

APEC GIT – Australian Economy Report

OVERVIEW

Australia continues to be a significant user of space-based technologies and data provided from space based infrastructure such as the Global Navigation Satellite Systems (GNSS).

Satellite navigation and positioning provided by GNSS has become not just useful but integral to a wide range of sectors in the Australian economy and is increasingly important for personal use.

Applications include maritime and aviation navigation and surveillance, timing, agriculture, mining water catchment and environmental management, tracking of trucks and freight consignments, in-car navigation systems and recreational use such as fishing and bushwalking.

The precise positioning technology now associated with GNSS continues to open up a range of new commercial applications for improving production and processing efficiency in a number of commercial and government sectors.

In transport Australia continues down the path of wider application of satellite technology in our transport management systems to provide enhanced safety, efficiency and environmental benefits while being cognisant of the need for robust ground-based back-up systems to avoid over-reliance on one approach.

Beyond aviation, precision GNSS technology in Australia has largely been facilitated to date by numerous Continuously Operating GNSS Reference Stations (CORS) across a number of generally State Government-owned networks providing regional access solutions to precision GNSS services.

Traditionally, GNSS-dependent technology developments have been driven more by solutions to specific local or regional issues across the community, industry and Government.

Australia, through the Space Policy Unit within the Department of Innovation, Industry, Science and Research (DIISR) is developing a National Space Policy to ensure the right mechanisms and policies are in place to support Australia's space activities, ensuring alignment in the sector to gain the greatest benefits.

The National Space Policy will take a whole of Government approach and will provide a vision for Australia's use of space and space-related technologies. The Policy will have particular focus on the areas of Earth Observation, Satellite Communications, and Position, Navigation and Timing (PNT) applications, which are key strengths for Australia.

GNSS is identified as a critical area in the development of the National Space Policy, Australia recognises how GNSS underpins smart infrastructure and social and economic security. GNSS is integral to the regulation of air traffic and other transportation operations, as well as in other applications such as providing time-stamping for financial transactions and precision measurements for civil engineering, agriculture and water management.

In addition to the diverse range of economic, societal and environmental benefits derived by Australia from GNSS technologies, it is also noted that GNSS will drive innovation across the services economy, enabling a new generation of location based services and products.

Further, the National Space Policy will take into account the anticipated development and deployment of new GNSS and Regional Navigation Satellite Systems (RNSS), recognising that Australia's unique geographical position enable us to play a significant role in the likely new wave of innovation in user devices and the early experimentation with multi-constellation technology and applications.

Australia appreciates the willingness of countries in the region, and in forums such as ICAO, IMO and APEC, to share their experiences and discuss areas of future mutual cooperation in the further use of satellite based technology in the transport sector. This approach will lead to further safety, efficiency and environmental benefits for domestic and international transport users and operators around the world.

This report briefly outlines the current status of Australia's use of satellite technology in the transport sector.

Aviation

The Australian Government released its National Aviation Policy White Paper in December 2009.

The White Paper provides a comprehensive aviation policy statement, bringing together all strands of aviation policy into a single, forward-looking document and will help facilitate planning and investment by the Government and the aviation industry out to 2020 and beyond.

The White Paper includes a commitment to supporting the wider application and use of satellite communication, navigation and surveillance technology.

Australia recognises the need for investment in modern air navigation infrastructure, including in satellite technology, to further enhance aviation safety and meet future air traffic demand.

By 2020 Australia will have moved to a national ground and satellite-based network of air traffic management providing a level of communications, navigation and surveillance coverage unprecedented in Australia's history.

In this respect, Australia's civil air navigation service provider – Airservices Australia - is investing close to \$1 billion over the next five years in air traffic infrastructure to ensure Australia maintains a modern, responsive and effective air traffic management system.

This will be achieved by implementing a number of key initiatives, including the increased use of satellite-based navigation procedures such as Approach with Vertical Guidance (APV) and the increased use of satellite-based surveillance systems such as Automatic Dependent Surveillance-Broadcast (ADS-B).

Australia is well placed to benefit from ongoing investment in satellite-reliant technology such as ADS-B, particularly where it can provide air traffic surveillance in airspace that currently has no radar surveillance coverage.

Australia's aviation safety regulator, the Civil Aviation Safety Authority (CASA) is also playing a key role in moving Australia's air traffic system towards a more satellite-based approach with the release of a technology regulatory discussion paper in October 2010 which outlined CASA's proposed approach and timing for aircraft equipage requirements over the next decade.

Industry feedback is being used to inform further planning work by CASA and there are many areas of significant agreement within industry which CASA will be looking to move forward on later this year.

Airservices Australia has already deployed a network of ground stations which when combined with radar provide air traffic control surveillance capability over the entire continent above 29,000 feet.

This will support CASA's mandate requiring aircraft operating at and above 29,000 feet in Australian continental airspace to have ADS-B OUT equipment installed by December 2013.

Australia's Department of Infrastructure and Transport, which oversees aviation policy advice to the Government, has recently completed a review to examine the justification, practicality, cost and timing issues associated with Satellite Based Augmentation Systems (SBAS).

The review has been provided to Government for consideration, and it is expected to be released later this year.

Rail

The Australian Rail Track Corporation (ARTC), Australia's interstate rail track manager, is currently trialling the Advanced Train Management System (ATMS), which could provide significantly improved capacity, efficiency and productivity for the interstate rail freight network in Australia.

The ARTC is investing over \$90 million in the ATMS which is being developed in conjunction with local and overseas private sector contractors.

One of the key capabilities of the ATMS is onboard location tracking, which uses a combination of GPS inputs along with track database data delivered through mobile broadband complimented by inertial sensors to determine the precise location of each locomotive.

The system would replace trackside signalling with in-locomotive displays, provide precise location of trains both front and rear, provide new digital network control functions and provide automatic route clearances.

Successful completion of the trial could see the system used on the ARTC's 10,000 kilometre national rail network.

Maritime

Australia uses satellite technology for search and rescue, maritime communications and vessel tracking.

Specifically, the Australian Maritime Safety Authority (AMSA) has interests in a number of areas of satellite-based technology to promote maritime safety and to protect the environment, including:

- use of the Cospas-Sarsat Low-altitude Earth Orbit (LEOSAR) System for Search and Rescue (SAR) - for the detection and location of 406 MHz distress beacon signals;
- Topex \Poseidon \Jason satellite altimeter and sea surface temperature data - Ocean drift modelling data used in the prediction of water movement in the prosecution of search and rescue incidents;
- ARGOS – Self Locating Data Marker Buoys (SLDMB) data used in accessing actual water movement during SAR operations;

- use of satellite based communications in prosecuting SAR incidents (Inmarsat or Iridium) and alerts;
- vessel Long Range Identification and Tracking (LRIT) Data Centre services via Inmarsat communication systems to monitor Australian vessels adhering to the International Convention for the Safety Of Life At Sea (SOLAS);
- AMSA and Customs are trialling satellite-based Automatic Identification System (AIS) for vessel tracking purposes;
- satellite polling via Inmarsat C (every 12 hours) of certain vessels entering Australia's search and rescue zone destined for an Australian port. The Great Barrier Reef and Torres Strait Coastal Vessel Traffic Service (REEFVTS) operated jointly by AMSA and Maritime Safety Queensland also uses this satellite service for automatic position reporting (APR) services to complement AIS and radar-based tracking of vessels, within the Great Barrier Reef and Torres Strait regions;

AMSA also operates a Differential Global Positioning System (DGPS), comprising 16 reference stations located near major waterways and ports around Australia's coastline. Stations broadcast a continuous GPS augmentation service for coastal shipping around Australia as part of their international commitments to the safety of marine navigation.

Road

In regard to road transport, the Australian Government is examining the use of GNSS technology in progressing the Council of Australia Government's heavy vehicle pricing and regulatory reforms, which will potentially include the monitoring of heavy vehicle movements on national and state road networks.

The Government is also examining the use of In-Vehicle and At-Roadside Technology and Intelligent Speed Assist as well as specific technology standards for future innovative products.

These stations will significantly improve the precision and accuracy of Australia's geodetic datum and contribute to the Australian Regional GNSS Network which serves as the national foundation for all positioning applications in Australia. This will have a direct impact on the many fields of science and industry that require accurate positioning to enhance effectiveness.