



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

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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

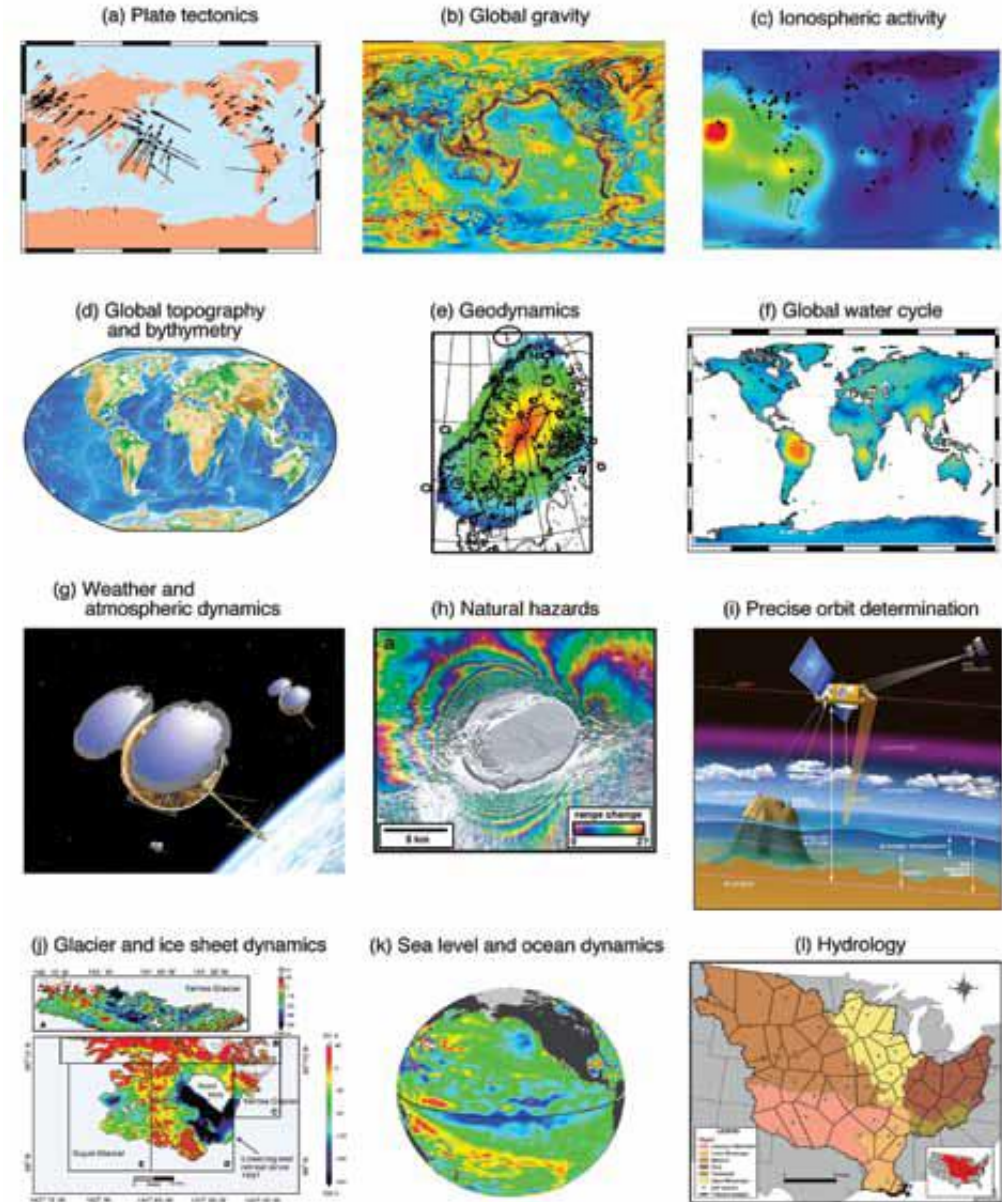


Geodetic measurements were made over 2000 years ago when Eratosthenes established the spheroidal shape and size of Earth

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.

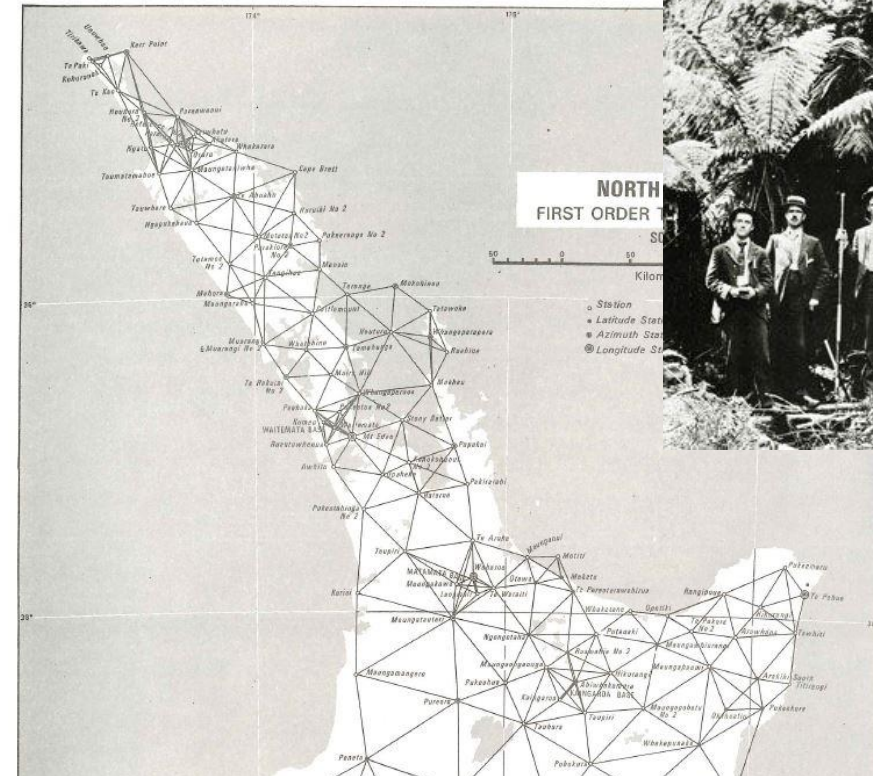


Historical Perspective



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



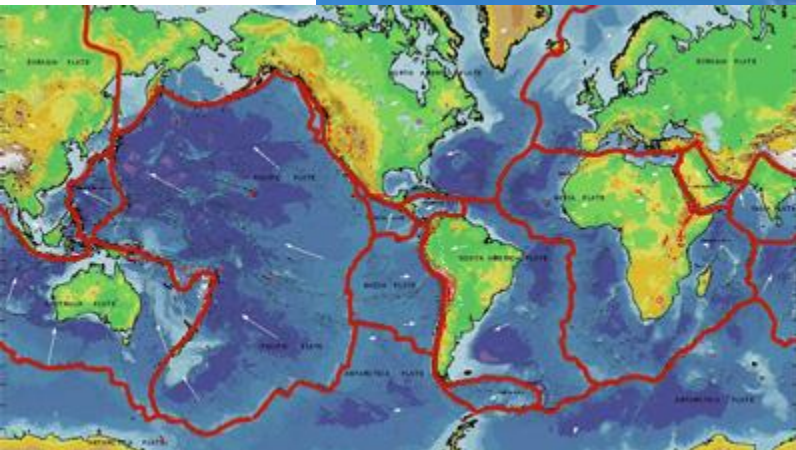
In the 50s



Geodesy contributed to and understanding of the dynamics of our world



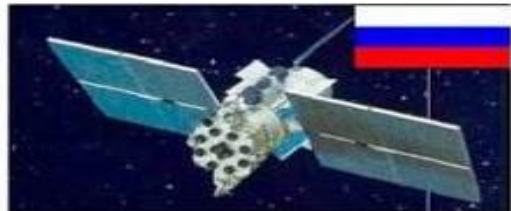
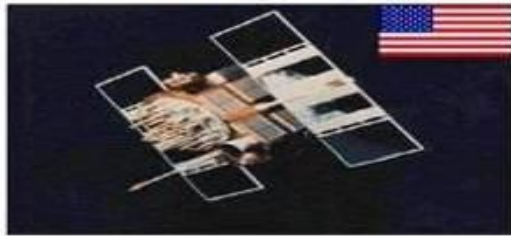
Alpine fault



Professor Harold Wellman



In the 80s and 90s the emergence of GNSS



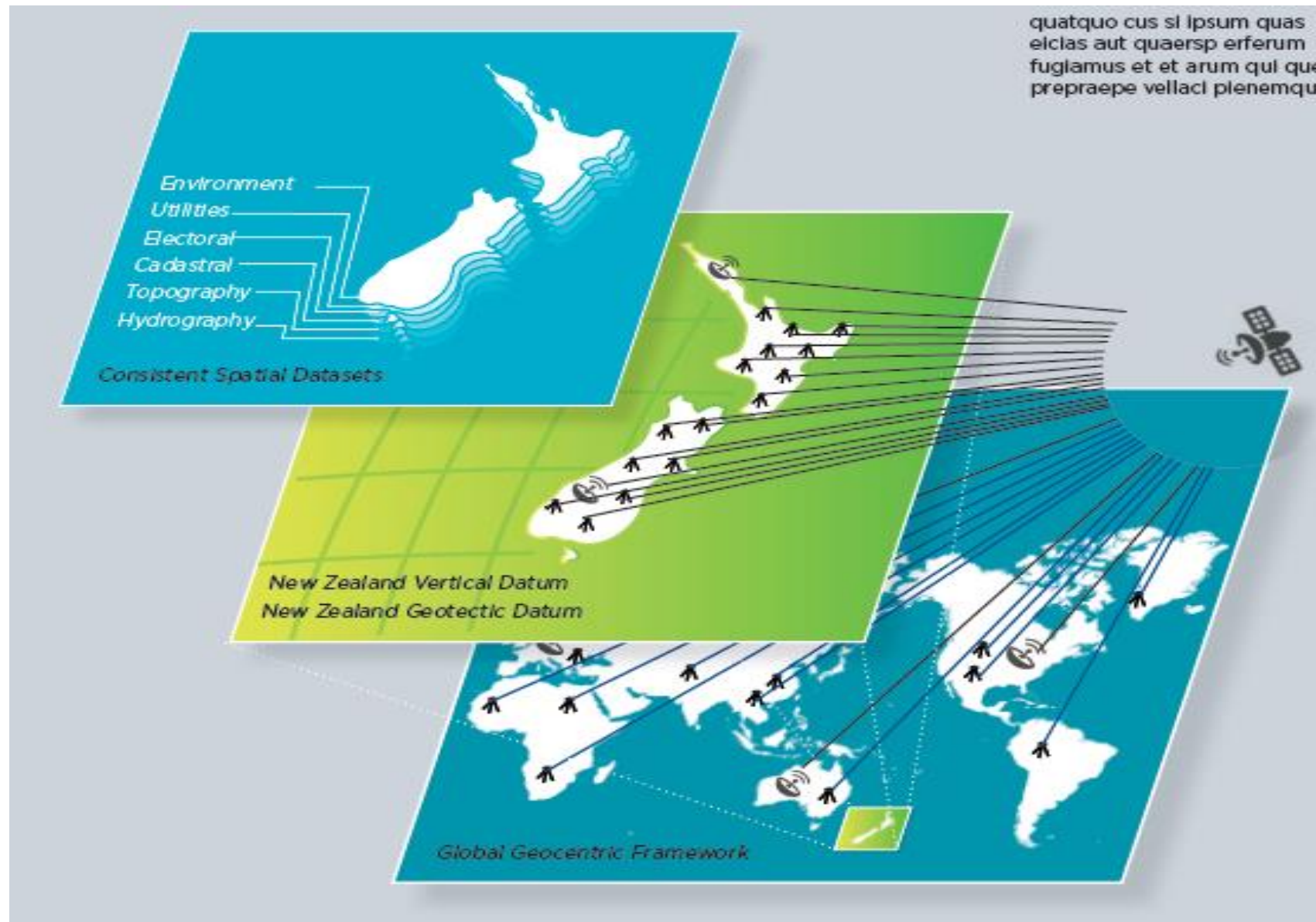
The world is moving to four global systems:

- 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

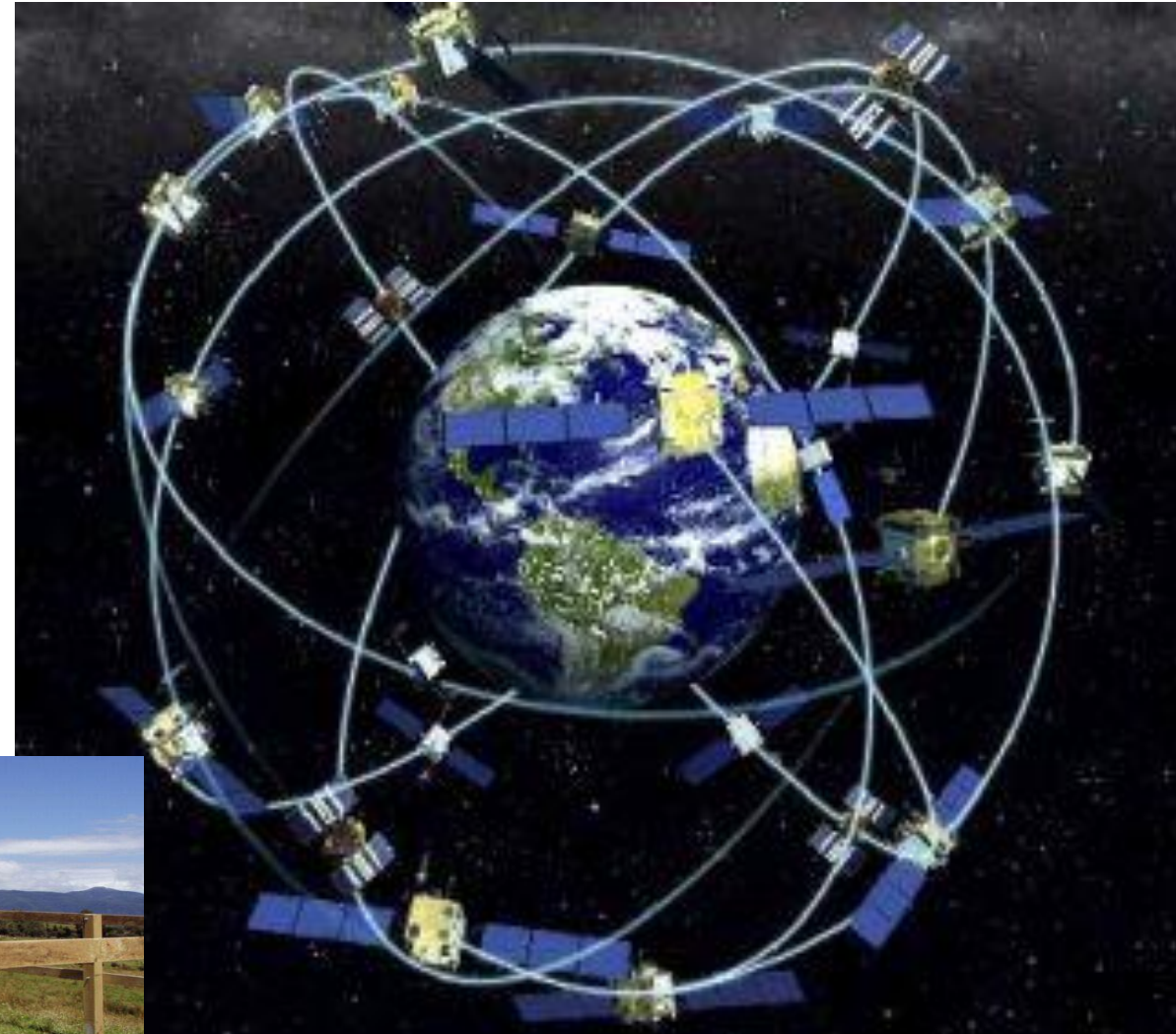


We get all of this for free

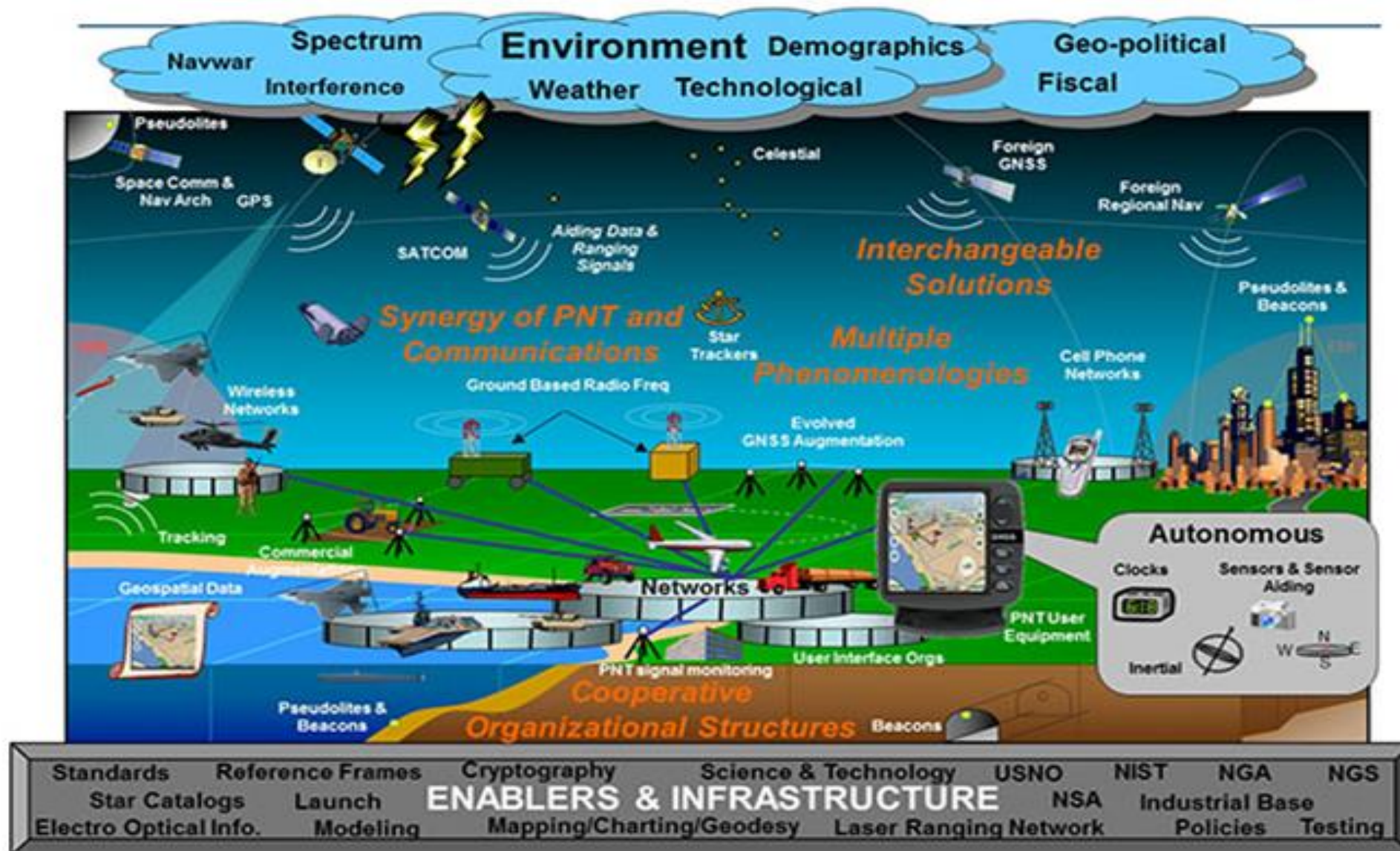
- The uses of GNSS goes way beyond what we could have ever foreseen
- Many innovative uses

In utilising this technology we must contribute to it

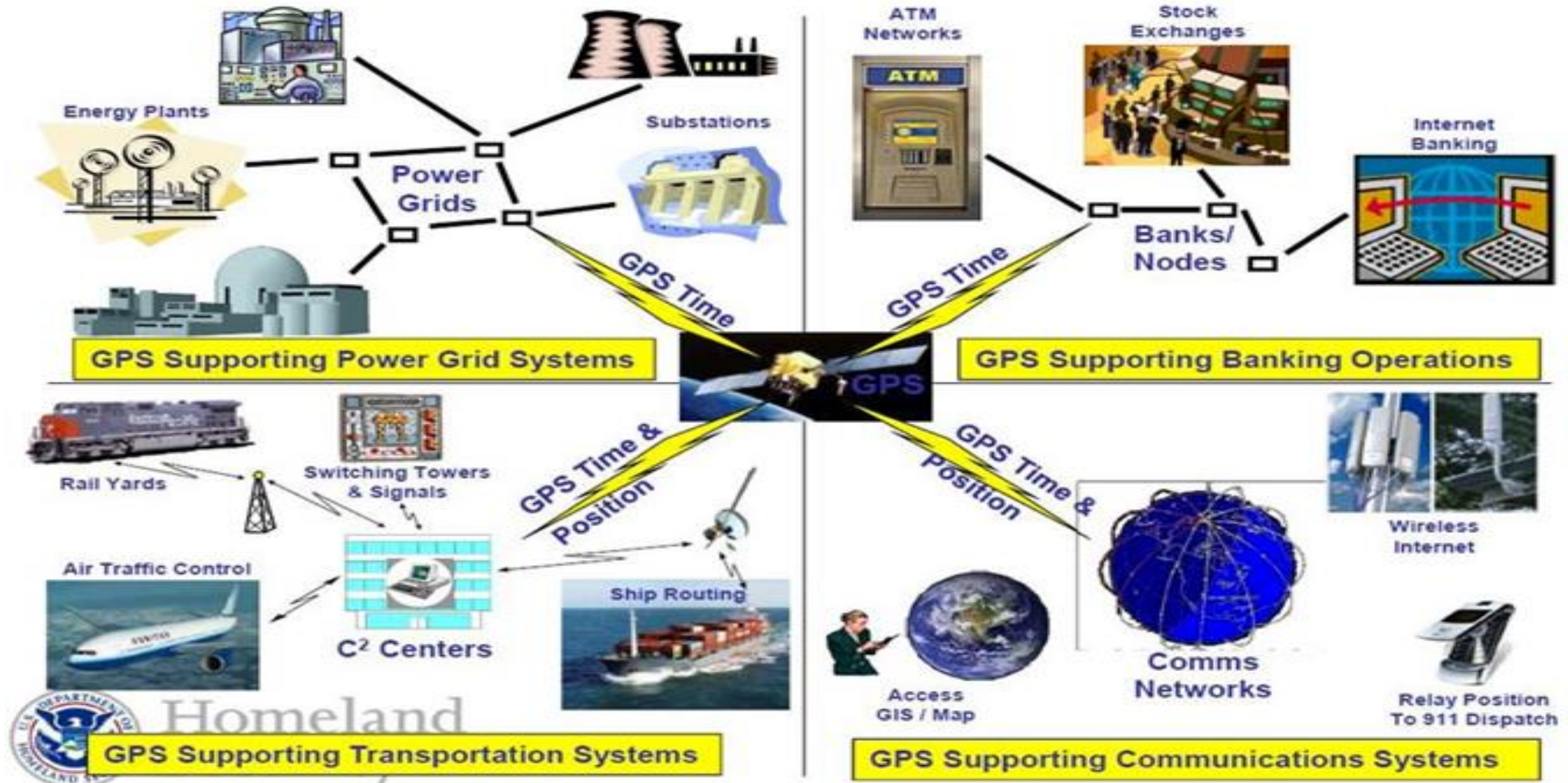
- Providing information to refine the reference frame



Positioning, Navigation and Timing



GNSS dependencies continues to grow



Only possible through the provision of an accurate GGRF



Observing instruments



VLBI



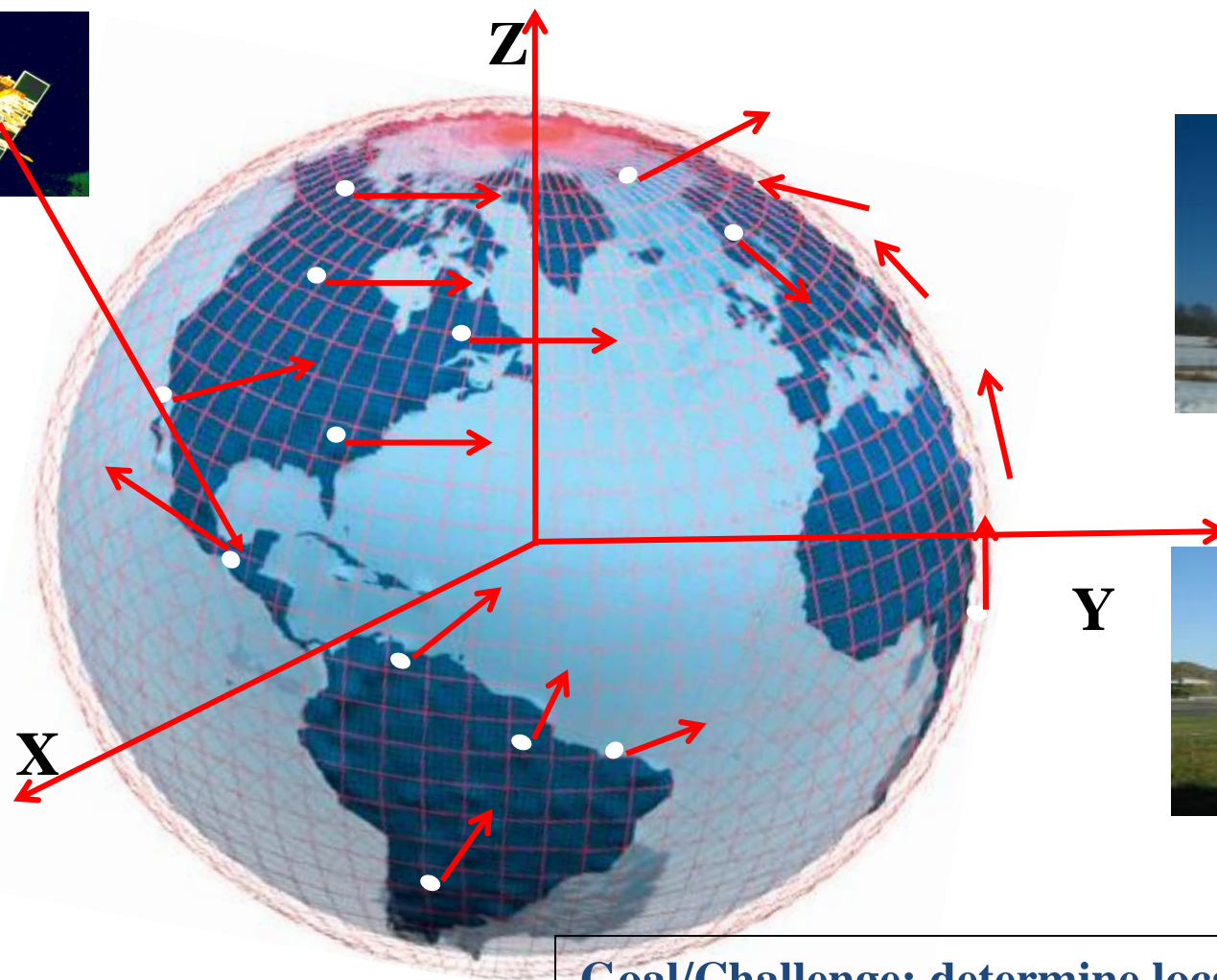
SLR



GNSS



DORIS



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

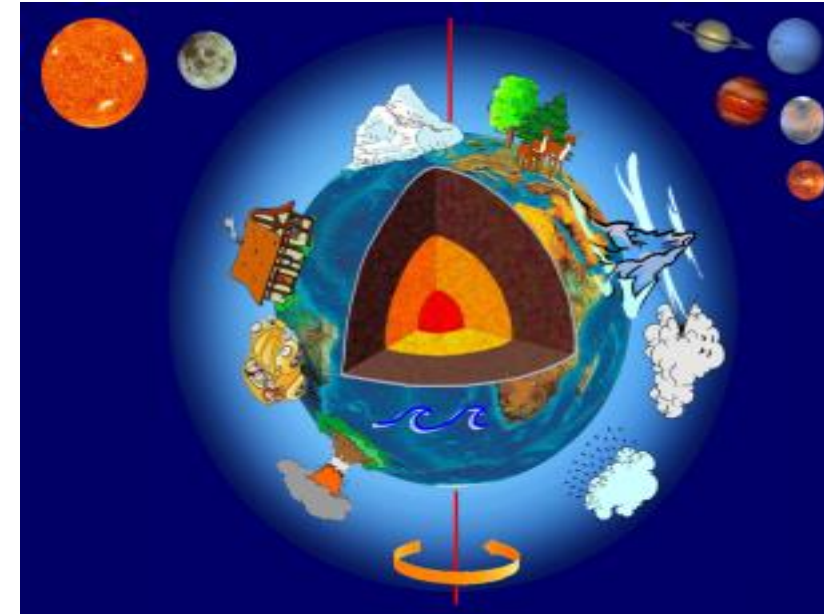
Opportunities in the broader sense



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?
- How do Earth's glaciers and ice sheets change on timescale of months to decades to centuries?

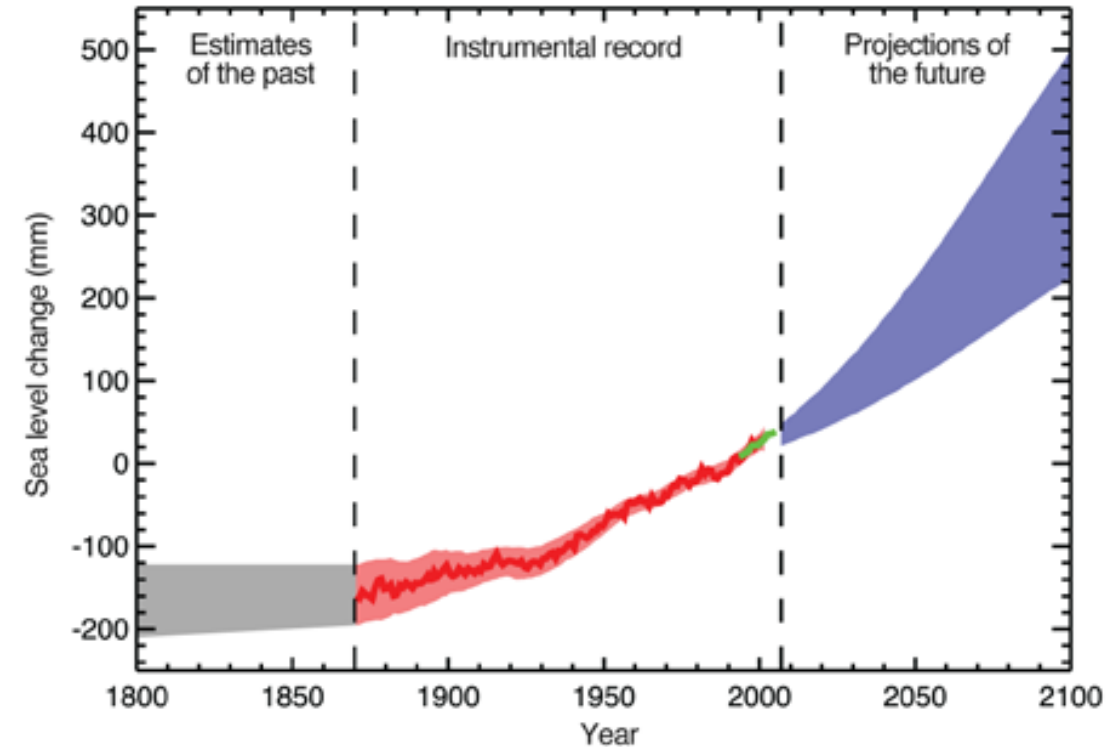
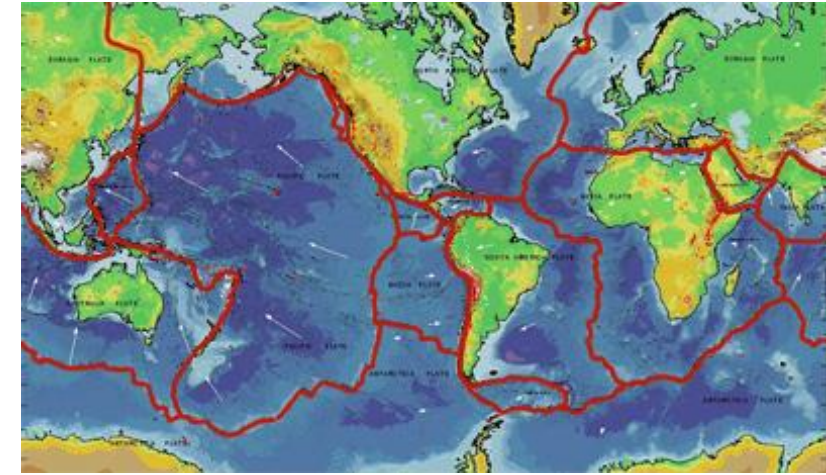


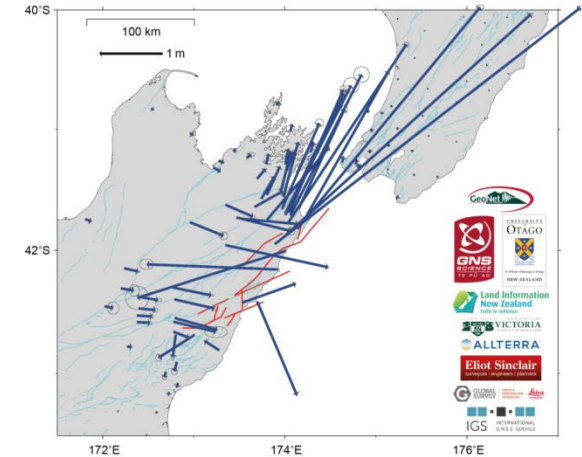
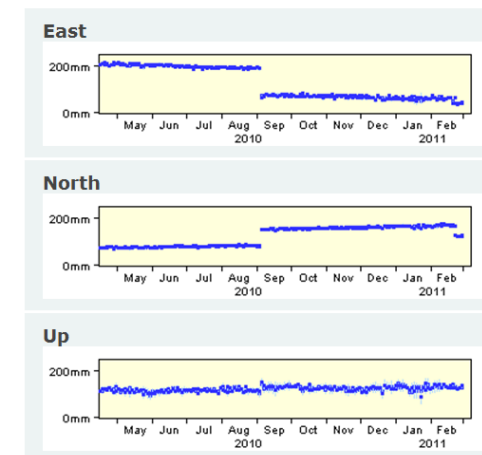
Figure FAQ 5.1 of S. Solomon et al. (2007), Technical Summary, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by S. Solomon et al., Cambridge University Press, 996 pp.

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

- How do tectonic plates deform?
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Daily solutions for MQZG

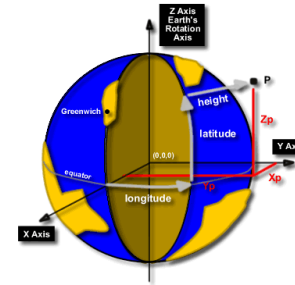


In the Public Interest: Societal Benefits



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

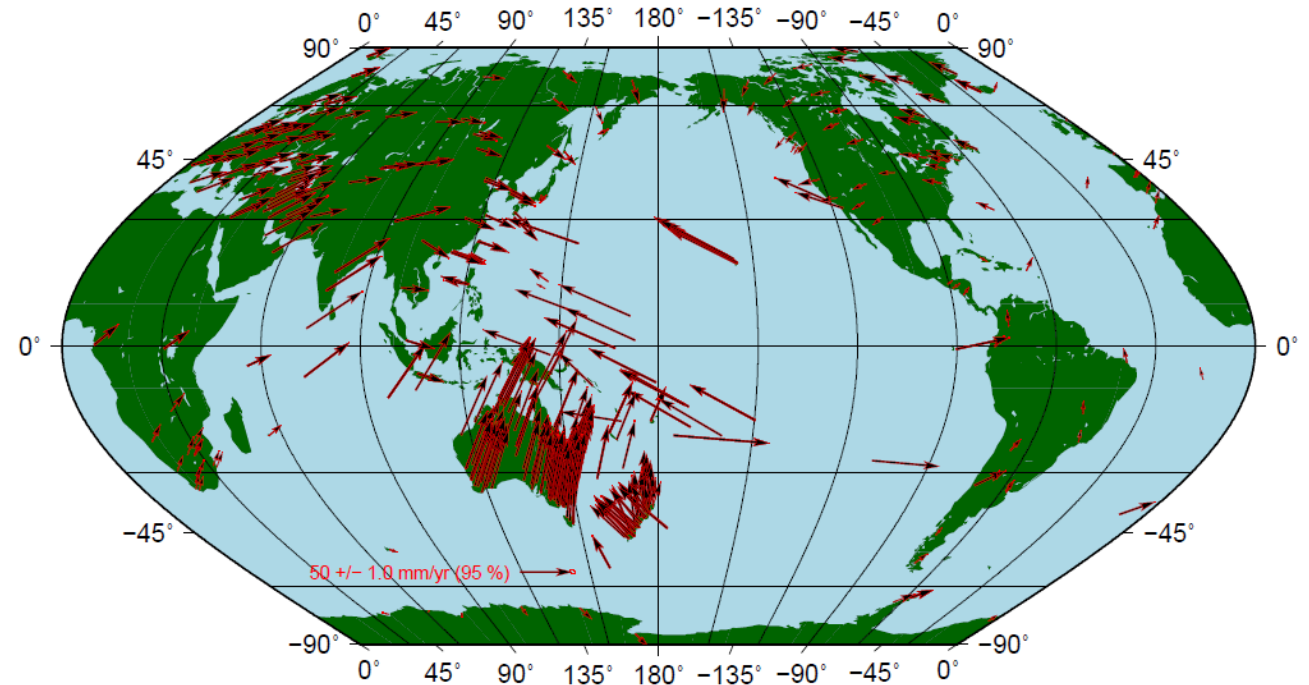


The Global View



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.

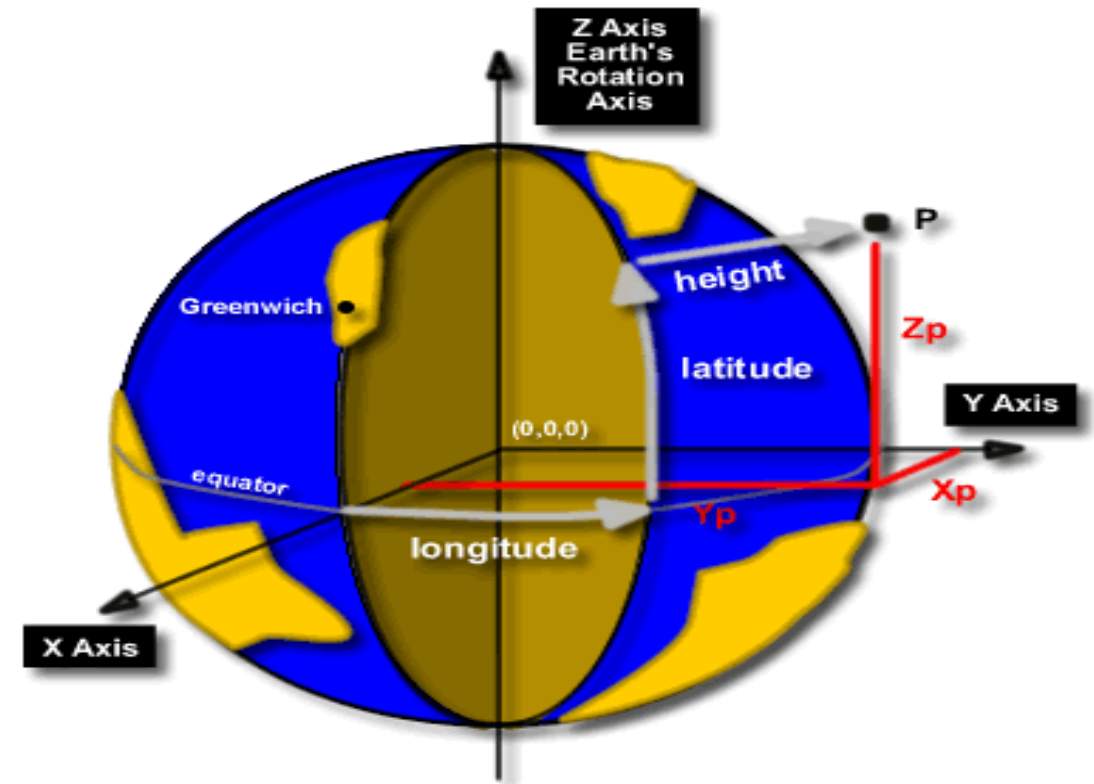
Contributes to hazard mitigation.

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.





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

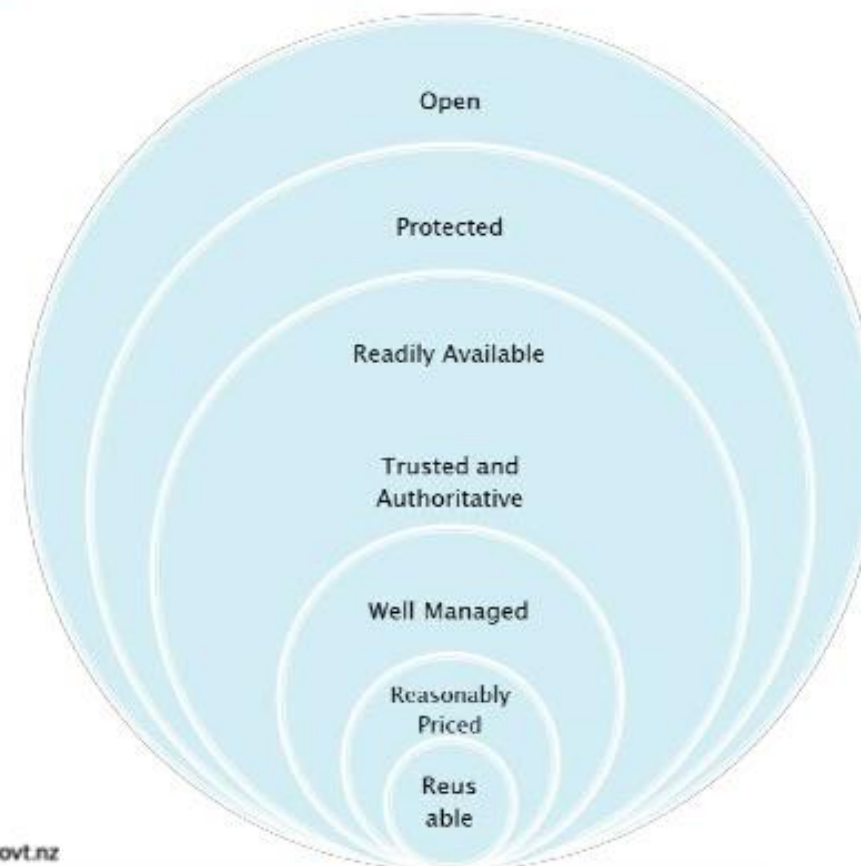
It does a wide variety of data/information like:

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

Data that is available in the “right” way:

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

NZ Data and Information Management Principles, 2011



LINZ Geodetic Data and Products – available freely on line



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

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Geodetic system

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LINZ DATA SERVICE

Geodetic

65 results for 'Geodetic'

- NZ Geodetic Marks
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- NZ Geodetic Vertical Marks
Licence: 8613, 1238 | Updated: 22 Sep 2017
- Antarctic Geodetic Marks
Licence: 1421, 55 | Updated: 22 Sep 2017
- Antarctic Geodetic Vertical Marks
Licence: 1108, 36 | Updated: 22 Sep 2017

Map of New Zealand showing major cities: Auckland, Hamilton, Gisborne, Napier, Palmerston North, Wellington, Nelson, Blenheim, Christchurch, Greymouth, Hokitika, Ashburton, Timaru, Oamaru, Dunedin.

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PositionNZ

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

The LINZ PositionNZ network consists of 39 continuously operating reference stations (CORS) located throughout New Zealand (including the Chatham Islands) and Antarctica.

Recent changes to PositionNZ-RT
LINZ is now streaming RTCM 3.2 (MSM) format. This means all available constellations including GPS, GLONASS, Galileo, QZSS and BeiDou are available in real time from the network. In addition to the new format LINZ will also be changing the port number. For more information and to see if this change will affect you please refer to our latest newsletter.
Subscribe to our newsletters

The network collects Global Navigation Satellite System (GNSS) data for the purposes of monitoring the New Zealand Geodetic

Access the Geodetic Database →
Access the online coordinate converter →

News

→ LINZ nominated for a spatial excellence award | 29 September 2017



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.



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Free your data

Start using Creative Commons for
copyrighted work

Unless there is a restriction which
prevents this



Questions

