



Press Release

17:00 CET 11 October 2021

SSTL secures ESA InCubed funding to improve data throughput for small EO satellites

Surrey Satellite Technology Ltd (SSTL) has secured European Space Agency InCubed programme financial and technical support to demonstrate a high throughput, flexible and intelligent payload downlink chain for small Earth Observation satellites. Currently advanced and innovative satellite imaging payloads are producing data with ever increasing dimensionality, volume and rates which can exceed small satellite's downlink bandwidth. To tackle the onboard data bottleneck SSTL is leading a consortium that includes the University of Surrey and Craft Prospect Limited to develop and demonstrate new capabilities for SSTL's Flexible & Intelligent Payload Chain (FIPC) solution. The FIPC's advanced hardware architecture enables a new intelligent and adaptive data downlink and a state-of-the-art framework for software defined onboard data processing to realise a payload chain capable of handling the throughput rates of future small Earth Observation satellites. The framework enables processing applications which include data calibration and image compression to Machine Learning (ML) for image classification and information extraction towards greater satellite autonomy.

Phil Brownnett, SSTL's Managing Director said *"The FIPC solution will significantly improve the capabilities of small earth observation satellites by increasing data rates to match the capacity of the onboard imager system. This will boost both the volume and the complexity of the data that can be downlinked on a single satellite pass – a step-up in capability that will match our customer's business plans and ambitions."*

Carlos Urbina Ortega, ESA Technical Officer for this activity, added *"We envisage substantial benefits from this InCubed investment, not least because of the system flexibility and computational power that the FIPC affords. Capabilities such as onboard ML acceleration for enhanced data management and services, together with in-orbit application reconfiguration, will ensure that small-satellite missions remain agile and end-user focused."*



SSTL, Craft Prospect Limited and the University of Surrey will work together on the FIPC solution and onboard processing applications and, following the design phases, the consortium will demonstrate and evaluate the capabilities on a flight representative testbed.

The FIPC is more than just a classical space unit; the software defined onboard pipeline and applications development framework is a critical component enabling end-user tailored functionality, and SSTL will develop the framework which enables third-party developers or customers to develop and deploy novel and disruptive mission designs. Software will be uploadable in-orbit for further flexibility over the mission's lifetime.

Dr Chris Bridges, Reader at the University of Surrey said *"It is exciting to consider how to bring relevant AI methods to complex compression and information extraction problems on real space hardware."* The University of Surrey's work is jointly carried out by the AI Institute and Surrey Space Centre.

Dr Murray Ireland, Craft Prospect's Autonomy Lead said *"The FIPC project is an excellent opportunity to further develop our AI toolbox, a suite of value-adding data processing and machine learning components, and test it against real customer requirements within the FIPC solution. The ability to intelligently inspect, process, and manage data on-board small satellites will provide real value to end users by prioritising the data they really need and delivering it to them as meaningful data products."*

Beth Greenaway, Head of Earth Observation and Climate at the UK Space Agency, said: *"The UK has world-leading satellite Earth observation capability, with companies like SSTL playing an important role in designing missions that help us understand climate change and tackle global challenges. This state-of-the-art technology, funded by the UK Space Agency through our ESA membership, harnesses the power of AI to help solve the growing problem of data exceeding a satellite's downlink bandwidth. It will be invaluable for scientists who rely on this data for their work."*

ENDS

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Notes to editor:

Full size accompanying images for this press release can be downloaded at <https://www.stl.co.uk/InCubed-FIPC>

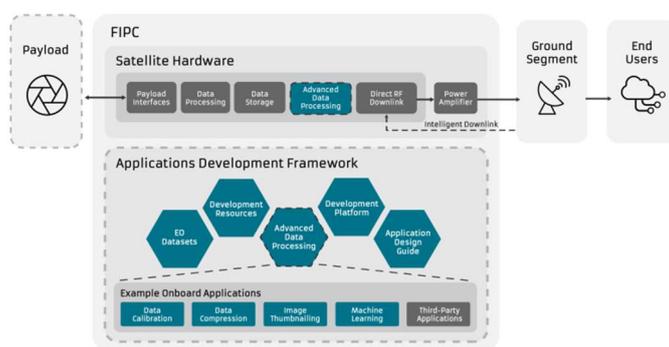


Image 1: Flexible and Intelligent Payload Download Chain for small EO satellites

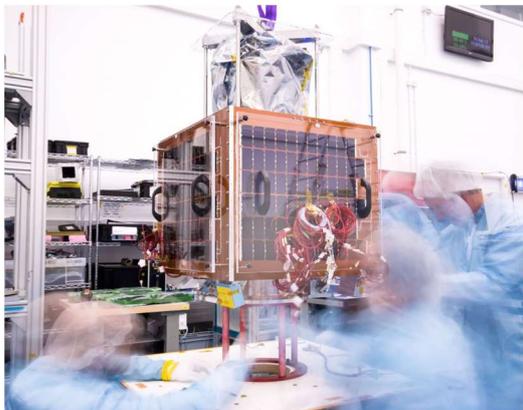


Image 2: SSTL small earth observation satellite, Carbonite-1, credit SSTL

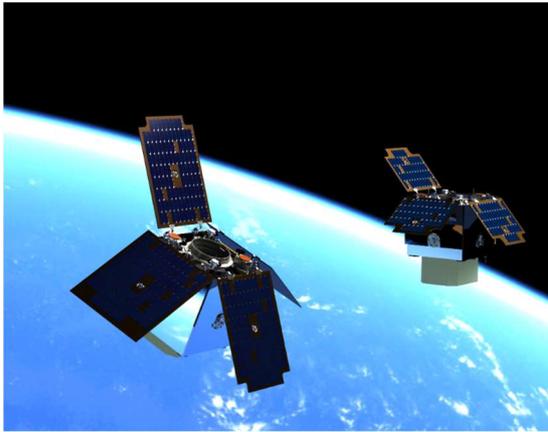


Image 3: SSSL CARBONITE satellites

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About ESA InCubed programme

InCubed stands for 'Investing in Industrial Innovation' and is a co-funding programme run by the ESA Φ -lab. InCubed focuses on developing innovative and commercially viable products and services that exploit the value of Earth observation imagery and datasets. The programme has a very wide scope and can be used to co-fund anything from building satellites to ground applications and everything between or to develop new EO business models.

<https://incubed.phi.esa.int/>

About SSSL

Surrey Satellite Technology Limited (SSTL) is at the forefront of space innovation delivering customisable complete mission solutions for Earth observation, science, communications, navigation, in-orbit debris removal and servicing and exploration beyond Earth infrastructure.

Since 1981, SSTL has built and launched 70 satellites for 20 international customers, as well as providing training and development programmes, consultancy services, and mission studies for ESA, NASA, international governments and commercial customers.

SSTL is well known for innovative missions such as the CARBONITE satellites, the NovaSAR S-band radar imaging satellite and the RemoveDEBRIS space debris removal technology demonstrator.



Headquartered in Guildford, UK, SSTL is part of Airbus.

www.sstl.co.uk

About University of Surrey

The University of Surrey is a world-class, research-led university committed to research excellence. Its research seeks to answer global challenges, drive innovation, and deliver real-world impact. Of the 16,000 students studying at the University, more than 1000 are research students, and 37% of the overall number are from outside the UK, helping to demonstrate both the diversity within the student body and the international reputation the University enjoys. Dr Chris Bridges is a member of the Surrey Space Centre (SSC) while Dr Simon Hadfield is a member of the AI Institute and Centre for Vision, Speech and Signal Processing (CVSSP). Both research centres are collocated on the University of Surrey Stag Hill campus and internationally recognised for their works in small satellite development and AI respectively.

About Craft Prospect

Craft Prospect Limited (CPL) is a space engineering practice leveraging state-of-the-art advances in robotics, artificial intelligence and quantum technologies to develop new payloads, services and operational concepts for satellite missions.

Founded in 2017 and drawing on Glasgow's nanosatellite heritage, CPL has developed the Forwards Looking Imager (FLI), an AI-powered smart sensor; the AI toolbox, a suite of autonomy-enabling components to add value across the data processing pipeline; and the JADE quantum source payload for satellite-based quantum key distribution. CPL's flagship mission, Responsive Operations for Key Services (ROKS), showcases all of these technologies and is due for launch in 2022.

CPL is located in Glasgow, UK