

# **AUSTRALIAN SENATE ECONOMICS COMMITTEE INQUIRY INTO THE CURRENT STATE OF AUSTRALIA'S SPACE SCIENCE & INDUSTRY SECTOR**

**SUBMISSION BY**

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## **Executive Summary**

Landgate is Western Australia's premier land information agency. Western Australia is such a large and diverse state that it requires satellite imagery to efficiently map and monitor the environment. Landgate invests \$2.5 million a year in space sciences in a Satellite Remote Sensing capability.

Landgate has developed and operates several customer-focussed, near realtime remote sensing products in the areas of Emergency Management (Firewatch and Floodmap), Natural Resource Management (Landmonitor), Agriculture (PasturesfromSpace and Agimage), Ocean Sciences (Ocean Watch), and Geological Sciences. Firewatch is recognized as a world class fire emergency management support system, and Landmonitor served as a development platform for the Australian National Carbon Accounting System (NCAS). In addition, Landgate is active in researching, developing and deploying new applications to meet the needs of its customers and Western Australia.

Landgate is reliant on foreign-owned and operated satellite systems for all of its products, which does pose a risk to ongoing delivery of its products and services.

Landgate is supportive of expanding Australia's space science activity, particularly to reduce the total reliance on the good will of foreign countries to allow free to ground transmissions from their satellites.

The benefits of expanded space activity can be summarised as follows:

- Improved certainty of data supply for more responsive emergency management, and improved environmental management.
- Commercial opportunity for private industry if an Australian satellite was designed, built, and operated in government/private sector partnership.
- Sustainable development of world class research and delivery capacity to problems facing Australia now and in the future.
- Enhanced partnering opportunities with other nations that operate satellites, and increased profile of Australian space science internationally.

Impediments to expanded activity include:

- Lack of a national coordinating body for space.
- Effective engagement between the States and the Federal Government to deliver on priority areas.
- Lack of a sustainable funding model
- Disconnection between the builders and the users of any satellite system proposed.
- Lack of sufficient human capacity to realise the benefits

## Landgate's Capability

Landgate is Western Australia's premier land information agency. Because of WA's size and small population, it relies heavily on satellite imagery to efficiently map and monitor the environment.

Landgate invests \$2.5 million per annum in a world class space sciences program through its Satellite Remote Sensing Services (SRSS). SRSS comprises 30 scientists and technologists and operates under the vision "Leading in the use of satellite information for the benefit of customers and communities, globally".

Satellite Remote Sensing Services role within Western Australian government is:

- To extract the social, economic and environmental benefits from Earth observing satellites for the State of Western Australia.
- To enable State Government agencies to use information from Earth Observing Satellites to achieve policy objectives.
- To better assist regional and remote communities, natural resource management agencies and emergency services to better manage natural risks.
- To develop new and innovative uses of satellite remote sensing data to deliver benefits to the state.

Landgate has developed and operates several customer-focussed, near realtime remote sensing products in the areas of:

- Emergency Management (Firewatch and Floodmap)
- Natural Resource Management (Landmonitor)
- Agriculture (PasturesfromSpace and Agimage)
- Ocean Sciences (Ocean Watch)
- Geological Sciences.

Firewatch is recognized as a world class fire emergency management support system, and Landmonitor served as a development platform for the Australian National Carbon Accounting System (NCAS). In addition, Landgate is active in researching, developing and deploying new applications to meet the needs of its customers and Western Australia.

The primary data source for most of Landgate's applications is satellite data received at stations at the Curtin University of Technology and Murdoch University operated by the Western Australian Satellite Technology and Applications Consortium (WASTAC). WASTAC is a consortium of state and federal departments and universities whose main objectives are to maintain a reliable, comprehensive and accessible archive of NOAA-AVHRR, MODIS and SeaWiFS satellite data. In addition to Landgate, the partners include CSIRO, Bureau of Meteorology, Geoscience Australia, Curtin University of Technology, and Murdoch University.

Landgate also invests in research and development activities in space science. For example, Landgate made significant contributions to Project 4.1 (Automatic near real-time thematic mapping based on MODIS) of the Cooperative Research Centre for Spatial Information (CRC-SI), which has resulted in better atmospheric correction of satellite data.

Landgate's Firewatch program is identified as both a national and international leader in the provision of fire management related products. At the recently held International Earth Observing System (EOS)/NPOESS Preparatory Project (NPP) Direct Readout Meeting hosted by NASA at the Asian Institute of Technology of Thailand held in March 2008, the fire products and delivery systems developed as part of Landgate's Firewatch programme were second to none in the global community. In addition, Firewatch is being introduced into Indonesia and Vietnam to address forest fire and carbon management needs of those countries.

## **Expanding Australian Activity in Space Science**

Satellite Imagery is listed as a fundamental dataset under the regulations of the Western Australian Land Information Authority Act of 2006, because of its importance as a source of spatial information for Western Australia Government policy objectives in mineral exploration, agriculture, natural resource and emergency management. New spatial information products continue to be developed to address emerging needs, the opportunities of new sensors and new scientific insights.

Landgate does not process any data from an Australian owned satellite system. The three main sensors from which nearly all of Landgate's current product and service offering are derived are NOAA-AVHRR, MODIS, Landsat, (through purchase from the Geoscience Australia's Australian Centre of Remote Sensing in Canberra), and SPOT. The first three of these satellites are United States owned and operated. The fourth satellite is owned by a French company.

The dependence on foreign satellites to provide free data, like MODIS or NOAA-AVHRR, for important emergency management services such as Firewatch poses a risk. Landgate minimises this risk by also processing data from a Japanese weather satellite and a Chinese geostationary satellite. Landgate also expects to process data from a new Chinese polar-orbiting satellite when it is launched later this year. Only the latter, however, can be considered a true duplication as one of the sensors on the new Chinese satellite is similar to the MODIS sensor in terms of spectral, spatial and radiometric resolution.

In the area of moderate resolution satellites like Landsat, Landgate relies on the Australian Centre for Remote Sensing (ACRES) to facilitate access to data, although Landgate does provide input to assist ACRES in that process. Landgate also relies on external commercial providers for access to SPOT and other moderate and high resolution data.

### ***Benefits of increased activity***

The benefits to increased activity in space science can be summarised into

1. Ongoing certainty of data supply for more responsive emergency management, and improved environmental management. Other areas will benefit, as well, agriculture and weather forecasting through better management tools and more accurate weather forecasting and climate modeling.

2. Commercial opportunity for private industry if an Australian satellite was designed, built, and operated in government/private sector partnership. This could be through investment in capacity to research and manufacture sensor systems, communication bus systems, optics, etc.

3. Sustainable development of world class research and delivery capacity to problems facing Australia now and in the future.

4. Enhanced partnering opportunities with other nations that operate satellites, and increased profile of Australian space science internationally.

### ***Impediments to strengthening and expanding space sciences and industry in Australia***

Impediments that can be identified to strengthening and expanding space sciences in Australia include:

1. Australia does not have a national coordinating body for space science.
2. Effective engagement between the States and the Federal Government to deliver on priority areas (address difference in contributions between jurisdictions) to deliver world class outcomes with finite resources.
3. Sustainable funding model. Space science is a strategic investment, which needs funding beyond a one year or three year funding cycle or agreement.
4. A close connection between the likely agencies/companies that would be responsible for building a platform and the end users that will utilise the data from that platform to deliver world class outcomes.
5. Lack of sufficient capacity, particularly human capacity (e.g. scientists, engineers, physicists, technologists).

### ***Goals of strengthening and expansion of Australia's space capability in the private sector and across government***

1. Partnering with other nations with satellite programs to develop and gain access to new, world class technology, sensors and solutions for Australia.
2. Securing certainty of data continuity for high priority applications (eg. Emergency management, food security, climate and weather modeling).
3. Secure increased economic, environmental and social benefits from earth observation satellites.

## Acronyms

NOAA	National Oceanic and Atmospheric Administration
AVHRR	Advanced Very High Resolution Radiometer
MODIS	MODerate resolution Imaging Spectroradiometer
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Project
SPOT	French high resolution satellite
SeaWIFS	Sea-viewing Wide Field-of-view Sensor