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Building bridges from space

Terri Freemantle looks at how the International Partnership Space Program is tackling real-world problems on two continents – and promoting British satellite remote sensing skills and expertise in the process

In 2015, the UK Space Agency (UKSA) launched the International Partnership Space Program (IPSP), a government-funded initiative aimed at encouraging collaboration between the UK and international partners in the field of space and satellite technologies.

Now a year on, the IPSP projects are coming to a close with successful outcomes. Two countries with whom the Satellite Applications Catapult engaged during the IPSP were Mexico and Australia.

Monitoring in the Yucatan

The project in Mexico saw a UK consortium collaborate with the Agencia Espacial Mexicana (AEM) and other partners to develop a series of Earth Observation-derived products aimed at monitoring the fragile Bacalar Transverse Coastal Corridor on the eastern side of the Yucatan Peninsular.

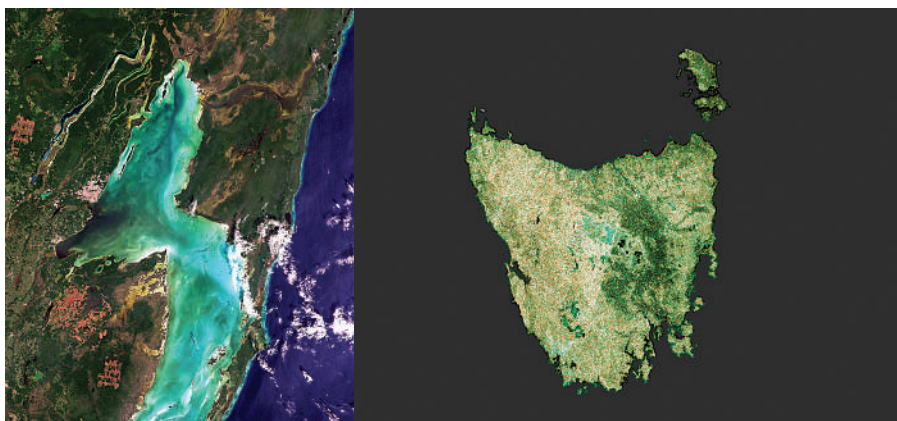
Faced with increased urbanisation following an uptake in tourism, the Bacalar Lagoon and its associated sub-surface eco-hydrological network is under pressure from pollution, coastal erosion, and land clearance. The sub-surface network of rivers and cenotes are vital providers of freshwater to the region, while the coastal mangroves and coral reef crests offer protection from hurricanes and tropical storms.

The Laguna Bacalar is also home to some of the Earth's oldest known living giant microbialites (*layered bio-chemical structures formed from sedimentary deposits - Ed*). These thrive in extreme and inhospitable conditions and are of particular interest to astrobiologists in understanding the potential for extra-terrestrial life in our solar system.

As the region requires environmental monitoring over vast scales, the use of Earth Observation data was investigated as a means of generating and presenting information in a visually simplified manner to policy-makers on issues such as urbanisation, mangrove degradation and water quality. In addition to incorporating these products into a bespoke demo web-application, the project forged strong academic links between the UK and Mexico, including the exchange of knowledge and students. The latter included the in-country delivery of training course in remote sensing, Synthetic Aperture Radar (SAR) and mission design.

Radar down under

The IPSP Australia project focussed on developing Synthetic



Left: Landsat 8 image of the Laguna Bacalar and Chetumal Bay, Mexico

Credit: Data © NASA & USGS. Image © Satellite Applications Catapult Ltd

Right: Sentinel-1 over Tasmania (Sentinel-1 Band combinations: R=VH; G=VVdb; B=VV Gammao_RTC (VV+VH) for 5 images acquired in October 2015)

Credit: Image © Satellite Applications Catapult Ltd

Aperture Radar (SAR) solutions. SAR data offers huge benefits for environmental monitoring as it is unaffected by cloud cover or lack of sunlight. However, developing applications using SAR data still requires large-scale processing, analysis and expert interpretation.

In tackling this issue, the project encouraged capacity-building through the exchange of knowledge and by initiating joint ventures. Thanks to IPSP funding, the Satellite Applications Catapult was able to collaborate with its Australian partners to develop a sustainable programme ... one that lays foundations for future opportunities in the wider Asia-Pacific region.

In parallel, the project partners have been working on SARCube – a high-performance, multidimensional database or a 'data cube' – for SAR data. They also showcased the potential of analysis-ready SARCube data in three projects covering agriculture, forestry and hydrology respectively.

Through projects of this type, the UK can export skills and expertise worldwide, generating income to the nation and promoting the use of satellite technologies to tackle real-world problems in the face of growing urbanisation and climate change. *Note: The IPSP Mexico project included partners from Surrey Space Centre, UKSA, Deimos UK and SSTL, while the IPSP Australia project involved the CSIRO (Commonwealth Scientific and Industrial Research Organisation), Geoscience Australia, and CRCSI (Cooperative Research Centre for Spatial Information).*