D-ORBIT

GUARDIAN MISSION BOOKLET

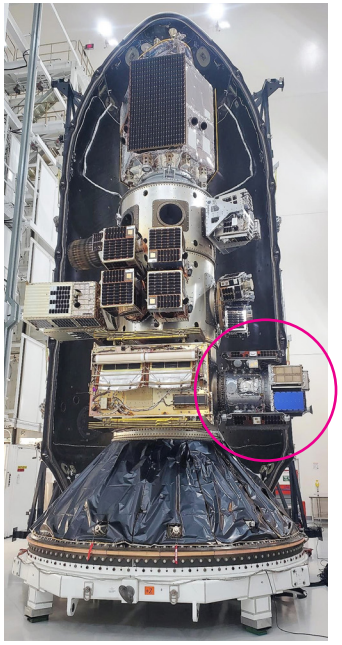
Mission name: Guardian
Carrier names: ION SCV010 Masterful Matthaeus

Fino Mornasco, Italy, April 15, 2023: Space logistics and orbital transportation company D-Orbit launched Guardian, the 10th commercial mission of their proprietary orbital transfer vehicle (OTV) ION Satellite Carrier (ION). The OTV lifted off on April 14th, 2023, at 23:48 p.m. PDT (April 15th, 2023 at 06:48 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 at 1:05 a.m. PDT on April 15th into an approximately 500km altitude polar orbit.

During the mission, ION SCV010, dubbed “Masterful Matthaeus”, will host onboard five satellites, one of which remains undisclosed, and two third-party payloads: Kepler 20 and 21, two spacecraft that are a continuation of Kepler’s communications constellation utilizing an upgraded and improved Gen1 Platform; VCUB1 the first Earth Observation and Data Collection satellite developed by the Brazilian private industry, showcasing Visiona Tecnologia Espacial’s ability to create high-performance space systems; EPICHyper-1, 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; SCORPIO, a SIGINT payload, is an in-house developed CubeSat created by Elettronica’s Space EW Team, leveraging over 70 years of experience in Electro Magnetic Spectrum (EMS) management; MicroCMG, VEOWARE’s first Control Moment Gyroscope to be tested in space.

Guardian is ION’s fourth mission of 2023. D-Orbit launched its first ION in September 2020 aboard an Arianespace VEGA launcher, then 9 further missions aboard SpaceX Transporter missions. With this launch, the Company will have transported to space more than 100 payloads collectively.

Photo credit: SpaceX



A note about the name of the satellite carrier

The name of the satellite carriers are “ION SCV010 Masterful Matthaeus”, 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 “Matthaeus” 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.

KEPLER

Name of payloads: Kepler 20, Kepler 21

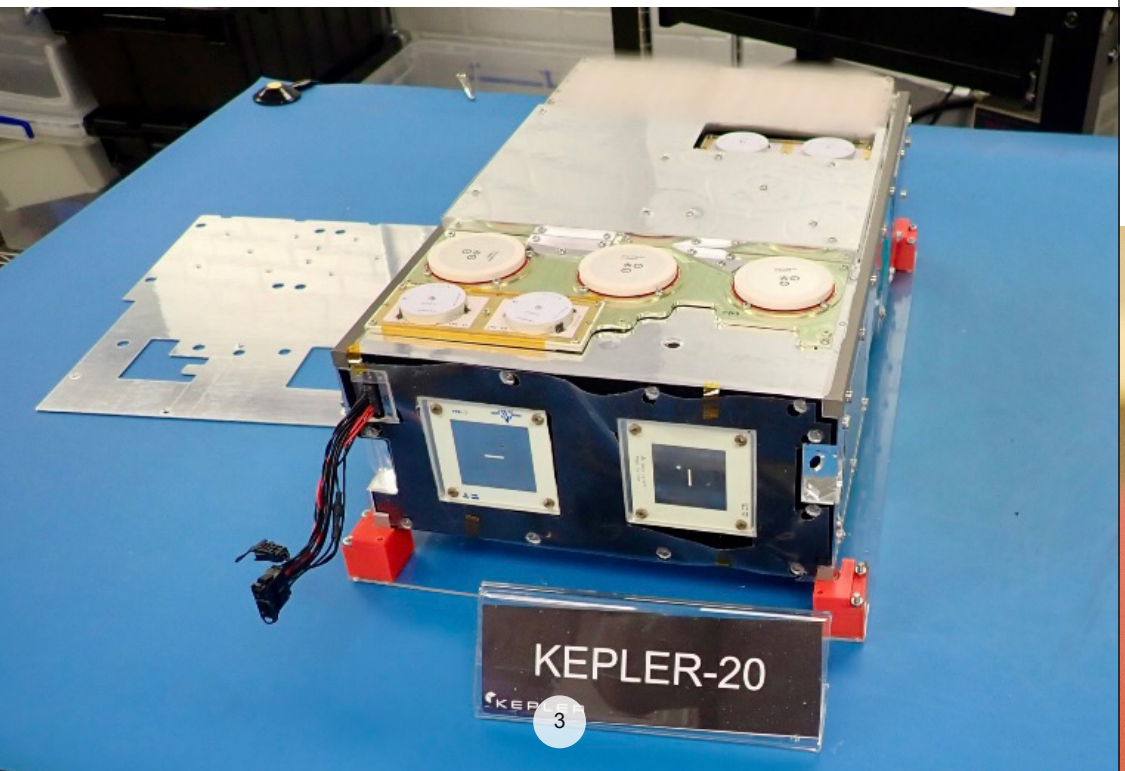
POC: Crystalyn Koch
ckoch@kepler.space

The two CubeSats are a continuation of Kepler's first-generation communications constellation. Kepler's two newest satellites will provide additional test and validation for payload technology planned for their next generation of satellites. The company is on a mission to build the Internet for space to provide real-time, continuous connectivity for space communications.

COMPANY PROFILE Website: www.kepler.space

Kepler Communications, Inc. is a satellite telecommunications provider on a mission to build the Internet for space. Incorporated in 2015, the company is vertically integrated, designing and deploying a next-generation hybrid constellation equipped with RF and optical technology to modernize communications to missions in LEO and beyond. Kepler provides real-time, continuous connectivity for space communications, abolishing barriers to make space-generated data universally available.

Photo credits: Kepler Communications



VISIONA
Tecnologia Espacial

Name of payload: VCUB1

POC: João Paulo Campos
joao.campos@visionaespacial.com.br

VCUB1 is the first Earth Observation and Data Collection satellite designed by the Brazilian private industry and will demonstrate Visiona's capability of developing high performance space systems. Although it is a twelve-kilogram nanosatellite, VCUB has a sophisticated architecture and uses last generation equipment. A high spatial resolution camera assembled in the satellite will be responsible for taking images with radiometric and geometric qualities better than currently provided by other same class commercial satellites, which is very important for agricultural and environmental protection applications. In addition, VCUB will handle a UHF data collection system based on radio defined software technology. At first, this system will be used in hydrological and meteorological data collection applications. However, it also has the capability of being updated in orbit in order to deliver IoT solutions. Finally, this satellite will validate in flight both on-board software's developed by Visiona: Attitude and Orbit Control System (AOCS) and the On-board Data Handling (OBDH), main satellite managing systems.

COMPANY PROFILE Website: www.visionaespacial.com.br

Visiona is a joint venture between Embraer Defense & Security and Telebras, focused on the integration of space systems. It was created in 2012 to meet the goals of the Brazilian Space Program. The company was responsible for the Geostationary Defense and Strategic Communications (SGDC) Satellite Program, launched in 2017. In 2018, Visiona announced the first satellite program designed entirely by the national industry, the VCUB1, and successfully completed the first System Orbit and Attitude Control System developed in Brazil. Visiona also provides Remote Sensing and Satellite Telecommunications products and services, as well as Synthetic Aperture Radar (SAR) aerial survey in Bands X and P.

Photo credits: Visiona

Name of payload: EPICHyper-1

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

EPICHyper-1 is a 6U EPIC CubeSat, designed and built by AAC Clyde Space. The spacecraft, the first 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 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.

Photo credits: AAC Clyde Space

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.

Photo credits: AAC Clyde Space

Name of payload: SCORPIO

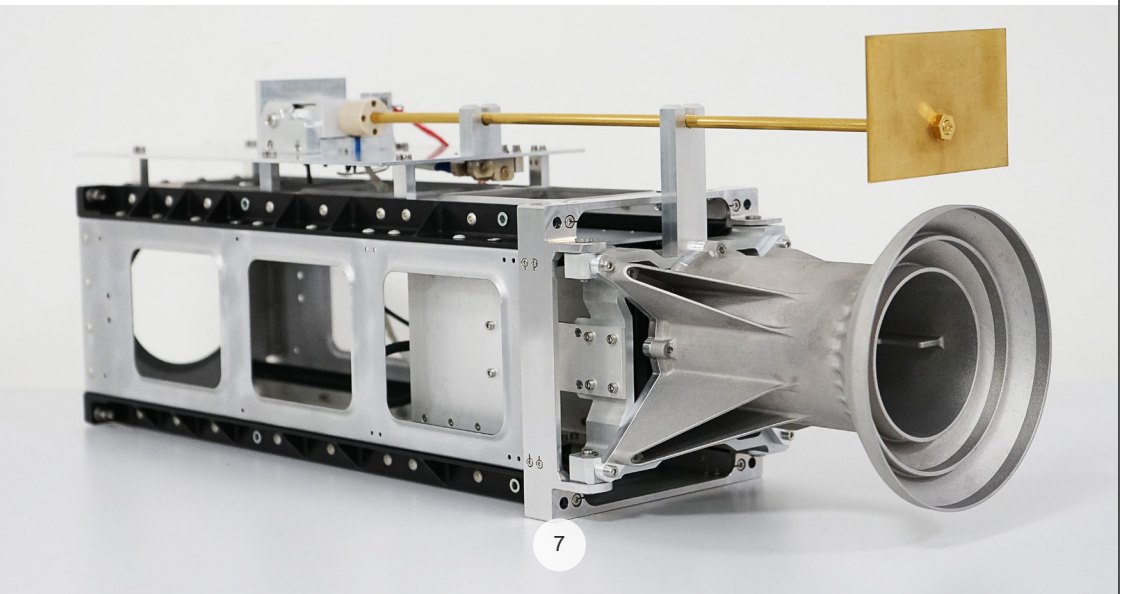
POC: Rossella Conte
rossella.conte@elt.it

SCORPIO, a Payload for Electronic Intelligence activities, is a hosted CubeSat developed in-house by Space EW Team in Elettronica thanks to over 70 years of experience in Electro Magnetic Spectrum (EMS) management. The system allows to intercept, identify and locate terrestrial electromagnetic sources (RF Signals) from Space, defining the characteristics of the signals and exploiting AI algorithms for an automatic categorization and storing data. During this specific mission, SCORPIO will collect data of interest for monitoring both maritime traffic and ground based emitters. These types of data can help in the civil field for the prevention of suspicious activities in the maritime areas surrounding the blue borders.

COMPANY PROFILE Website: www.elt-roma.com

Elettronica has been at the forefront of Electronic Warfare for more than 70 years, supplying over 3000 high-tech systems to the armed forces and governments of 30 countries. Elettronica's systems are designed for a variety of operational missions, from strategic surveillance, self-protection, intelligence gathering, electronic defence and operational support for the sea, land and air domains. The company boasts a strong list of successful national and international collaborations on major programmes like the Tornado fighter, the Eurofighter Typhoon combat aircraft, the NH-90 helicopter, the Italian offshore patrol vessel and the Franco-Italian Horizon and FREMM warships. The company is part of Gruppo Elettronica which also includes CY4GATE, specialising in Cyber EW, Cybersecurity and Intelligence; Elt GmbH, a German subsidiary specialising in the design of Homeland Security systems and EltHub is focused on research, innovation and fast prototyping.

Photo credits: Elt - Elettronica Group



Name of payload: VEOWARE microCMG

POC: Jan Smolders
jan.smolders@veowarespace.com

VEOWARE will launch its first Control Moment Gyroscope into space. This In-Orbit-Demonstration mission for VEOWARE's microCMG will be a key milestone in the development and commercialization of this unique high-agility Attitude Control technology. The microCMG can support any spacecraft between 50 and 250kg, enabling more data capturing, new in-orbit applications and more downlink time.

COMPANY PROFILE Website: www.veoware.space

VEOWARE SPACE develops and commercializes Attitude Control Systems improving 10X the agility of any spacecraft. VEOWARE's next-gen technologies include high-torque Reaction Wheels and ultra-high-torque Control Moment Gyroscopes (CMG), both made to reduce maneuvering time, therefore improving productivity in space. Headquartered in Brussels, and founded in 2016, VEOWARE developed a unique scalable-by-design microCMG, miniaturizing technology that has traditionally been adopted for larger satellites, enabling high-agility maneuvering for small satellite applications such as Earth Observation, Communication, Space Situational Awareness and In-Orbit Servicing. The VEOWARE team can also provide mission analysis support, define ACS requirements, simulate required attitude and propose a suitable ACS design to meet mission requirements.

Photo credits: Veoware Space

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