National Collaborative Research Infrastructure Program

A new initiative for Australian Satellite Geodesy

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AuScope: Structure and Evolution of the Australian Continent.

AuScope has two components:

- National GeoTransects Program
  - Earth Imaging and structure
  - Earth composition and Evolution

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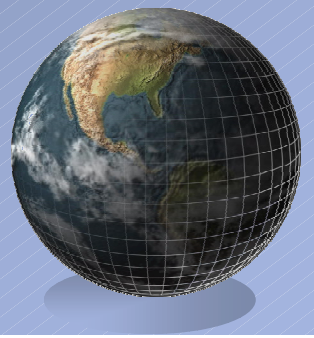
- National GeoTransects Program
  - Earth Imaging and structure
  - Earth composition and Evolution
- National Geospatial Reference Framework

Geospatial component

- Core research infrastructure to deliver a geodetic positioning capability of 1cm accuracy in real time and 1mm accuracy in post-event processing across the Australian region.

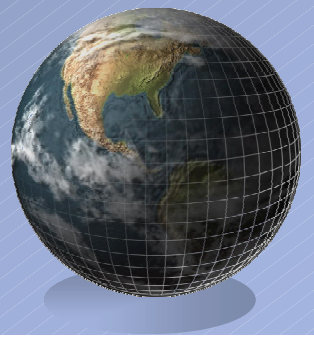


Geospatial component

- Core research infrastructure to deliver a geodetic positioning capability of 1cm accuracy in real time and 1mm accuracy in post-event processing across the Australian region.
- To provide a capability for crustal deformation and environmental monitoring that will underpin the GeoTransect program and to provide a coherent and national framework for geospatial applications.

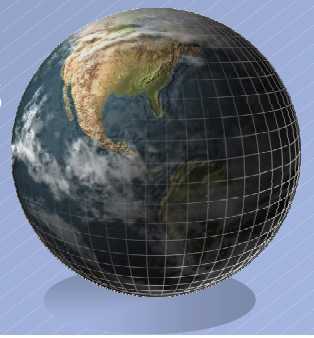
Process

- Iterative process for developing the program
- Collaborative program developed through intensive consultations between Universities, Government (Federal and State) agencies, and Industry.
- Program and funding levels approved in principle.
- Expect Ministerial announcement in early December



Elements of the proposal.

- It is an infrastructure proposal, not a research proposal.
- But the research and application areas that require the science and application goals have been identified.
- Expectation existing funding schemes (e.g. Australian Research Council) will provide the research funding for both the basic and strategic research.
- It is integrated within a larger Earth Science Framework.
- Recognition that while the goals may be largely regionally focused that there is a global context as well.



Geospatial components

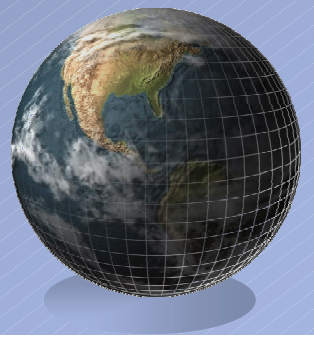
- Recognition of limitations of GPS for maintaining the long-term stability of the geodetic reference frame.
  - Hence need to underpin the proposal with VLBI and SLR to maintain orientation, scale and origin.
- Recognition of limitations of geodetic coverage in southern hemisphere.
  - Need to design the geospatial components so as to also contribute to the improvement of the global reference frame(s).

Core component of reference frame: VLBI

- To provide the high accuracy and long term stability for the reference frame, through an expanded VLBI project.
- To contribute to astronomical VLBI projects.
- New VLBI network will comprise:
  - New VLBI antennas:
    - to replace the aging system at Hobart,
    - new antenna at Yarragadee (Western Australia),
    - new antenna near Katherine (Northern Antenna), and
    - a possibility for upgrading the existing Ceduna (South Australia) telescope.

12 m antennas, initially S/X band with possibility of switching to broadband when it is demonstrated that this is effective for geodetic VLBI.

Development of software correlator for geodetic VLBI to permit near-real-time processing (based on work at RMIT).

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Core component of reference frame: SLR

- To provide the high accuracy and long term stability of the reference frame (mainly scale and origin).
- To contribute to global programs in satellite tracking.
- The SLR component will include:
  - Long-term commitment to the Mt Stromlo facility with an upgrade for routine tracking of GPS and other GNSS satellites.

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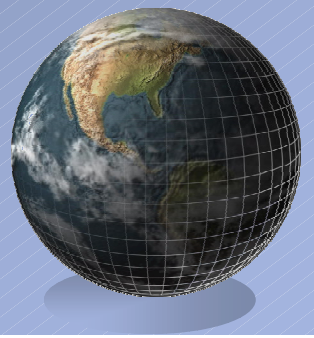

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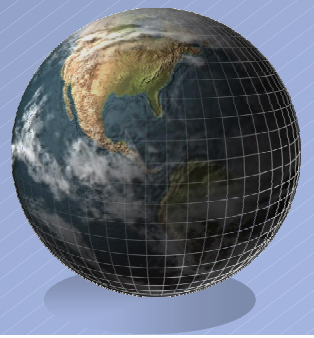
  - Examination of whether a third SLR laser site in northern Australia (colocated with VLBI near Katherine) is necessary in order to meet the long-term accuracy goals.

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Secondary SLR component.

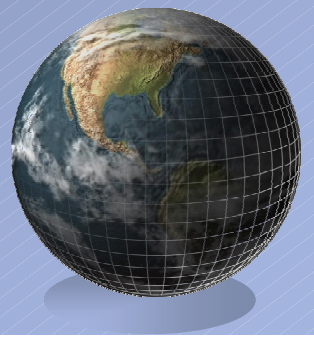
- Mobile laser ranging experiment, in cooperation with France, for Jason Altimeter calibration in 2007.
- A pilot study for a possible acquisition/development of a similar system for long-term use in the Australian region.

GPS

- An expanded and enhanced GNSS system (including Galileo and GLONAS capability) across the Australian region (including off-shore territories and Antarctica) meeting the highest geodetic requirements.
- Developed in collaboration with Federal and State Agencies to provide a seamless capability for real-time cm positioning.
- Initially will consist of about 45 new sites in addition to the current ARGN network, as part of basic network for strain monitoring along the selected geotransects, and at existing tide gauge sites.
- At end of 5 years will have expanded to a network of ~ 120 site across the continent providing real-time positioning information at cm accuracy.

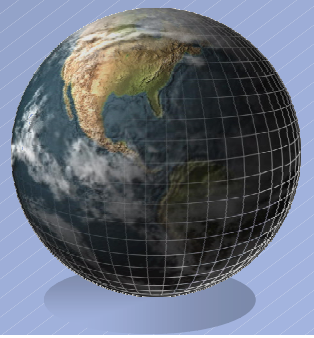
Gravity as part of establishing the reference frame

- For establishing the height system and for studies of the time dependence of gravity. It includes:
  - Absolute gravity
  - Relative gravity.



Back to SLR

- Working within an overall budget and what will be achieved at the end of the five years will depend on how well we can manage the aspirations of the competing interest groups and avoid cost blow outs.
- We have identified our own priorities within each geospatial component and between the geospatial components.
- For the SLR these are:



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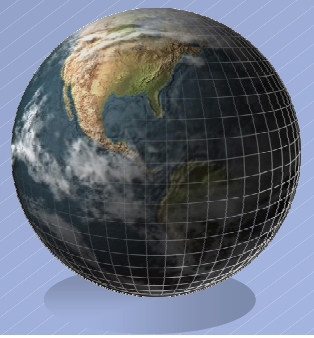

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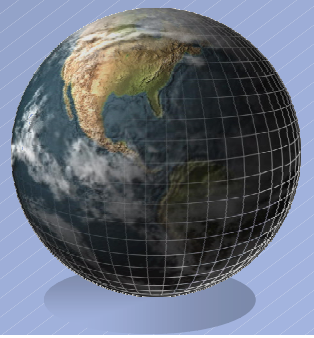

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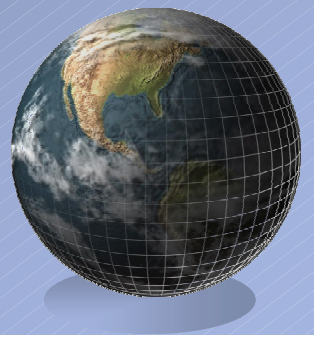

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- Examination of whether a third SLR laser site in northern Australia (colocated with VLBI near Katherine) is necessary in order to meet the long-term accuracy goals:
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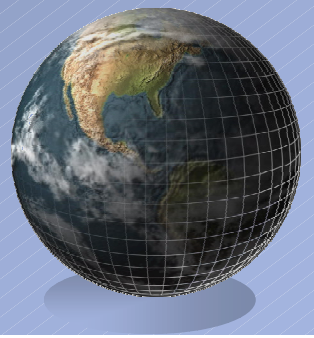

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Cost of construction and operation of laser station in remote area is high and will need good reasons!