



ABOVE THE SKY

MISSION BOOKLET



Mission name: Above the Sky Carrier names: ION SCV011 Savvy Simon

Fino Mornasco, Italy, June 13th, 2023: Space logistics and orbital transportation company D-Orbit launched Above the Sky, the 11th commercial mission of their proprietary orbital transfer vehicle (OTV) ION Satellite Carrier (ION).

The OTV lifted off on June 12th, 2023, at 2:19 p.m. PDT (June 12th, 2023 at 21:19 UTC) aboard a Falcon 9 rocket from the Space Launch Complex 4 East (SLC-4E) at Vandenberg Space Force Base in California, and was successfully deployed 1h:20m after lift off into an approximately 525km Sun-Synchronous Orbit

ION SCV011, dubbed "Savvy Simon", will host onboard 16 payloads, one of which remains undisclosed: Kelpie-2, a 3U designed and built by AAC Clyde Space for ORBCOMM that will deliver Automatic Identification System (AIS) data exclusively to ORBCOMM and its clientele, as part of a Space Data as a Service agreement; EPICHyper-2, a 6U EPIC CubeSat designed and built by AAC Clyde Space that will deliver Hyperspectral data exclusively to their partners at Wyvern Inc, a Canadian Earth observation company; Spei Satelles (SpeiSat), a nanosatellite developed by the Polytechnic of Turin and the Italian Space Agency, featuring advanced sensors to study space environments. The satellite will also transmit messages of hope and peace from a nanobook printed with a publication from 2020; Mission 1, the inaugural satellite venture by Outpost designed to obtain crucial flight experience for the company's ferry avionics system before embarking on their first Earth Return missions; NavILEO™, a low-cost, high-performance Global Navigation Satellite System (GNSS) receiver developed by SpacePNT; ODIN-DU1 by ODIN Space, a hosted sensor and the first installation of a distributed network that will deliver novel data on lethal sub-centimeter debris; UKRI SWIMMR-1 by RAL Space, a space radiation monitor designed to collect data for space weather monitoring. ION will also host onboard two AlbaPod 6P PocketQube satellite deployers by Alba Orbital, which will release six PocketQube satellites into orbit.

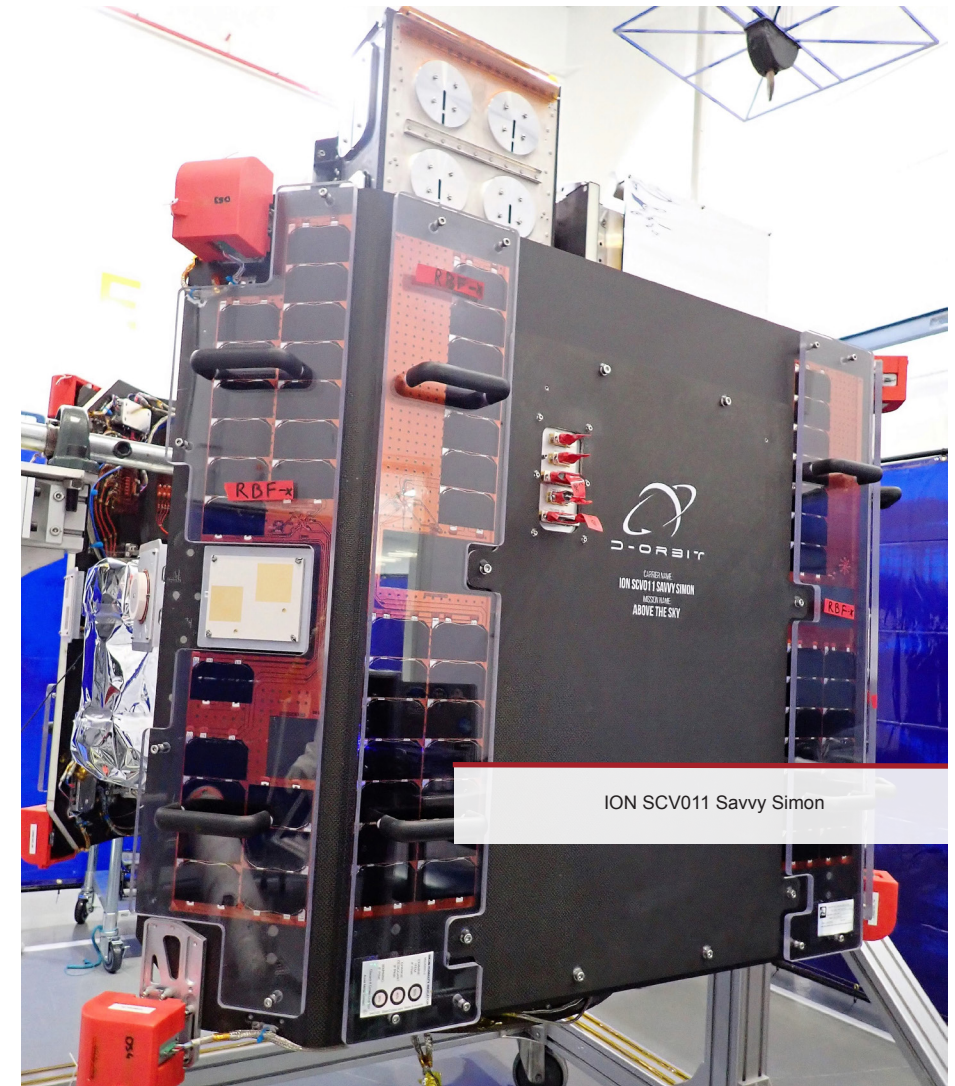
Above the Sky is ION's fifth mission of 2023. D-Orbit launched its first ION in September 2020 aboard an Arianespace VEGA launcher. With this launch, the Company will have transported to space more than 110 payloads collectively.



Photo credit: SpaceX

A note about the name of the satellite carrier

The name of the satellite carriers are "ION SCV011 Savvy Simon", a combination of the acronym "ION", which stands for "InOrbit NOW", the acronym "SCV," which stands for "Space Carrier Vessel," and the satellite's first name. This format follows the naming conventions of naval vessels used in navies around the World. The name "Simon" was drawn at random from a bowl containing the names of all D-Orbit's employees. The company will continue to follow this procedure in the future to honor the skills, energy, passion, and commitment of its people.



ION SCV011 Savvy Simon



Name of payload: KELPIE-2

Form Factor: 3U

POC: Derek Bennet
derek.bennet@aac-clydespace.com

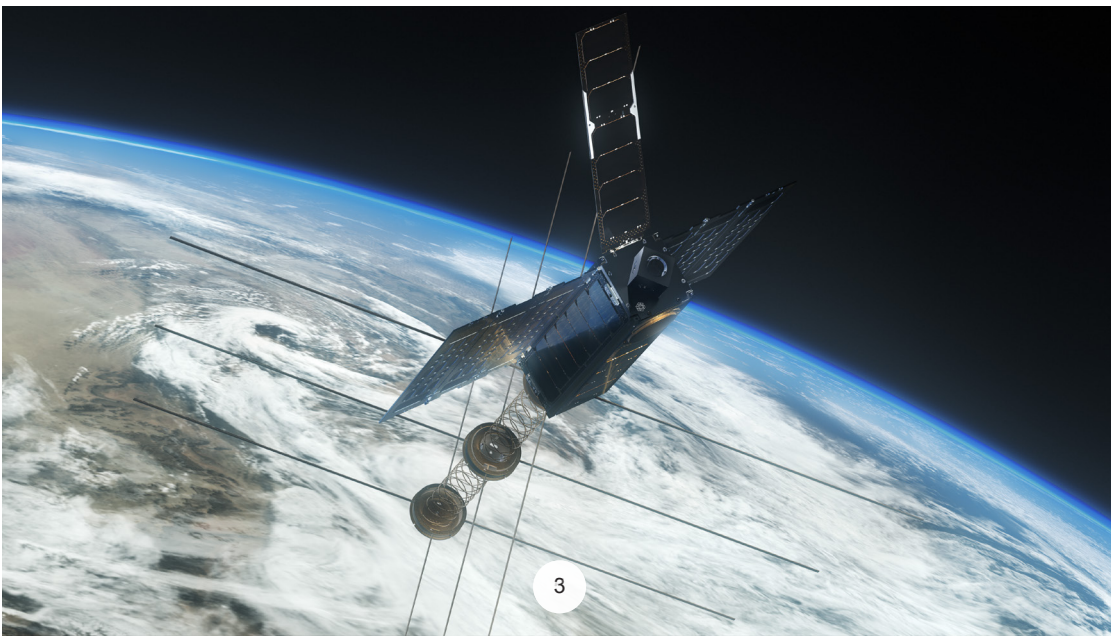


The second Kelpie satellite is a 3U EPIC CubeSat, designed and built by AAC Clyde Space. The Kelpie-2 spacecraft shall deliver Automatic Identification System (AIS) data exclusively to ORBCOMM and its government and commercial customers, under an exclusive Space Data as a Service deal. The state-of-the-art satellite weighs just 4 kg and features a proprietary low-noise bus architecture, multiple SDR payload, and an advanced antenna concept developed by Oxford Space Systems, to maximize AIS detections of all message types.

COMPANY PROFILE Website: www.orbcomm.com

ORBCOMM is a pioneer in IoT technology, empowering customers with insight to make data-driven decisions that help them optimize their operations, maximize profitability and build a more sustainable future. With 30 years of experience and the most comprehensive solution portfolio in the industry, ORBCOMM enables the management of over a million assets worldwide for a diverse customer base spanning transportation, supply chain, heavy equipment, maritime, natural resources and government.

Photo credits: AAC Clyde Space



Name of payload: EPICHyper-2

Form Factor: 6U

POC: Derek Bennet
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EPICHyper-2 is a 6U EPIC CubeSat, designed and built by AAC Clyde Space. The spacecraft, the second of three, shall deliver Hyperspectral data exclusively to their partners at Wyvern Inc, a Canadian Earth observation company. The 6U EPIC VIEW satellites dedicated to Wyvern are designed as 'application specific' and feature increased data downlink and enhanced control capabilities and will deliver hyperspectral data, a method for capturing images of Earth across multiple bands, providing much more information than the three main colour bands that the human eye captures. Under their Space Data as a Service agreement, AAC Clyde Space manufactures, operates, and owns the 6U EPIC satellites equipped with hyperspectral payloads, while Wyvern Inc. commits to subscribe to the data service. Wyvern, specializing in Earth observation, will first offer the data to the agricultural sector where it will help optimize yields, and detect invasive plants, pests and changes in soil makeup.

COMPANY PROFILE Website: www.wyvern.space

Wyvern is a space company located in Edmonton, Alberta, Canada delivering Earth Observation imagery from satellite platforms. An advanced spectral imaging technique that collects hundreds of images at different wavelengths to form 3D data blocks, hyperspectral imaging has the power to detect incredible details invisible to conventional imaging standards. This information-rich imagery will change the game in agriculture, forestry, environmental and emissions monitoring, energy, and defence. Wyvern's deployable optics telescope, one that unfolds in space, is the key to unlocking high resolution hyperspectral imagery from space. Hyperspectral images contain more colours than other types of imagery, meaning it captures the spectral signature of your crop or forest. Like magic, Wyvern's imagery reveals hidden insights: the chemistry of the scene.

COMPANY PROFILE Website: www.aac-clyde.space

AAC Clyde Space, a leading New Space company, specialises in small satellite technologies and services that enable businesses, governments, and educational organisations to access high-quality, timely data from space. This data has a vast range of applications, from weather forecasting to precision farming to environmental monitoring, and is essential to improving our quality of life on Earth. Our growing capabilities bring together three divisions:

- Space Data as a Service – delivering data from space directly to customers
- Space missions – turnkey solutions that empower customers to streamline their space missions
- Space products and components – a full range of off-the-shelf and tailor-made subsystems, components, and sensors

AAC Clyde Space aims to become a world leader in commercial small satellites and services from space, applying advances in its technology to tackle global challenges and improve our life on Earth.



Name of payload: Spei Satelles



Form Factor: 3U

POC: Giuseppina Piccirilli
giuseppina.piccirilli@asi.it

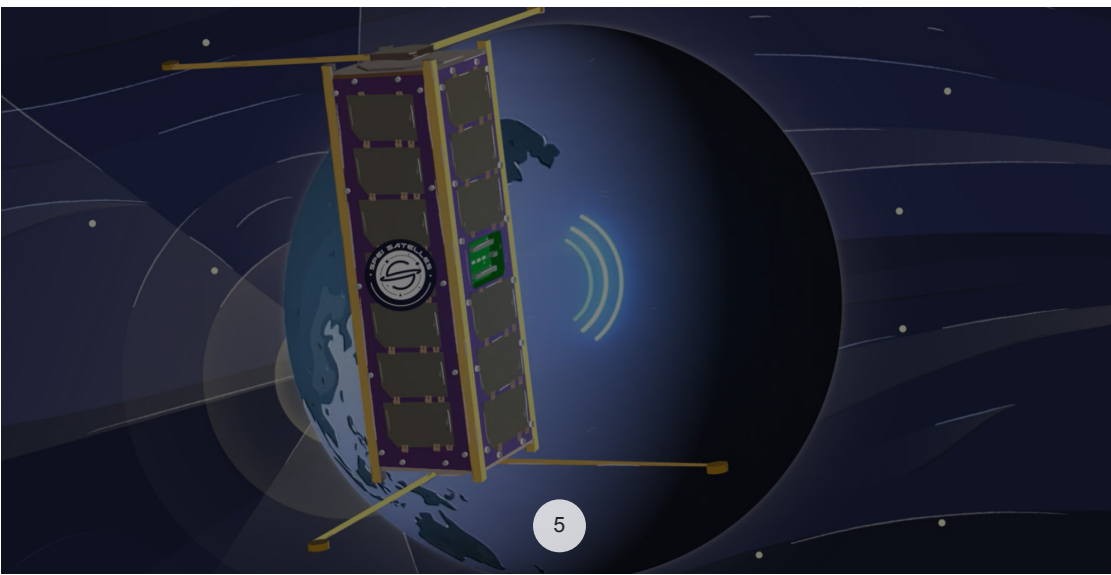


The Spei Satelles (SpeiSat) is a nanosatellite built upon a 3U CubeSat platform with advanced avionics for onboard vital functions and a sensing suite for thermal, magnetic, and inertial measurements aimed at assessing the interaction with the space environment.

SpeiSat hosts a nanobook, a silicon microchip in which the text of the publication regarding the Statio Orbit of March 27th 2020 is printed thanks to digital printing advanced technique. The messages of hope and peace to be spread worldwide are stored in the onboard memories and transmitted to the ground every 2 minutes from a Sun-Synchronous orbit at about 525 km altitude. The satellite operates at 437.500 MHz with AX.25 protocol.

Spei Satelles is a space mission that aims to be a sign of hope for all humanity. Promoted by the Dicastery for Communication, the mission is coordinated by the Micro and Nanosatellite Unit of the Italian Space Agency and carried out by the Polytechnic of Turin, which designed and built the satellite. The nanobook, from which the entire mission originated, was realized by the National Research Council (CNR) and the logo was created by the students of the IUSVE in Venice while the pastoral/cultural coordination was entrusted to the Digital Apostolate of Turin.

Photo credits: Dicastero per la Comunicazione



COMPANY PROFILE - ITALIAN SPACE AGENCY (ASI)

Website: www.asi.it

The Italian Space Agency (ASI), established in 1988, is a national public body with the task of coordinating and managing funds linked to all space activities, both at national programs level and for international collaborations, preparing and implementing the Italian space policy in agreement with the Government's guidelines and the Interdepartmental Space and Aerospace Research Policy Committee (COMINT)

COMPANY PROFILE - POLITECNICO DI TORINO (PoliTo)

Website: www.polito.it

First Italian School for Engineers, from 1859 Politecnico di Torino (www.polito.it) became one of the best European technical universities for research and education, with about 1000 professors and researchers and 38700 students spread over 8 campuses in Piemonte and three sites abroad. PoliTo has been training engineers, architects, designers and urban planners involved in all societal changes and innovations and it evolved into an inclusive University, permeable to the labour and industrial realities, playing a key role in innovation and lifelong learning, to become a growing driving force for the sustainable development of society.

COMPANY PROFILE - NATIONAL RESEARCH COUNCIL (CNR)

Website: www.cnr.it

The National Research Council (Cnr) is the largest public research institution in Italy, the only one under the Research Ministry performing multidisciplinary activities. Founded on 18 November 1923, Cnr's mission is to perform research at its own Institutes premises, to promote innovation and competitiveness of the national industrial system, to promote the internationalization of the national research system, to provide technologies and solutions to emerging public and private needs, to advise Government and other public bodies, and to contribute to the qualification of human resources.

COMPANY PROFILE - THE DICASTERY FOR COMMUNICATION

Website: www.comunicazione.va

The Dicastery for Communication of the Holy See oversees the entire communications network of the Apostolic See and unifies the Holy See's activities in the area of communication. It does so in order that the whole system responds in an integrated way to the needs of the Church's evangelizing mission.

COMPANY PROFILE - IUSVE

Website: www.iusve.it

IUSVE is the University Institute based in Venice aggregated to the Faculty of Education of the Pontifical Salesian University of Rome that provides three-year and master's degree courses in Educational Sciences, Psychology, Communication Sciences inspired by the Salesian charism and Don Bosco.

COMPANY PROFILE - THE DIGITAL APOSTOLATE

Website: www.apostolatodigitale.it

The Digital Apostolate of the Turin Archdiocese is part of the University Pastoral Office of the Archdiocese of Turin. Its task is to reflect, design and act with respect to digital and technological culture with a faith base perspective.



Name of payload: AlbaPod 6P PocketQube satellite deployers

Form Factor: 3U

POC: Caus Reza
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AlbaPods are satellite deployers specifically designed by Alba Orbital for PocketQube satellites, supporting various formats from 1p to 3p. Onboard this mission, the AlbaPods are hosting the following PocketQube satellites:

UNICORN-2I - UNICORN-2I is part of Alba Orbitals flagship Earth Observation pico-satellite constellation dedicated to monitoring artificial light at night (ALAN) across the globe. The 3P PocketQube satellite will provide high resolution imagery of the earth at night, enabling tracking of applications such as light pollution, urbanization, greenhouse gas emissions and energy usage from space.

ARIEL UNIVERSITY - SATLLA-2I - Satlla-2I is the latest PocketQube satellite from Ariel University. The educational platform is being used for testing concepts of Free Space Optical Communication.

HELLO SPACE - ISTANBUL - Istanbul is Hello Space's first PocketQube satellite. The test satellite will provide a foundation for worldwide, uninterrupted and powerful IoT data service at low cost. Services such as tracing the motion of cargo containers, remote monitoring of several variables as temperature, humidity levels of industrial equipment and tracking agricultural output to secure efficient supply chain management are all part of this smallsat's portfolio. (<https://hellospace.ist/>)

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS - MRC-100 - A 3P PocketQube mission by Budapest University of Technology and Economics, MRC-100 is the continuation of SMOG-P and ATL-1 (previously flown by Alba Orbital) spectrum monitoring PocketQube class satellites with wider monitored spectrum range 30MHz- 2600 MHz, focused on HAM, ISM and broadcasting bands, made by university students, integrated into the higher education.

AMSAT-EA - URESAT-1 - URESAT-1 is the latest iteration of the GENESIS pico-satellite platform used by AMSAT-EA missions with the engineering support from Hydra Space, a company also based in Madrid. URESAT-1 will incorporate an FM voice and an FSK data repeater with store and forward capability, used to relay frames such as the ones on APRS, an IoT (Internet of Things) network for amateur radio use. All functionalities will be open so anybody with a proper license will be able to use and experiment with them. (<https://amsat-uk.org/tag/uresat-1/>)

INTERNATIONAL COMPUTER HIGH SCHOOL OF BUCHAREST - ROM-2 - Rom-2 is a 1P PocketQube satellite built by students from the International Computer High School of Bucharest. The satellite is equipped with a 2MP camera onboard that will take images of the earth and will enable amateur operators as a digital repeater. (<https://rom-space.ro/>)

COMPANY PROFILE Website: www.albaorbital.com

Founded in 2012, Alba Orbital from Glasgow, Scotland, is the world's leading PocketQube satellite manufacturer and launch broker. To date, Alba launch has successfully deployed 25 PocketQube satellites into orbit including the Unicorn-2 platform. Unicorn-2 is the world's most capable Picosat by specification. Alba also offers ground station services via their Albaconnect platform enabling an end-to-end service to newspace users and operators. Alba has over 20 customers on 3 continents.

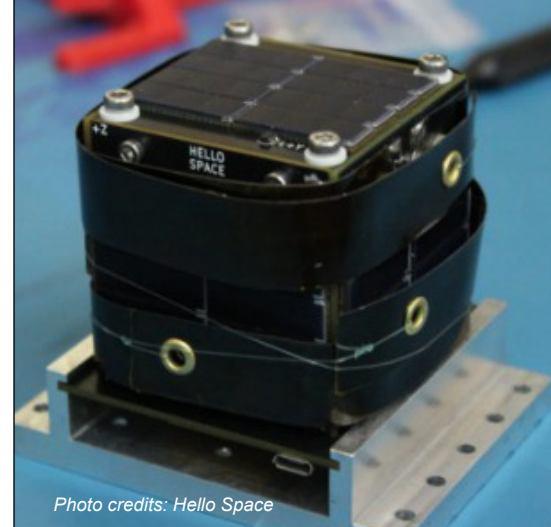


Photo credits: Hello Space

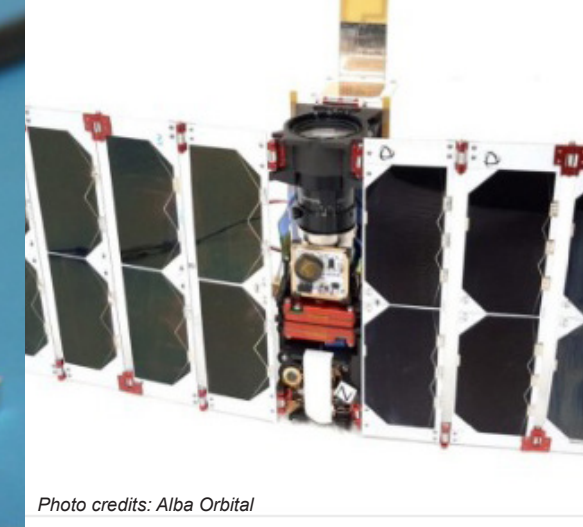


Photo credits: Alba Orbital

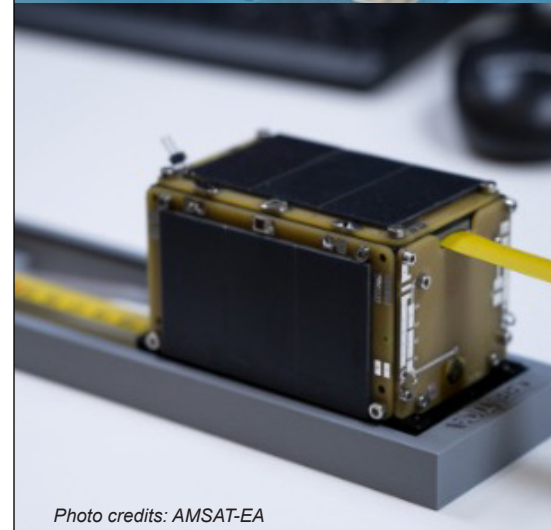


Photo credits: AMSAT-EA

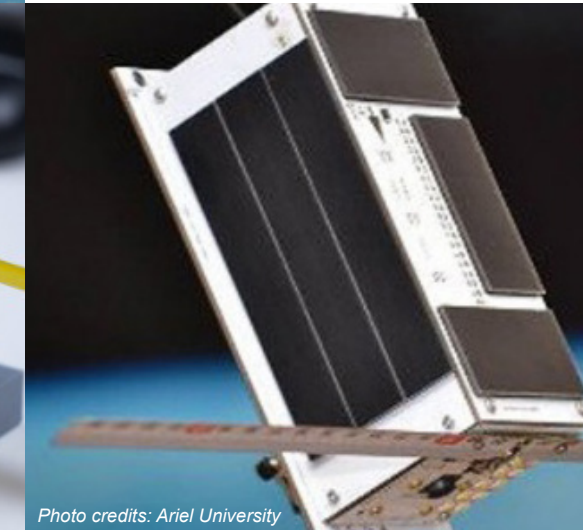


Photo credits: Ariel University

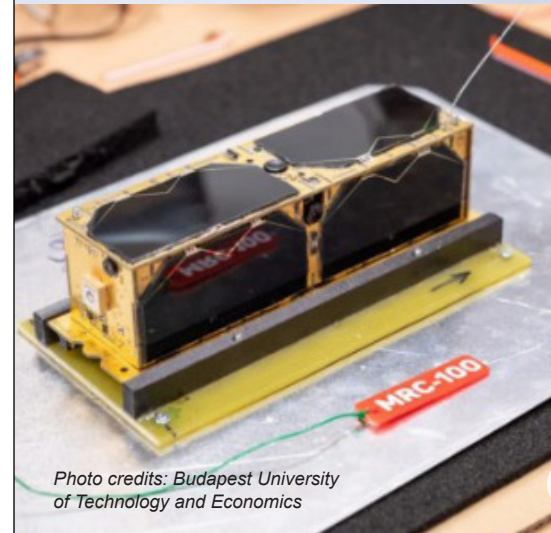


Photo credits: Budapest University of Technology and Economics

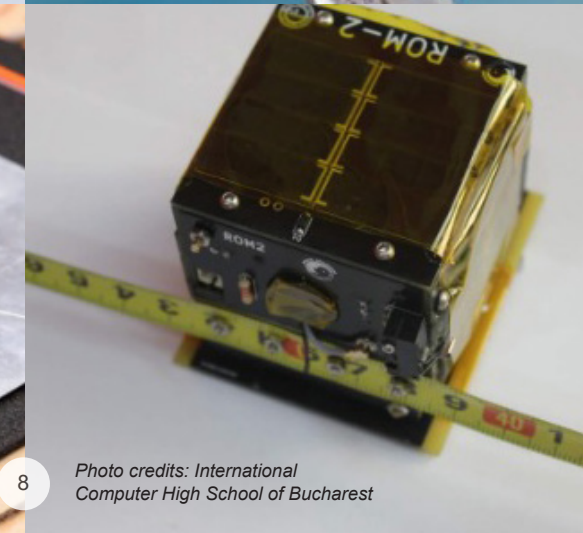


Photo credits: International Computer High School of Bucharest



Name of payload: Mission 1: Failure is an Option

Form Factor: 3U

POC: Marilee Jooste
press@outpost.space

The inaugural satellite venture by Outpost, Mission 1, is designed to obtain crucial flight experience for the company's Ferry avionics system before embarking on their first Earth Return missions. On this first mission of Outpost's hosted payload platform, they will successfully bring into orbit their first customer payload. They have also innovated on the standard satellite structure materials and this launch will have the first ever-to-be-flown carbon fiber CubeSat frame. This mission is a testament to the unwavering dedication of the exceptional team at Outpost, whose efforts and commitment have propelled the company to this significant milestone. In only 7 months, the Outpost team built out their facility and designed and built two flight model satellites featuring in-house designed and built power systems, communications, computers, harnessing, and ADCS. The project, named 'Failure is an Option', epitomizes Outpost's approach of rapid innovation and premature launching, embracing the calculated risk of failure to expedite learning and to ensure dependable return to Earth.

COMPANY PROFILE Website: www.outpost.space

Outpost is the sustainable space company developing the world's first satellite to return orbital payloads back to Earth with landing pad precision. Outpost is committed to advancing efficient and precise Earth Return as an essential step towards the development of new industries in space and the improvement of life on Earth. Outpost is developing satellites that will come back to Earth after mission completion and then get refurbished for the next mission, reducing future space debris and contributing to the long term sustainability of human life in space while making the cost of a satellite mission up to 80% cheaper. Earth return technology and reusable satellites will allow companies to iterate on technical developments in space and ensure mission success.

Photo credits: Outpost

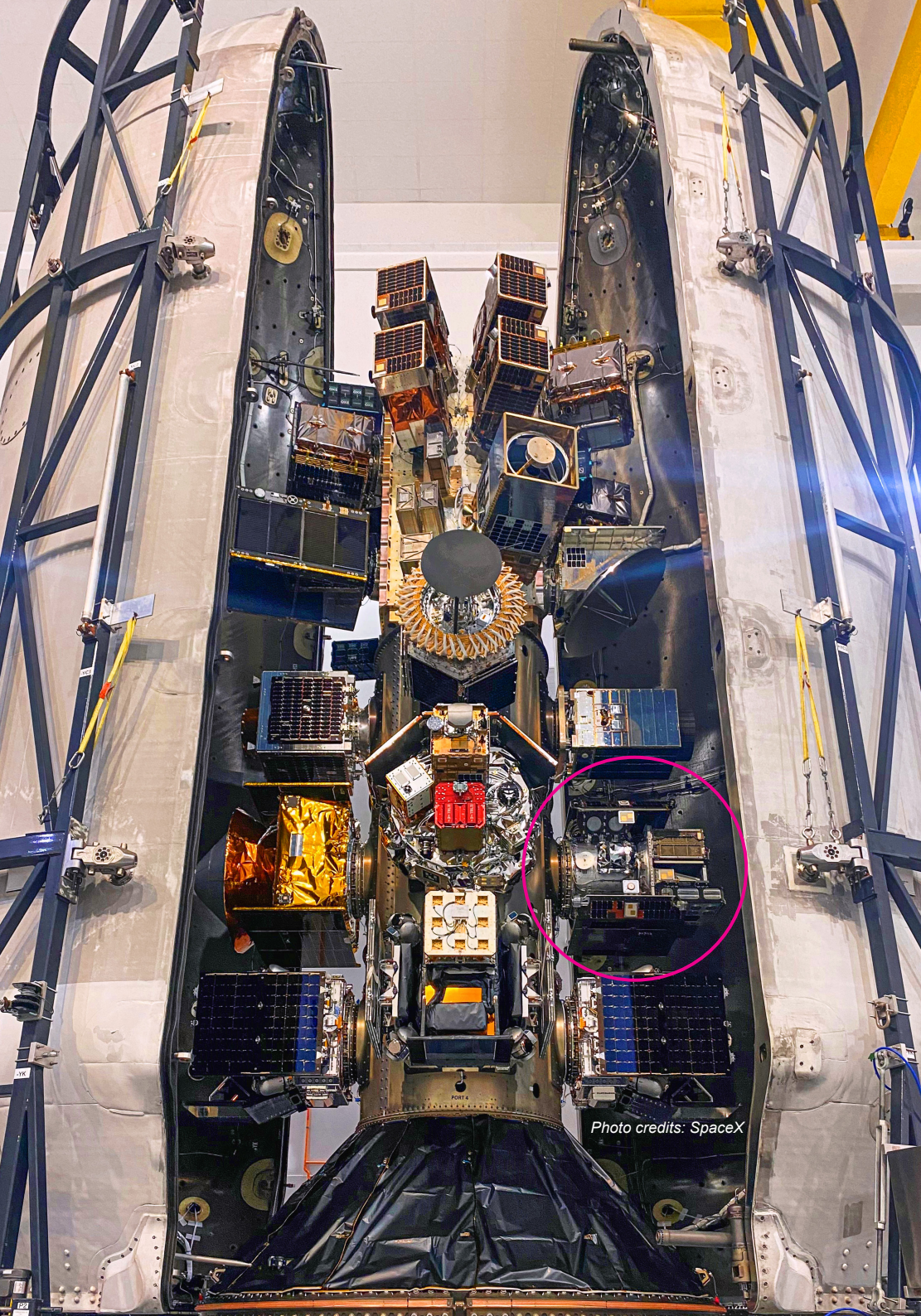
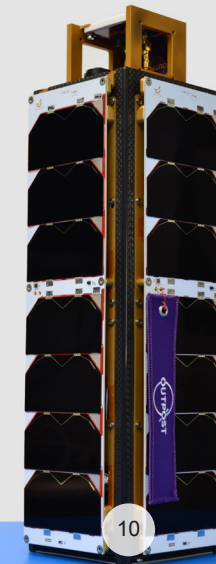


Photo credits: SpaceX





Name of payload: NaviLEO

POC: Cyril Botteron
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NaviLEO is a low-cost, high performance GNSS receiver product platform that has been developed by SpacePNT to address the specific requirements of the New Space market, bridging the gap between today's low-end and high-end GNSS space receiver solutions, offering a high performance, autonomous, state-of-the-art navigation solution at an affordable price for single spacecraft or large constellations. Taking advantage of carefully selected rad-tolerant components and a rad-tolerant design architecture, NaviLEO supports multiple constellations (currently GPS, Galileo) and various signal frequencies (L1, E1, L5, E5, E6), and is fully in-flight reprogrammable. Its advanced acquisition and tracking channels running on a state-of-the-art FPGA provide very high sensitivity and short time to first fix, while its on-board orbital propagator provides robust performance and improved availability. Thanks to the significant experience of SpacePNT's team with previous GNSS receiver developments, NaviLEO has also been conceived as a flexible and scalable platform that can support several configuration options to cover a wide range of missions, from LEO (the present payload configuration) to GEO (with dual antennas inputs), and even up to the Moon (thanks to its super-high-sensitivity), providing autonomously and in real-time positioning and timing accuracies ranging from <10 cm 3D rms in LEO orbits (thanks to its optional POD algorithm) to <100 m 3D rms in cislunar orbits.

COMPANY PROFILE Website: www.spacepnt.com

SpacePNT builds on a long GNSS receiver tradition originating from the activities of its founders and key engineers at the Ecole Polytechnique Fédérale de Lausanne (EPFL), ranked 14th university in the world, where they pioneered the development of highly sensitive GNSS algorithms for space exploration missions. After a stint with Syderal Swiss, SpacePNT, founded in Nov 2020, took over the intellectual property and GNSS team to become a global leader in Positioning Navigation and Timing (PNT) solutions for space applications. SpacePNT is supported for its technology and product developments by ESA, Swiss Space Office, and Swiss business angel investors.

Photo credits: SpacePNT



Science and
Technology
Facilities Council

Name of payload: UKRI SWIMMR-1

POC: Ian McCrea
ian.mccrea@stfc.ac.uk

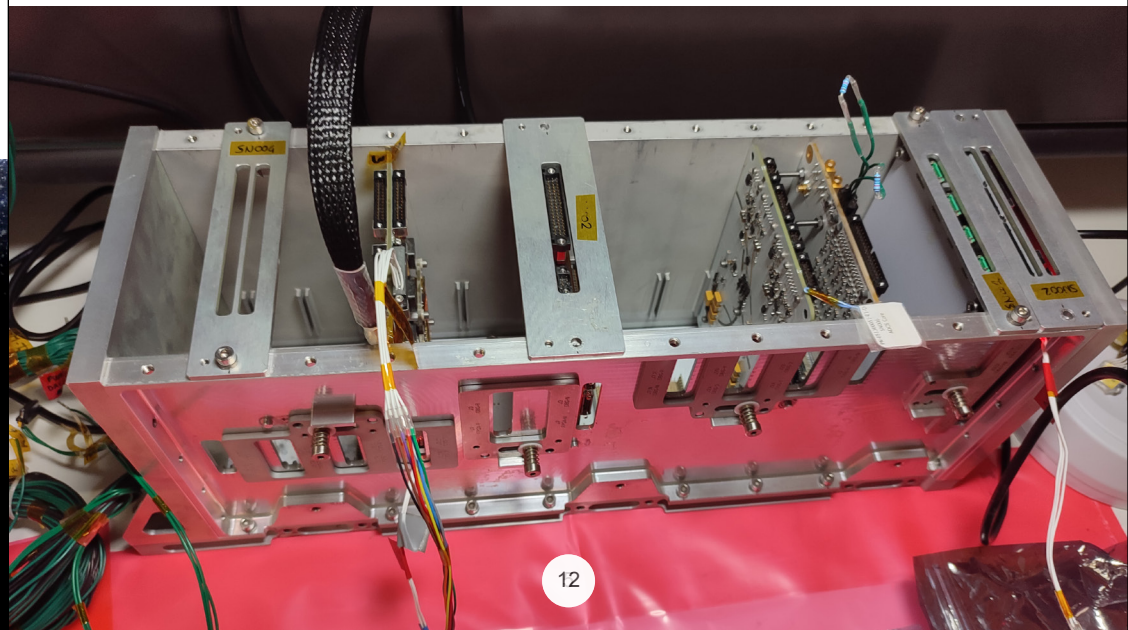
RAL Space

UKRI SWIMMR-1 is a space radiation monitor to provide data usable for space weather monitoring purposes. Radiation hazards to spacecraft and aircraft are among the most high-profile space weather risks in terms of government priority. The mission is also a de-risking exercise with benefits, to ensure that the follow-on SWIMMR space mission proceeds with maximum value and lowest possible risks. The instrument is being deployed as part of the SWIMMR (Space Weather Innovation, Measurement, Modelling and Risk) programme within the 'Improved in-situ radiation measurements for space and aviation' project at STFC within RAL Space.

COMPANY PROFILE Website: www.ralspace.stfc.ac.uk

RAL Space carry out world-class science research and technology development with significant involvement in more than 210 instruments on missions to date. As an integral part of the Science and Technology Facilities Council (STFC), RAL Space is the space hub for UK Research and Innovation, supporting its mission to create the best possible environment for research and innovation to flourish. The organisation works with UK and overseas agencies, universities and industrial companies on space and ground-based space projects and is uniquely positioned between industry and academia to strengthen the UK space community. RAL Space has over 60 years of experience and expertise in space programmes, working at every stage, from leading concept studies for future missions and developing bespoke innovative scientific instrumentation, to providing space test and ground-based facilities and processing and analysing data.

Photo credits: UKRI





Name of payload: ODIN-DU1

POC: contact@odin.space

ODIN-DU1 is the first payload launched by London-based ODIN Space. This represents the next major milestone on their journey to map lethal sub-centimeter space debris.

ODIN-DU1 is a hosted sensor, designed and built by ODIN Space. This sensor is the first installation of a distributed network that will deliver novel data on lethal sub-centimeter debris. ODIN Space will map the debris population, as well as the size, speed and trajectory of debris in LEO and GEO. These insights are crucial in controlling the risks faced by satellites on orbit.

With as many as 100,000 satellites and hundreds of billions of dollars worth of space-based infrastructure expected to be on orbit by 2030, a complete understanding of the sub-centimetre debris environment provides the missing piece in the space situational awareness ecosystem.

COMPANY PROFILE Website: www.odin.space

Founded in 2020, ODIN Space is the first company focused on mapping and analyzing sub-centimeter debris. They have developed light-weight sensors that are deployed as secondary payloads to maximize coverage and minimize debris. Data captured by the Orbital Debris Impact Network (ODIN) enables satellite operators, insurers and government agencies to control their risk and protect billions of dollars of space assets.

Photo credits: ODIN Space

