What are the social, technical, environmental and economic benefits and opportunities of accessing and sharing geodetic data?

Graeme Blick

Group Manager Positioning and Resilience

Land Information New Zealand

What do we aim to achieve

This presentation will look at building the why case for exchanging/sharing geodetic data based on New Zealand experience and will include:

- historical perspective
- “benefits/opportunities” for all sectors and the region
- a focus on - disaster risk reduction applications
- “community” responsibility to contributing data
- potential products / services
- noting also this is a pathway for a modernised GGRF and capacity development

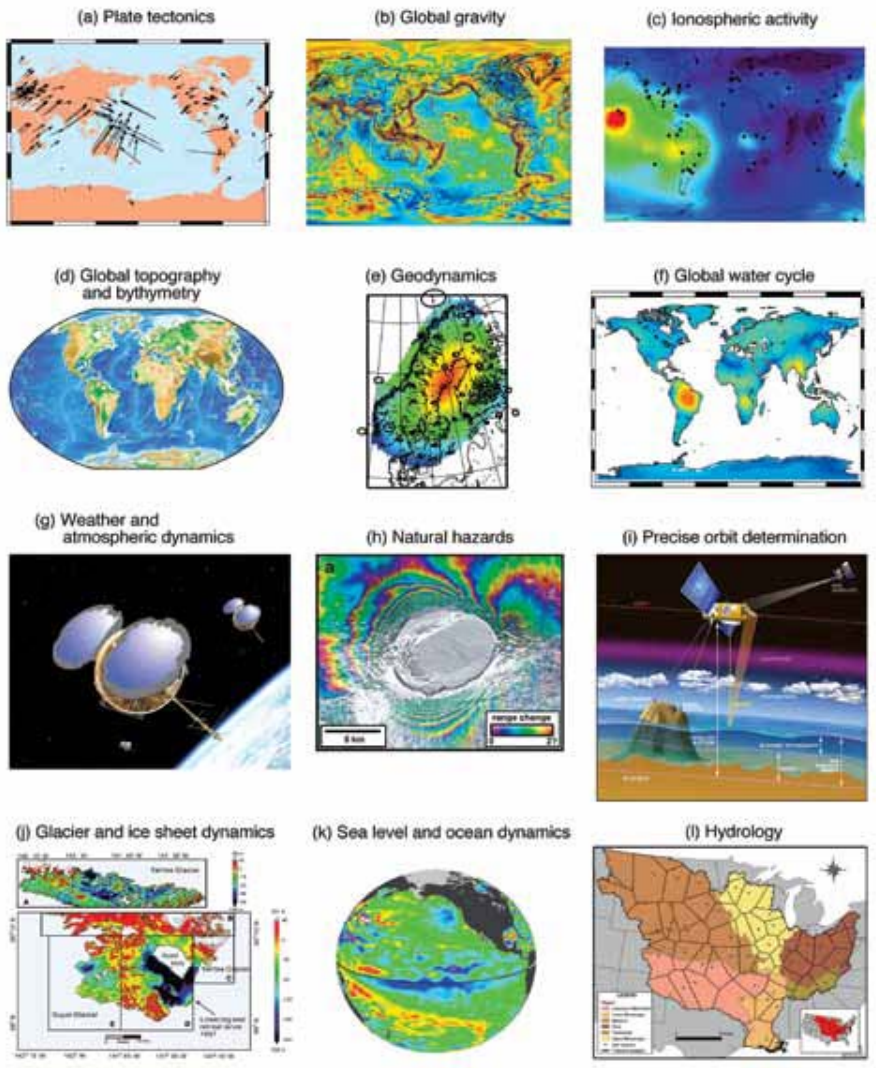
The Science of Geodesy

Geodetic measurements were made over 2000 years ago when Eratosthenes established the spheroidal shape and size of Earth

Geodesy has grown into the science of observing and understanding Earth's time-varying shape, gravity field, and rotation.

Modern geodesy targets the study of processes as diverse as deformation of Earth's surface, redistribution of mass within and on the surface of the solid Earth, and changes in sea level.

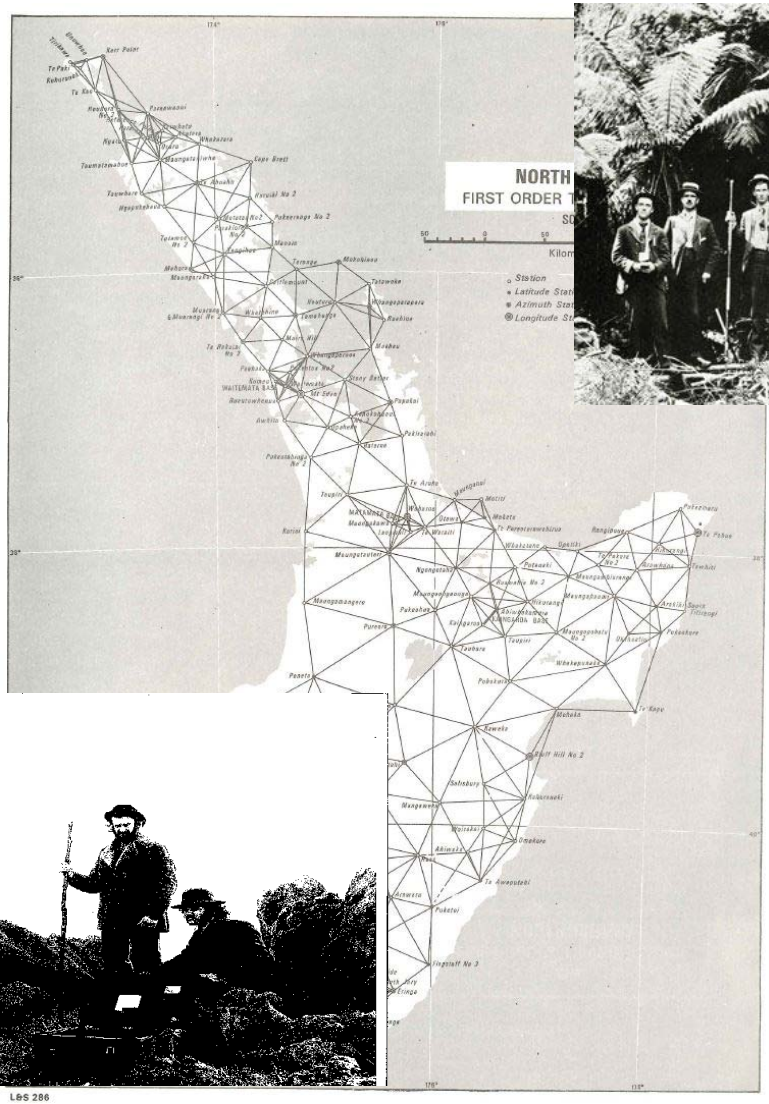
It provides the spatial framework that underpins positioning, navigation and timing.



Historical Perspective

The Geodetic System Provided a local datum (national framework)

- The basis for national mapping
- The basis for land development (cadastre)
- Sharing data was not so much of an issue



In the 50s

Geodesy contributed to and understanding of the dynamics of our world

Professor Harold Wellman

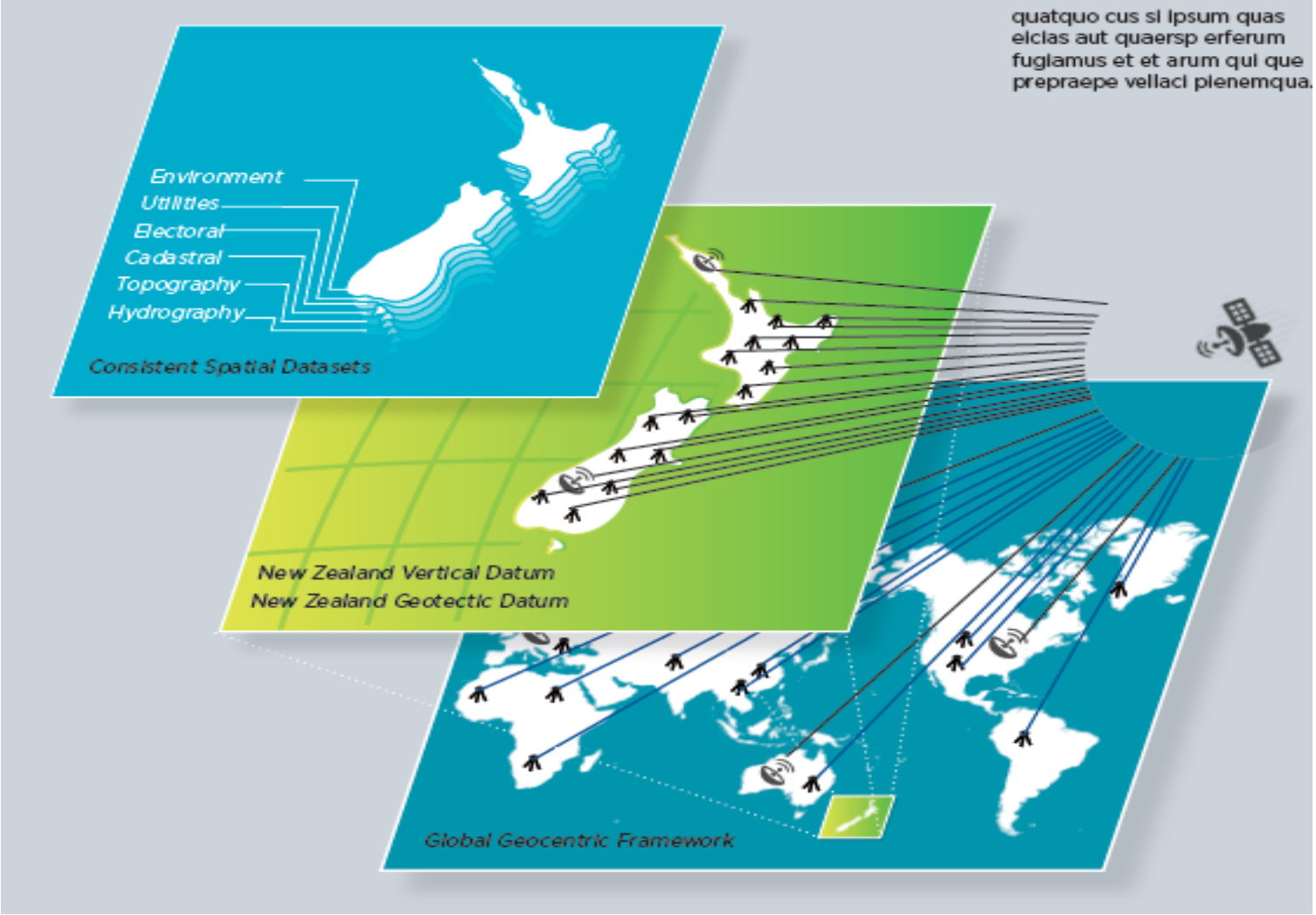
In the 80s and 90s the emergence of GNSS

The world is moving to four global systems:

- USA: GPS
- Russia: GLONASS
- China: BeiDou
- Europe: Galileo

Plus, there are at least two regional satellite systems: Japan and India.

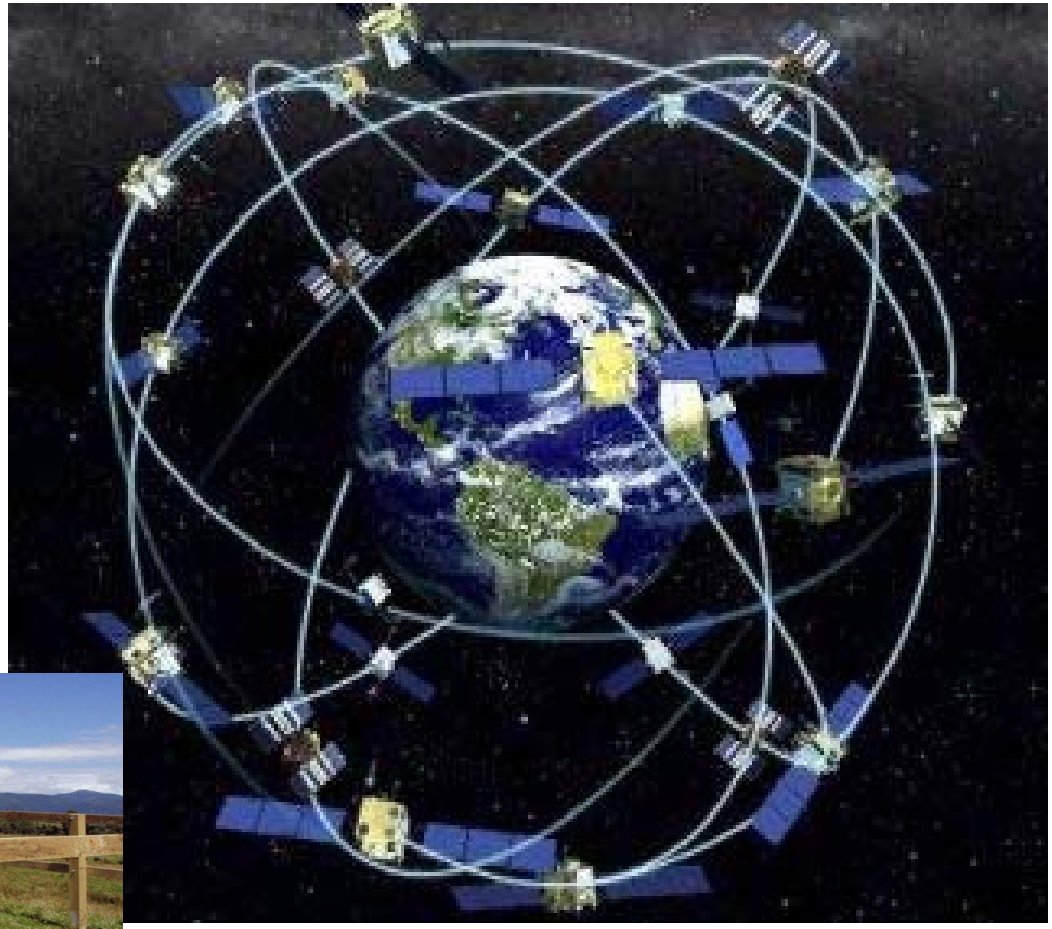
Position gives the context to ‘Where’



The greatest example of open and free data

We get all of this for free

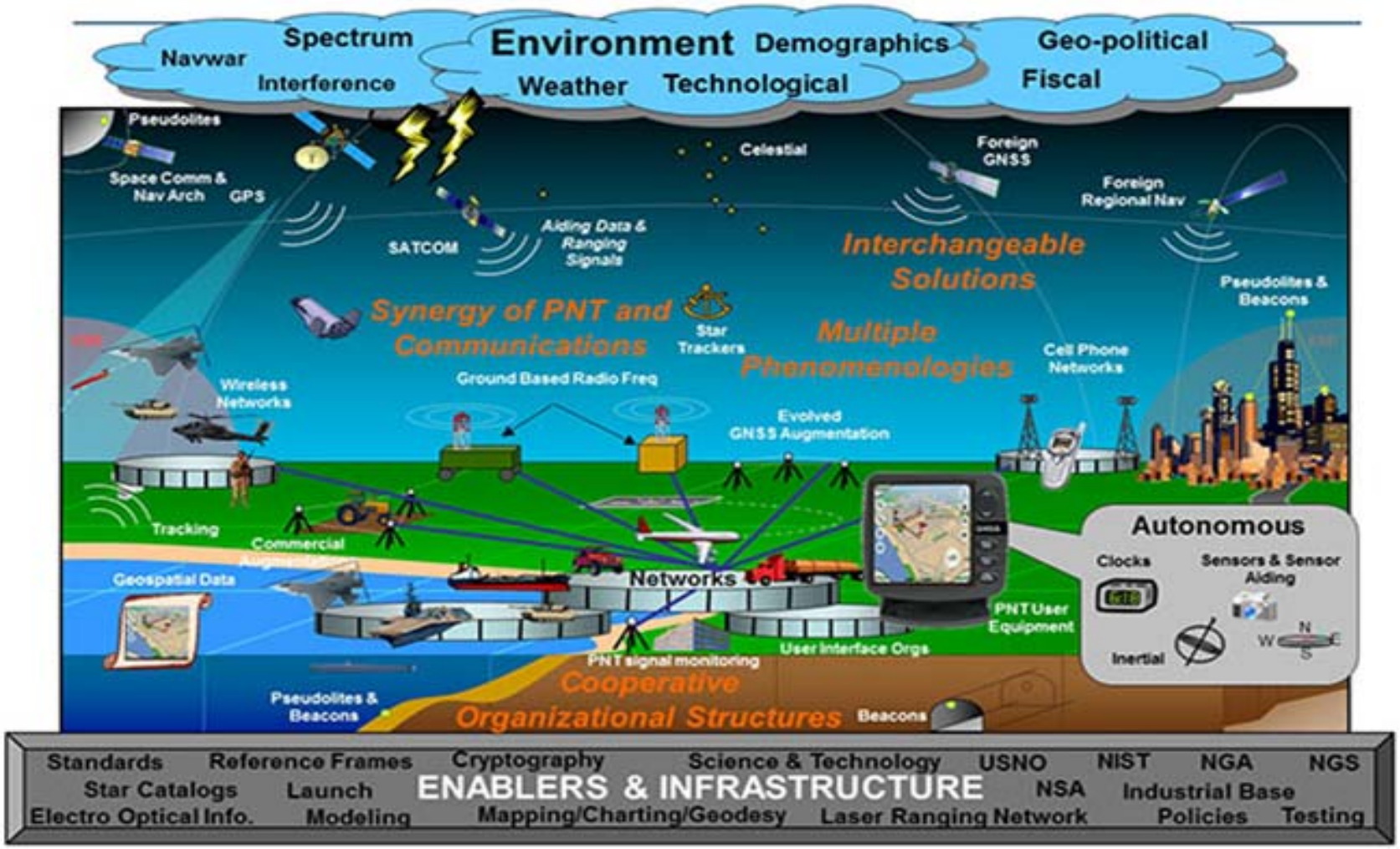
- The uses of GNSS goes way beyond what we could have ever foreseen
- Many innovative uses



In utilising this technology we must contribute to it

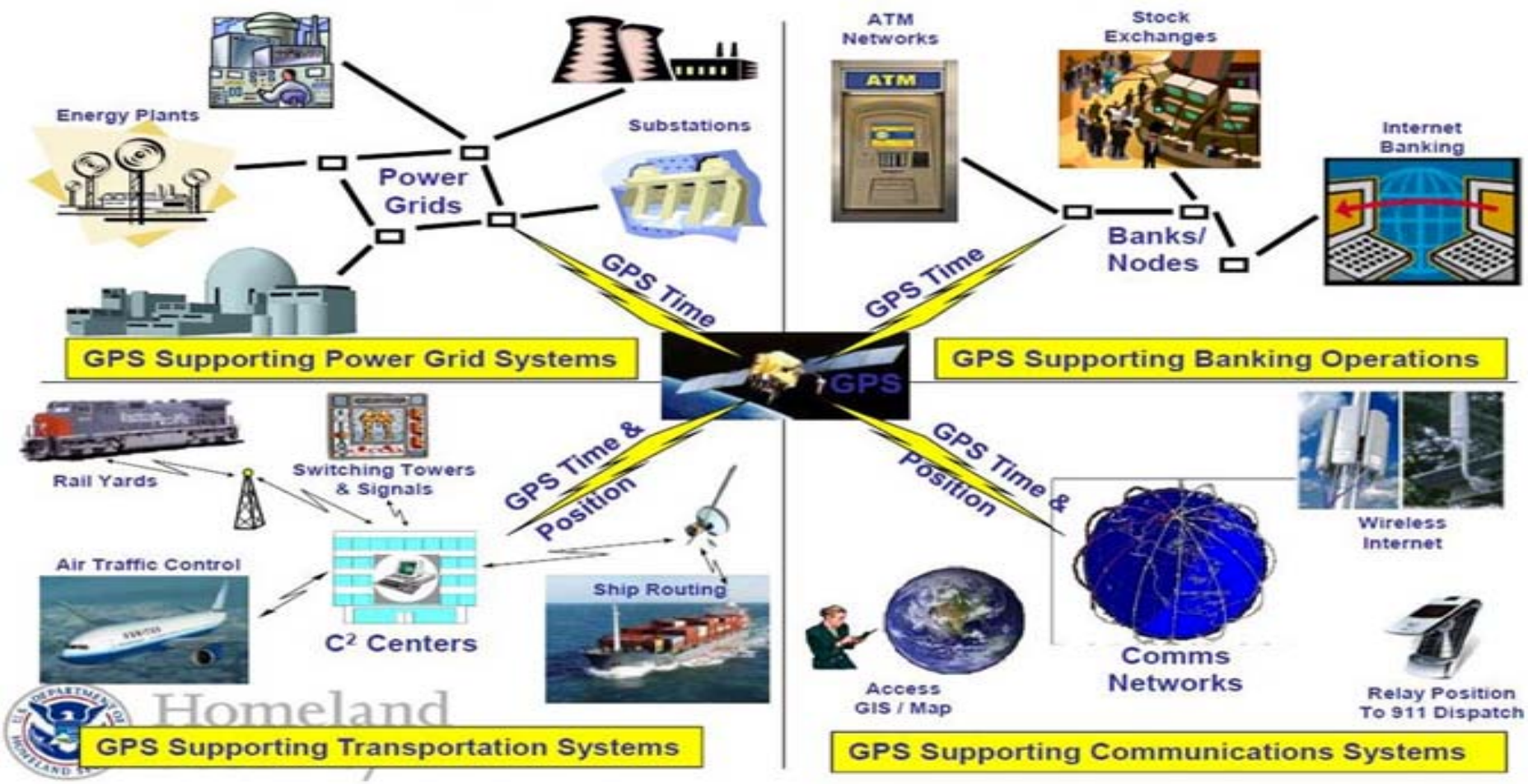
- Providing information to refine the reference frame

Positioning, Navigation and Timing

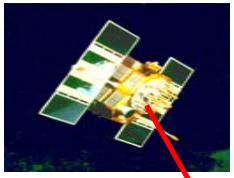


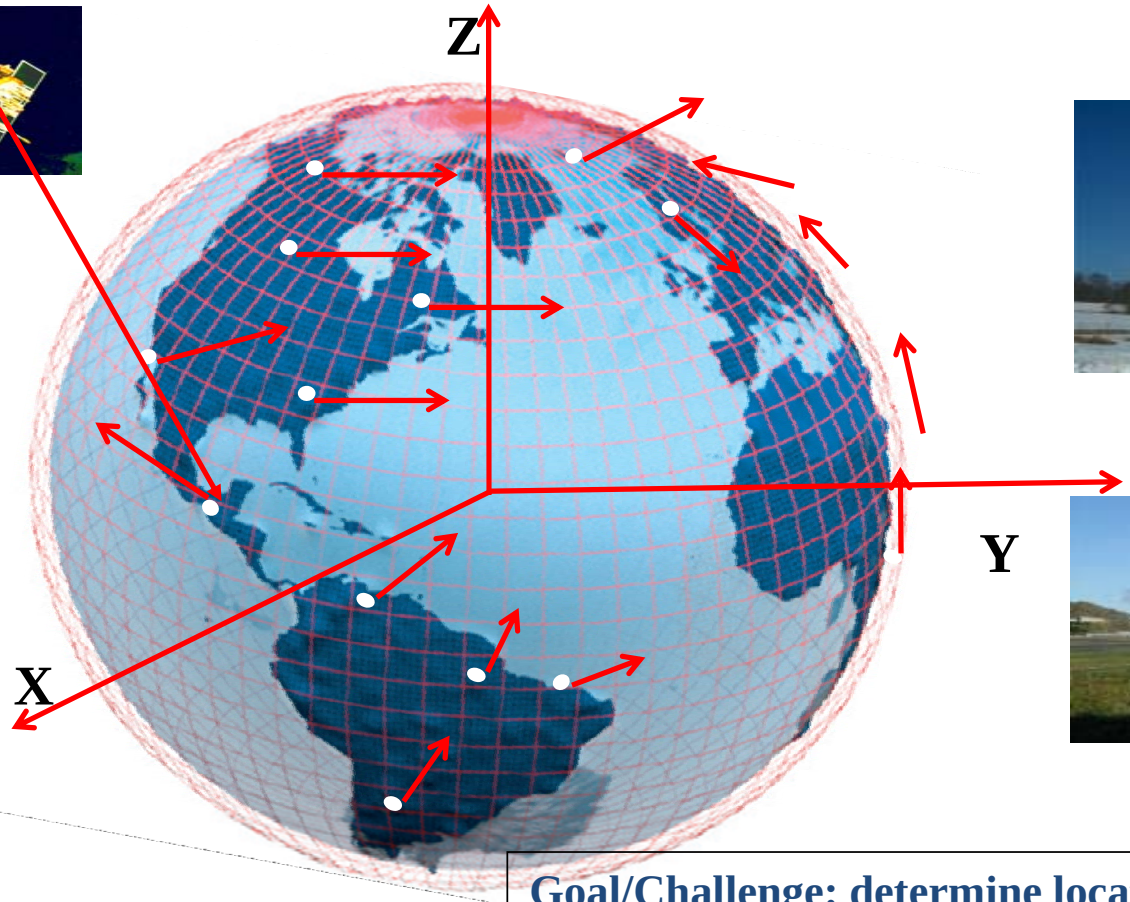
US Department Of Transport

GNSS dependencies continues to grow



Only possible through the provision of an accurate GGRF





Observing instruments

VLBI

SLR

GNSS

DORIS

Goal/Challenge: determine locations & deformations with an improved precision, everywhere & anytime to satisfy societal and science requirements

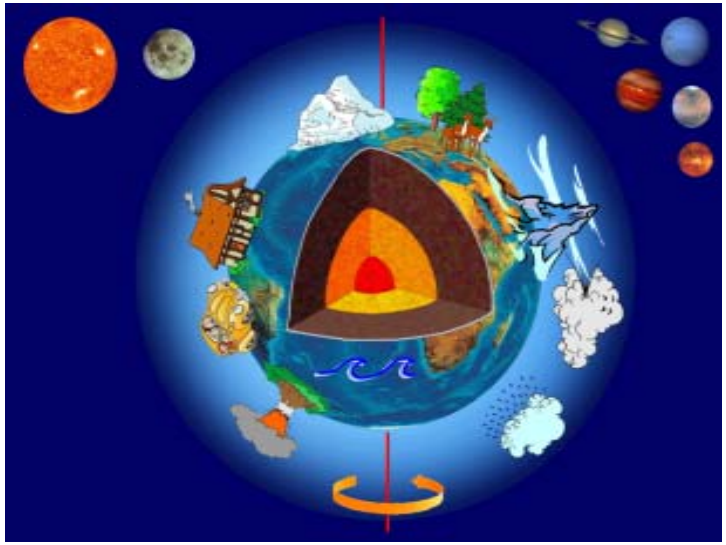
Milton Saunders, National Land Agency, Jamaica

Opportunities in the broader sense

In October 2009, 76 scientists met near Salt Lake City to discuss the future of geodesy.

That workshop, *Long-Range Science Goals for Geodesy*, identified the following grand scientific challenges over the next decade:

- Will humanity have enough water to sustain itself?
- How will Earth change as sea level rises?
- How do Earth's glaciers and ice sheets change on timescales of months to decades to centuries?
- How do tectonic plates deform?
- What physical processes control earthquakes?
- How does Earth's surface evolve?
- What are the mechanics of magmatic systems?



Where is the Water?

Where is the Water? focuses on the distribution of water in the Earth system, in oceans, glaciers and great ice sheets, in the atmosphere, and on continents.

- Will the global population have enough water to sustain itself?
- How will Earth change as sea level rises?
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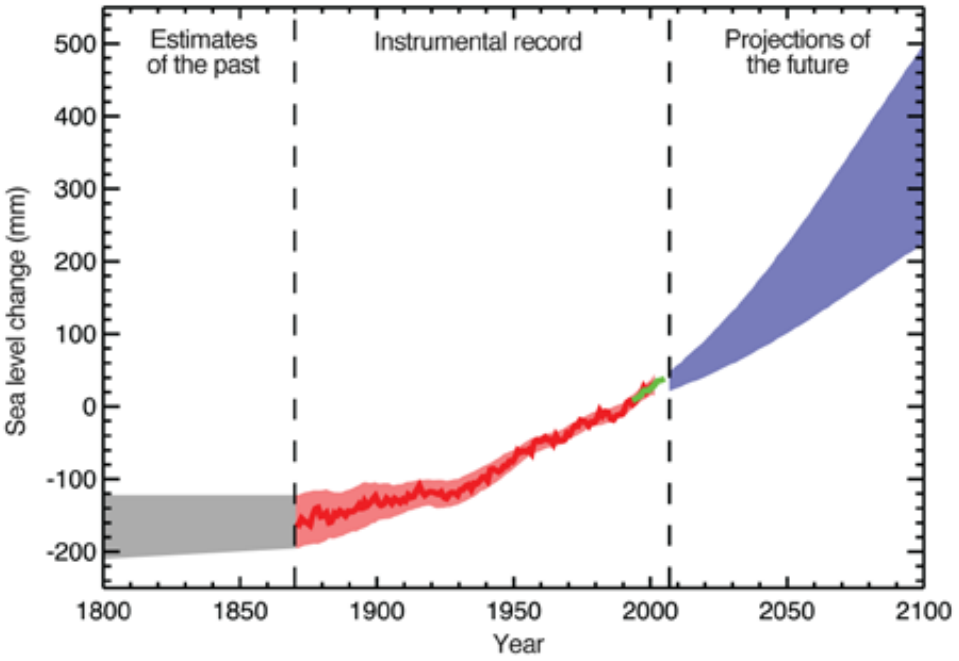

Figure FAQ 5.1 of S. Solomon et al. (2007), Technical Summary, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by S. Solomon et al., Cambridge University Press, 996 pp.

Earth the Machine

Earth the Machine is concerned with the dynamics of solid-Earth systems.

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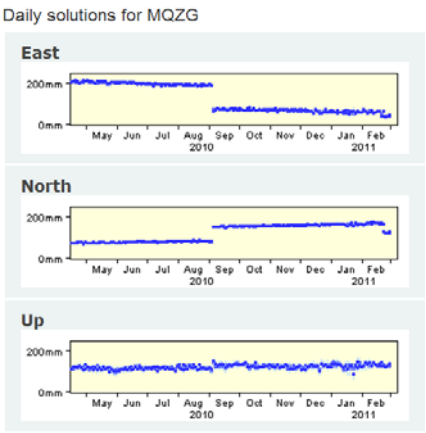
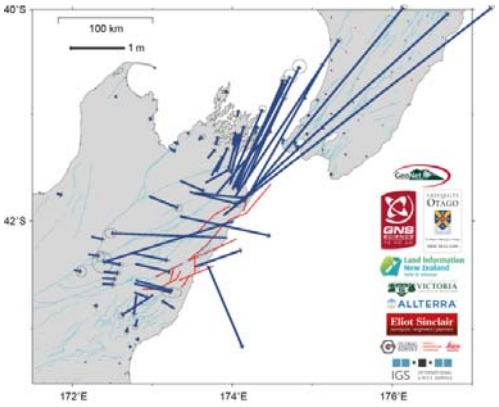
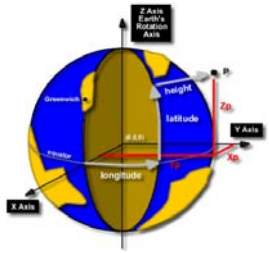




In the Public Interest: Societal Benefits

Geodesy benefit society as a whole.

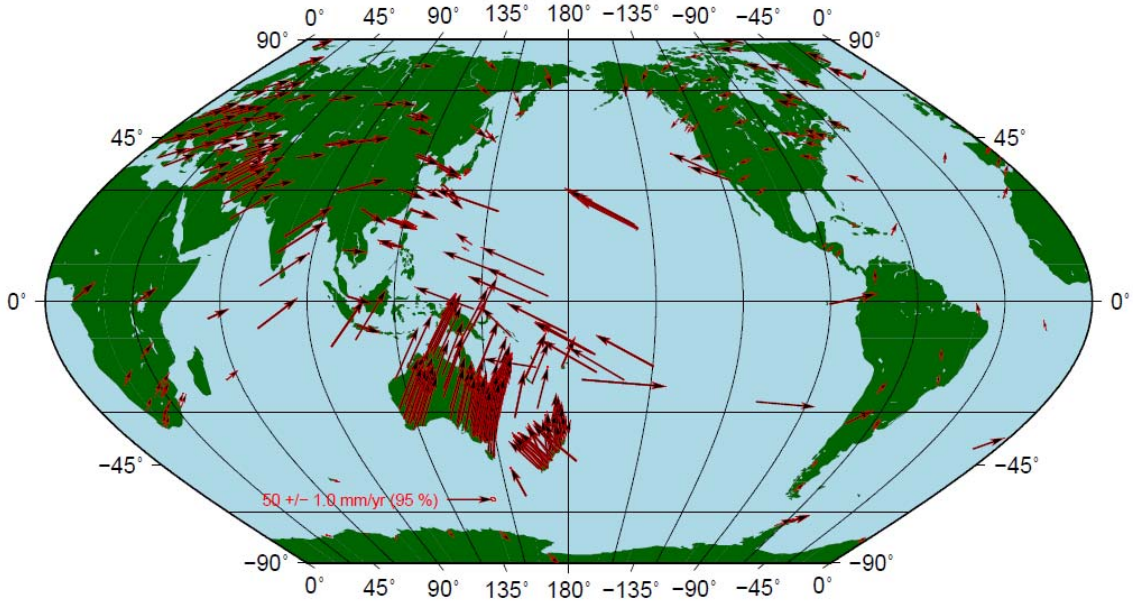
- improvement of geodetic methods and accuracy leads to a host of benefits to society in non-scientific realms such as commercial and civic planning.
- Early warning for natural hazards – tsunami, earthquakes and volcanic eruption
- Rapid recovery from natural events



The Global View

Modern geodesy requires multiple global observing networks, and that the infrastructure that geodesists have established for global coordination of geodetic data acquisition and analysis has been crucial for achieving the accuracy required for many applications.

Open data is key to this.



Asia Pacific Reference Frame

Recommendations

The key recommendations from the workshop, *Long-Range Science Goals for Geodesy*:

- Advance open, real-time access to data and data products.
- Improve the robustness of the global geodetic reference frame.
- Emphasize system integration and interdisciplinary cooperation.
- Undertake geodetic missions recommended by the Decadal Survey.
- Obtain continuous observations of the dynamic Earth and its environment.

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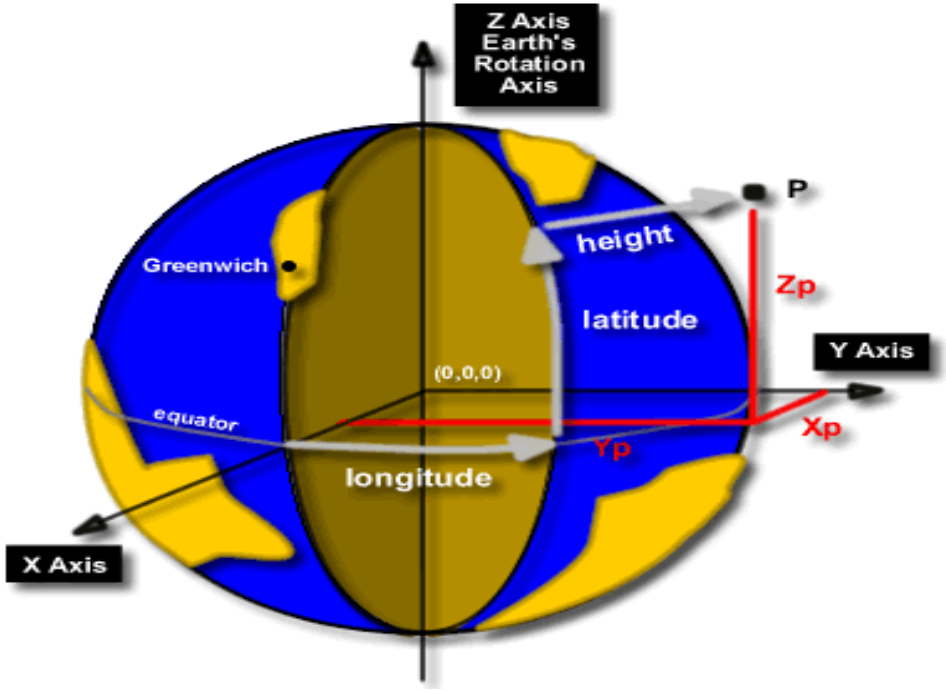
In summary Geodesy:

Enables a better understanding of the world we live in.

Contributes to hazard mitigation.

Facilitates better decision making.

Enables spatial data interoperability.



Allows for safer navigation by air, land and sea.

Enables more sustainable management and development of earth resources.

NZ – what data and information

It is not:

- X Personal information
- X Commercially sensitive
- X Security implications
- X Culturally sensitive
- X Other reasons, e.g. incomplete data and information that may be misleading

It does a wide variety of data/information like:

- ✓ Administrative
- ✓ Statistical
- ✓ Geospatial data, maps
- ✓ Meteorological
- ✓ Research
- ✓ Databases, real-time data
- ✓ Photos, videos

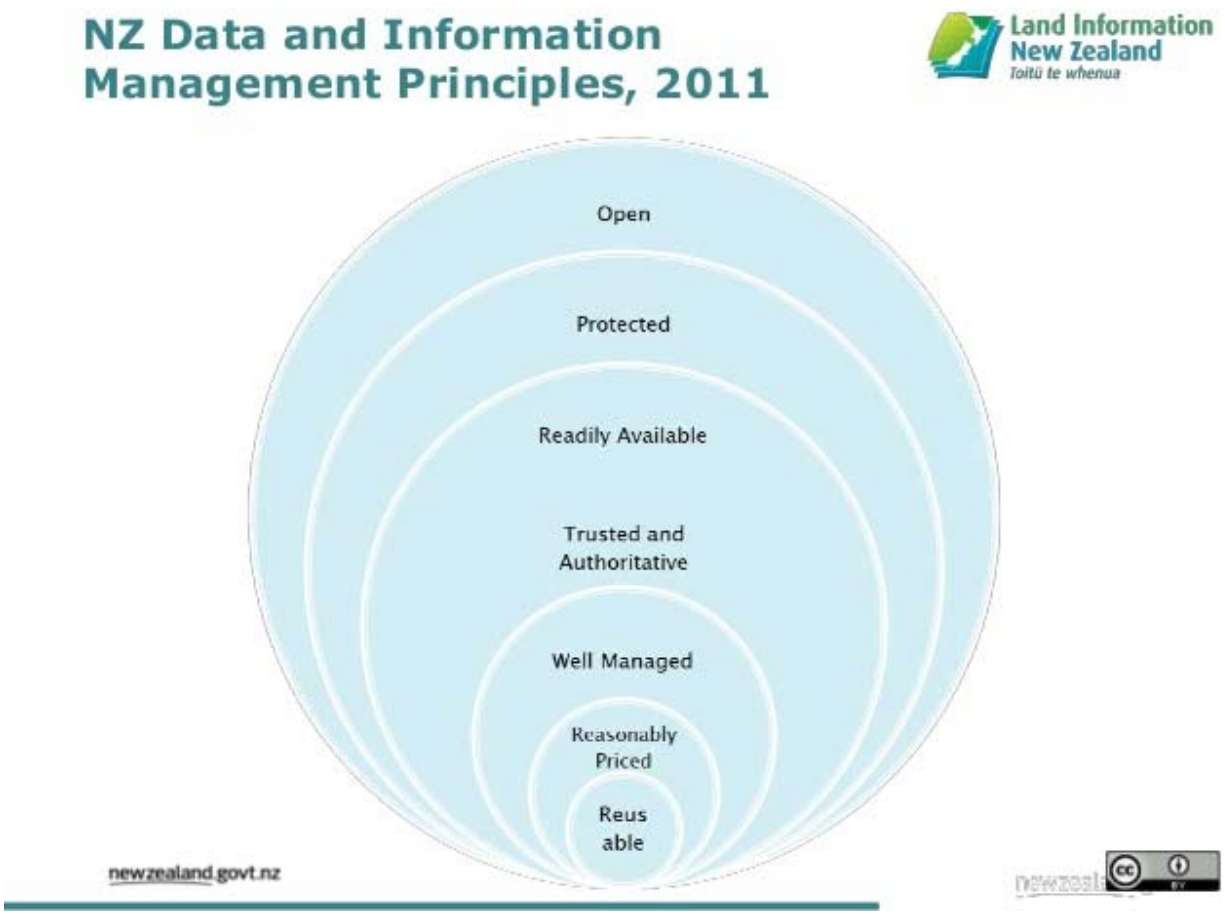
OPENDATANZ
Data and information for New Zealand

creative commons
AOTEAROA NEW ZEALAND

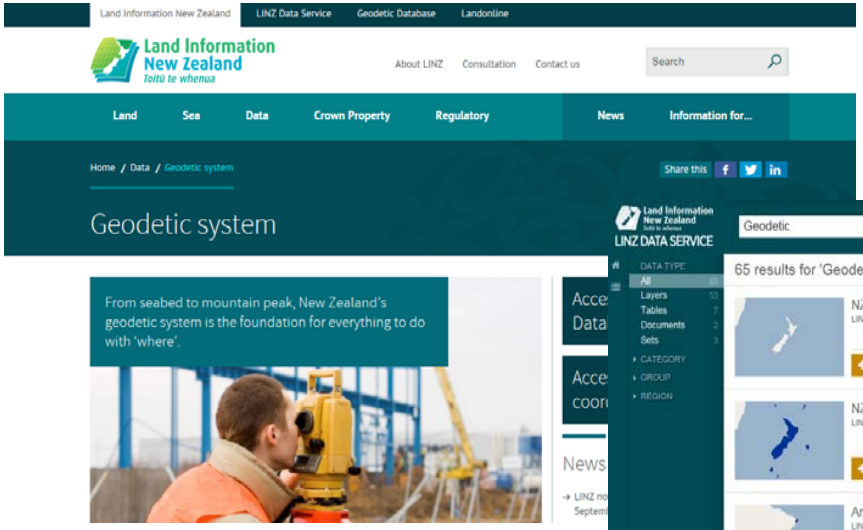
NZ open data – what data and information

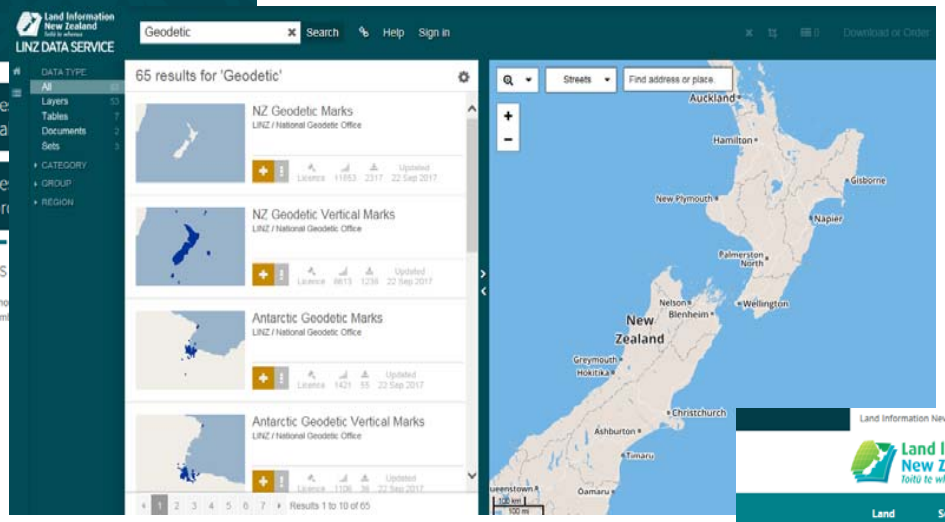
Data that is available in the “right” way:

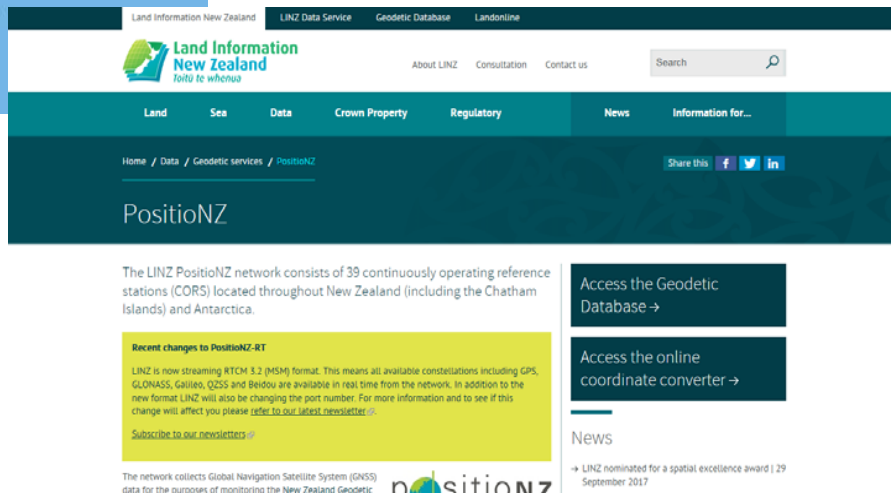
- ✓ Complete
- ✓ Primary
- ✓ Timely
- ✓ Accessible
- ✓ Machine processable
- ✓ Non-discriminatory
- ✓ Non-proprietary
- ✓ Open reuse licence



LINZ Geodetic Data and Products – available freely on line







Geodetic data is made available through:
Geodetic database website
LINZ data service
Landonline
GeoNet

The Information includes:
Observational data
Mark information
Coordinates
Gravity data, geoid
Deformation models
GNSS observations, RINEX files, streamed data

Why is it set free?

- Because people want it, and they've paid for it already
- Social, cultural and economic benefits
- Agencies benefit too

What are some of the benefits to LINZ

- In releasing GNSS data freely we get GNSS supplied to us for free by the Private sector – enhances the geodetic network
- In releasing all our data it enables it to be used for GGRF improvements from which we can benefit
- It enables the innovative use of the data – weather forecasting
- It saves us money – we work jointly across Central and Local Government and the Private Sector.

Set your data and information free

Free your data

Start using Creative Commons for copyrighted work

Unless there is a restriction which prevents this

Questions