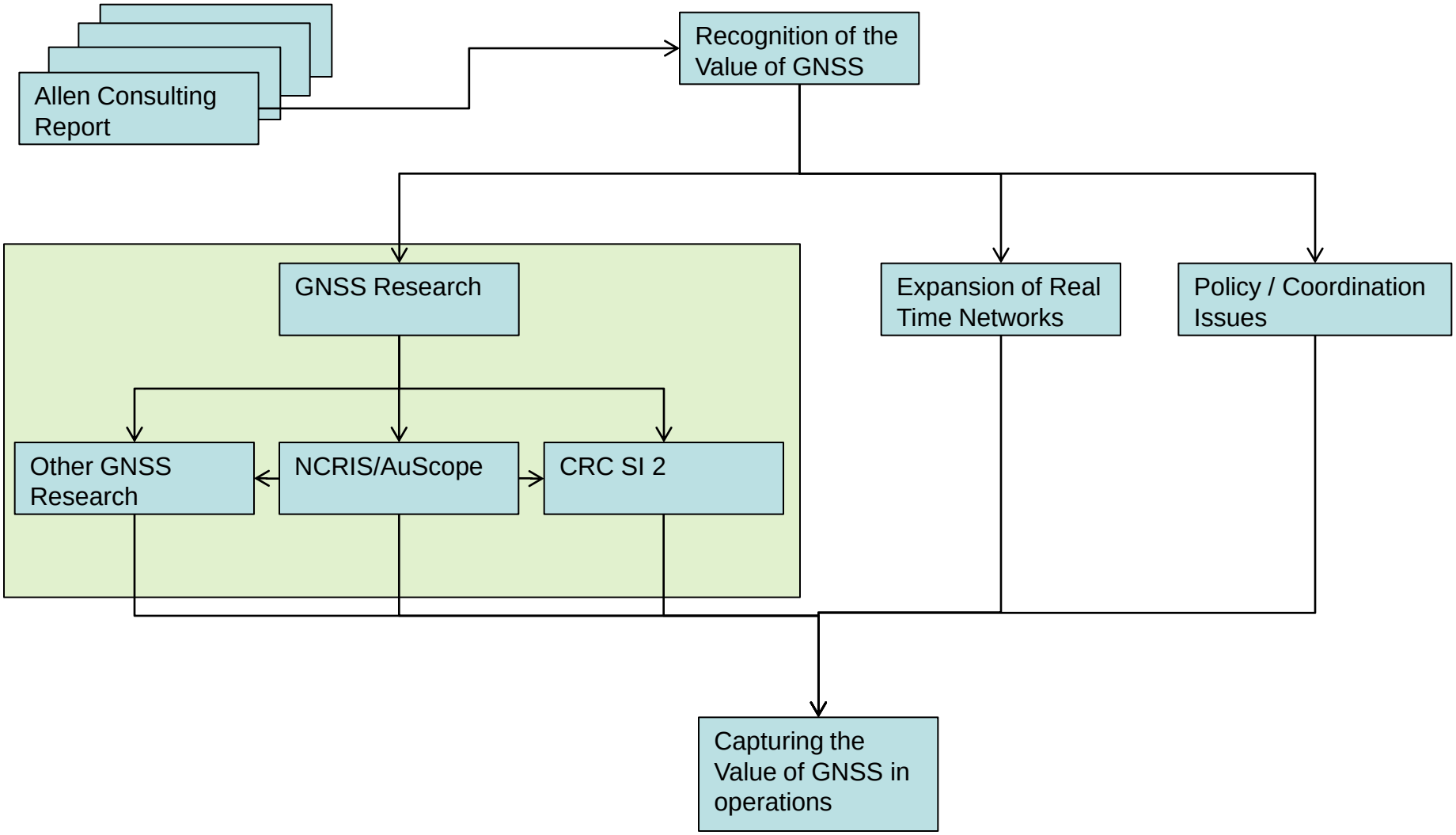
GNSS In Australia; An Overview

Peter Ramm

CGSIC

Savannah Sep 2009

Outline


Allen Consulting Report
Recognition of the Value of GNSS
GNSS Research
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NCRIS/AuScope
CRC SI 2
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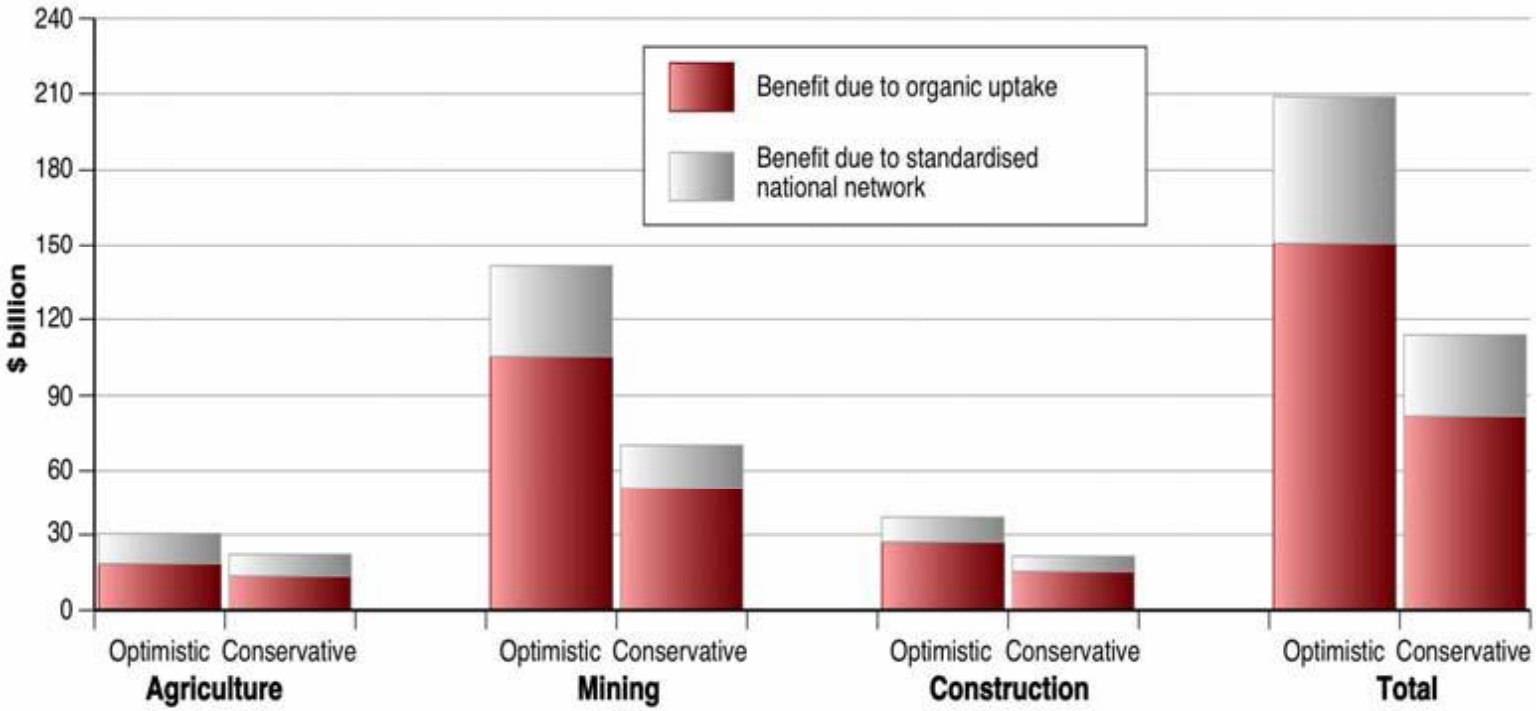
Policy / Coordination Issues
Capturing the Value of GNSS in operations

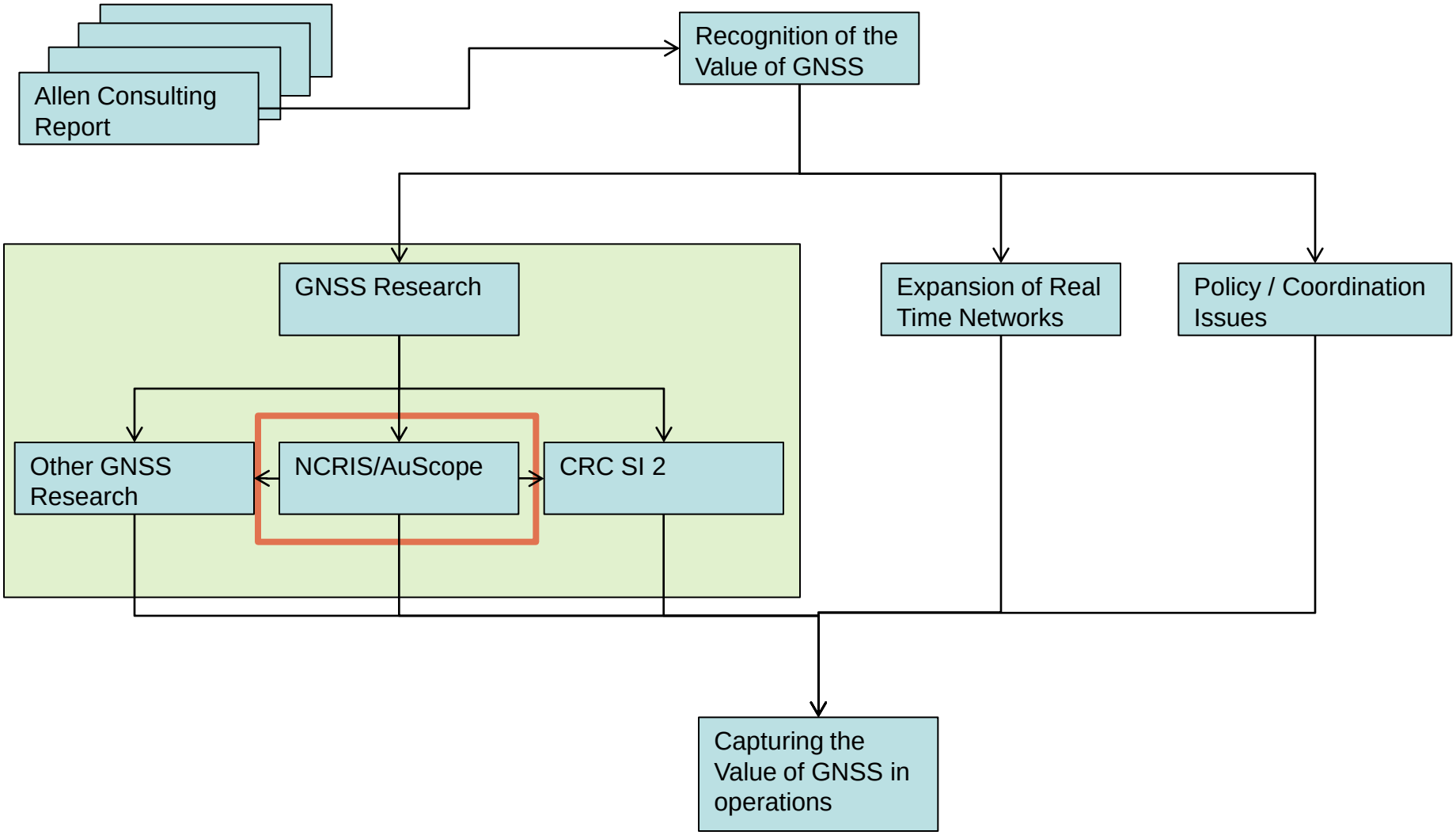
Benefits of Coordination



- Estimated total benefits $105-$192 billion NPV over 20 years.
- About 25% of the value due to a standardised net

Source 2008, Allen Consulting Group, *Economic Benefits of High Resolution Positioning Services*, http://www.crcsi.com.au/UPLOADS/PUBLICATIONS/PUBLICATION_348.pdf

Research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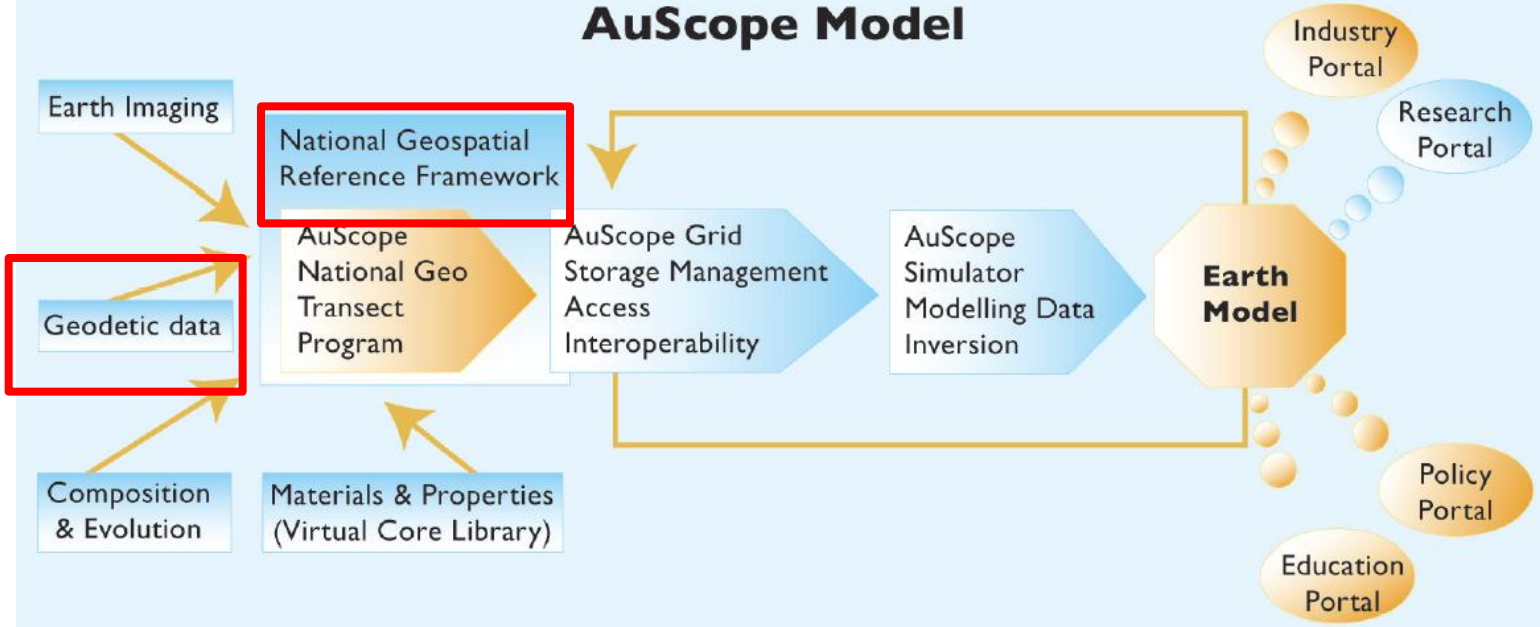
National Collaborative Research Infrastructure Strategy (NCRIS) Objectives

- Provide research infrastructure;
  - national, strategic, collaborative & world-class

One of the priority areas is

- Structure and evolution of the Australian continent
- Auscope is funded under “Structure and evolution of the Australian continent”
- $ 112m over 5 years

AuScope



http://www.auscope.org.au

Background AuScope Project Plan

- Operate a comprehensive national geodetic infrastructure at increased levels of accuracy and time resolution
- Generate a significant quantity of data that will be used to improve the accuracy of Australia's Coordinate Reference Frame

Geodetic Data Scope

- Very Long Baseline Interferometry
  - 2 new VLBI sites & a replacement Hobart.
- Satellite Laser Ranging
  - Upgrade of Mt Stromo
  - explore the use of mobile SLR
- Global Navigation Satellite Systems
  - 91 new stations
- New absolute and relative gravimeters

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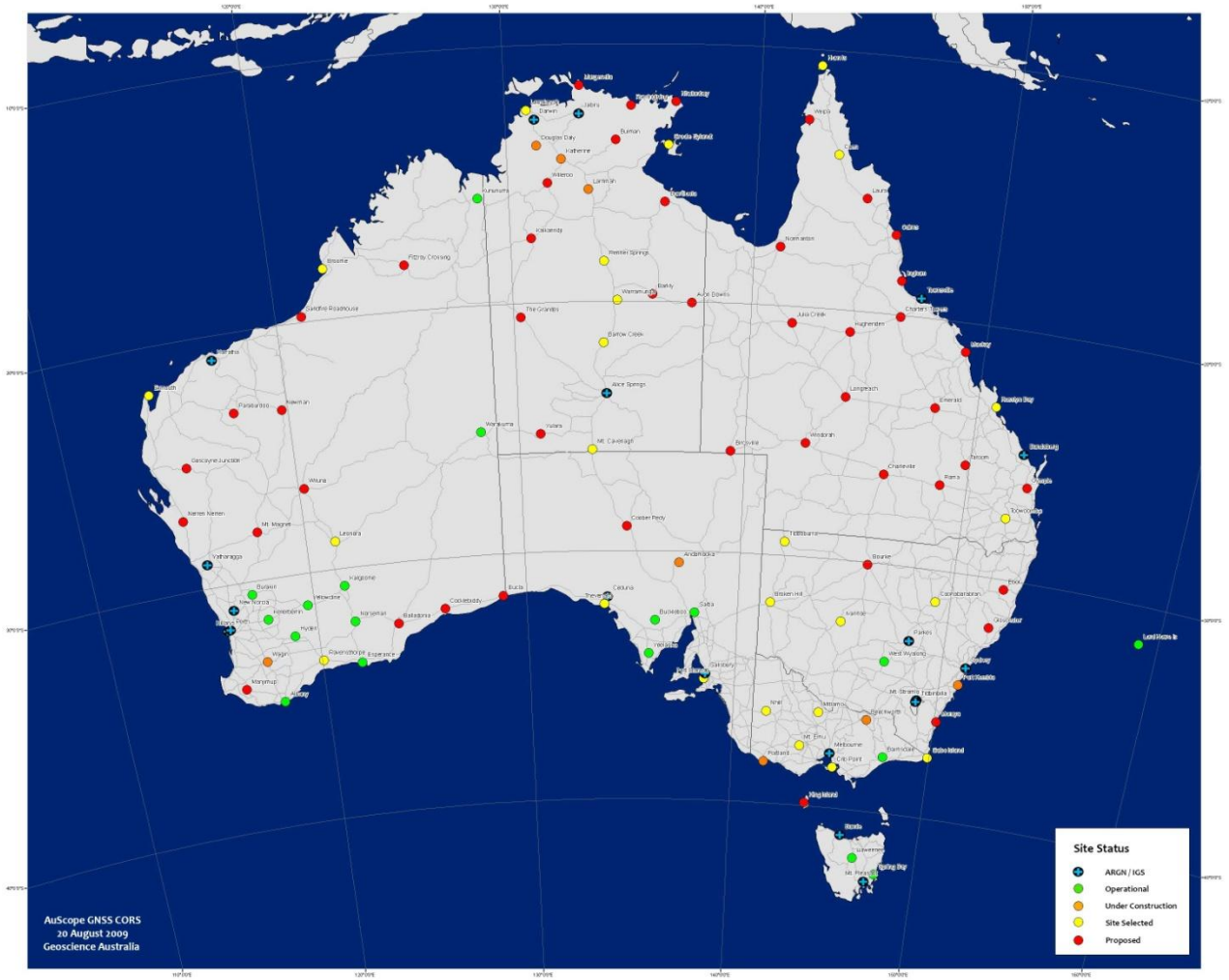
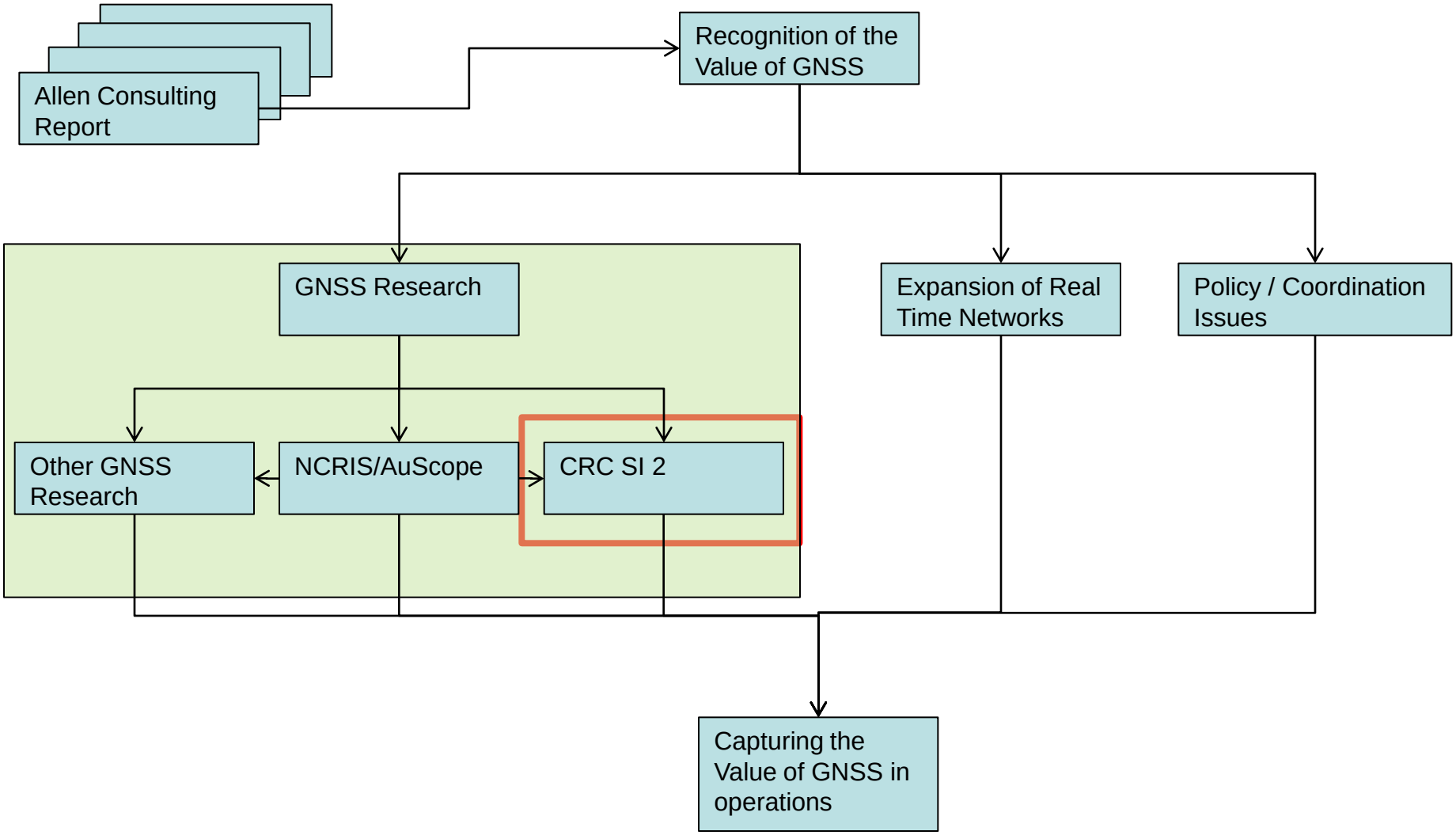
Status of AuScope GNSS Deployment



Research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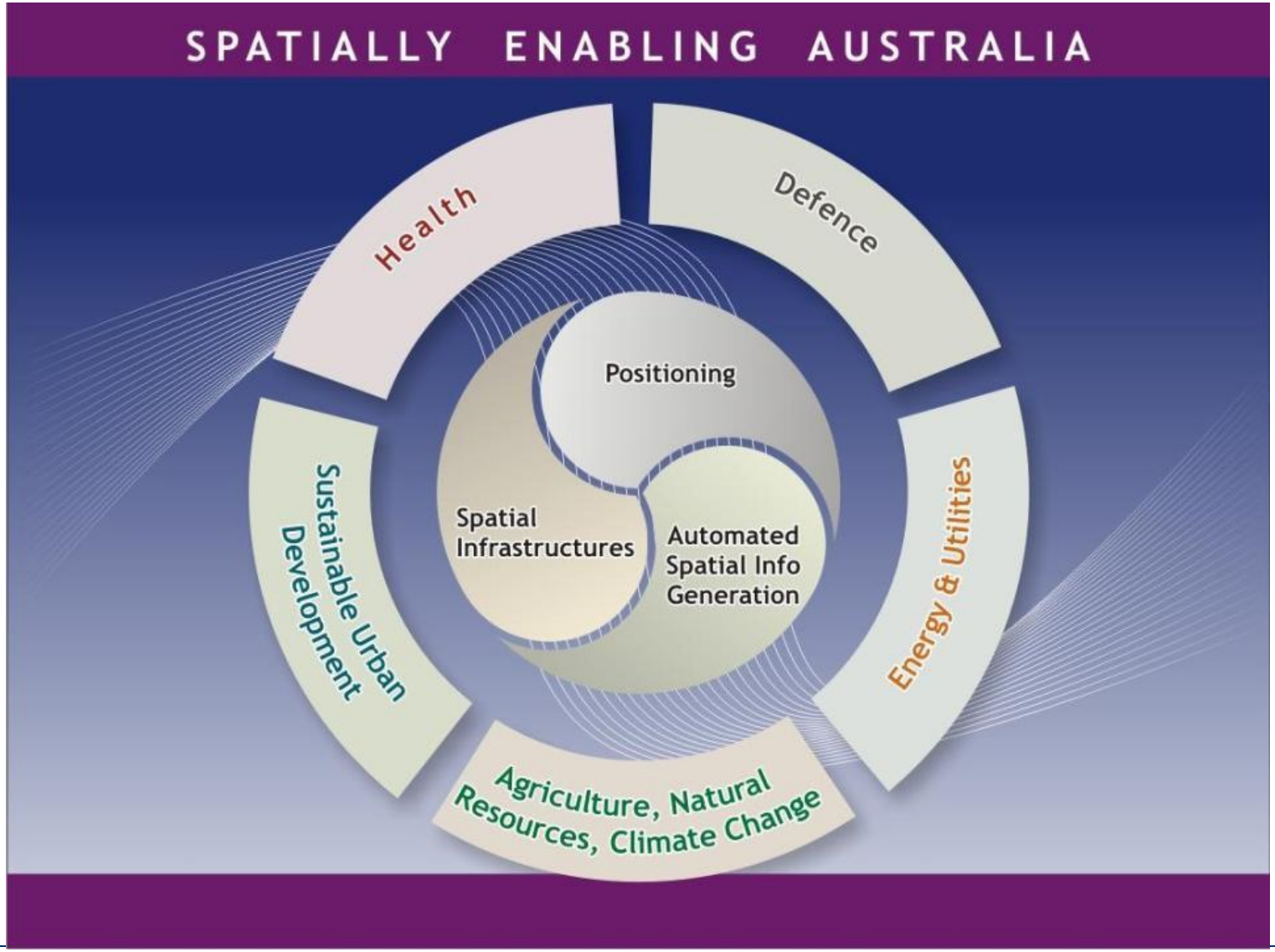
- CRCSI
  - Cooperative Research Centre for Spatial information
- CRCSI 1
  - $ 100 m,
  - Ran from 2003 to 2009
  - addressed the needs of the spatial information industry

CRCSI 2

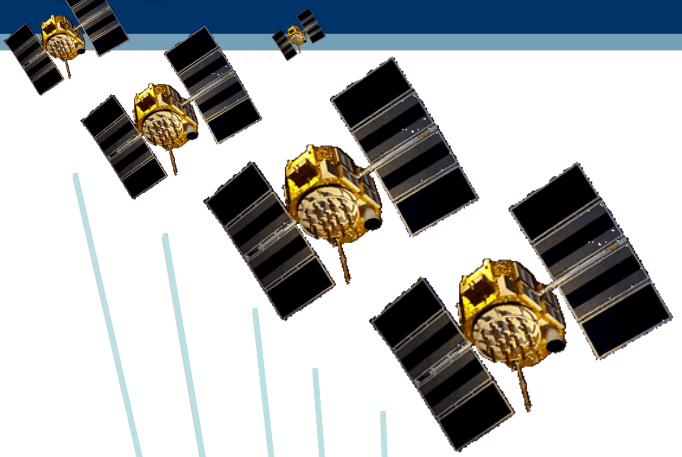
- CRCSI 2 just been announced
  - spatially enabling end-user industries
  - Eight-year joint venture
  - Total budget of $180 million
  - Links 100+ organisations from government, the private sector & universities.
- Positioning a major focus

CRC SI 2 Satellite Positioning



Source 2009, CRCSI -2

Program 1 Positioning



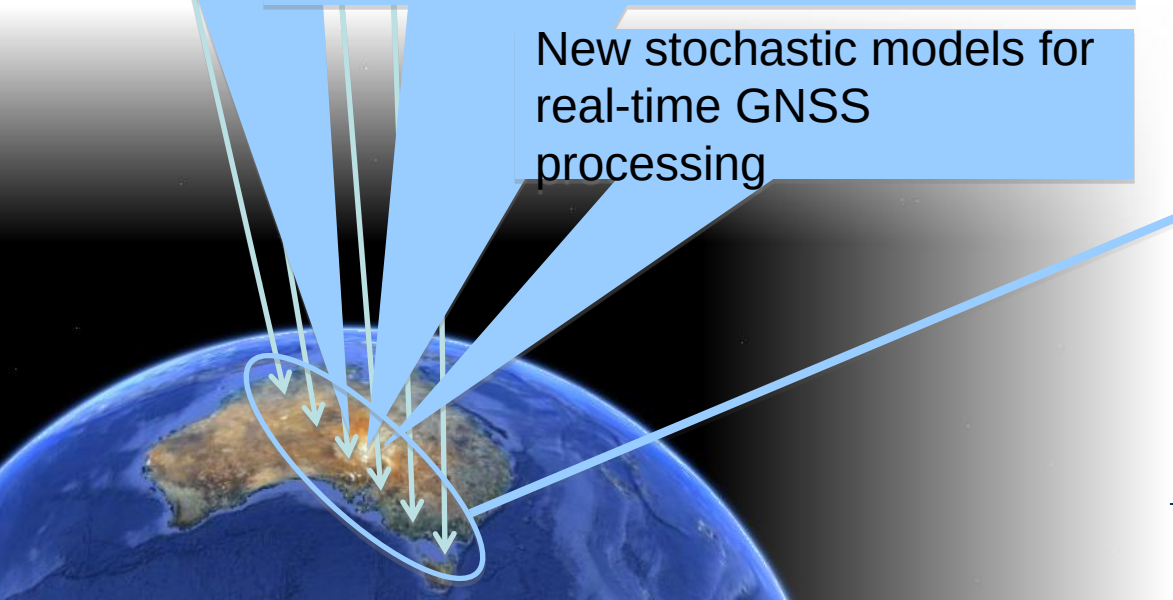
Research challenges

Integer inference theory

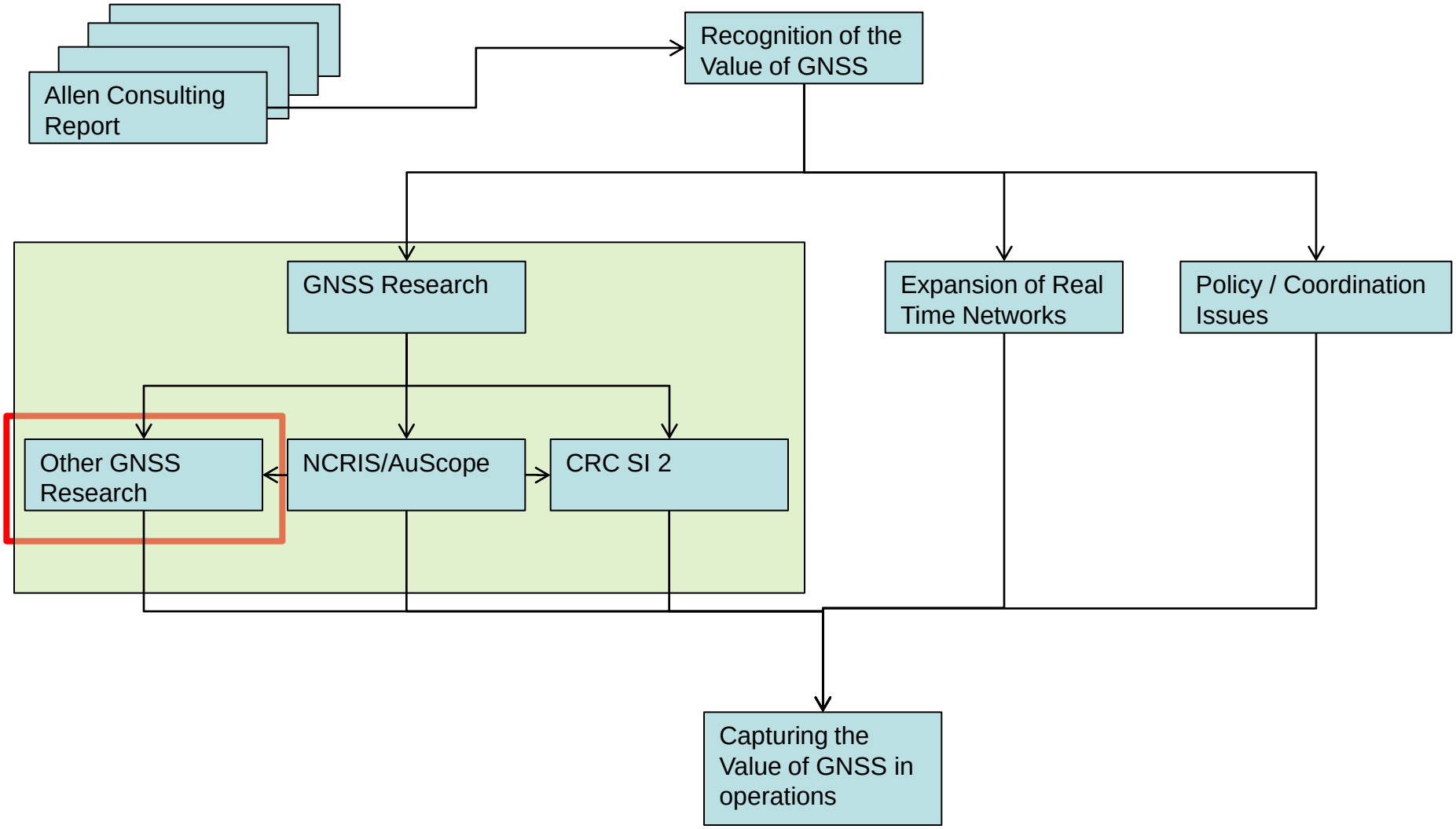
Ionospheric & tropospheric modelling

New stochastic models for real-time GNSS processing

Real time positioning for users



Research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- CORS Networks
  - Quality Control
  - Atmospheric Modeling
  - Performance Benchmarking
  - Weather Forecasting
- Sensor Fusion
  - Integration Algorithms
  - Ubiquitous Positioning Sensors and Algorithms
  - Stochastic Modeling
- Wireless Sensor Networks
  - Localisation
  - Data Quality
  - Data Integration
- Deformation Monitoring
  - Structural monitoring in obscured environments

Summary of Australian Research Activity

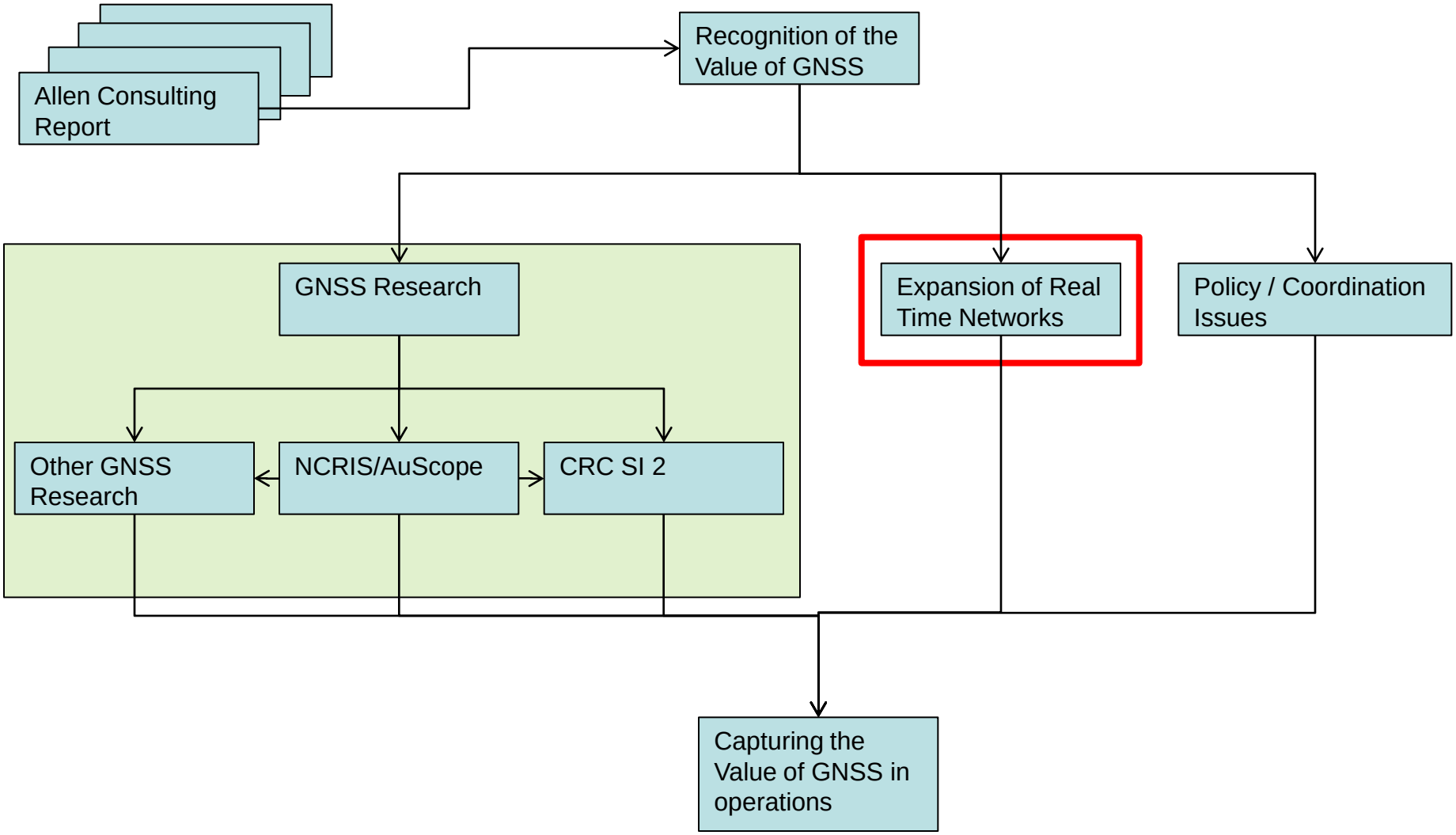
Satellite Navigation and Positioning (SNAP); UNSW

- CORS & GNSS Algorithms
- InSAR/DinSAR & Deformation Monitoring
- Multi-sensor Integration Algorithms & Applications
- New Positioning Technologies and Applications
- GNSS Receiver Design &Signal Processing

The Western Australian Centre Geodesy; Curtain University of Technology

- Core research areas gravity field determination, precise satellite positioning, and deformation monitoring

Expansion of GNSS Networks



National Overview

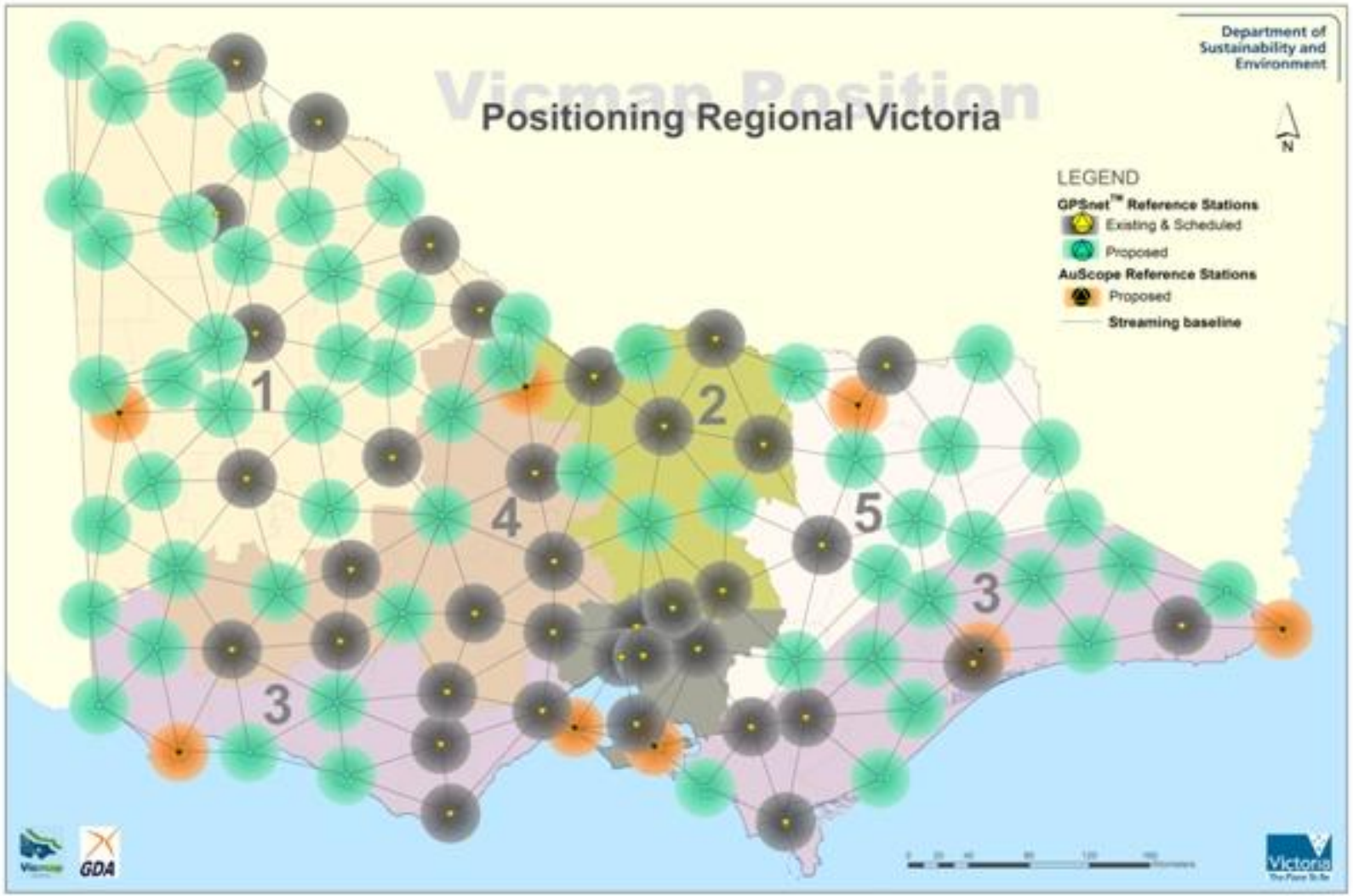
State	Now	by About 2012
ACT	0	0
NSW	21	71
NT	5	26
QLD	7	20
SA	0	7
TAS	2	2
VIC	39	104
WA	16	26
National	25	
Total	115	256

- The next few years will see an accelerated investment in GNSS networks
- Driven by
  - Business needs for efficient positioning infrastructure
  - AuScope Research infrastructure

Positioning Regional Victoria

- $6.9 million to extend existing NRTK service state-wide over 3 years
  - Additional 57 Stations
  - Duplicated backend
  - Supported by Department of Innovation, Industry and Regional Development

State; Victoria, PRV

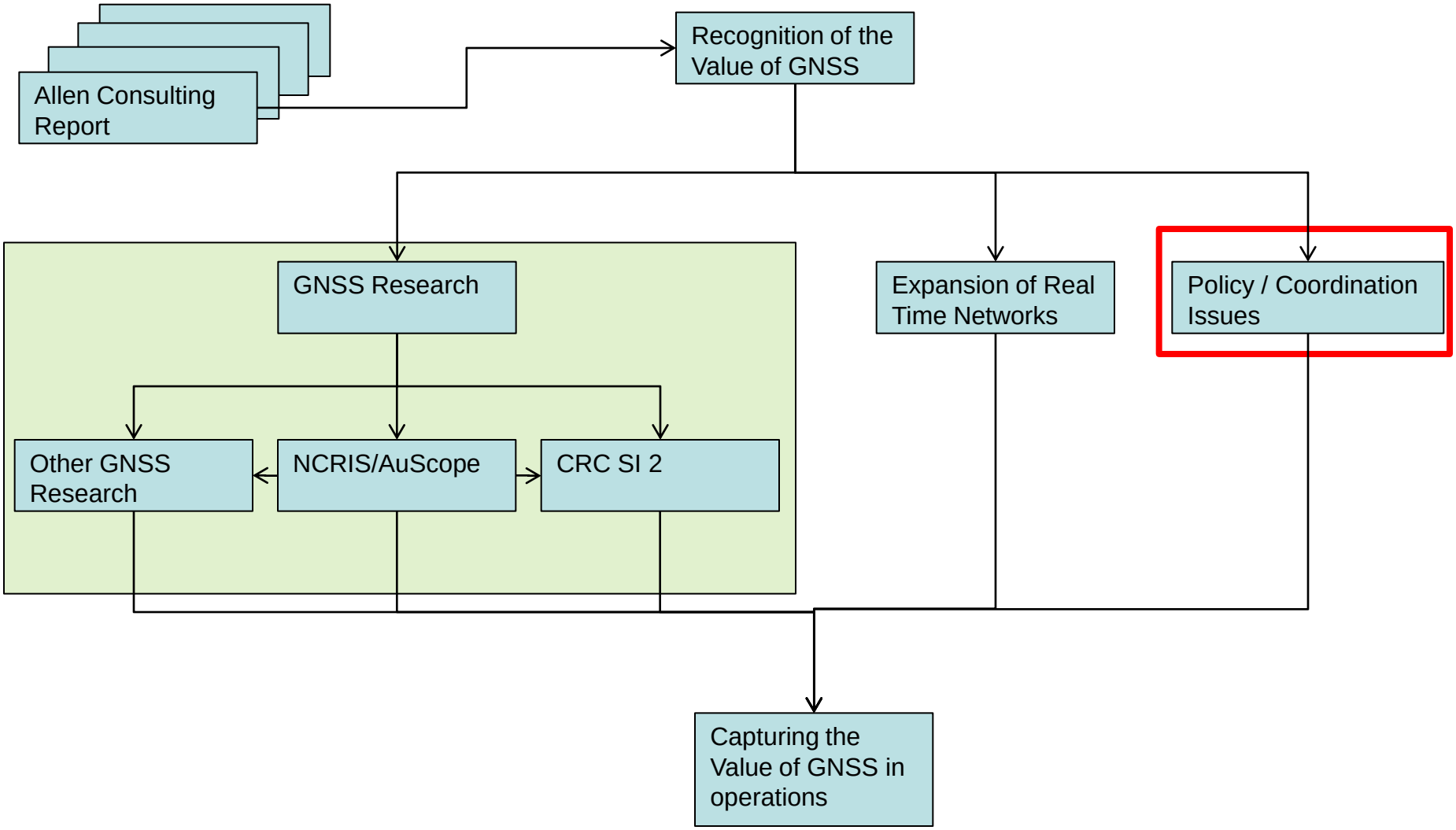


NSW

	Existing	Proposed	Total
AuScope	3	6	9
NSW Net	23	39	62

http://corsnet.lands.nsw.gov.au/gsp/images/CORS_A4_july09_xm.jpg

Policy / Cordination Issues



- Positioning now covers a wide range of technologies
  - The technologies are either mature, or maturing
  - What is currently lacking is a policy framework to allow their best use
- The Policy aims to provide a unified framework for the determination and use of positioning and location information

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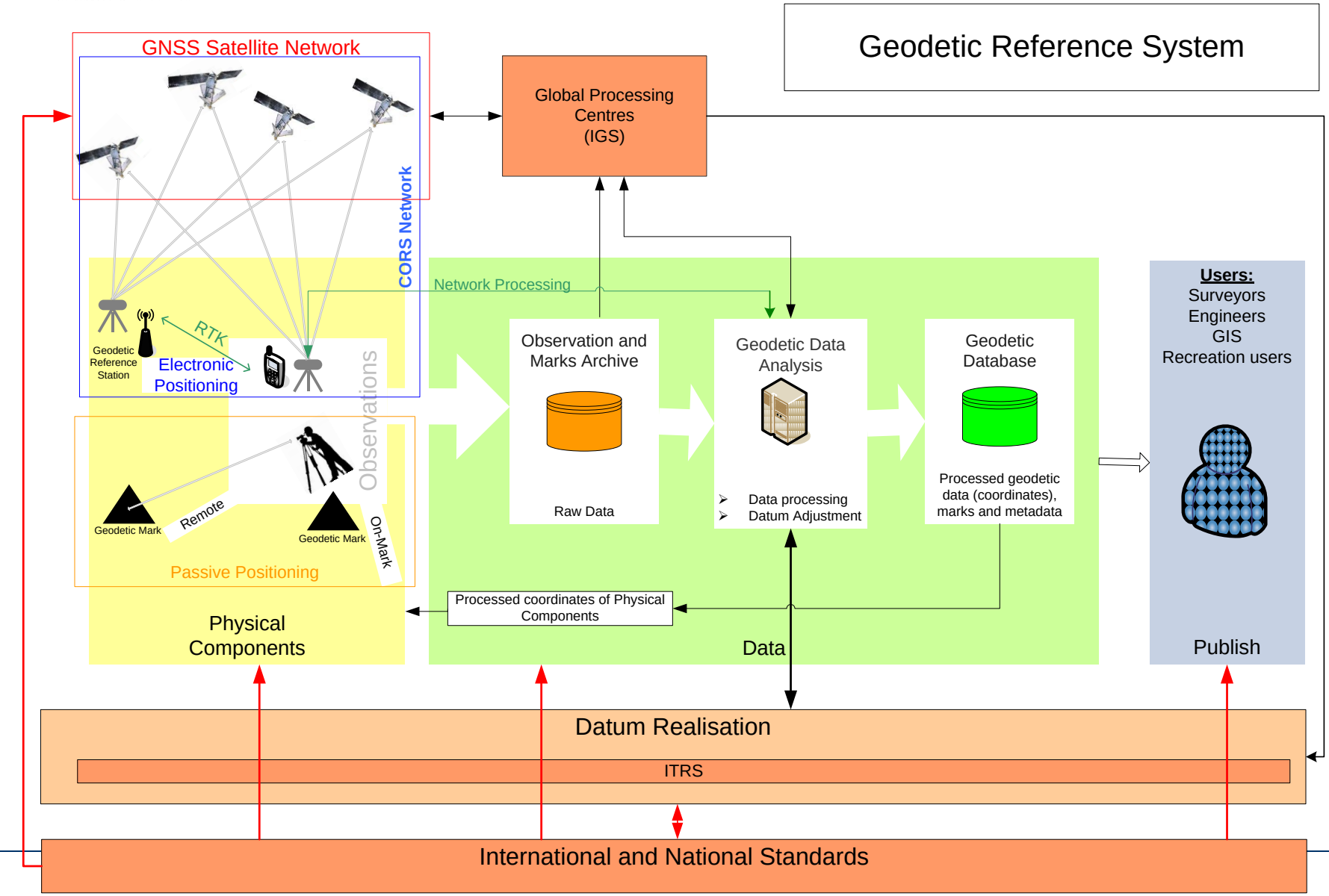
Intergovernmental Committee on Surveying and Mapping (ICSM)



ICSM GTSC work Program

- National Geodetic Datum
- eGeodesy (XML for Geodetic information)
- National Geodetic GNSS Observation Archive
- Integration of Geodetic Datasets
- Unification of CORS
- AuScope
- Legal Traceability of Position for Surveying
- National Adjustments (Dynanet)
- Geodetic Standards (SP1)
- Height Modernisation / AusGeoid09
- Geodetic Component of Sea Level monitoring
- Monitoring the impact of positioning technology and infrastructure

Issues

- Numbers of Satellites
  - 24 no longer enough
    - Precise / real time positioning
    - Aviation

Summary

Australia is embarking on a major investment in positioning.

- CORS networks will double in size by 2012
- Major research focus
- The Allen Consulting report encapsulates many of the drivers for this change
- The satellites need to be there.

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