

# **ESPI Insights** Space Sector Watch

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Schwarzenbergplatz 6 | A-1030 Vienna, Austria | (Entrance: Zaunergasse 1) Phone +43 1 718 11 18 - 0 | E-Mail: office@espi.or.at

### **EUROPEAN INVESTMENT COUNCIL FUNDING DELAY RAISES CONCERNS**



Dear Friends of ESPI,

The European Innovation Council (EIC) was officially launched in March 2021 (following its pilot phase which began in 2018) under the EU Horizon Europe programme by the European Commission (EC). Seen as the EC's start-up fund, it has a budget of  $\in 10.1$  billion over 7 years aimed to fill an existing funding gap. During the first year of its programme it handed out  $\in 1.5$  billion in funding. The goal of the EIC is to identify, develop and breakthrough technologies and game changing innovations throughout the life cycle, from early-stage research to proof of concept,

technology transfer and later financing rounds for start-ups or SME's. In addition, EIC selected companies receive coaching, mentoring, access to investors and corporates, and many other opportunities as part of the EIC community. The 2022 EIC Programme established a budget of €1.7 billion, to be distributed amongst various programmes, including:

- EIC Accelerator (€1.16 billion), to support SMEs and start-ups through a combination of grants (nondilutive) and investments (direct equity investments). The accelerator is the most substantial financial support tool of the EIC and has €7 billion earmarked for seven years.
- EIC Pathfinder (€350 million), for advanced scientific research, among others, in the development of information processing, communication or sensing components space applications for breakthrough technologies, which can be granted to entrepreneurial researchers from start-ups, high-tech SMEs and industrial stakeholders.
- EIC Prizes, ad hoc cash prizes worth between €5M and €10M for designated issues. In 2021, there was one competition themed "Low-Cost Space Launch", aiming to launch satellites into LEO with low-cost technology.

The EIC Accelerator has proven to be of significant interest to start-ups, as it provides a unique offer of grants, blended finance or equity investments. However, significant set-backs (three delays up until now) have affected the EIC, delaying access of funds to awarded companies. This hampering occurred due to a range of factors ranging from the seeking of appropriate procedural authorization of contracts to the EC's concerns regarding equity investments in high-risk companies. Out of the companies selected in 2021, more than **30 saw delays in receiving "blended-financing"** which is a mixture of grants and equity investments. Initially delayed until January 2022, some applicants have now been asked to wait until June **2022 to receive their funds**.

While the delays have not affected all start-ups, they raise serious issues for those still yet to receive funding. Applying for EIC funding required a substantial effort, in particular for small, cash-strapped startups. As a result, the initiative can prove to be counterproductive. The situation provides an echo chamber to stakeholders who raised concerns over the capacity of public institutions to play a more prominent role in fostering investment, in particular through direct involvment. The experience has certainly **proved disappointing for some start-ups so far**. Stakes are high and finding appropriate mechanisms to foster entrepreneurship and investment is poised to remain a serious challenge for European institutions.

Yours sincerely,

Jean-Jacques Tortora Director of ESPI



## **POLICY & PROGRAMMES**

### Responses to the cyber-attack against the Ukraine and updates on the ExoMars rover mission



On May 10th, the European Council released a declaration of the High Representative of the EU on the Russian cyber operations against Ukraine. The declaration states that the EU and its Member States strongly condemn the cyberattacks conducted by the Russian Federation against Ukraine one hour before Russia's invasion of Ukraine on February 24th, targeting Viasat's satellite KA-SAT network. The cyberattack impacted critical infrastructure in Ukraine and also other countries in Europe, and thus facilitated Russia's

military operation. The declaration points out that the EU - in cooperation with international partners - is considering further steps to prevent and respond to irresponsible behaviour in cyberspace and that the EU will continue supporting Ukraine to enhance its cyber resilience. In addition, North Macedonia, Montenegro, Serbia and Albania, Bosnia and Herzegovina, Iceland, Liechtenstein, Norway, Ukraine, Republic of Moldova and Georgia will apply to this declaration.

The U.S. joined the European declaration by releasing a statement and the U.S. State Department formally blamed Russia for the cyber-attack. In addition, U.S. Space Force official Lt. Gen. B. Chance Saltzman, Deputy Chief of space operations for nuclear and cyber, stated on May 19th in a virtual panel discussion hosted by the American Institute of Aeronautics and Astronautics, that one lesson learned is the importance of ground systems and network user equipment protection against cyber attackers. In response, the Space Operations Command is retraining cybersecurity specialists for more demanding functions to defend military satellite networks. Furthermore, Elon Musk stated that SpaceX's Starlink broadband service is increasingly threatened by Russian hackers.

With regards to the launch of ExoMars, during a meeting of NASA's Mars Exploration Program Analysis Group (MEPAG) on May 3rd, Jorge Vago, ExoMars project scientist at ESA, pointed out that the ExoMars launch is unlikely before 2028 - and then it would require assistance from NASA. In April, ESA DG Aschbacher said to continue discussions with NASA on how ESA and NASA can cooperate to revive ESA's ExoMars mission.

### The EU conducts Space Threat Response Architecture Exercise 2022 (STRA-22)

The EU carried out the Space Threat Response Architecture (STRA-22) exercise in the European External Action Service (EEAS) HQ in Brussels from May 10th to 13th. The exercise, organised by the EEAS, the European Commission and the EUSPA, activated the EU's response mechanisms and tested



the capability of the EU to respond to attacks on its space assets. The exercise aims at strengthening the EU's readiness to respond to and address attacks and threats against EU space assets and infrastructure.

STRA-22 is the fourth exercise of its kind and builds on the French AsterX-2022 Space exercise, which was carried out in March 2022. In addition, the exercise builds on the recently published Strategic Compass which identified space as a strategic domain and announced the update of the Space Threat Response Mechanism by the end of 2022 as well as its extension to other EU Space Programme components.



### The new structure of Italy's space governance

Based on the **Decree-Law April 30th 2022, n. 36**, which entered into force May 1st and modifies the Legislative Decree of June 4th, 2003, n. 128, **the Italian space governance underpins a broad reorganisation**. The Presidency of the Council of Ministries (Prime Minister) will exercise responsibilities of direction, coordination, planning and supervision of the Italian Space Agency (ASI), while the Ministry of the University and Research (MUR) will only provide the strategic direction limited to scientific research and activities.



Presidenza del Consiglio dei Ministri Credit: Presidenza del Consiglio dei ministri

The Legislative Decree of June 4th, 2003, n. 128 defines the aims, activities, bodies, principles and criteria of the organisation and functioning of the ASI. The current transformation is a long-overdue reform which has the main aim to guarantee the simplification, greater efficiency and speed of action in achieving the digital transition objectives set by the National Recovery and Resilience Plan (PNRR). Over €4B of the PNRR have been allocated for the space sector.

In addition to this, the criteria for evaluating the results of the research programmes of the ASI will no longer be carried out by the MUR. It will now be evaluated based on parameters defined by the Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR), and not as previously occurred. Also fundamental is the change on criteria for decision regarding the President of the Agency. The President will now be appointed by the Prime Minister, in agreement with the MUR. **The Decree-Law provides for the establishment of a financing fund for ASI of €499M**, again under the control of the Prime Minister, starting from 2022. The fund is intended to cover operating and management costs, which also include collaboration programmes with the ESA. Finally, it is also specified that the shares of the Italian Aerospace Research Center (CIRA) owned by ASI are transferred, free of charge, to the National Research Council of Italy (CNR).

### The European Commission allocated €150M from the 2022 EDF work programme to Space

The European Commission published the factsheet on EDF calls 2022 on May 25th. The 2022 (and the second) EDF work programme with a total budget of €925M is organised around 8 calls covering 33 topics that are divided into 16 categories, including space. The category space entails 3 topics with a budget of €150M allocated:

- Responsive Space Systems (Research): €20M
- Innovative Space ISR capabilities (Development): €40M
- Space-based Missile Warning (Development): €90M

In addition, the 2022 EDF work programme provides support for SMEs and supports the stimulation of Defence Innovation through targeted measures. The EDF is implemented through annual work programmes. The 2022 work programme follows the EDF's kick-off and its first calls in July 2021. The 2022 calls are expected to be published on the EC's Funding & Tenders website by June 9th.



### Italian Government signs MoU with Axiom Space to expand commercial utilisation of space

Italy's Minister for Technological Innovation and Digital Transition, Vittorio Colao and Axiom Space's President and CEO, Michael Suffredini, **signed a MoU to expand the collaboration between Italy and Axiom Space** – marking the first MoU of this kind between the Italian government and a private international corporation. The cooperation areas include space exploration R&T, pharmaceuticals, on-orbit manufacturing, space security, aerospace medicine, simulation and robotics, training and mission operations and the



Credit: Axiom Space

integration of an Italian module with the Axiom Space Station. The implementation of the MoU will be pursued by a joint working group, which is comprised of representatives from Axiom Space, institutions and industries selected by the Italian Government.

### The European Parliament releases a draft opinion on the EU Secure Connectivity Initiative

The European Parliament's Committee on Budgets released a draft opinion on the Secure Connectivity Programme (2023-2027) for the Committee on Industry, Research and Energy in response to and following the Commission's draft proposal from February. In the draft opinion, the Committee states that it welcomes the new initiative but recalls that this new initiative was not foreseen in the EU's MFF 2021-2027 and that funds from other programmes should not be reduced or redeployed to this new initiative. Furthermore, the funding model of the initiative (PPP) should not represent a financial risk for the programme's governmental component and a good "safeguard mechanism" between the governmental and commercial components is important to secure the viability of the governmental component.

### U.S. expands space cooperation with countries of the Indo-Pacific region

In May, U.S. President Joe Biden held bilateral summits each with Japan and South Korea **agreeing on expanding security and space cooperation**. During a summit with Japanese Prime Minister Fumio Kishida on May 23rd in Tokyo, Biden agreed to work to include a Japanese astronaut on the lunar Gateway and human and robotic lunar surface missions as part of the Artemis program, aiming to sign an implementation agreement this year - according to a **joint statement** released after the summit. During the bilateral summit with South Korea's President Yoon Suk-yeol on May 21st in Seoul, Biden agreed to strengthen space cooperation.



Credit: The Prime Minister's Office of Japan

In addition, a U.S.-led Quadrilateral Security Dialogue Summit between the U.S., Japan, India and Australia took place on May 24th in Tokyo. During this summit, the leaders of the four countries agreed (as part of a broader set of security, science and technology agreements) to launch a satellite-based maritime domain awareness initiative which aims to support Indo-Pacific countries to track illegal fishing and maritime activities - according to a joint statement they released after the summit. In

addition, the heads of states agreed to open a "Quad Satellite Data Portal" aggregating links to national satellite data resources, to improve public access to EO satellite data and applications to tackle global challenges, such as climate change and disaster response. Furthermore, they agreed to organise joint workshops to promote norms, rules and principles for space sustainability.



### The European Commission signs Copernicus agreement with the Canadian Space Agency



Credit: European Commission

The European Commission signed an agreement on Copernicus with the Canadian Space Agency (CSA) during the EU-Canada Ministerial Committee meeting in Brussels, chaired by Josep Borrel, the High Representative and Vice President of the EC and Mélanie Joly, the Minister of Foreign Affairs of Canada, on future possibilities for space cooperation between both parties. The Copernicus agreement earmarks a reciprocal EO satellite data exchange. This enables the CSA to provide

end-users with simplified Copernicus data access, and Copernicus services and enhances its accuracy. Furthermore, the agreement contributed to strengthening the EU-Canada cooperation in various areas, such as in the Arctic region and the area of climate action.

### The UK and the U.S. sign partnership agreement for spaceflight

The UK and the U.S. signed a partnership agreement to enhance spaceflight opportunities and to mutually benefit from operating from each other's spaceports, working together on future commercial spaceflight missions, in particular on commercial space launch licensing. The agreement lays the basis for the launch and lift-off of rockets, high-altitude balloons and spaceplanes from British spaceports. The objective of the partnership is to enable more cost-efficient (cheaper, quicker and streamlined) spaceflight operations. Providing mutual benefit, the agreement will support the efficient hosting of U.S. spaceflight operators in the UK and will allow UK space organisations to operate in the U.S.

### France and India agree to establish a strategic dialogue on space

As part of a set of economic and security agreements between France and India, both states **agreed to foster cooperation in space**. The agreement was reached between the French President Emmanuel Macron and the Indian Prime Minister Narendra Modi in the frame of a bilateral summit on May 4th in Paris. In a **joint statement** they agreed to set up a bilateral strategic dialogue on space issues to tackle "contemporary challenges that have arisen in space" - including secure access to outer space. The strategic dialogue will bring together experts from both countries and the first round of the dialogue is planned this year at the earliest.



Credit: PIB

### UK Ministry of Defence contracts UK-Australian collaboration to enhance capabilities

The UK Ministry of Defence awarded an U.S. \$1M contract over a 1,5-year-duration to the UK-based SSA company Northern Space and Security Limited (NORSS) and the Australian Nominal Systems for the development of the simulator solution for spacecrafts and missions called ARTSIM. ARTSIM is aimed at supporting the satellite operational plans of the UK MoD and a broad range of activities, such as design activities, testing and verification, commissioning, mission and spacecraft operation as well as disposal. ARTSIM aims to provide a modular, data representative satellite simulation architecture through integrating simulation with high-quality visualisations and will be built on the Nominal simulation platform.



### U.S. DIU selects nuclear-powered spacecraft designs for demonstrations in 2027

The U.S. Defense Innovation Unit (DIU) selected the two companies Ultra Safe Nuclear Corp. and Avalanche Energy and awarded them "other transaction (OT)" contracts to demonstrate SNPP technology for future U.S. DoD missions, specifically to develop a small nuclear-powered spacecraft for in-space demonstrations in 2027. The advantage of OTcontracts, which are increasingly used in military space projects, is that these are negotiated faster than traditional defense procurements. Ultra



Credit: DIU

Safe Nuclear Corp. and Avalanche Energy were selected seven months after DIU's solicitation for small nuclear-powered engines for in-space missions.

### U.S. Space Force plans to select small rocket for Tactically Responsive Space mission

The U.S. Space Force plans to award a contract for the Tactically Responsive Space (TacRS-3) mission in August, selecting a small satellite launcher to rapidly fly the SDA payload "Victus Nox" to LEO. Suppliers that were pre-selected for the Orbital Services Program OSP-4 will compete for this contract. The Space Force's Rocket Systems Launch Programme will manage the TacRS-3 which will demonstrate an end-to-end tactically responsive space capability, including the launch, space and ground segments and on-orbit operations.

In addition, the Space Force unveiled plans to invest \$3.7B in total to build and launch two more Mobile User Objective System (MOUS) narrowband communication satellites, in order to complement the four MUOS satellites already in orbit. According to details revealed regarding this budget request, it includes \$165.9M for the development of the MOUS satellites in fiscal 2023, approx. \$2.2B over the upcoming five years as well as funding for two fixed-price satellite design contracts which will be awarded beginning of 2023. According to budget documents, the launch of the satellites is planned in 2029 or 2030.

### Egyptian Space Agency and SANSA sign MoU for cooperation in space



Credit: EgSA

The Egyptian Space Agency (EgSA) CEO, Mohamed Al-Qousi, signed a MoU for cooperation in space and the peaceful use of outer space with the interim CEO of the South African National Space Agency (SANSA), Andiswa Mlisa, alongside EgSA's Vice President Mohammed Khalil Iraqi and His Excellency Ambassador Fadl Nasr El-Din, Deputy Foreign Minister and Director of North Africa and Middle East Department at the South African Foreign Ministry. The MoU's objective is to activate mechanisms for cooperation in space activities, research and exploration for peaceful purposes and to encourage exchange.

### ESA awards Astroscale €14.8M funding for the 2024 ELSA-M debris removal mission

ESA awarded Astroscale's UK a €14.8M in funding from the Sunrise Partnership Programme between ESA, OneWeb and the UKSA for the ELSA-M servicer mission, developed in partnership with OneWeb, the UKSA and ESA. The launch of ELSA-M is planned by the end of 2024. The funding is for the completion of ELSA-M's design and includes the manufacturing and the satellite pre-integration phase. ELSA-M aims to deliver a debris removal service to satellite operators.



### ESA and Switzerland sign agreement to establish a Space Deep-Tech Innovation Centre

ESA DG Joseph Aschbacher and the Swiss State Secretary Martina Hirayama **signed a Memorandum of Cooperation between Switzerland and ESA to establish a new joint centre**, the European Space Deep-Tech Innovation (ESDI) Centre. The centre aims to better link economic development and academic research. On the upcoming ESA Council, ESA member states will agree on the necessary ESA programmatic framework - after approval, the first projects can start in 2023.

### **U.S. National Reconnaissance Office awards largest ever EOCL contracts**



The U.S. National Reconnaissance Office (NRO) **awarded Electro-Optical Commercial Layer (EOCL) multi-billion contracts to Maxar, BlackSky and Planet** - marking a NRO's largest award of commercial imagery contracts. EOCL, which will support the U.S. commercial remote sensing industry and NRO user's mission requirements, is effective as of May 22nd with a 5-year base as well as multiple 1- year options with additional growth through 2032.

### Canada proposes space law to punish crimes committed on Moon

Canada proposed an amendment to its criminal code, allowing for the **crime prosecution committed by Canadian astronauts when traveling to and back from the Moon and during presence on the Moon**. In the **newly proposed code** Bill C-19 it is outlined: "A Canadian crew member who, during a space flight, commits an act or omission outside Canada that if committed in Canada would constitute an indictable offense is deemed to have committed that act or omission in Canada".

### China's Tianzhou-4 cargo spacecraft docks with the Tianhe Space Station Module

The Chinese Tianzhou-4 cargo spacecraft completed an automated docking with the Tianhe Space Station module, the core module of the Chinese Tiangong Space Station, on May 9th - following its launch on a Long March 7 rocket from Wenchang launch center. The cargo is comprised of supplies for the astronauts, equipment for space station maintenance and space science experiments as well as a palette of seeds which will be exposed to radiation in LEO - to be analysed back on Earth.



Credit: CAST

### Indian Space Agency ISRO plans mission to Venus in 2024

The Indian Space Agency ISRO plans a mission to Venus to study the atmosphere. During a meeting on Venusian science on May 4th, ISRO's Chairman Somnath revealed that the project report has been prepared and funding was identified. ISRO expects and plans to use a launch window in December 2024 with orbital manoeuvre planned in 2025, enabling the spacecraft to enter into Venus's orbit with a minimum amount of propellant.



### In other news

**Colombia signs the Artemis Accords:** Colombia's Vice President and Foreign Minister Marta Lucía Ramírez signed the Accords alongside NASA Deputy Administrator Pam Melroy. Colombia is the 19th nation (and the third nation in Latin America, succeeding Brazil and Mexico) joining the Accords.

**Canada joins U.S. ASAT testing ban:** the announcement of Canada's opposition to ASAT testing was expressed in a **paper** on the first day of first session of the new UN OEWG on reducing space threats.

The Switzerland-based in-orbit services company ClearSpace is joining the Net Zero Space initiative: the initiative, launched by the Paris Peace Forum in November 2021, brings together industry companies to ensure safe and sustainable space operations for sustainable use of space by 2030.

The French Defence Innovation Agency signs a contract with Exotrail to provide the French Space Command with a simulation and mission analysis software: the software is an enhanced version of Exotrail's Software-as-a-Service product of ExoOPS<sup>™</sup> - Mission Design and will provide the Space Command with the capability to simulate and characterise complex manoeuvres of satellites.

The EUSPA and the European Fisheries Control Agency (EFCA) sign a MoU: through the agreement, Galileo and Copernicus will further be used to assess the location of fish stocks and to track the location of vessels to prevent illegal, unreported and unregulated fishing.

NASA and ESA astronauts returned safely on Earth from the ISS: NASA's SpaceX Crew-3 astronauts Kayla Barron, Raja Chari, and Tom Marshburn and ESA astronaut Matthias Maurer safely returned to Earth in a parachute-assisted splashdown on May 6<sup>th</sup> in the Gulf of Mexico off the coast of Florida.

DARPA successfully completed a free flight test of the Hypersonic Air-breathing Weapon Concept (HAWC) of Lockheed Martin: The flight test was the second one completed within DARPA's HAWC programme - the first test flight was conducted by Raytheon Technologies' configuration last year.

NASA Psyche spacecraft's launch will have a delay due to a software problem: The spacecraft, which recently arrived at the Kennedy Space Center for starting the launch preparations, will not launch before September 20th – a delay of more than one and a half month.

SES's non-geostationary MEO satellite network will become part of the GovSatCom-grade satellite communications platform for governments and institutions (REACH platform): the non-geostationary satellites will be technically integrated in MEO into the platform which will provide higher performance for users.

**EUSPA elected Philippe Bertrand as new Chair of the EUSPA Security Accreditation Board**: He was elected during the 52nd meeting of EUSPA's Security Accreditation Board by the representatives of the Member States.

Japan Air Self Defense Force awards contract to LeoLabs: LeoLabs will provide SDA data, services and training at the Japan Air Self Force.

NASA selected NanoAvionics to build a 12U nanosatellite bus for an in-orbit demonstration of its Advanced Composite Solar Sail System (ACS3): NASA's ACS3 mission aims to replace conventional rocket propellants by developing and testing solar sail propulsion systems using sunlight beams to thrust the nanosatellite.



## **INDUSTRY & INNOVATION**

### Orbex and Astra Space reveal new launch vehicles to be launched from the UK

The UK-based spaceflight company **Orbex unveiled the first full-scale prototype of the Prime orbital launch vehicle**, which is the first micro-launcher in this development stage developed in Europe and is currently preparing for the first vertical rocket launch from UK soil.

Furthermore, the U.S.-based launch service provider Astra Space revealed its new launch vehicle Rocket 4.0, which is part of the company's Launch System 2.0 and will be able to carry up to 300 kg into LEO at a base price of \$3.95M. Rocket 4.0's



Credit: Orbex

test launch is planned for the fourth quarter of 2022. Additionally, **Astra and the SaxaVord Spaceport announced their partnership** to increase access to space by providing dedicated orbital launch services, with the first rocket launches planned for 2023, depending on regulatory approvals.

### MDA secures first commercial sale of Canadarm3

On May 3rd, the Canada-based company **MDA reached the first commercial sales agreement of its Canadarm3 technology** with Axiom Space. Accordingly, a total of 32 external interfaces will be built in the Axiom Station, a future space station currently under construction. Canadarm2, currently aboard the ISS, is building the Axiom Station and will install the interfaces which are compatible with its next-generation Canadarm3. After the construction is complete, the Axiom Station will decouple from the ISS.

### **Benchmark Space Systems opens UK facility**

The U.S.-based company Benchmark Space Systems, a company dedicated to propulsion solutions for small satellite applications, **opened a manufacturing and testing facility** in the Satellite Applications Catapult Facility, at the Westcott Innovation Centre in England. This investment follows a propulsion contract to support the in-space manufacturing mission of Space Forge. The two companies are planning to co-develop reusable generations of Benchmark's chemical propulsion systems for powering the reusable ForgeStar satellites of Space Forge.



## Phantom Space Corporation places an order for more than 200 Ursa Major rocket engines

On May 4th, **Phantom Space announced an agreement with Ursa Major** to purchase a large number of rocket engines, 30 of which are to be delivered this year. The U.S.based rocket propulsion company will supply both its Hadley and Ripley engines that Phantom plans to use first on its Daytona launch vehicle, with a hot-fire test already scheduled for this summer, and on the larger Laguna in 2025. According to Ursa's founder, Joe Laurienti, the agreement aims at building a "sustaining partnership" between the two US companies.

Credit: Ursa Major



### **EUMETSAT** signs agreement with African Union Commission on climate monitoring

EUMETSAT DG Phil Evans and African Union Commissioner for Agriculture, Rural Development, Blue Economy and Sustainable Environment Her Excellency Ambassador Josefa Sacko, **signed a cooperation agreement on climate monitoring** to formalise their collaboration under the Intra ACP Climate Services and Related Applications Programme (ClimSA programme), which was initiated by the EU and the Organisation of African, the Caribbean and the Pacific States.



Credit: EUMETSAT

The ClimSA programme facilitates African meteorological and

hydrological services in renewing their current EUMETCast stations to ensure the reception and processing of Meteosat Third Generation data. As a result, the improved access to information supports decision-making and development planning processes.

### Satellogic and Mayday.ai team-up to improve risk and disaster intelligence

The EO data collection company Satellogic entered into a **partnership agreement** with the German realtime risk and disaster intelligence provider Mayday.ai to create new standards for and improve data intelligence as well as to reduce the barriers of EO data between up- and downstream, for risk and disaster management. Through the cooperation, EO capabilities and advanced data processing are integrated with Al. Mayday.ai utilises machine learning with data sources, enabling automated risk-modeling and data for preventive action, real-time detection, and post-disaster analytics, which is enhanced by Satellogic's highfrequency and -resolution satellite constellation. This cooperation will facilitate to obtain disaster insights easier for the public.

### Lockheed Martin and Filecoin Foundation sign partnership

On May 23rd, Lockheed Martin and the U.S.-based decentralised database developer Filecoin Foundation stated they will **develop a program to deploy the Interplanetary File System** (IPFS). The objective is to use the IPFS to provide faster internet connection in space by decentralising data servers. That is, when a user clicks on content on the internet, the data would be fetched from the closest person that already retrieved it before, instead of the centralised server on Earth.

This method will enable better data transfer and communication speeds, supporting long-term presence in space. A preliminary study will be conducted until the end of August 2022 to pick the spacecraft of the initial IPFS payload and opportunities for demonstration of the technology.



Credit: Gilmour Space

## Gilmour Space tests new rocket engine and signs contract with Australian Department of Defence

The Australian launch services company Gilmour Space demonstrated the new oxygen/kerosene liquid rocket engine "Phoenix" which it aims to integrate into the third stage of its Eris rocket. One week before the testing, the Australian Department of Defence signed a \$15M contract to develop and launch a new sovereign surveillance satellite aboard the Eris rocket in 2023.



### SES and Sky UK extend long-term partnership

On May 3rd, **SES signed a contract with its broadcast customer Sky UK**. The deal, which is worth around €84M, builds on a €90M capacity agreement dated back to February 2021. Consequently, Sky UK will continue to deliver TV channels to its subscribers in the United Kingdom and the Republic of Ireland, leveraging the Ku-band capacity provided by SES.

### In other news

Aerospacelab and ArianeGroup sign MoU: The satellite platforms and geospatial intelligence Belgiumbased company and ArianeGroup aim to collaborate in the development of avionics and water propulsion systems.

**Open Cosmos signs a €5.2M contract with ESA**: The UK-based company dedicated to satellite-based solutions, was contracted by ESA to develop the NanoMagSat mission, a small satellite constellation to monitor Earth's magnetic field and ionosphere environment.

Launches in Spaceport Nova Scotia to begin in the summer of 2023: The Canadian-based companies Maritime Launch Services and Reaction Dynamics (RDX) signed a letter of intent to start launches from the spaceport in the Summer of 2023. Accordingly, the first suborbital launch will be performed by RDX's "Aurora" launch vehicle.

Starlink completes licencing process in the Philippines and Nigeria: With the licencing authorisation, SpaceX's Starlink will be able to act as an internet service provider in these countries and is now able to provide its services on all seven continents.

**Innospace signs technology agreement with Brazilian Air Force (FAB):** The South Korean start-up will launch on a suborbital test flight the inertial navigation system SISNAV in Q4 2022 from the equatorial Alcântara Launch Center, in Brazil. With the agreement, Innospace aims to prove its technology to the small satellite launch services market.

**Satellogic secures multiple launch agreement (MLA) with SpaceX**: Accordingly, the Uruguay-based Earth observation company will launch 68 new satellites with SpaceX. This agreement builds upon previous ones, maintaining the American company as its preferred launch partner.



## **ECONOMY & BUSINESS**

### Consulting and banking firms release three reports offering insights on the space industry

Euroconsult reveals first edition of the Space Logistic Markets report

In the **first edition of its report on Space Logistics Markets**, Euroconsult projects that the demand for logistics services (on-orbit space services from launch to satellite end of life) will generate \$4.4B by 2031. The consulting company underlines a "new momentum" led by the private sector in the space logistics sector, which raised \$732M in the last five years. The report covers six markets:

- Access to space
- Last mile logistics (LML)
- Life extension services (LES)
- Active debris removal (ADR)
- On-orbit assembly and manufacturing (OOAM)
- Space situational awareness (SSA)



A complete analysis and forecast of spac logistic value chain and market.

It was noted that even though maturities vary across the space logistics value chain, SSA is picking up the pace, being the largest market with estimated earnings of \$1.4B over the next 10 years. In comparison, LML's projections are ten times smaller. Moreover, the Governments role will be fundamental in the maturation of the market, particularly as early customers and helping to increase Technology Readiness Levels (TRL).

### Citi's report highlights expansion of the space market

In its report "**Space: the Dawn of a New Age**", Citi gives an overview of the space industry, underlining the decrease in launch costs, as an enabler of the growth of the space industry, projected to reach a value of \$1T in 2040. In particular, the bank notes that until 2040 almost half of the launch costs decrease will be driven by more efficient and reusable second stage rockets. Accordingly, it is projected that launch costs, currently sitting at \$1.500 per kg, will fall to around \$100 per kg in the next 18 years.

Regarding the satellite market, Citi estimates that the total market value will increase from \$118B in 2020 to \$144B in 2040. Moreover, there will be shifts in the satellite services businesses' share of the market, even though television will keep the largest portion, it will decrease from 75% in 2020 to 41% in 2040. On the other hand, broadband will increase from 5% to 21%, making up the second-largest share of the market by 2040. Furthermore, future new segments of the space market are projected to raise \$100B annually by 2040.



## McKinsey's report notes various long-term estimates of the space economy

McKinsey report "The role of space in driving sustainability, security, and development on Earth", highlights discrepancies in various estimates of long-term growth of the space economy, with most optimist ones projecting a \$2.7B market by 2050, and the more pessimistic ones putting its value at \$900B by 2040. Still, McKinsey underlines that the space sector, currently sizing \$350B, is at an inflection point and set to expand.

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### Astrocast set to acquire Hiber Global amid second IPO

On 30th May, Astrocast, a Swiss-based nanosatellite IoT network start-up, **signed an agreement to acquire Hiber Global**, a Netherlands-based IoT-as-a-Service provider. Therefore, the Swiss company will purchase all of Hiber's shares in exchange for the issuance of new Astrocast shares representing a 16.5% **Cred** stake. Moreover, Hiber's shareholders will invest €10.5M in Astrocast's future IPO.



The purchase is subject to the completion of Astrocast's pending second IPO on Euronext Growth Paris, through which the company is seeking an inflow of capital representing  $\in$ 70M. Accordingly, the agreement with Hiber Global, contingent on the IPO, guarantees a portion of the funds sought after.

With the acquisition, the Swiss IoT operator will establish a direct-to-end user sales channel, expand its products and services, and gain access to Hiber's L-band spectrum over the Americas and its clients, including major ones, such as ExxonMobil, Shell, Oil Search, NAM and ENI.

### **Orienspace secures \$59.9M Series A round**

The Chinese launch vehicle developer raised \$59.9M in a financing round led by Hike Capital. The funds will be used to develop the first flight of the "Gravity-1" medium-lift launch vehicle and accelerate the development of a 100-ton trust reusable liquid oxygen and kerosene rocket engine. Gravity-1 test flight is scheduled for mid-2023, and if successful, it would be China's rocket with the largest carrying capacity of 6.500 kilograms to LEO or 3.700 to sun-synchronous orbit.

### Pachama closes \$55M Series B funding round

On March 5th, the U.S.-based carbon credit platform provider **raised \$55M in a Series B investment round** led by Future Positive with the participation of Breakthrough Energy Ventures and LowerCarbon Capital. Among other services, Pachama uses remote sensing data to train machine learning models and estimate carbon storage in forests. The company will invest the capital in the expansion of its human resources and the development of its technology, expanding the range of services the company provides to encompass forest restoration projects from the beginning, instead of just evaluating existing ones.

### **Perennial raises \$18M in Series A funding round**



On May 16th, Perennial, a U.S.-based company formally called "Cloud Agronomics", which is dedicated to the measurement, reporting, and verification (MRV) for soil-based carbon removal, **raised \$18M in its Series A funding round**. The investment round, led by Temasek and Bloomberg, will allow the company to expand its team and accelerate its growth.

### Lunar Outpost raises \$12M in seed round

The U.S.-based company dedicated to building instruments for a sustainable presence in cislunar space **raised \$12M in a seed round** led by Explorer 1 Fund. The investment will be used to develop an autonomous rover for the Moon, with plans for its lifespan to be of years, deploy the company's robotic technologies in more environments and improve existing technologies.



### Astroforge closes \$13M seed round

On May 26th, the U.S.-based asteroid mining **company Astroforge raised \$13M in seed capital to start its operations**, which include a demonstration flight to be conducted in a rideshare mission aboard a SpaceX Falcon 9 in 2023. So far, there are not many details regarding how the company plans to surpass the numerous problems related to asteroid mining activities, but the company is selecting space objects between 20 metres and 1.5 kilometres in diameter with high concentrations of the six platinum-group metals, such as platinum and iridium, for potential future operations.

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Credit: Lunar Outpost

### Apogeo Space concludes €5M seed round

The Italian satellite company that specialises in the design and manufacturing of nanosatellites **secured** €5M in a seed round led by Primo Space. The company will use it to build a constellation of pico-satellites for data management and provide global connectivity to Internet of Things devices. Apogeo Space, which to date launched two experimental satellites, now plans to put 20 satellites into orbit by the end of 2023 and to start providing services in the first half of the same year.



### In other news

Ubotica Technologies raises €4M in seed funding: The Ireland-based provider of real-time insights on semi-autonomous satellite systems closed an oversubscribed round led by Atlantic Bridge. Ubotica will use the funds to develop the next generation of its onboard processing system CogniSat.

**European Innovation Council allocates €2.5M to E.T. PACK-Fly consortium**: The consortium, coordinated by Universidad Carlos III de Madrid, with the participation of the companies SENER Aeroespacial and Rocket Factory Augsburg and the University of Padova and the Technical University of Dresden, will use the funds to develop a device based on space tether to deorbit space debris.

Swiss-based Lightly secures \$3M seed round: The start-up will use the funds to increase its workforce and expand to the U.S. Lightly uses a data curation tool to improve companies' machine learning models, which can be applied to space data, autonomous vehicles, medical imaging, and visual inspection.

**CropSafe secures \$3M in seed round**: The UK-based company dedicated to the monitoring of crops through satellites and weather stations, will use the investment to accelerate its growth in the U.S. and expand its team.

Miratlas closes €2M seed round: The French start-up will use the investment to develop its industrial capacities and help deploy its instruments globally. The company's technology helps characterise atmospheric turbulence and cloud cover necessary to establish and maintain laser communications between Earth and space. The investment round was led by Karista.

NaraSpace Technology secures \$7.88M Series A: The South Korean start-up specialised in the design, development, integration, and testing of CubeSats and small space systems, will use the funds to continue developing its electro-optical remote sensing nanosatellites. Among the investors, there were Posco Capital, Korea Development Bank and Hana Ventures.

Kongtian Dongli closes angel round: The newly established Chinese company dedicated to satellite electric propulsion secured "millions of yuan" in an angel round led by Jinshajiang Hongyu and MiraclePlus.

**Precious Payload acquires HOSTmi**: The U.S.-based start-up dedicated to planning and execution of satellite missions acquired the German space company, which provides a digital platform for the management of space missions. With the acquisition, the Precious Payload plans to leverage its developer tools and bolster existing HOSTmi services.

**Northern Sky Research (NSR) acquired by Analysis Mason**: The UK-based consulting company Analysis Mason is a consulting firm dedicated to technology, media, and telecom, while NSR is a consulting firm based in the U.S. focused on satellites and space. With the acquisition, Analysis Mason intends to combine the companies' expertise in satellites, 5G and fibre.



## LAUNCHES & SATELLITES

### **Global space activity statistics**

May 2022	USA	Russia	China	Others	Total
Number of launches	6	1	4	1	12
Number of spacecraft launched	267	1	13	24	315
Mass launched (in kg)	77 059	4000	14 622	189	95 869

### Launch activity over the year



Evolution of the number of launches per launch country



Evolution of launch activity over the year 2021-2022



### Satellite missions and markets



Evolution of the total mass launched (tons) per mission (Jun. 2021-May 2022)



Evolution of the total mass launched (tons), per market (Jun. 2021-May 2022)

May 2022	Telecom	Remote sensing	Human Spaceflight	Technology/ Demonstration	Science	Other
Europe	3.5	451		9.5	3	109
USA	62 549.6	180		13 335.85		365
Russia		4000				
China		1562	12 910	150		
Others	8	209		24		

### Total mass (kg) launched by mission and customer country

May 2022	Commercial	Governmental Civil	Military	Education
Europe	570	3		2.8
USA	63 385.45	13 028	12	5
Russia			4000	
China	1662	12 960		
Others	241			

Total mass (kg) launched by market and customer country



### Launch Log

Launch date	Launch country	Launcher	Spacecraft name	Main customer	Customer country	Prime manufacturer	Manufactu rer count <u>ry</u>	Mass (kg)	Mission	Market
02/05/2022	New Zealand	Electron KS (R)	AuroraSat-1	Aurora Propulsion Technologies	Finland	SatRevolution SA	Poland	2	Tech / Demo	Commercial
			BRO 6	UnseenLabs	France	GOMSpace	Denmark	6	Signal Intelligence	Commercial
			Copia	Astrix	New Zealand	Astrix	New Zealand	20	Tech / Demo	Commercial
			E-Space Demo (3 satellites)	E-Space	USA	E-Space	USA	50 (each)	Tech / Demo	Commercial
			MyRadar 1	Acme AtronOmatic	USA	Acme AtronOmatic	USA	0,2	Tech / Demo	Commercial
			SpaceBEE (24 satellites)	Swarm Technologies	USA	Swarm Technologies	USA	0,4 (each)	Telecommunication	Commercial
			TRSI (2 & 3) Unicorn 2	Acme AtronOmatic Alba Orbital	USA UK	Acme AtronOmatic Alba Orbital	USA UK	0,2 (each) 0,5	Tech / Demo Tech / Demo	Commercial Commercial
05/05/2022	China	CZ-2D(2)	Jilin-1 Gaofen-03D (7 satellites)	Chang Guang Satellite Technology Co	China	Chang Guang Satellite Technology Co	China	42 (each)	Earth Observation	Commercial
			Jilin-1 Kuanfu-01C	Chang Guang Satellite Technology Co.	China	Chang Guang Satellite Technology Co.	China	1250	Earth Observation	Commercial
06/05/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (53 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
09/05/2022	China	CZ-7	Tianzhou 4	CNSA	China	CAST	China	12910	Cargo Transfer	Governmental Civil
13/05/2022	China	Hyperbola-1	Jilin-1 Mofang-01A(R)	Chang Guang Satellite Technology Co.	China	Chang Guang Satellite Technology Co.	China	18	Earth Observation	Commercial
13/05/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (53 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
14/05/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (53 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
18/05/2022	USA	Falcon-9 v1.2 (Block 5)	Starlink (53 satellites)	SpaceX	USA	SpaceX	USA	295 (each)	Telecommunication	Commercial
19/05/2022	USA	Atlas-5(N22)	Starliner OFT-2	NASA	USA	Boeing	USA	13000	Tech / Demo	Governmental Civil
19/05/2022	Russia	Soyuz-2-1a	Bars-M 03	Russian Aerospace Forces	Russia	Progress Rocket Space Center	Russia	4000	Earth Observation	Military
20/05/2022	China	CZ-2C(3)/YZ-1S	Unknown (2 satellites)	Chang Guang Satellite Technology Co.	China	Chang Guang Satellite Technology Co.	China	50 (each)	Tech / Demo	Commercial
			Unknown	CAST	China	CAST	China	50	Tech / Demo	Governmental Civil
25/05/2022	USA	Falcon-9 v1.2 (Block 5)	Agile Micro Sat	MIT	USA	Blue Canyon Technologies	USA	16	Tech / Demo	Governmental Civil
			BroncoSat 1	Cal Poly	USA	Cal Poly	USA	2	Tech / Demo	Education
			Centauri 5	Fleet Space Technologies	Australia	Tyvak Nano-Satellite Systems	USA	8	Telecommunication	Commercial

### Launches & Satellites



CICERO-2 (1 & 2)	GeoOptics Inc	USA	Tyvak Nano-Satellite Systems	USA	10 (each)	Earth Observation	Commercial
CNCE Block 2 (1 & 2)	Missile Defense Agency	USA	Blue Canyon	USA	6 (each)	Tech / Demo	Military
Connecta T1.1	Plan-S	Turkey	Plan-S	Turkey	4	Tech / Demo	Commercial
CPOD (A & B)	Tyvak Nano-Satellite Systems	USA	Tyvak Nano-Satellite Systems	USA	4 (each)	Tech / Demo	Commercial
Foresail 1	Finnish Centre of Excellence in Research of Sustainable Space	Finland	Aalto University	Finland	3	Space Science	Governmental Civil
FossaSat (7 satellites)	Fossa Systems	Spain	Fossa Systems	Spain	0,5 (each)	Telecommunication	Commercial
GHGSat (C3, C4 & C5)	GHGSat Inc.	Canada	UTIAS/SFL	Canada	15 (each)	Earth Observation	Commercial
Guardian	Aistech	Spain	OrbAstro	United	6	Tech / Demo	Commercial
Hawk 5 (A, B & C)	HawkEye 360	USA	UTIAS/SFL	Canada	25 (each)	Signal Intelligence	Commercial
ICEYE (5 satellites) ION-SCV 6	ICEYE D-Orbit	Finland Italy	ICEYE D-Orbit	Finland Italy	85 (each) 100	Earth Observation Other	Commercial Commercial
Lemur-2 (5 satellites)	Spire	USA	Spire	USA	4 (each)	Earth Observation	Commercial
ÑuSat (4 satellites) Outpost Mars Demo-1	Satellogic SA Nanoracks	Argentina USA	Satellogic SA Nanoracks	Argentina USA	41 (each) 111	Earth Observation Tech / Demo	Commercial Commercial
Planetum 1	Planetum	Czech Republic	Spacemanic	Czech Republic	1	Other	Education
Platform 1	EnduroSat	Bulgaria	EnduroSat	Bulgaria	6	Other	Commercial
PTD 3	NASA	USA	Tyvak Nano-Satellite Systems	USA	12	Tech / Demo	Governmental Civil
SBUDNIC	Brown University	USA	Brown University	USA	3	Tech / Demo	Education
SelfieSat-1	Orbit NTNU	Norway	Orbit NTNU	Norway	1,8	Other	Education
Sherpa-AC 1 Spark 2	Spaceflight Inc. Omnispace	USA USA	Spaceflight Inc. NanoAvionics	USA Lithuania	150 10	Other Tech / Demo	Commercial Commercial
SPiN 1	Space Products and	Germany	Space Products and	Germany	1	Tech / Demo	Commercial
Umbra 03	Umbra Lab	USA	Umbra Lab	USA	65	Earth Observation	Commercial
Urdaneta-Armsat 1	Satlantis	Spain	Satlantis	Spain	20	Earth Observation	Commercial
VariSat 1C	VariSat LLC	USA	OmniTeq	USA	11	Tech / Demo	Commercial
Veery FS-1	Care Weather Technologies	USA	Care Weather Technologies	USA	0,25	Tech / Demo	Commercial
Vigoride Demo-1	Momentus	USA	Momentus	USA	215	Other	Commercial





### **Launch Highlights**

### Second test mission for Starliner

On May 19th, ULA **launched** the second Starliner Orbital Flight Test (OFT) on an Atlas 5. Starliner, a crew capsule built by Boeing and expected to transport astronauts to the ISS along SpaceX's Dragon spacecraft, performed its first OFT in December 2019. However, due to several technical issues, the capsule could not dock to the ISS at the time and additional software problems were discovered during reentries. Boeing planned a second test in August 2021, but a valve issue delayed the launch. On the contrary, although a few unexpected events happened, the **second OFT mission** has been considered a success, with the spacecraft



Credit: NASA TV

reaching its intended orbit and delivering cargo to the crew onboard the space station. Astronauts also conducted some checks and tests with the capsule, which departed from the ISS after five days in orbit and landed on Earth on May 25th.



Credit: Rocket Lab

### **Rocket Lab fails to recover its booster**

On May 2<sup>nd</sup>, Rocket Lab performed its second launch of the year, which sent to orbit more than 30 satellites. In particular, the launcher carried three test satellites for E-Space, a new company established by Greg Wyler, whose objective is to build the "most sustainable" network of satellites in space, with connectivity applications. Moreover, for the first time, **Rocket Lab tried to catch a** 

**booster** with a helicopter after an operational launch. Although the pilot managed to capture the booster mid-air, he had to release it a few moments after due to "different load characteristics" than those experienced during previous tests. For this reason, the booster fell in the sea but could be recovered, and Rocket Lab is contemplating a potential reuse for a next flight. Other trials for the capture of a booster will take place in a few months.

### iSpace fails to launch again

On May 13th, the Chinese start-up iSpace, which became the country's first private company to reach orbit in August 2019, **suffered a third consecutive failure** of its Hyperbola-1 launcher. The payload was a high-resolution remote sensing satellite for the company Chang Guang Satellite Technology. This represented the first launch not being conducted by CASC in 2022 and the first failure for China in the year.

### Starlink constellation continues its expansion

In May, SpaceX launched four batches of 53 Starlink satellites each, thus sending more than 200 spacecraft in orbit for its constellation. Remarkably, three Starlink launches took place in only five days, although they all launched from different spaceports. With these launches, the company has now deployed **half of its first-generation fleet**, which is expected to be made of more than 4400 satellites, although the constellation could eventually expand to up to 42 000 spacecraft.

## **ABOUT ESPI**



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	0	Ē	Research and analysis on major space policy issues	
Multinational team with interdisciplinary expertise	9.00°	Q	Monitoring of global space trends and policy developments	
Part of a network of European and international partners			Organization of thematic conferences and workshops	

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Schwarzenbergplatz 6 | A-1030 Vienna, Austria | (Entrance: Zaunergasse 1) Phone +43 1 718 11 18 - 0 | E-Mail: office@espi.or.at