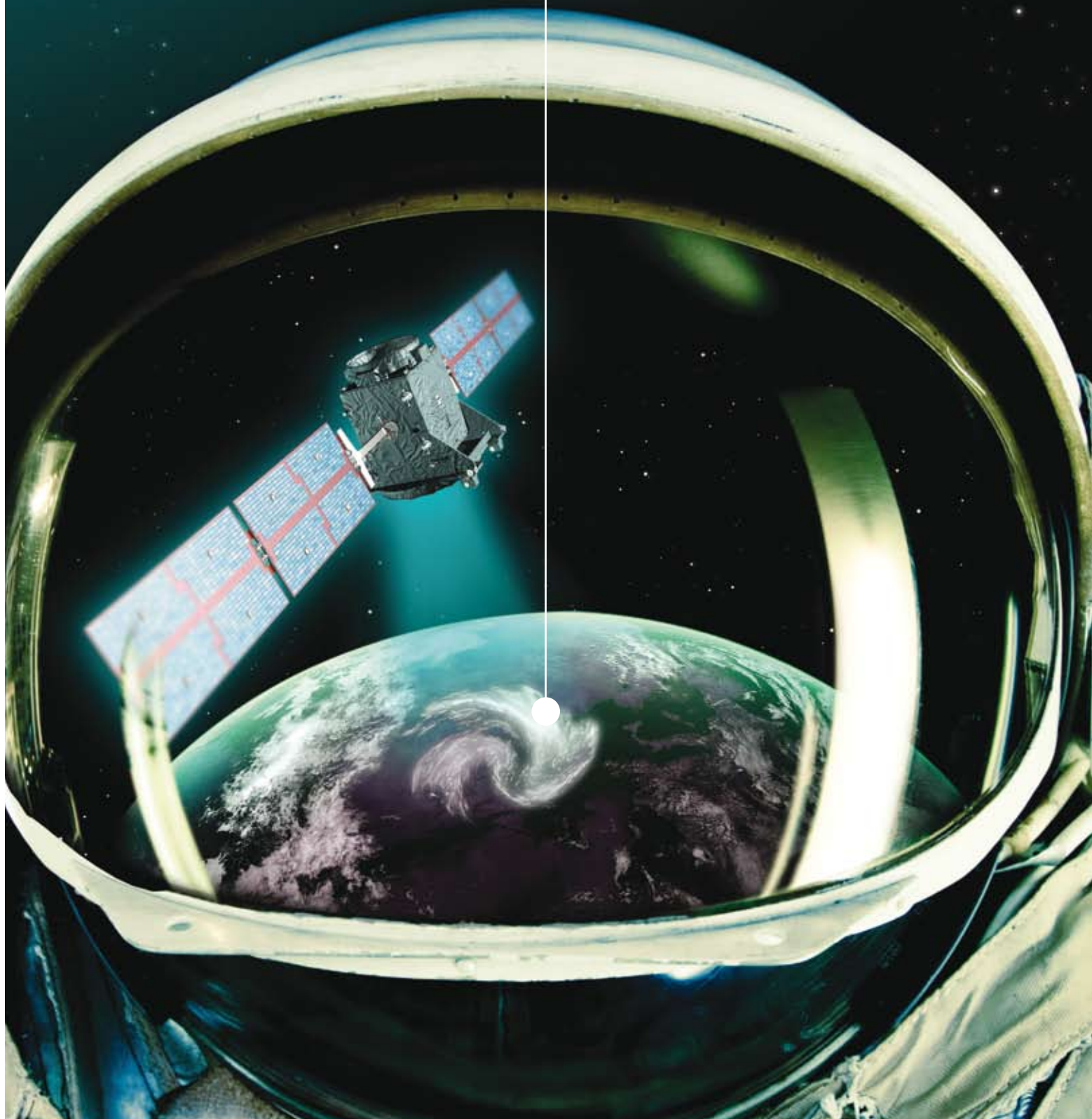


Spatial sciences

# Precision Expertise

THE AUSTRALIAN SPACE RESEARCH PROGRAM  
IS ENCOURAGING AUSTRALIA INTO A LEADING  
POSITION IN PRECISION SPACE SURVEILLANCE  
AND NAVIGATION TECHNOLOGIES.



**A** Curtin research group in global navigation satellite systems (GNSS) is part of a six-member international consortium developing new geospatial technologies that will help monitor climate change in Australia.

Australian Research Council (ARC) Federation Fellow, Professor Peter Teunissen, heads the Curtin team that is part of the \$8 million, three-year initiative. The project, led by RMIT University, is being funded under the Australian Space Research Program, as 'Platform technologies for space, atmosphere and climate'.

'It's an impressive collaboration of Australian and international expertise in space-related research,' Teunissen said.

'Our aim is to produce software and system platforms with technologies for precise real-time, in-space tracking, precise orbit determination and satellite positioning.

'The suite will also include new technologies for monitoring space weather, atmospheric modelling and climate monitoring.'

Teunissen - internationally regarded for his expertise in GNSS data processing - will oversee the Curtin team's development of

methods and algorithms for the new GNSS technologies. This includes investigating theory and methods to integrate the use of multiple constellations from the next generation GNSS for high-precision positioning and navigation of air-based and space-based platforms.

'Our goal is to enable fast and reliable ambiguity resolution to make possible very precise real-time kinematic (RTK) remote-sensing platform positioning in space,' he said.

'The new space technology program is a vital step towards improving our understanding of climate change in Australia and will play an important role in the way we cope with changes in our environment.'

The capabilities realised by the project will also address some limitations of ground-based meteorological observation stations, which affect the accuracy and reliability of current climate models, particularly in the Southern Hemisphere.

Consortium members also include the University of New South Wales (UNSW), the Bureau of Meteorology, Electro Optic Systems Space System, GPSat Systems Australia Pty Ltd, Taiwan's National Space Organisation, and the US World Data Centre for Metrology.

Teunissen has also begun working on a second project funded by the Australian Space Research Program. If successful, the research could provide new satellite-based systems for improved monitoring of bushfires, floods, storms, volcanic eruptions and earthquakes.

The project is an international collaboration in space engineering in the expanding field of satellite earth observation, and involves Curtin; UNSW; Delft University of Technology, the Netherlands; and two industry partners.

Titled 'Earth environment monitoring using Formation Flying SAR', the project is investigating whether synthetic aperture radar (SAR) satellites flying in small formations can enhance real-time environmental monitoring.

Singular SAR satellites are currently used for measuring elevation and biomass. The research will develop the satellite-positional accuracy that is essential for formation flying, and determine the capability of multiple SARs, configured into various formations, to provide more effective environmental monitoring.

[geology.curtin.edu.au/research](http://geology.curtin.edu.au/research)

## the GNSS Research Laboratory

Since receiving an ARC Federation Fellowship in 2009, Professor of Geodesy and Navigation Peter Teunissen has been building a specialist GNSS research team to work with him on leading-edge national and international projects.

Teunissen's fellowship has enabled him to appoint 10 researchers, many of whom have left European-based research organisations to join Curtin. Concurrently, Teunissen has been acquiring the scientific instrumentation for a dedicated GNSS

research laboratory within Curtin's Department of Spatial Sciences.

During 2010 Teunissen was appointed science director of one of three programs of the national Cooperative Research Centre for Spatial Information (CRC-SI). This Geospatial Positioning program aims to realise a National Positioning Infrastructure that enables instantaneous positioning anywhere, anytime, with the highest possible accuracy and integrity.

