Ubotica Delivers Increased Edge Compute Performance per Watt for In-Orbit AI

Ubotica launches CogniSAT-XE2 - the next generation hardware platform for delivering state of the art Artificial Intelligence (AI) in space.

Building on the flight proven CogniSAT technology, CogniSAT-XE2 comes in a mechanical and power envelope compatible with small satellites even down to CubeSats and delivers increased compute performance per Watt.

Satellites designed using CogniSAT-XE2 accelerate system return on investment by maximising in-orbit data analysis capabilities to deliver actionable insights in real-time and optimising downlink data load. CogniSAT-XE2 provides the AI capabilities to enable a wide variety of AI-enabled applications such as real-time navigation and collision avoidance assistance, image analysis and insight generation, area of interest identification and smart data management.

According to John Doody, VP Product at Ubotica, **"CogniSAT-XE2 expands the capabilities and autonomy of Earth Observation satellite constellations. Image analysis at the edge in space can be used to direct space-based observation assets in real time to areas of specific interest. Operation of CogniSAT-XE2 is programmable in orbit and can be dynamically enhanced based on operator need or the real-time analysis of sensor data."**

Operators can easily integrate CogniSAT-XE2 within their satellite systems using the CogniSAT-HCS host control

software which can also orchestrate the use of the CogniSAT-XE2 platform for many different tasks during a single orbit. The CogniSAT-TK provides the AI software developer with a range of image pre-processing and post-processing algorithms which will speed up the development of applications optimised for the CogniSAT-XE2 platform.

CogniSAT-XE2 is available now and will fly on the Ubotica CogniSAT-6 mission. 🜂

In the issue

Ubotica and Open Cosmos Agree to Launch AI Centric Satellite

Ubotica has signed an agreement to deliver CogniSat-6, the first AI centric CubeSat mission to include autonomous capabilities.

CogniSat-6 will carry the flight proven (TRL-9) CogniSat™ edge computing platform to low earth orbit and will provide reactive retargeting to optimise image gathering on specific areas of interest identified in-orbit without requiring any intervention from ground stations. This allows faster response times for satellite tip and cue operations resulting in higher value data gathering which significantly accelerates the mission return on investment (ROI).

The mission will be used to execute a wide selection of CogniSat applications. These applications enhance the value of imagery available for analysis through smart AI-enabled compression techniques. This results in a six-fold increase in the usable data received by the ground station when compared with the transmission of uncompressed images and a two-fold increase when compared with the use of standard compression approaches.

Fintan Buckley, Co-Founder and CEO of Ubotica Technologies, said: **"CogniSat-6 builds on the solid foundation of flight proven Ubotica technology to deliver the first AI centric CubeSat mission with autonomous capabilities. CogniSat-6 also uses CogniSat on-board edge computing to realise considerable system savings. For example, applications running on CogniSat-6 will increase the system value by expanding system data throughput and cutting downlink costs. Satellite System Designers are already telling us that it is a compelling proposition."**

This mission will be joining the OpenConstellation project: a global, shared satellite infrastructure built and managed by Open Cosmos to enable anyone to access satellite data to address challenges around the climate crisis, energy and natural resources. The OpenConstellation enables business, organisations, national and regional governments to participate and access insightful, actionable data from space for the first time while keeping high levels of governance and security.

Best Global Satellite Systems Real-Time Insights Provider

We are pleased to announce that Ubotica has been successful in the Artificial Intelligence Awards and has been awarded Best Global Satellite Systems Real-Time Insights Provider - Europe.

Delivering hyperspectral data - hyperspectral imaging

Ubotica's technology can be applied for on-board analysis of hyperspectral imagery, which allows remote chemical sensing.

We can detect the location of methane leaks, for example, and send insights directly to end users on the ground to take appropriate action.

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Satellite monitoring to aid agribusiness

By monitoring agricultural land from satellites, we can extract information such as the moisture content of the ground, the type of crop, and the health of vegetation.

Such information can help cultivators and data analysts understand the quality of the soil and the quality of the crop that's growing in it, enabling them to distinguish between different crops, understand yields and predict harvests.

Flood monitoring using satellite imagery

The earlier you can detect flooding, the better you can mitigate the effects and damage associated with it.

Ubotica helps to monitor natural disasters from space by providing near real-time information to our customers so they can take action to protect property and lives.

Seeing through clouds in satellite images

"With Ubotica's on-board AI technology we can deliver cleaner and higher-quality images to ground by filtering out the cloudy images directly on the satellite so that only good quality clear images are sent to ground. Our on-board cloud removal solution enables satellites to be more efficient at capturing and transmitting valuable cloud free data."

Aubrey Dunne
Ubotica's Co-Founder and Chief Technical Officer

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In current Earth Observation satellite systems, images are captured on satellite and queued for downlink to earth at the next available ground station pass. Some process or person on the ground then filters through these images and discards all the images that are cloudy. This can be a slow and expensive process.

With Ubotica's on-board AI technology we can deliver cleaner and higher-quality images to ground by filtering out the cloudy images directly on the satellite so that only good quality clear images are sent to ground.

Our on-board cloud removal solution enables satellites to be more efficient at capturing and transmitting valuable cloud-free data, thereby increasing the value realised by the satellite. 🌢

Space-based vessel tracking

Vessel monitoring is ideally suited for our on-board processing solution, as a large area of water can be scanned via satellite in a short space of time, with vessels automatically detected and located using AI.

The Ubotica team have developed a vessel detection solution that can support use cases such as the enforcing of fishing regulations or the identification of ships that may be involved in illicit activities. 🌢

"The Ubotica team monitor ships from our AI satellite technology for our security customers."

Aubrey Dunne
Ubotica's Co-Founder and Chief Technical Officer

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Satellite imagery for forest fire monitoring

Ubotica's AI technology is well suited to identifying where forest fires have started and to detect their onset as early as possible, facilitating the on-satellite generation of alerts and warnings to the appropriate authorities on the ground so that they can prevent the fire spreading further.

We can help customers to monitor natural disasters from space by providing near real-time information to them that they can action on in order to protect property and lives.

" Our AI technology is well suited to identifying where forest fires have started, providing near real-time information to the appropriate authorities on the ground so that they can protect property and lives. **"**

Aubrey Dunne
Ubotica's Co-Founder and Chief Technical Officer

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TECHNICAL ADVISORY BOARD

Dr. Alessandra Menicucci.

Dr. Alessandra Menicucci is a tenured Assistant Professor in the Space System Engineering chair of the Delft University of Technology. She holds a PhD in Physics (2004) from the University of Rome Tor Vergata and a Laurea in experimental physics from University of Rome La Sapienza (2000).

Dr. Menicucci research interests are focused in the development of miniaturized radiation sensors which can be distributed on-board of micro-satellites and on the radiation tolerance assurance of COTS components.

From 2006 to 2015 she worked at the European Space Agency in the space environment and effects section where she was leading several radiation monitor developments. She was also supporting most of the ESA missions under development at that time for what concerns space environment and effects analysis.

She is the project manager of the Delfi Space Program which aims to realize education and research by the end-to-end engineering of space missions of high relevance and impact using very small satellites. Previous missions were the Cubesats Delfi-C3 (2008) and Delfi-n3xt (2013) and the picosatellite Delfi-PQ to be launched in early 2022.

Dr. Menicucci is author of more than 40 refereed papers in journals and conferences and she supervises several Msc and PhD students.

She is co-investigator of different national and international projects in the field of radiation hardness assurance of miniaturized systems.

She is member of the Advisory Board of the Aerospace Systems division of the Royal Netherlands Aerospace Centre (NLR), one of the major aerospace research organizations in the Netherlands.

She is member of the evaluation committees for several national and international research grant applications.

> "A growing number of universities are collaborating with space technology start-up businesses as this provides unprecedented access to university space expertise, facilities and to explore new opportunities. The Delft University Space Engineering team are proud to be working with Ubotica."

Dr Alessandra Menicucci
Assistant Professor in the Department of Space Engineering at Delft University & Member of Ubotica's Technical Advisory Board

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2023 EVENTS

Join Ubotica at PSW
March 9th & 10th 2023
SAVE THE DATE
Paris Space Week
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Join us at Paris Space Week on 9th-10th March.

The Ubotica team will join other leading Irish Space companies on the Enterprise Ireland Booth at this year's event.

Paris Space Week will focus on 4 main themes:
- Satellites
- Launchers
- Ground Systems
- Space Applications

The event will highlight the cooperation between the European States involved in Space research and Technology and their Space applications for the sole purpose of scientific and operational Space applications or Industrial systems.

Join the Ubotica team in Washington between the 13th – 16th March for the SATELLITE Conference & Exhibition.

SATELLITE2023 is the largest and most important satellite event which will focus on the benefits that satellite and space technology can offer.

At Booth 1961 we will be showcasing the flight proven (TRL-9) CogniSat™ edge computing platform and our new CogniSat based products for satellite system and space platform designers.

Meet Ubotica at SATELLITE 2023 Conference & Exhibition
March 13 - 16, 2023
Walter E. Washington Convention Center
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JOIN OUR WORLD CLASS TEAM

We call on talented individuals from all over the world to join us in our growth journey.

Here are some of our current vacancies: