

The EXpress Production Real-time e-VLBI Service (EXPReS) project

Dr Tasso Tzioumis, Commonwealth Scientific and Industrial Research Organisation (CSIRO) says Australia has been a major player in this international collaboration initiated and run from Europe. Very Long Baseline Interferometry (VLBI) is a radio astronomy technique that enables widely separated radio telescopes to operate simultaneously. The resulting array is equivalent to a 'virtual antenna' of diameter equal to the separation of the individual antennas and can reach sizes close to the diameter of the Earth. Such an array is capable of the highest resolution in all of astronomy and hence results in the most detailed images. Up to now, VLBI arrays have operated by recording data to tapes or disks, and processing all the telescope data simultaneously at a much later date, which has made VLBI slow and cumbersome.

The challenge has been to operate a worldwide VLBI array in real-time, using the fast international connections available through the internet. However, VLBI requires speeds of around 1 Gbps, about 1000 times faster than the internet available to homes and businesses. Special connectivity and instruments need to be developed and operated in real-time as an electronic-VLBI array (e-VLBI).

The EXpress project, completed in 2009, was led by the European VLBI Network (EVN) and funded by the European Commission (EC). It involved 19 institutions primarily from Europe with five institutions from around the world, including Australia's Academic and Research Network (AARNet) and CSIRO's Australia Telescope National Facility (ATNF). Rated as one of the most successful projects in the European Commission, with the Australian contribution clearly recognised, a follow-up project proposal (NEXPReS) has received favourable reviews, with CSIRO the only non-European participant in it.

The potential impact of this collaboration is to provide a technological pathfinder for next generation instruments, such as the Square Kilometre Array (SKA). The technological developments will find immediate application in the Australian SKA Pathfinder (ASKAP) now under construction in Western Australia, and will enhance Australia's opportunities to host the full SKA.

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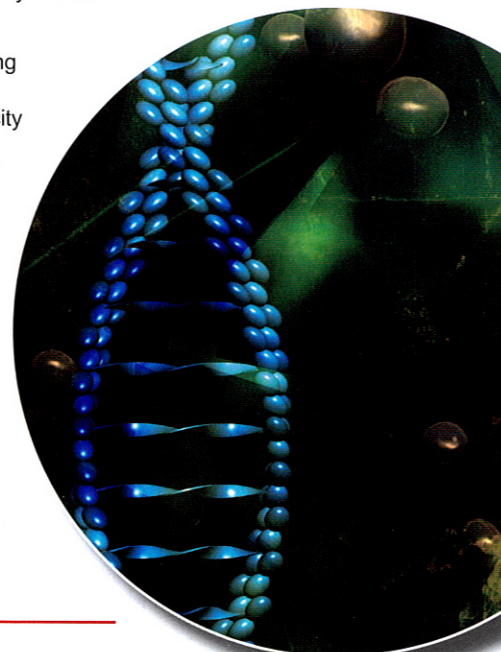
Firstly, managing the likely transition to a new paradigm with a greater emphasis on assessing openness and reciprocity in providing international access to domestic research funding sources. In this new regime, bilateral and multilateral cooperation will be enhanced by joint funding arrangements that cross national borders ('twinning') – but this powerful mechanism will only be accessible to those countries that actively foster openness and reciprocity in their national research funding systems.

Australia is already active in articulating how best to assess and disseminate information on openness and reciprocity in national research funding systems via the EC funded AUS-ACCESS4EU project, which is one of a number of cooperating projects worldwide.

'Academic research collaboration between Australia and Europe is diverse and vibrant. In terms of academic publication activity, Europe is Australia's most important collaborative partner.'

Secondly, articulating how best to balance the opportunities for intensifying Europe–Australia cooperation in the innovation dimension against the fact that, unlike public science (which tends to have a strong collective international dimension), innovation policies are more closely linked to national competitiveness concerns.

Some nations have coupled science policy and innovation policy. This makes it more, rather than less, difficult to justify support for international research cooperation because this close coupling overlooks the major distinctions between public science (with its inherently collective international ethos) and national competitiveness issues associated with innovation policy. This means that care must be taken not to 'over sell' the opportunities for stronger cooperation in the industry–academic interface while also ensuring that key opportunities are not missed. This is particularly important in innovation addressing major global challenges (such as sustainable water purification – see case studies for examples). ■



Web links

FEAST

www.feast.org

CORDIS: FP7

http://cordis.europa.eu/fp7/home_en.html

COST

www.cost.eu

EURAXESS – Researchers in Motion

<http://ec.europa.eu/euraxess/>

Australian Researchers' Mobility Portal

www.mobility.org.au

Australian Academy of Science

www.science.org.au/internet/

ERAWATCH

<http://cordis.europa.eu/erawatch/index.cfm>

ACCESS4EU

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