

:: ANNUAL REPORT

— 2020

# A world empowered by satellites

We work with  
Innovate UK

**CATAPULT**  
Satellite Applications

## Contents

Chair's Statement	03.
Chief Executive's Statement	04.
The Year in Numbers	05.
Geospatial Intelligence	06.
Ubiquitous Connectivity	07.
Access to Space	09.
Emerging Technology	10.
Agriculture	11.
Health	11.
Extractive Industries	12.
Intelligent Transport	12.
New Markets	13.
Strategic Facilities	14.
Regional and Academic Engagement	15.
International	16.
Business Support	17.
Financial Highlights	18.





# Chairman's Statement



To say this has been a significant year would be an understatement. Along with every single organisation in the space sector, after an exciting year we suddenly found ourselves challenged by the emergence of COVID-19 and the global pandemic.

Ultimately, satellites provide us with services 'at a distance', but much of the preliminary work relies on hands-on and face-to-face activities, as do mission operations for operational satellites. And that is as true for us as for any other business in our sector.

When normal activities started to be affected, our team quickly responded, working out how to operate in the 'new normal'. I am immensely proud of their response – and amazed at their ingenuity. Very quickly, they set about thinking of innovative ways of working and progressing with ongoing projects, rather than simply cancelling events and accepting delays. Where delays were unavoidable, they successfully revised plans and provided support to those affected.

Their approach accords closely with our mission, which from the start has been "To innovate for a better world, empowered by satellites". Indeed, I've seen that mission in action throughout this year. As well as the ongoing work in the UK, like our remarkable CASSIS project which will deliver connectivity for the

next generation of in-vehicle technologies, our teams also have been driving forward with initiatives around the world that are impacting lives for the better.

Among these are projects in South America, such as those aiming to improve the safety of tailings dams at mines and the COLCO project, which is already making a difference to tens of thousands of Colombian cocoa farmers. Another notable infrastructure project is Brigital, which could have a huge impact globally by using satellites to monitor the safety of bridges and other structures. You can read about all of these in this annual report.

Elsewhere in the Catapult, our Geospatial Intelligence, Ubiquitous Connectivity and Access to Space teams are pursuing projects to advance both their knowledge and that of our partners, which will then enable many of these initiatives. None of our Value Streams operate totally independently, which is one of our strengths, even in times when we cannot all be together in the same building.

Nobody can predict how this pandemic will play out and where we will be by the end of the next year at the Catapult. But I do know that the team here will continue to strive for the best possible results – and for that, and what they have achieved over the last year, I thank them immensely.

# Chief Executive's Statement



At the end of our seventh year at the Satellite Applications Catapult, we have been confronted with the unique challenges of COVID-19. But unprecedented times have only continued to strengthen the outcomes that our team delivers, alongside a host of new and exciting ways to interact with partners, space sector businesses and other stakeholders. The year has certainly been remarkable, and not just because of the events since March.

In July, we launched our first ever satellite from the International Space Station in collaboration with Orbital Microsystems. IOD-1 (GEMS) hosts a unique weather sensor which is a prototype for a future constellation of small satellites. This launch paves the way for the next five satellites in the IOD programme.

We have opened a new advanced prototyping and manufacturing facility at Harwell, our Disruptive Innovation for Space Centre. Oversubscribed before it opened, the facility is full and supporting both UK SMEs like Open Cosmos and international primes including Lockheed Martin. It will become the blueprint for a series of such centres around the UK over the next five years.

Many of the examples of our work in this report demonstrate the remarkable power of satellites in providing actionable insights about the world around us, and truly ubiquitous connectivity wherever you are on the globe. Projects like COLCO, Common Sensing, and our work on providing connectivity for health applications and the emergency services are helping to drive forward UK research and

development in these areas, and lead to the development of commercial solutions all based on satellite data. Many of these projects are also taking on a new relevance in a post-COVID world, as the need for global connectivity and remote monitoring technologies have accelerated the trends we were already influencing.

These projects also form a key part of the wider Catapult network's goals to be world-leaders in global challenge areas including Net Zero, modernising health and social care, strength in places, secure and resilient communications, and food sustainability, to name just a few.

On a national level, UK government engagement with the space sector has never been stronger. Boris Johnson's comments in his first speech as Prime Minister have galvanised the industry, and with the creation of the new National Space Council, chaired by the Chancellor of the Exchequer, the development of a national space strategy, and the creation of groups including the Geospatial Commission, Government is more informed and engaged with supporting the growth of the sector than it has ever been.

It is certain that the space industry in the UK is again at a key tipping point. We must invest to continue to deliver and compete with other space-going nations around the world, and do this across the UK, not just at Harwell. By good preparation and planning, we have never been better placed to deliver on these goals.

# The Year in Numbers

45



No. of active projects  
with a business

26



No. of R&D projects  
completed

£37.7m



Funding raised by  
supported businesses

723



New Organisations  
Engaged

439



SMEs Engaged

153



New SMEs Introduced  
to the Sector

# Geospatial Intelligence

By integrating geospatial data and intelligence into business processes, both industry and government can make their operations more effective and efficient, and create new products and services. Our aim is to help UK businesses maximise the advantages of geospatial technologies, resulting in significant business, societal and environmental benefits.

## Open Data Cube

A 'data cube' refers to the concept of creating a multi-dimensional array database to store standardised data and associated metadata – in this case, analysis-ready Earth observation (EO) data. We are a founding partner of the Open Data Cube initiative and over the last year we've been implementing open data cubes within the IPP CommonSensing project (see New Markets).

We deployed a number of data cube environments for development, testing and production, and developed an API to allow non-technical users to access the data from within their own GIS applications. The results prove that this approach can be run on a national scale and used to help solve real-world problems.

## EO2Go

One of our key focuses is accelerating the use of EO data by ensuring that it is made available in a usable way. And that is only going to happen if there is a viable value proposition for individual EO offerings due to common requirements, which are likely to be found within 'clusters' that may have shared scientific or technological capability needs. As a result, we have been working closely with stakeholders in government and academia to identify and develop these market clusters, and ascertain key

technology blockers to market adoption, such as data discovery and access through initiatives like Analysis Ready Data (ARD).

## AI4EO

Artificial intelligence (AI) and machine learning (ML) will be increasingly important in extracting information from EO data, so we have been helping organisations test use cases and review commercialisation opportunities. In some cases this has been by providing access to high resolution commercial EO data and in others by providing technical consultancy. We have worked on projects with a number of organisations, including Element AI, Alcis, Oxford University, the Alan Turing Institute, UCL and OceanMind. Ultimately we aim to provide sets of open training data for specific use cases.

Our work with Element AI focussed on using AI and ML in human rights monitoring – specifically in Darfur, Western Sudan – with Maxar as the data partner and Amnesty International as the end-user. We helped to upskill their research scientists and refine research and business case opportunities, and supported an international hackathon for the company. An additional use case focussed on Global Witness's large-scale investigation into cattle raising and transportation practices, which are considered to contribute to deforestation and climate change.





# Ubiquitous Connectivity

*Along with Geospatial Intelligence, Ubiquitous Connectivity is a major technology focus for the Catapult within our 2018-2023 strategy. We aim to empower a new era of communications and value-added services, through our strategic focus on four key areas:*

**Future systems and networks** – the UK's ambition is to be a world leader in 5G by 2027. Our Westcott 5G Step-Out Centre is a nationally recognised 5G testbed for the UK's IOT community, supporting new integrated services and standards development

**Pervasive devices** – we are working to understand the technological building blocks that are key to building 'fit for purpose' devices which address different market segment needs

**Consolidated smart networks** – we are driving the integration of 5G and new satellite constellations, via early-stage terminals and systems demonstrators

**Strategic leadership** – we continue to lead, engage and influence government policy and stakeholder perception to ensure satellite solutions are integrated into communication standards.

We are also driving mainstream adoption of communications and positioning technologies, through a range of activities and projects.



# Ubiquitous Connectivity

## MK:5G

This year saw the start of the MK:5G project, an exciting new testbed in Milton Keynes which includes a dedicated 5G infrastructure and a data exchange/hub facility. Designed exclusively for research and development, it will cover seven sites around central Milton Keynes, key junctions on the M1 and some rural communities. The 5G Standalone Core will be installed at our Westcott facility and connected by a fibre link.

The testbed will focus on trialling applications across three core themes: mobility; health and wellbeing; and energy.

The project is being led by Milton Keynes Council and we are responsible for the 5G infrastructure design and deployment, including procurement of the 5G core and ancillary equipment and resources. During this year, we drove the pre-planning application process in collaboration with the Council and created the initial 5G system architecture and mast structures with supplier Beacon Communications.

## RCC Dorset

Towards the end of the year, we started work on a two-year project aiming to boost rural connectivity in Dorset using 5G

and Internet of Things (IoT). The aim is to test to what extent next generation connectivity can be delivered using existing infrastructure, such as masts, buildings and fibre, to minimise visual effects on the county overall, including its world-famous, UNESCO-recognised coastline.

The project is particularly focussed on meeting the needs of vulnerable people, delivering economic growth and providing enhanced educational and social opportunities. Our role is to co-ordinate the development and testing of IoT devices for four trials that will look at innovative public, social and business uses of improved mobile coverage:

- Coastal safety infrastructure – remote monitoring of lifebuoys; beach WiFi for first responders and supporting organisations, and to provide safety information to the public.
- Agri-tech – wireless technology for smart farm controls; drones for precision crop spraying.
- Lulworth Estate – new mobile services for social and commercial use for the local community and tourist industry.
- 5G Innovation Accelerator – new connectivity for the Dorset innovation Park (a Local Enterprise Zone with an advanced engineering centre).



# Access to Space

*The UK has a huge opportunity to provide all the elements required by a space ecosystem, from components to in-orbit services and mission support. We aim to provide the opportunities and assistance needed by organisations to demonstrate their space-based services and technologies, and to support growth of UK supply chains.*

## In-Orbit Demonstration Programme

Our In-Orbit Demonstration (IOD) programme was created in 2016 to enable businesses to demonstrate a service using small satellites, with a focus on securing UK-operated constellations. We do this by providing the mission infrastructure needed to trial services, including the satellite, launch and operations.

This was a landmark year for the Catapult and IOD, as IOD-1 GEMS became our first satellite to be put into orbit when it was launched from the International Space Station on 3 July 2019 – just 18 months after concept stage. The satellite is now capturing weather data for Orbital Micro Systems (OMS) to promote its future constellation that will provide weather coverage across the globe every 15 minutes instead of every 3 hours. The data is being processed at OMS's International Centre for Earth Data (ICED), which was co-developed by OMS and Edinburgh University.

OMS's instrument is much smaller and lighter than existing equivalent data systems, reducing deployment costs by 95%. OMS has since placed a further order with AAC Clyde Space for a 6U satellite.

Work continued on the rest of the IOD missions (2 to 6) as

well, although some activities were affected by the COVID-19 pandemic towards the end of the year, including the launch of IOD-5 TARS in collaboration with Kepler Communications.

## National In-Orbit Services Facility

Thousands of satellites already orbit the Earth and many more are expected to launch over the next 10 years, making the issue of tackling space debris increasingly urgent.

This year, we continued our work on development of a National In-Orbit Servicing Facility and operations centre at Harwell in partnership with Astroscale. Initially the aim is to demonstrate advanced robotics to tackle space debris and satellite servicing, with a view to providing end-to-end servicing capabilities that would generate up to 150 jobs directly and a supply chain of over 350 jobs, and position the UK as a world leader in in-orbit space services.

During the year, we moved into the validation and verification phase, and completed the ground segment critical design review with Astroscale, which plans to launch its End-of-Life Service by Astroscale demonstrator (ELSA-d) mission later in 2020. The company has raised substantial additional investment since we started working with it, and increased its staff from four to 30 in just two years.

# Emerging Technology

*Our Emerging Technologies team has continued to provide a leading role in identifying and helping to exploit exciting new technologies that offer prospects across our value streams, in terms of solving practical challenges, opening new markets and generating impact for the UK economy.*

## CASSIS 2

Increasingly, people expect seamless, ubiquitous connectivity wherever they are, with consistently high communication speeds but at low cost. This extends to connectivity for all types of vehicles, for autonomous driving, infotainment and location-based services, and also emergency services.

We have been continuing to develop, demonstrate and commercialise all the satellite elements needed for vehicle connectivity within our CASSIS 2 (Colour and Stereo Surface Imaging System) project. This includes a compact, light, low-cost satellite-terrestrial hybrid terminal that is scalable so that it can accommodate different applications and price points. A new satellite terminal supply chain in the UK could contribute 100 new jobs by 2023 and export revenues of £200 million.

## LightBar

The Catapult is prime contractor in the European Space Agency funded LightBar project, which is developing a hybrid connectivity solution for emergency services. The system will provide continuous connectivity with a consistent bandwidth anywhere for mission-critical data and services, seamlessly switching between terrestrial and satellite communications

systems, and could also be used by other professional vehicles operators.

The project achieved significant milestones towards the end of the year, despite the COVID-19 lockdown, putting it in a good position for the drive towards a marketable product by the end of 2021. Overall, it provides an initial use case, demonstrating the value of integrated satellite and terrestrial communications and is expected to contribute to UK exports and job creation as well as having environmental benefits.

## SMARTER

This year we have also continued work on the Space Manufacturing, Assembly and Repair Technology Exploration and Realisation (SMARTER) project, led by BAE Systems. This is testing the technical and commercial feasibility of in-space manufacture, assembly and repair technologies – our first such project in an area that will be of strategic importance to the UK. Our role is to lead on the business model and commercialisation side, and provide support on technical feasibility aspects.

Manufacturing in space could mark an important contribution to human spaceflight operations and extend the useful life of assets launched into space. It also opens the prospect of new space architectures that are not constrained by gravitational restrictions



# Agriculture and Health



## Agriculture

One of the standout successes this year has been the Colombian Cocoa (COLCO) control system project. In its second year, this is designed to support the Colombian cocoa sector to increase quality and yield, and more widely the country's ambition to be a regional leader in the sector and achieve sustainable socioeconomic development.

We have been leading the project with the Manufacturing Technology Centre, with the aim of employing several technologies, including IoT and machine learning, to deliver a range of services within an overall ecosystem for all those in the cocoa value chain, including the 50,000 smallholder producers.

The project's impact was so impressive that further funding was received in January 2020 and the project has been extended by 12 months.

Improving the sustainability of food production systems is a recognised driver of progress across multiple UN Sustainable Development Goals. COLCO will increase agricultural productivity and incomes of small-scale food producers, and will implement resilient agricultural practices that increase productivity and production. It will also reduce food losses along the production and supply chains, provide job security, reduce poverty and help to displace illegal crop production.



## Health & Wellbeing

Within our Health & Wellbeing value stream, we have been focussing on emergency response and management of long-term conditions, looking at early intervention and diagnosis, and at remote monitoring and consultation.

As part of our work, we are developing a Health Living Lab at our Westcott facility. This will house a range of communications technologies (satellite and terrestrial 4G and 5G) to enable organisations to test new ideas and ways of working within the healthcare sector, including development of diagnostic and communications products and services.

We piloted the development this year by creating an Ambulance Connectivity Living Lab, using a real ambulance located at Westcott. This was fitted out with satellite and terrestrial communications equipment, including a range of antennae on the roof. Including satellite equipment means that solutions can be tested for connectivity in areas where terrestrial coverage is poor or non-existent, including hybrid satellite-terrestrial systems. Improved ambulance communications should enable more patients to be cared for within a shorter time, reduce the need for people to visit hospitals and A&E, and free up critical NHS resources.

# Extractive Industries and Transport



*“This is the most amazing body of work produced in very challenging timescales. I am exceptionally impressed by the diversity, complexity and coherence of the work the Catapult team has produced.”*



**MARK RUGLYS,**  
Head of Global Engagement,  
Science and Innovation, BEIS

## Extractive Industries

Mines generate substantial waste products, known as ‘tailings’, which are typically contaminated with heavy metals and toxic chemicals. These are stored in ‘tailings storage facilities’ that are some of the largest engineered structures on Earth and often rely on waste being held behind dams. Dam failure can be catastrophic, resulting in loss of life and severe ecological damage.

Joint intervention by 110 investors, led by the Church of England Pensions Board and the Swedish Council of Ethics for the Swedish Public Pension Funds, led to us creating an automated system based on satellite technology to monitor the stability and seepage

of tailing dams, and provide an alert system, funded by the Department for Business, Energy & Industrial Strategy (BEIS). This would help to address several of the UN Sustainable Development Goals, including Good Health and Wellbeing (SDG3) and Responsible Consumption and Production (SDG 12).

By year end, we had developed seepage, detection and stability products for 50 dams and an initial version of an intuitive user interface. Longer term, this project could help set a new global standard for tailings dams, provide an independent 24/7 alert system, and ultimately achieve removal of the most dangerous dams.



## Intelligent Transport

During this year we continued with a number of projects around transport safety and efficiency. Among these were Project sAFE (Aftermarket eCall For Europe), which is defining standards and specifications for deployment of aftermarket systems for the pan-European eCall system based on 112. Estimates suggest 112 eCall can speed up emergency response times by 40% in urban areas and 50% in the countryside, and reduce fatalities by at least 4% and severe injuries by 6%. In addition, the system can significantly improve traffic management associated with any incidents.

Since April 2019, our focus has been on buses and coaches, with an emphasis on those travelling longer distances, across borders or carrying high risk groups, such as children or the elderly,

in order to maximise the benefits of the system.

We also furthered our work on the Brigital bridge monitoring solution, developed with the National Research Council of Canada. Brigital uses a system of comparing multiple synthetic aperture radar (SAR) satellite images to detect millimetre scale changes over time. A new 3D visualisation tool will contribute to maintenance and safety of bridges, reduce risk for maintenance teams, and benefit the national economy by minimising bridge closures.

Through the Rail Market Challenge that we ran this year, we have now identified opportunities to pilot Brigital in the UK, for both rail and other infrastructure projects, along with other potential rail sector applications for satellite applications.

# New Markets

*In our New Markets value stream, our focus this year has been on the construction sector, regional economies, sustainable finance and sustainable development.*

## IPP CommonSensing

The impacts of climate change are being felt everywhere, but Small Island Developing States (SIDS) are on the frontline due to their dispersed and remote geographies. The challenges they face include increasingly destructive one-off events and longer-term, slow onset emergencies, such as rises in sea level.

The Catapult is part of the IPP CommonSensing international consortium, which is developing services based on satellite remote sensing to boost SIDS climate resilience and enhance their decision-making. Funded through the UK Space Agency's International Partnership Programme, the project is tailored to the needs of three SIDS – Fiji, Solomon Islands and Vanuatu.

The platform uses free data and open data cubes to provide up-to-date information to decision-makers on trends in different areas (such as agriculture, urban development and coastal erosion) that they can use to take positive action, including applying for climate finance. Although the COVID-19 pandemic disrupted activities at the end of the year, the project already shows great promise as a long-term solution that could be adapted for other island nations.

## Sustainable Finance

Another focus this year was on activities to increase the uptake of satellite data for sustainable financial decision-making. We're activating the market on the finance side, supporting satellite technology businesses entering this international growth market

and engaging with government stakeholders to incorporate satellite technologies in future roadmaps such as the Green Finance Strategy and the Geospatial Commission's UK Geospatial Strategy.

During this year, we:

- Partnered with Oxford University, the Alan Turing Institute and the Green Finance Institute to form the Spatial Finance Initiative.
- Ran networking events (Spatial Finance Connect) to bring together finance and geospatial communities.
- Initiated our first multi-disciplinary research project developing global open source asset-level datasets for the cement and steel sectors based on satellite and web data.
- Supported UK start-ups and SMEs with product development through Spark sessions, technical and market advice, introductions and project proposals.

Our goal is that 80% of the world's largest financial institutions will use geospatial analysis to assess risks, opportunities and impacts, and that the UK will become the global hub for spatial finance services. This, in turn, will drive demand for both raw satellite data and derived analytics, increasing development of tailored geospatial products and services, driving revenue and job growth and achieving environmental and socio-economic impacts.



# Strategic Facilities

*The Catapult develops and maintains a range of facilities across the UK to support our mission of energising the market, empowering technology and enabling business. We provide technical and workspace facilities at our Harwell office, the Westcott Space Cluster and our Disruptive Innovation for Space Centre (DISC).*

## Westcott Space Cluster

Our Westcott facilities within the Westcott Space Cluster near Aylesbury, Buckinghamshire have been busy this year. These include the Westcott Business Incubation Centre (BIC), 5G Step-Out Centre and Innovation Centre.

At the Westcott BIC, we support early stage businesses and talented entrepreneurs with technical and business expertise, and access to product development and testing facilities. This year, Valerann became the first company to graduate from the BIC. As a result of support from the BIC and collaboration with the 5G Step-Out Centre, Valerann improved its Smart Road Studs (SRS) product offering, secured R&D investment from the European Space Agency and started its first major project in the UK with Milton Keynes Council. Its solution has also been deployed in the US and Israel, it has raised US\$5 million in seed investment and continues to recruit more staff.

In June 2019, the 5G Step-Out Centre became operational, with

support for SMEs and commercially funded activities with the Home Office. Among our successes have been connecting SMEs to form a new supply chain, improving their product technology readiness levels (TRL) and enabling them to significantly increase their revenues.

## Disruptive Innovation for Space Centre (DISC)

DISC supports the design, manufacture and testing of products by providing equipment and expertise in a collaborative environment for existing manufacturers and new companies developing spacecraft and associated technologies. At the end of 2019, we opened a new 1,150 square metre facility to DISC, with laboratory and design areas, clean rooms, vibration table, thermal ovens and other equipment.

During this year, DISC supported 22 customers and 10 Catapult projects, including vital support during the COVID-19 pandemic for companies such as Helix Technologies. OpenCosmos now completes all its technical operations at DISC.

*“Thanks, especially at this time, for going to the lengths to accommodate our (often short notice) requirements for testing in the Near Field Range [at DISC]. Your services are an essential ingredient in the progress and ultimate success of Helix Technologies.”*



**JAMES LEWIS,**  
CEO, Helix Technologies Ltd

# Regional and Academic Engagement

*With levelling up at the heart of the Government's agenda, the Catapult is working hard to deliver economic growth around the UK, not just in London and the South East. One of these major initiatives is DISC and the blueprint this provides for the creation of Regional Space Business Parks around the UK.*

DISC is designed to lower the cost of entry to new ideas and to stimulate innovation that leads to world-leading commercial ventures. The concept provides a unique collaborative environment that will encourage the creation of teams with the range of skills needed to be competitive. It will support industry to take innovative R&D projects from proof-of-concept through to full-scale production ready prototypes. Users will be able to manufacture at quality levels and scales to undertake end-customer validation and meet the demands of the 'New Space' commercial environment. It will ensure rapid and effective roll-out that beats the competition, and anchors economic benefits in the UK.

The power of DISC is in the way that it can respond to regional specialisms. DISC at Harwell, in Oxfordshire is a £4 million facility, already oversubscribed, and attracting clients such as Lockheed Martin, who will be using DISC to develop technology for their orbital launch vehicle. Over the next 10 years, the regional space ecosystem of the UK will be transformed by a linked series of DISC facilities and associated Regional Space Business Parks, which will grow to support regional space sector strengths. Currently, discussions are ongoing around a further 5 regional DISC facilities around the UK from Cornwall and West Wales to Scotland.

## Regional engagement

Our regional engagement has to date largely been carried out through our Centres of Excellence. At the end of the year, the contract for the North East Centre of Excellence was extended for a further two years, while our Centres of Excellence in Scotland

and the East Midlands ended their current contracts with us. The plan is for these Centres to evolve, thanks to the new projects and successful collaborations they have facilitated. We will be continuing our support in Scotland through the Scottish Space Leadership Council and in the East Midlands with Space Park Leicester. We are pleased that the two teams will continue to be part of our **Knowledge Exchange and regional network**.

Also this year, we continued our hugely successful Space Placement in Industry (SPIN) programme. Since its inception seven years ago, over 100 undergraduates have benefitted from placements in space sector organisations, including the Catapult. In addition, our staff have been involved with a range of activities as part of UKSA's target of engaging with over 1 million young people each year about space.

## Academic engagement

Academic engagement is vital to help steer relevant research and accelerate its impact, and nurture the talents, skills and knowledge of both our staff and academic researchers. At the Catapult, this has included our Researchers in Residence scheme, sponsoring students, collaborating with universities across the UK and delivering academic training.

Our Geospatial Intelligence team has been particularly busy in this field this year, delivering Earth observation (EO) training at several universities and into businesses. Other Value Stream teams have been exploring collaborations with universities including Oxford, Exeter, Bristol, Surrey, Portsmouth and Plymouth.



# International

*The UK's Space Innovation and Growth Strategy 2014-2030 included an ambitious target for the UK to increase its exports in the space-enabled market to £25 billion by 2030. Our targets for international activity are equally significant. We are coordinating closely with the UK Space Agency, Department for International Trade and Foreign and Commonwealth Office.*

## China

The Chinese government's 5-year plan includes a drive for commercial exploitation of space technology in civilian markets, presenting a major opportunity for the commercial UK space sector. As a result, one of the Catapult team spent half of the year based in China pursuing prospects for projects and investment, and seeking potential partners.

The results offer huge potential for UK businesses within our Agriculture, Transport and Geospatial Intelligence Value Streams. We also supported a UK delegation to China in collaboration with the Future Cities Catapult, resulting in a contract for one SME.

As an extension of this work, we have started working with GHST, a subsidiary of Hero Investment, to establish a Sino-British Satellite Applications Centre (SBSAC) in Guangzhou in the Guangdong province. The aim of SBSAC, which we hope to open by the end of 2020/21, will be to act as a platform for UK companies wanting to engage in the Chinese and Asian markets, exploring partnerships and investment opportunities to facilitate joint ventures for the UK space sector.

## UK Australia SpaceBridge

Following engagements with UK and Australian government and industrial stakeholders, the Catapult proposed an 'Australia-UK SpaceBridge' designed to enable closer collaboration on space technologies and associated applications between governments, regulators, financiers and the private sector.

This SpaceBridge could deliver a £65 million contribution to the UK GVA within 5 years and 390 new high tech jobs. It has ministerial support in the UK and Australia, and the formal agreement is now under development. This is now being driven by UKSA but we hope to continue our involvement in the SpaceBridge programme in future.

Interest in UK-Australia business and partnerships is high. During our research in both countries, we identified over 40 opportunities for business collaborations, connected with 200 organisations via a UK SpaceBridge webinar and engaged directly with 38 SMEs. Several collaborative projects are now in development.

# Business Support

*Our work with businesses spans a broad range of activities designed to open new routes to market and attract investment. As well as connecting them with resources and facilities, we provide signposting to finance, targeted business support, information, upskilling and*

## Access to finance

Small businesses in the space sector face substantial challenges in raising finance. As a result, we facilitate funding by providing a range of supporting activities and work in partnership with the space-focussed £100 million Seraphim Space Fund. During 2019/20, the businesses we supported raised £37.7 million against our target of over £35 million, endorsing our approach.

## Sprint programme

We have provided a Business Sprint programme since the inception of the Catapult to support companies at critical stages of their development. This year we developed new Sprint formats to meet stakeholder needs as overall demand increased:

- **Academic Sprints:** defining commercial value and roadmaps from academic research
- **Inward Investment Sprints:** for non-UK companies looking to define a UK growth strategy
- **Rapid Commercialisation:** how to 'inject' new space-based services into non-space primes

By the end of the year these had all been piloted and two rapid commercialisation 'Explore' Sprints – interactions with the Catapult's business support and technical experts to move businesses forward on the path to commercialisation – had taken place.

We also provide Sprints to businesses being incubated at the

Westcott Business Incubation Centre (BIC) and completed Regional Sprints as part of a programme funded by the UK Space Agency.

## Introductions and industrial engagement

Our unique position in the UK space ecosystem makes us ideally placed to introduce SMEs to potential customers, partners and collaborators. As well as a diverse range of individual introductions, we were engaged this year to support the SPRINT programme, led by the University of Leicester, for potential SMEs seeking to collaborate with one or more of the five partner universities.

*"The Catapult has positioned itself as a central pillar in the UK's space innovation ecosystem and SPRINT's collaboration with the Catapult is an important factor in the success of the Programme thus far, to date supporting over 40 SMEs in over £2.5 million of collaborative R&D and business growth activities." Ross Burgon, Head of the SPRINT Programme, University of Leicester*

We continued our active collaboration with the UK European Space Agency BIC, supporting their incubatees and companies we have met through their network, and we're an active partner in the Seraphim Space Camp accelerator programme.

Other successes this year on top of our regular events, such as our Satuccinos, included: the launch of the WILDLABS Tech Hub; facilitated interactions with organisations from Canada and India; and our Spatial Finance Initiative collaboration.

# Financial Highlights

The Catapult benefits from Innovate UK grant funding, which underpins the Company in its role within and for the UK space sector. The Company, along with its trading subsidiaries (together, the “Group”), leverages this grant funding, and achieved £11.7m of collaborative and commercial income in the year (2019: £18.6m).

For the year ending 31 March 2020, the income and operating profit were as follows:

	2020	2019	2018
	£'000	£'000	£'000
Innovate UK core grant income	12,000	10,820	10,252
Collaborative and commercial income	11,740	18,626	16,900
<b>Total income</b>	<b>23,740</b>	<b>29,446</b>	<b>27,152</b>
<b>Operating profit</b>	<b>(1,278)</b>	<b>916</b>	<b>1,072</b>

The Group has adopted the performance model of grant recognition under FRS102, with the whole capital element of grant income being recognised in the year it is incurred.

This results in large operating profits during periods of capital investment and operating losses when depreciation exceeds investment. The Group's 'normalised' operating surplus for the financial year totalled £194k (2019: £461k). As a not-for-profit research organisation, any surplus is reinvested in pursuance of the Group's strategy.

Extracts of the consolidated statement of financial position as 31 March are as follows:

	2020	2019	2018
	£'000	£'000	£'000
Fixed Assets	9,281	10,824	9,962
Net current assets	4,301	2,451	2,096
Net Assets	11,976	13,274	12,058
<b>Total capital and reserves</b>	<b>11,976</b>	<b>13,274</b>	<b>12,058</b>





# CATAPULT

Satellite Applications

The Company is registered in England and Wales under company number 07964746 with its registered office at Electron Building, Fermi Avenue, Harwell Science and Innovation Campus, Didcot, Oxfordshire, OX11 0QR.

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## Directors

The Directors who served the Company during the year were:

Timothy Sherwood  
Stuart Martin  
Simon Acland  
Chad Anderson  
Lucy Edge  
Susan Hunt  
William Hutton  
Dr Vanessa Lawrence  
Lynne Patmore  
Richard Tuffill



