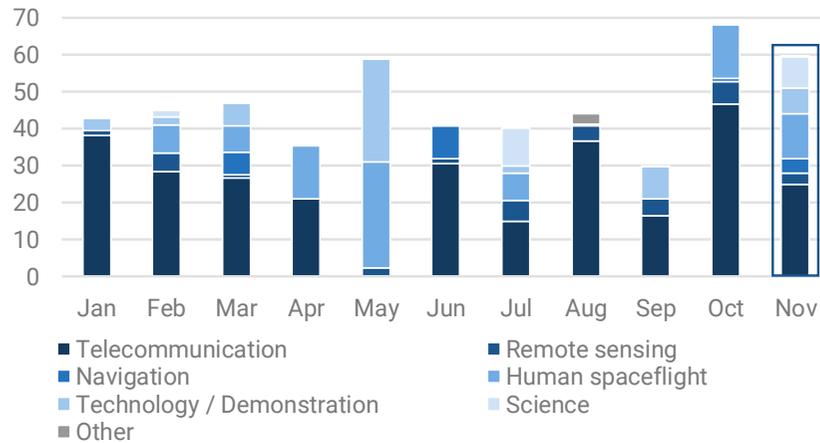


Evolution of launch activity over the year 2020

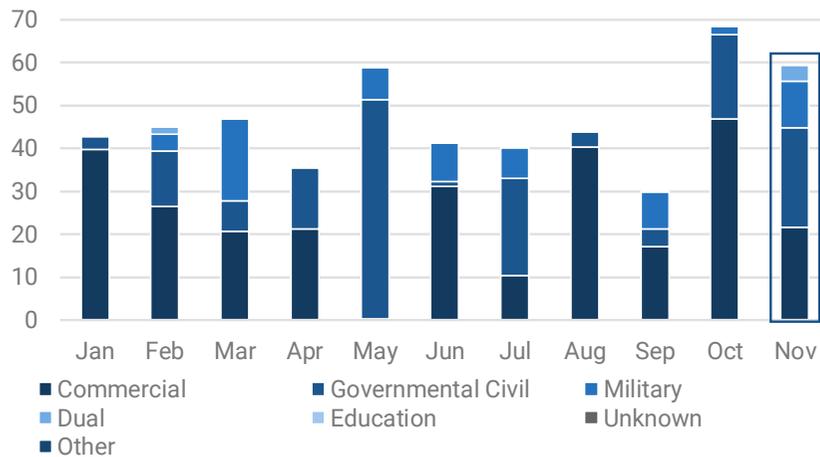


Launches & Satellites

Satellite missions and markets



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



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

November 2020	Telecom	Remote sensing	Navigation	Human Spaceflight	Science	Tech/Demo	Other
Europe		2066			175	8	
USA	15 624	16	3880	12 055		7025	1.5
China	5450	70			8200	32	
Japan	3800						
India		630					
Others		410			1.5		

Total mass (kg) launched by mission and customer country

November 2020	Commercial	Governmental Civil	Military	Dual	Education	Other
Europe	52	2197				
USA	15 665	12 055	10 880			1.5
China	5550	8200			2	
Japan				3800		
India		630				
Others	410	1.5				

Total mass (kg) launched by market and customer country



Launches & Satellites

Launch Log

Launch date	Launch country	Launcher	Spacecraft name	Main customer	Customer country	Prime manufacturer	Manufacturer country	Mass (kg)	Mission	Market
05/11/2020	USA	Falcon-9 v1.2	GPS-3 4	US Space Force	USA	Lockheed Martin	USA	3880	Navigation	Military
06/11/2020	China	CZ-6	Beihangkongshi-1	Spacety Co.	China	Spacety Co.	China	30	Techno/Demo	Commercial
			BY 3	Jinshan Middle School	China	Jinshan Middle School	China	2	Techno/Demo	Education
			ÑuSat (10 satellites)	Satellogic SA	Argentina	Satellogic SA	Argentina	41 (each)	Earth Observation	Commercial
			Tianyan 05	ADA Space	China	MinoSpace Technology	China	70	Earth Observation	Commercial
07/11/2020	China	Ceres-1	Tianqi 11	Guodian Gaoke	China	Shanghai ASES Spaceflight Technology	China	50	Telecommunication	Commercial
07/11/2020	India	PSLV-DL	EOS-01 / RISAT-2BR2	ISRO	India	ISRO	India	630	Earth Observation	Governmental Civil
			KSM (4 satellites)	Kleos Space	Luxembourg	GOMSpace	Denmark	8 (each)	Signal Intelligence	Commercial
			Lemur-2 (4 satellites)	Spire	USA	Spire	USA	4 (each)	Earth Observation	Commercial
			M6P 2	NanoAvionics	Lithuania	NanoAvionics	Lithuania	8	Techno/Demo	Commercial
12/11/2020	China	CZ-3B/G3	Tiantong-1 02	China Satcom	China	CAST	China	5400	Telecommunication	Commercial
13/11/2020	USA	Atlas-5(531)	USA 310	NRO	USA	NRO	USA	7000	Techno/Demo	Military
16/11/2020	USA	Falcon-9 v1.2	Crew Dragon USCV-1	NASA	USA	SpaceX	USA	12055	Crew Transfer	Governmental Civil
17/11/2020 (failure)	France	Vega	SEOSAT-Ingenio	Hisdesat	Spain	Airbus	France	830	Earth Observation	Governmental Civil
			TARANIS	CNES	France	CNES	France	175	Earth Science	Governmental Civil
20/11/2020	New Zealand	Electron KS	APSS 1	University of Auckland	New Zealand	University of Auckland	New Zealand	1,5	Earth Science	Governmental Civil
			BRO (2 & 3)	UnseenLabs	France	GOMSpace	Denmark	6 (each)	Signal Intelligence	Commercial
			Dragracer A	TriSept	USA	Millennium Space Systems	USA	15	Techno/Demo	Commercial
			Dragracer B	TriSept	USA	Millennium Space Systems	USA	10	Techno/Demo	Commercial
			Gnome Chompski	Unknown (USA)	USA	Weta Workshop	New Zealand	1,5	Other	Other
SpaceBEE (24 satellites)	Swarm Technologies	USA	Swarm Technologies	USA	1 (each)	Telecommunication	Commercial			
21/11/2020	USA	Falcon-9 v1.2	Sentinel 6A / Jason-CS A	ESA	Europe	Airbus	France	1192	Earth Observation	Governmental Civil
23/11/2020	China	CZ-5	Chang'e 5	CNSA	China	CAST	China	8200	Planetary Science	Governmental Civil
24/11/2020	USA	Falcon-9 v1.2	Starlink 15 (60 satellites)	SpaceX	USA	SpaceX	USA	260 (each)	Telecommunication	Commercial
29/11/2020	Japan	H-2A-202	JDRS 1	Cabinet Satellite Intelligence Center	Japan	Mitsubishi Electric	Japan	3800	Satellite Data Relay	Dual



Launch Highlights

Vega fails to deliver two governmental satellites to orbit



Credit: Arianespace

On November 17th, for the second time in its last three flights, the European launcher Vega **suffered a failure**. After eight minutes, the rocket left the planned trajectory, leading to the loss of the mission. Contrary to the launch failure that occurred in July 2019, the problem happened this time with the upper stage of the rocket, not the second one. Moreover, the failure is due to a human error (two cables being inverted), and not to a design error. This fact would allow a quicker return to flight of the launcher.

The failure led to the loss of two European satellites: SEOSAT-Ingénio and TARANIS. SEOSAT was the optical component of the Spanish Earth Observation programme, with civil and governmental applications, and would have complemented the radar component already in orbit; TARANIS was a first-of-its-kind mission developed by CNES to study luminous, radiative and electromagnetic events above thunderstorms.

Rocket Lab retrieves a first stage for the first time

On November 20th, Rocket Lab launched its 16th Electron mission. For the first time, the company tried, and succeeded, in **recovering the first stage** of its rocket (a first for a small launcher). Contrary to SpaceX's technology, Rocket Lab did not attempt to vertically land the stage, but rather used parachutes to make it smoothly fall into water and recover it with a vessel. The ultimate goal of the company is to recover a first stage mid-air with a helicopter but some work (e.g. on thermal protection systems) needs to be done before reaching this step. With reusable rockets, Rocket Lab aims at increasing its launch cadence.



Credit: Peter Beck/Twitter

First launch of Ceres-1



Credit: russian.people.com.cn

On November 7th, the Chinese private company Galactic Energy **launched** for the first time its Ceres-1 rocket. Ceres-1 is a four-stage solid rocket planned to lift 350 kg to LEO and 230 kg to SSO, but this launch carried out a satellite of only 50 kg. Galactic Energy is the second Chinese private launch company to reach orbit, after iSpace in July 2019, while two other competitors, Landspace and OneSpace, failed during their previous attempts. In the future, the company wants to develop Pallas-1, a launcher using liquid propellant and capable of vertical take-off and landing. A first test launch is currently planned for 2022.

India carries out its first launch of the year

On November 7th, the flight of a Polar Satellite Launch Vehicle (PSLV) marked the **first launch** for India this year. The latest flight happened in December 2019, and the long delay between the two missions can in large part be explained by the COVID-19 pandemic, which slowed down activities on launch sites all over the world. The rocket carried out, among other payloads, the first four satellites of Kleos Space, a company based in Luxembourg which aims at providing reconnaissance services relying on signal intelligence. Indeed, the company's spacecraft are able to detect and geolocate radio frequency emissions, with a particular focus on the maritime domain.



Credit: ISRO

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