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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

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Take Home Messages

- *Sharing and exchanging geodetic data is just **ONE** pathway to a **modernised geodetic reference frame / datum***
- *Surveyors need to have the competency and capability to contribute to **geospatial reference system** policy development and implementation*



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Benefits and Opportunities of Exchanging and Sharing Geodetic Data

- The Why Case and the DRIVERS -

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The Science of Geodesy



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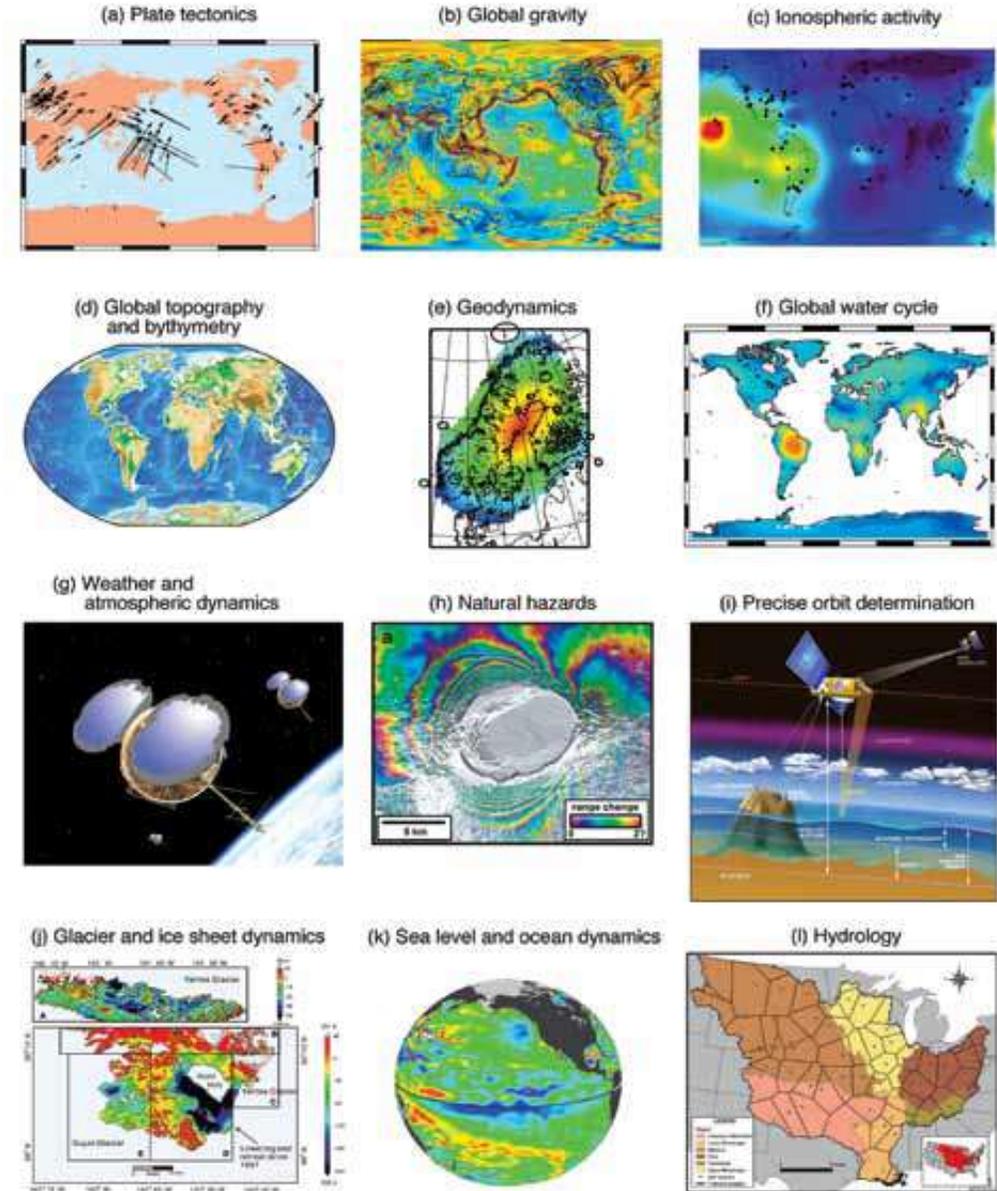


Geodetic measurements were made over 2000 years ago when Eratosthenes established the spheroidal shape and size of Earth

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.

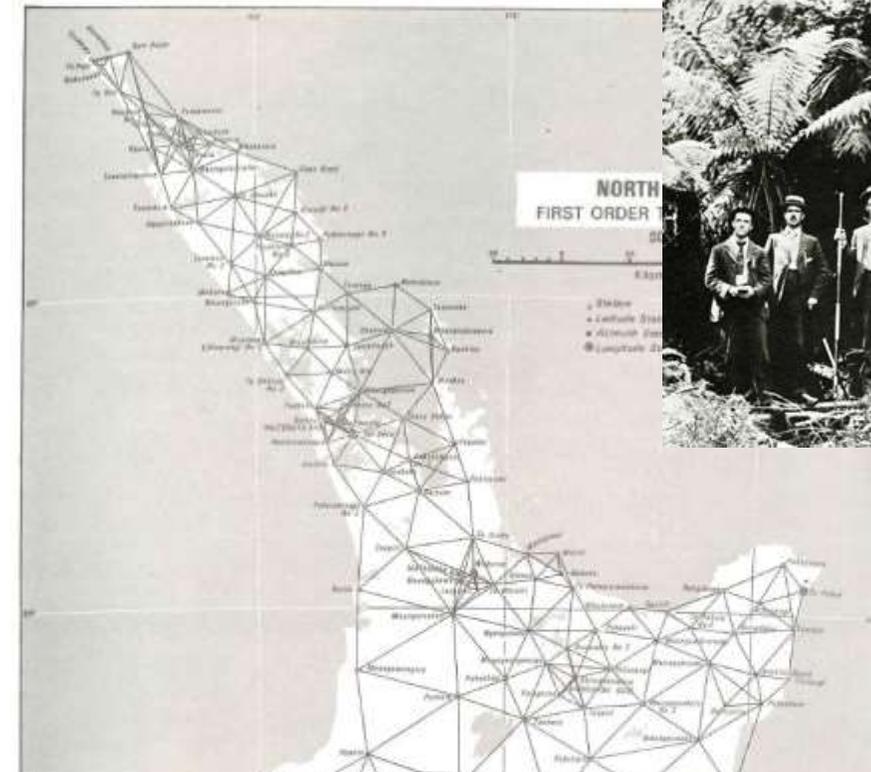
It provides the spatial framework that underpins ***positioning, navigation and timing.***



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



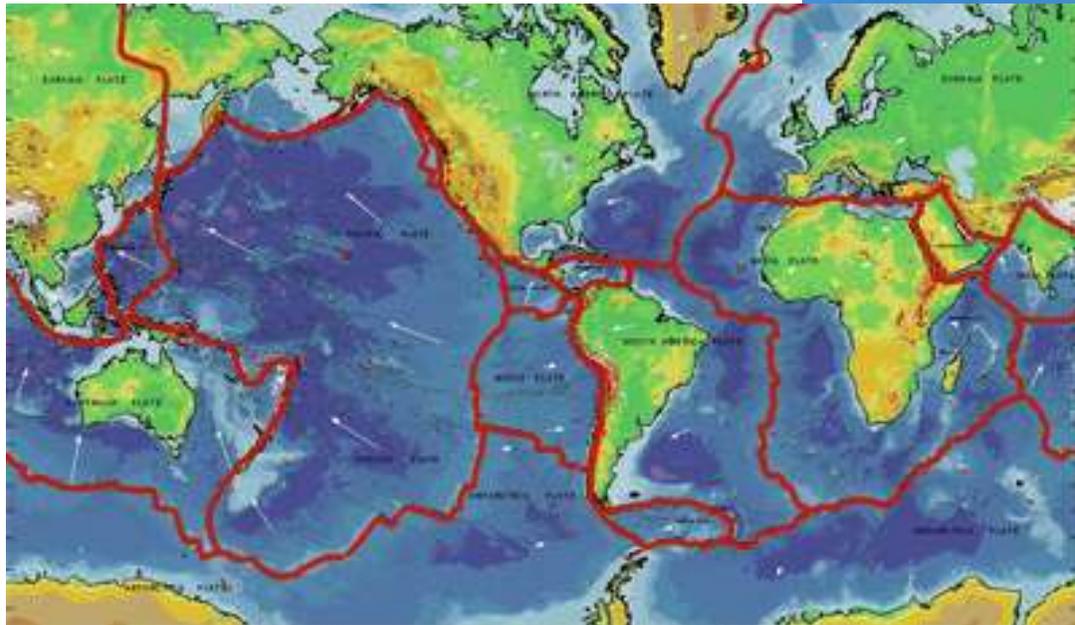
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Geodesy contributed to and understanding of the dynamics of our world



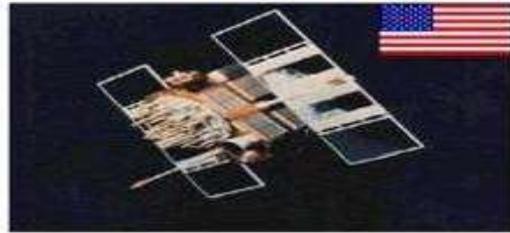
Alpine fault



In the 80s and 90s the emergence of GNSS



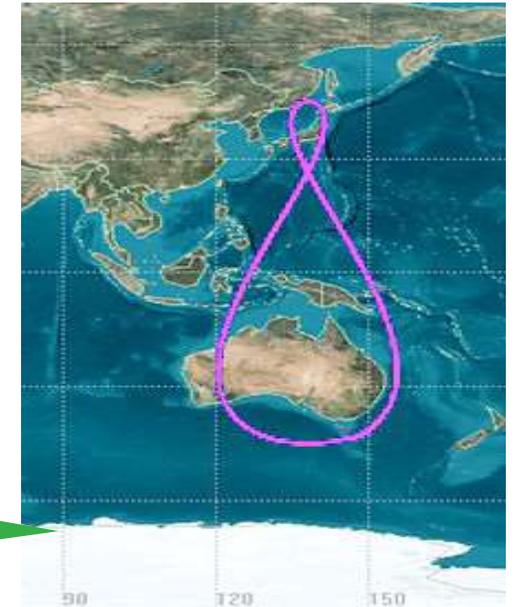
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The world is moving to four global systems:

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

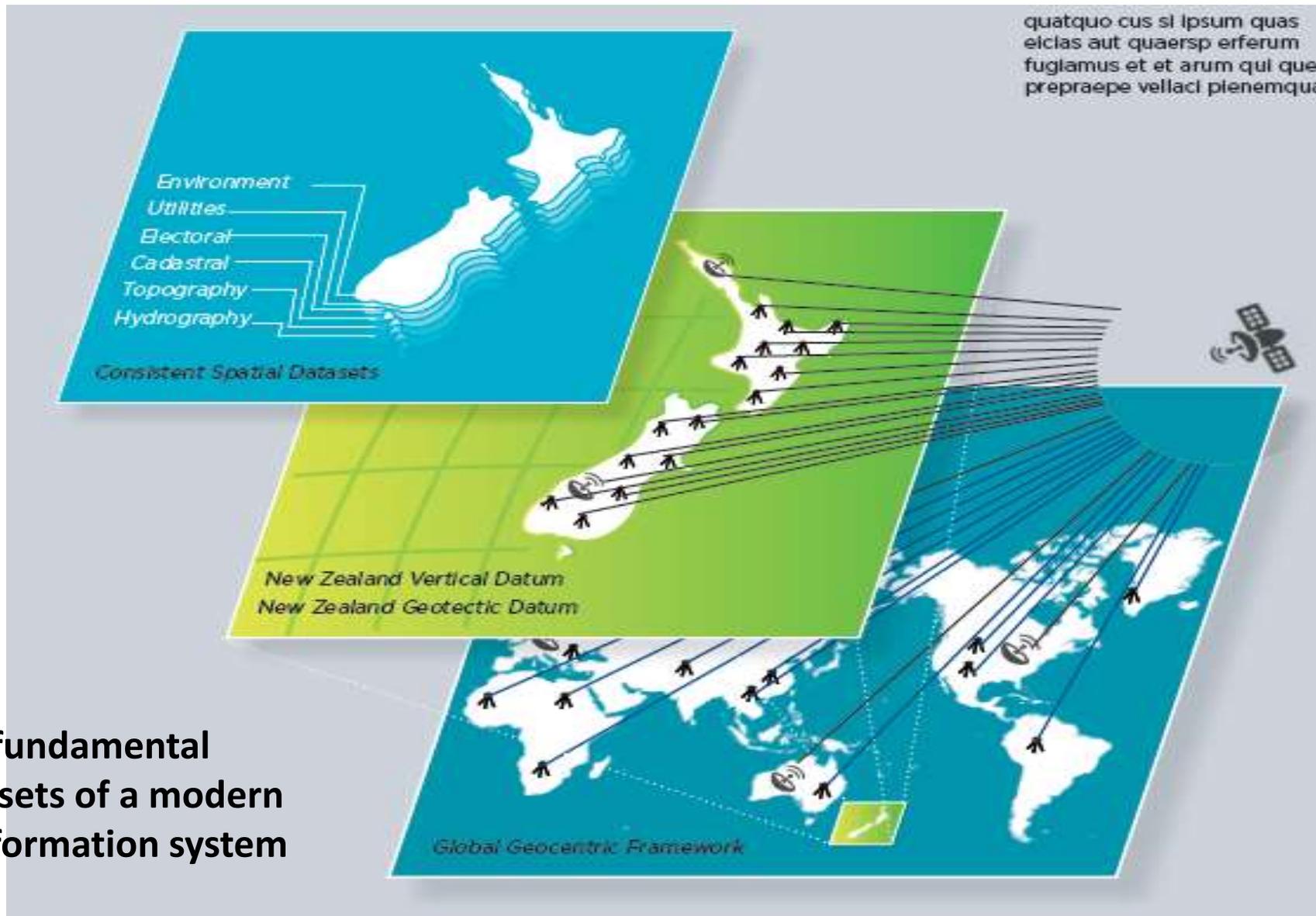
Plus, there are at least two regional satellite systems: Japan and India.



Position gives the context to 'Where is it' and 'Location Intelligence'



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Underpins the fundamental geospatial datasets of a modern land / water information system

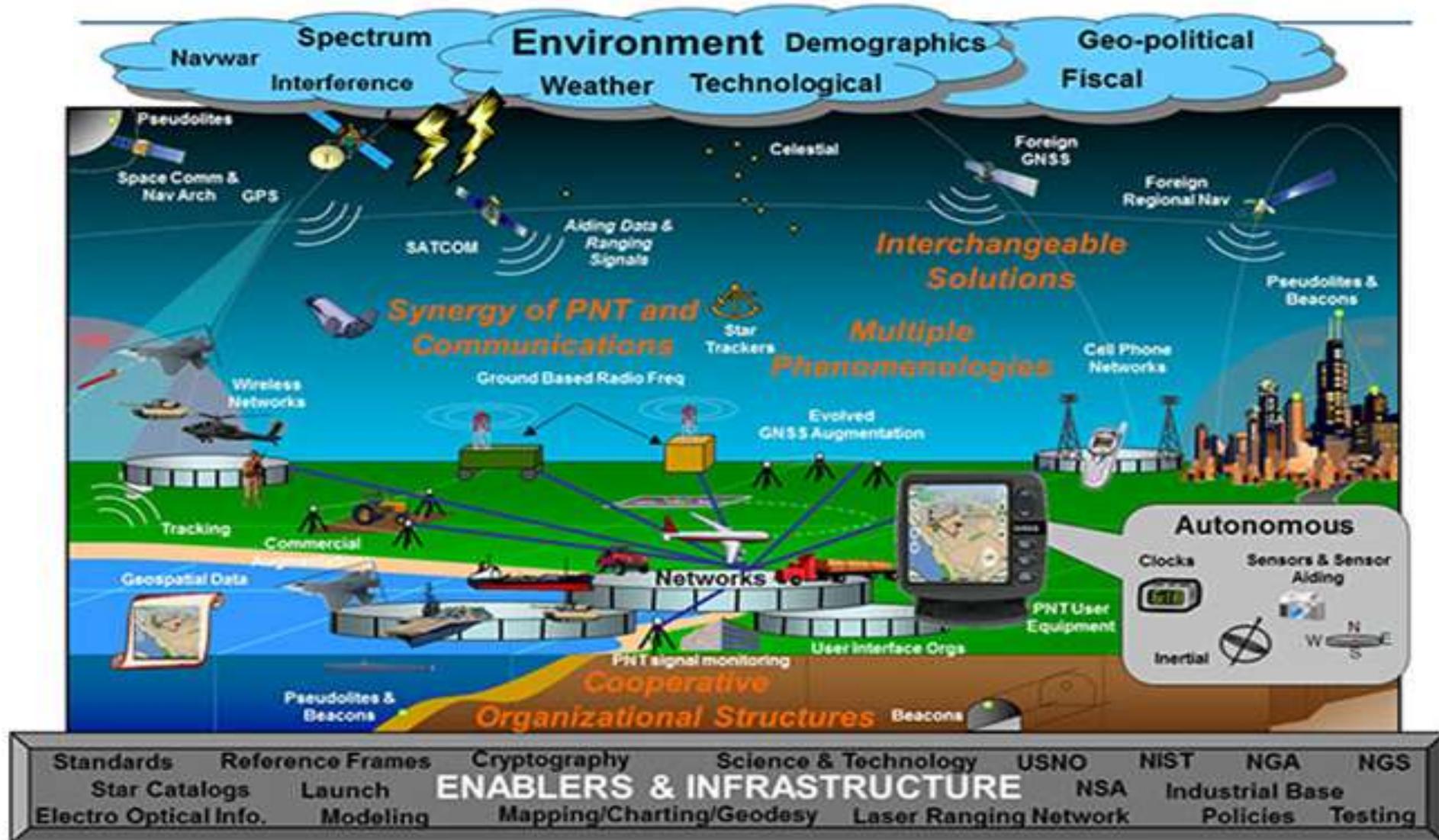
Ubiquitous Positioning, Navigation and Timing



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GNSS has permeated into our everyday life in ways we don't realise !



In the Public Interest: Societal Benefits



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Geodesy benefit society as a whole.

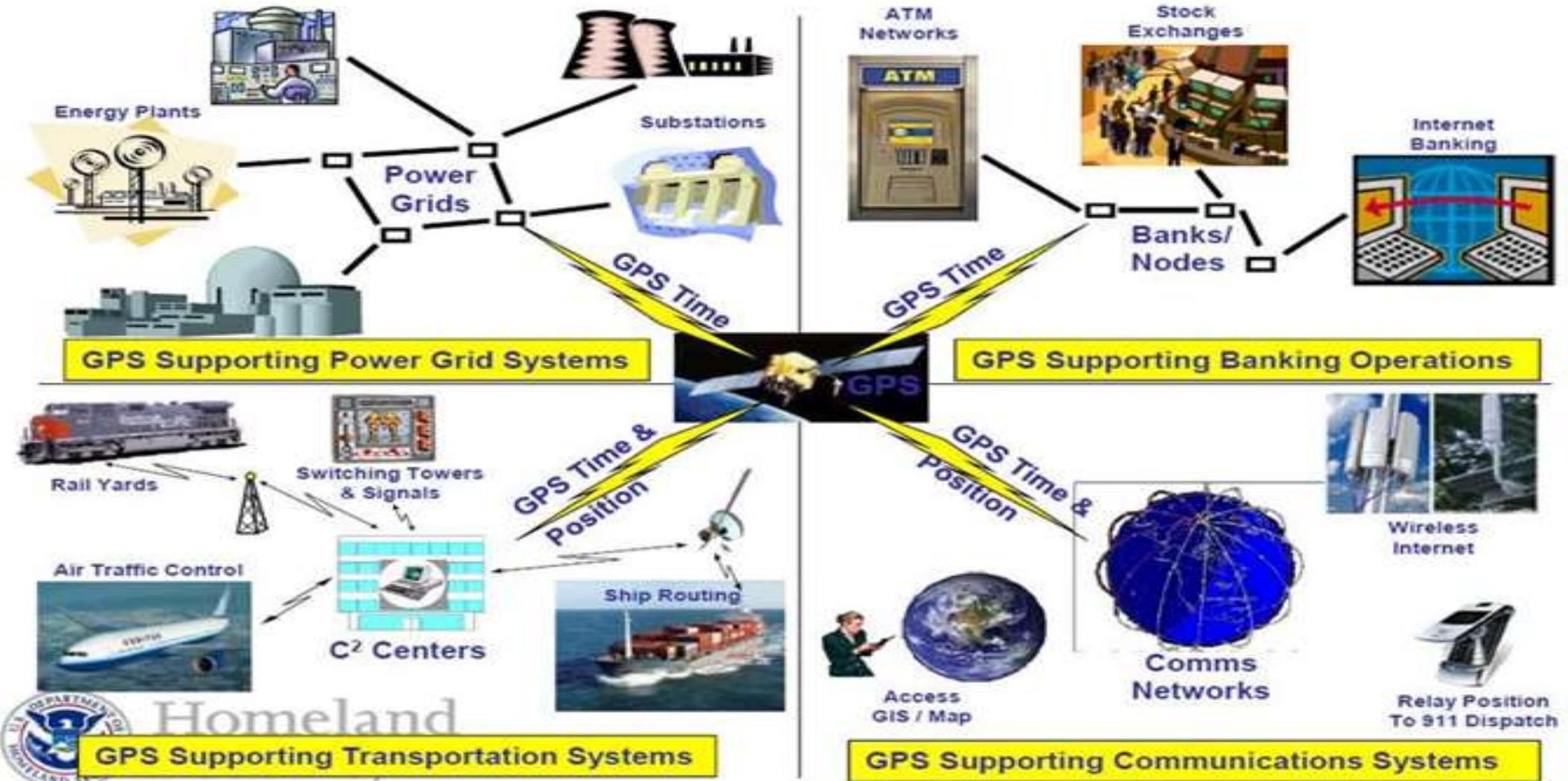
- improvement of geodetic methods and accuracy leads to a host of benefits to society in **non-scientific realms such as commercial and civic planning.**
- **Early warning for natural hazards** – tsunami, earthquakes and volcanic eruption
- **Rapid recovery** from natural events
- **Building resilience**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



GNSS dependencies continues to grow



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The greatest example of open and free data



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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



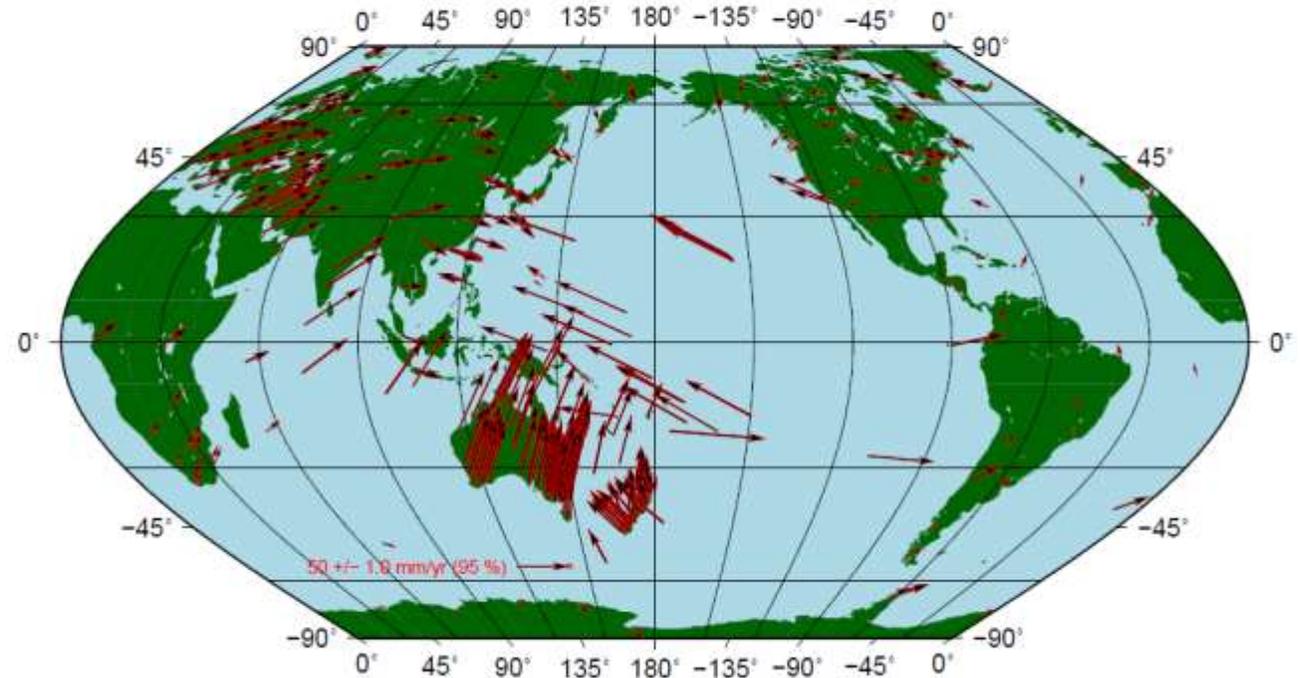
The Global View



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Modern geodesy requires multiple global observing networks. 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.

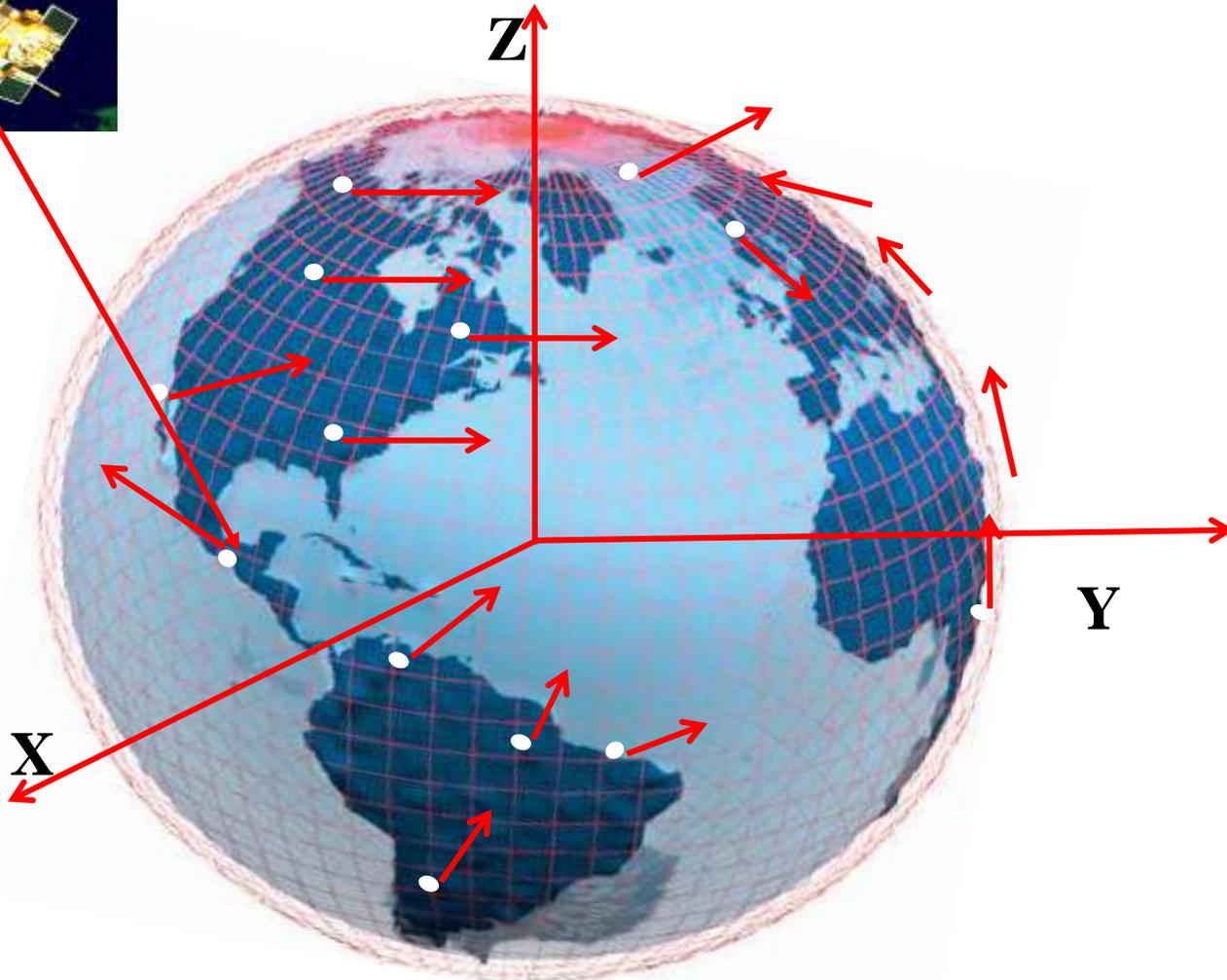


Open data is key to this!

Only possible through the provision of an accurate GGRF



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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

Achieved through sharing / exchanging of data !

Opportunities in the broader sense



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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?

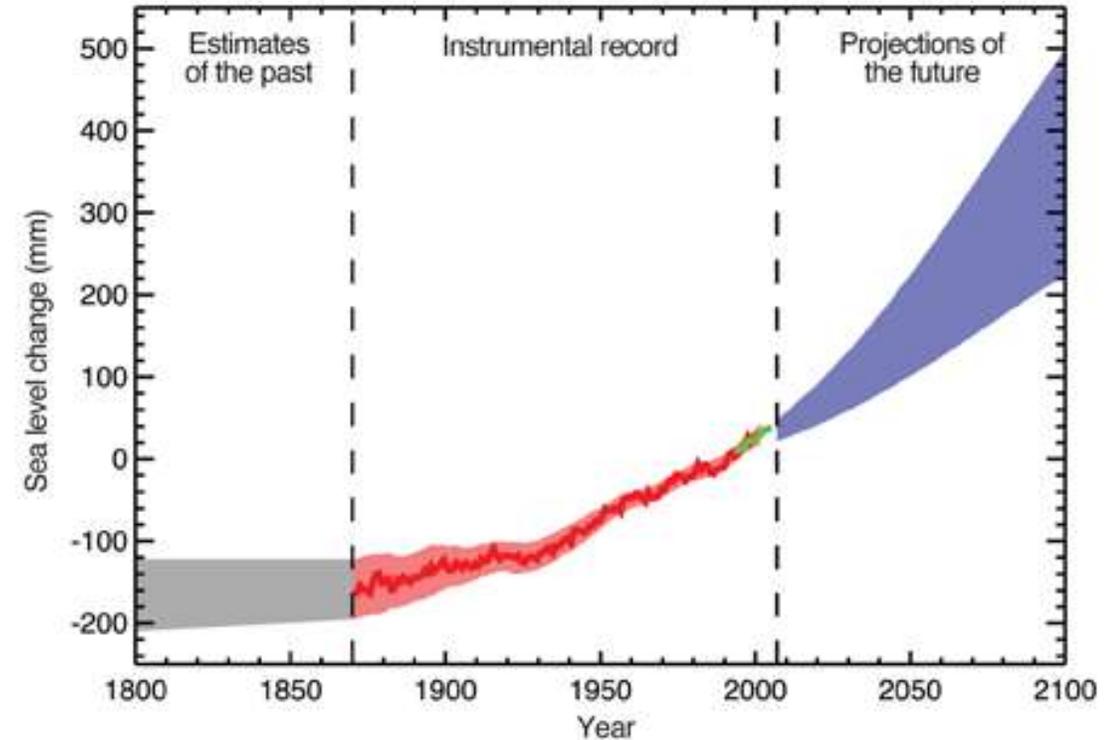
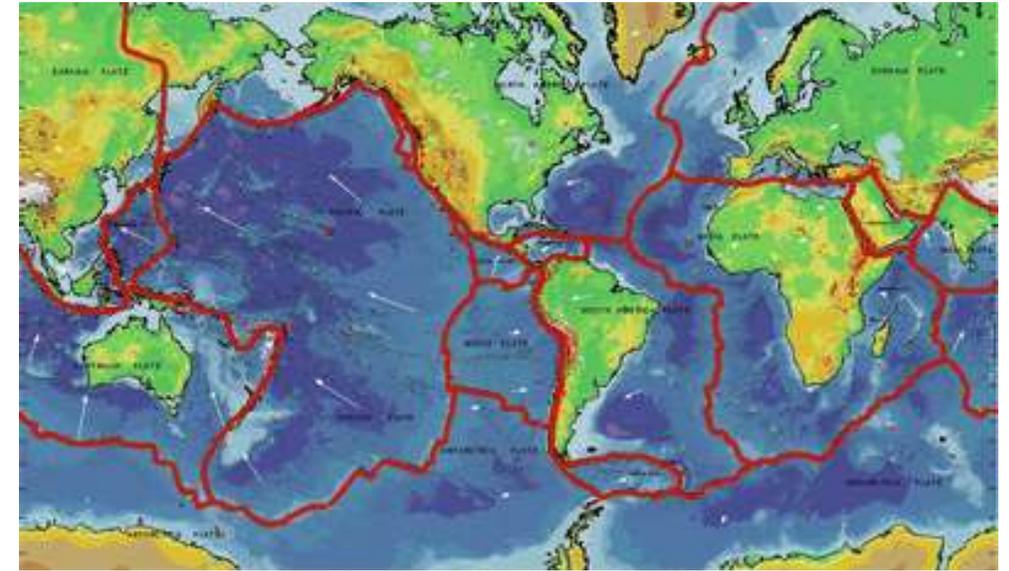


Figure FAQ 5.1 of S. Solomon et al. (2007), Technical Summary, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by S. Solomon et al., Cambridge University Press, 996 pp.

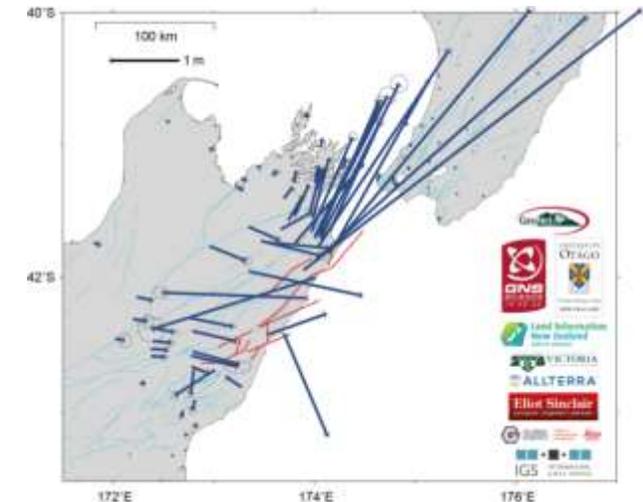
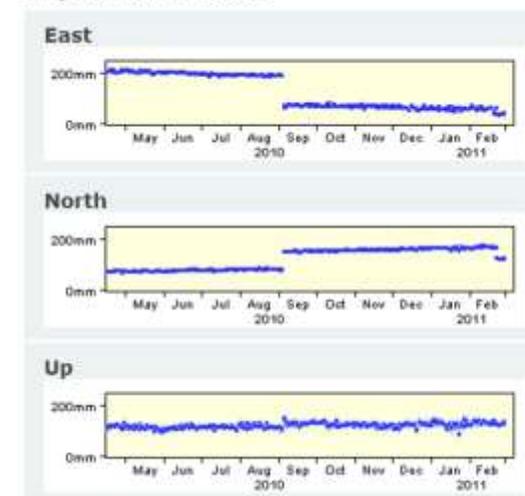
Earth the Machine

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

- How do tectonic plates deform?
- What physical processes control earthquakes?
- How does Earth's surface evolve?
- What are the mechanics of magmatic systems?



Daily solutions for MQZG



Recommendations



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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.



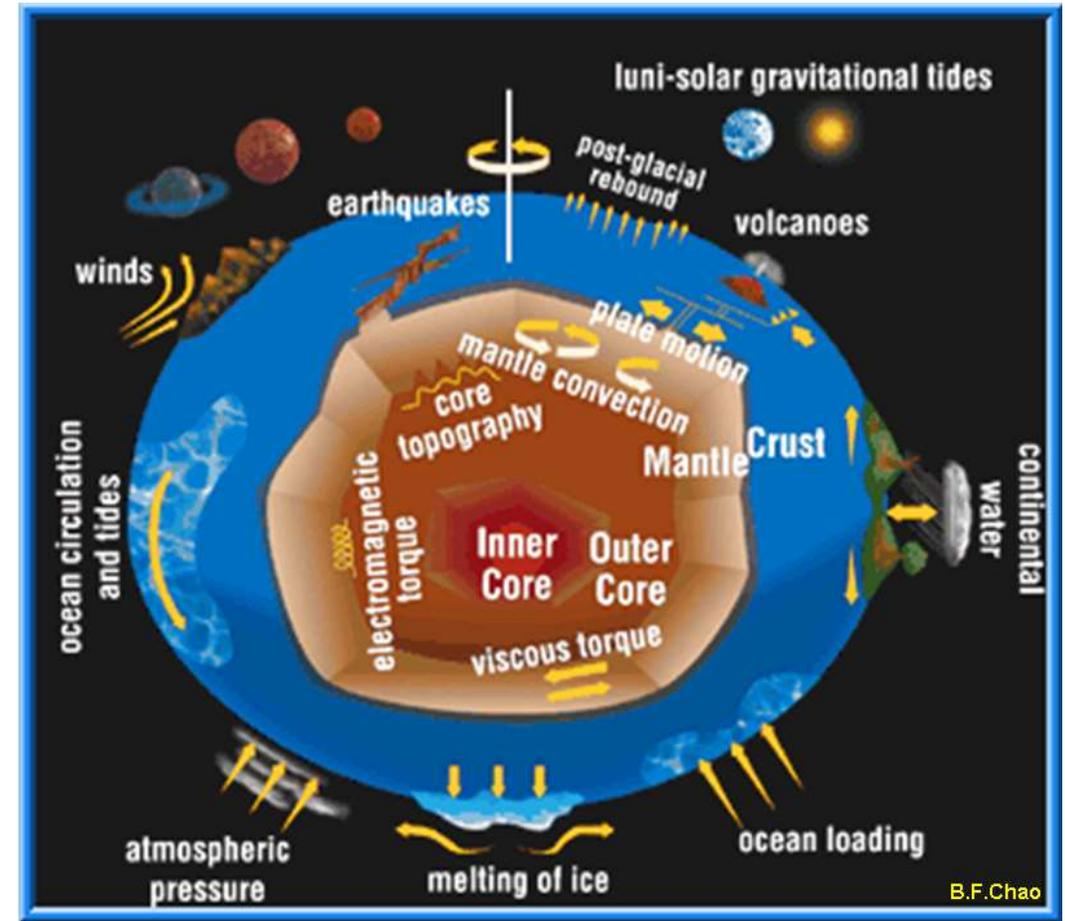
In summary Key Geodesy Drivers:



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- Enables a better understanding of the world we live in.
- Contributes to - hazard mitigation / monitoring, building resilience, emergency response
- Facilitates better decision making.
- Enables spatial data interoperability.
- Allows for safer navigation by air, land and sea.
- Enables more sustainable management and development of our assets and earth resources



<https://geodesy.agu.org/about/>



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Exchanging and Sharing Geodetic Data

- A Policy Perspective -

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Geodetic Data Sharing Policy

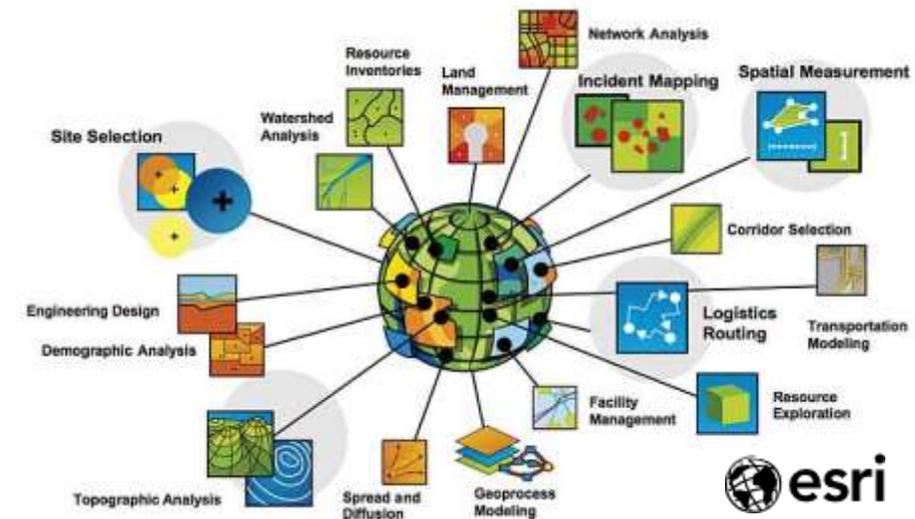


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Generally -

- A **government policy** is a statement or an announcement of a government's activities, plans, intentions, and guiding principles relating to issues / challenges of the day.
- It also declares how a government agency implements legislation, changes law, instigates a public or community initiative or makes decisions.
- **Policy making** is the process of transforming an idea into an action.



Geodetic Data Sharing Policy – Yes or No?



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Some questions to be considered during a S.W.O.T analysis (or brain storming) –

- Why do you want to share geodetic data?
- What is your government's position or opinion on geodetic data sharing?
- What geodetic data can be shared?
- Who is the owner and / or data custodian of the geodetic data?
- Who should be involved – internally and externally, traditional and non-traditional?



Geodetic Data Sharing Policy – Yes or No?



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Some questions to be considered during a S.W.O.T analysis (or brain storming) –

- Do you have the capacity to share geodetic data?
- Are there impediments or restrictions or challenges (real or perceived) associated with sharing geodetic data? – technical, political, legal, social, economic?
- Are there existing policies amongst geospatial organisations, agencies and authorities to embrace, create or consider “shared or open” data policies.
- What is the status of your geodetic data “closed” or “opened” or “shared”?



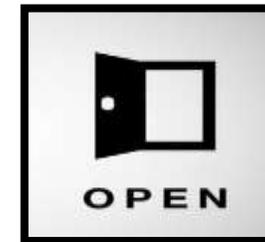
Geodetic Data – Opened / Closed / Shared?



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- **Open Data** – data that can be accessed, used, and shared by anyone without restrictions.
 - Weather records, earthquake monitoring data, and particle physics information has been opened up for research to develop solutions or assist risk management
- **Closed data** - data that only people in an organisation can see.
 - National security data, mobile phone use, confidential business reports
- **Shared data** (a hybrid of both) – data that can be use by a specific group of people for a specific purpose; broad term that is often used to cover data that is collected everyday.
 - Supermarket shopping habits, electoral register
- The difference between these is about **who can use data and how!**

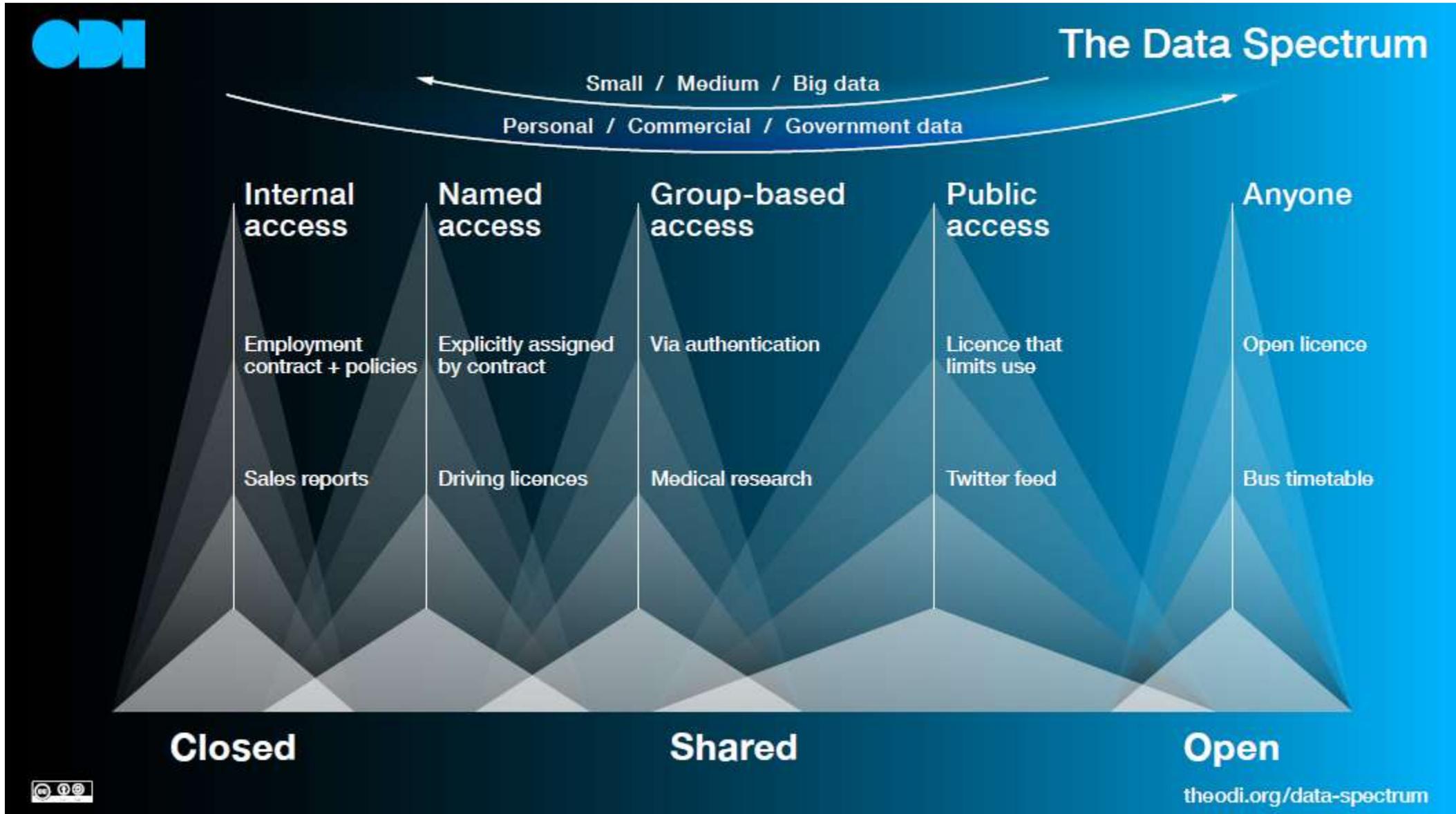


<https://theodi.org.au/>

Geodetic Data – Opened / Closed / Shared?



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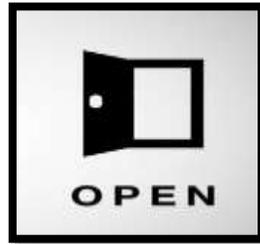
Geodetic Data – Opened / Closed / Shared?



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What classification is - *geodetic data* ?



Is it closed? If so, why?

Can it be open? If so, is it being implemented?

Can it be shared with expressed permissions on how it shall be accessed, used, re-distributed and published?

Content of a Geodetic Data Sharing Policy (1)



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Why do you need a geodetic data sharing policy? Why is it important?

- State the benefits, purpose, vision, and drivers for the policy
- Applicable or relevant reasons -
 - Meeting / accommodating community needs, obligations and expectations (local / regional / global); other - social, economic, technical, environmental, scientific?
 - Fosters transparency, accountability, a more efficient, effective and responsive government
 - Stimulates research outcomes, and innovation
 - Improves management of datasets, assets, service delivery
 - Supports initiatives with respect disaster risk management / mitigation / monitoring
 - Creates economic opportunities
 - Enhances development of fundamental data for SMART cities
 - Facilitates capacity development
 - Delivery of Sustainable Development Goals (<https://theodi.org/supporting-sustainable-development-with-open-data>)
 - Empowers governments, society, public and private sector organizations to work toward better outcomes
- CASE STUDIES and STORIES - <https://theodi.org/publications>

Content of a Geodetic Data Sharing Policy (2)



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What are the guiding principles of the policy?

- The core values, ideologies, standards, associated with geodetic data sharing.

The International Open Data Charter Principles -

| | | |
|--|--|--|
|  <p>1. Open by Default</p> |  <p>2. Timely and Comprehensive</p> |  <p>3. Accessible and Usable</p> |
|  <p>4. Comparable and Interoperable</p> |  <p>5. For Improved Governance and Citizen Engagement</p> |  <p>6. For Inclusive Development and Innovation</p> |

<https://opendatacharter.net/principles/>

Content of a Geodetic Data Sharing Policy (3)



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What are the guiding principles of the policy?

“GEO now aims to implement the following GEOSS Data Sharing Principles:

- data, metadata and products will **be shared as Open Data by default**, by making them available as part of the GEOSS Data Collection of Open Resources for Everyone (Data-CORE) **without charge or restrictions on reuse, subject to the conditions of registration and attribution when the data are reused;**
- where international instruments, national policies or legislation **preclude the sharing of data as Open Data**, data should be **made available with minimal restrictions on use** and **at no more than the cost of reproduction and distribution;** and
- all shared data, products and metadata will be **made available with minimum time delay.**”

Content of a Geodetic Data Sharing Policy (4)



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What are the guiding principles of the policy?

“Principles

- Data, metadata, products, and information should be **fully and openly shared, subject to national or international jurisdictional laws and policies**, including respecting appropriate extant restrictions, and in accordance with international standards of ethical research conduct.
- Data, metadata, products, and information produced for research, education, and public-domain use will be **made available with minimum time delay and free of charge**, or for **no more than the cost of dissemination**, which may be waived for lower-income user communities to support equity in access.
- All who produce, share, and use data and metadata are stewards of those data, and **have responsibility for ensuring that the authenticity, quality, and integrity of the data are preserved**, and respect for the data source is maintained by ensuring privacy where appropriate, and encouraging appropriate citation of the dataset and original work and acknowledgement of the data repository.
- Data should be **labelled ‘sensitive’ or ‘restricted’ only with appropriate justification** and following clearly defined protocols, and should in any event be **made available for use on the least restrictive basis possible.”**



WORLD DATA SYSTEM

The World Data System (WDS) is an Interdisciplinary Body of the International Council for Science (ICSU)

<https://www.icsu-wds.org/services/data-sharing-principles>

Content of a Geodetic Data Sharing Policy (5)



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What are the guiding principles of the policy?

Principle 1 - Government data will be made available **unless access is restricted for reasons of privacy, public safety, security and law enforcement, public health, and compliance with the law.**

Principle 2 - Government data will be made **available under flexible licences.**

Principle 3 - With limited exceptions, government data **will be made available at no or minimal cost.**

Principle 4 - Government data will be **easy to find (discoverable) and accessible in formats that promote its reuse.**

Principle 5 - Government will **follow standards and guidelines** relating to release of data and agency accountability for that release.

An agency may commercialise, or apply the Cost Recovery Guidelines to, government data if:

- a) it has an explicit statutory function to do so; or
- b) it has been explicitly authorised to do so by the relevant Minister after consulting with the Treasurer, because of a clear net benefit to the Victorian community.



Content of a Geodetic Data Sharing Policy (6)



What are the guiding principles of the policy?

Open Data Principles

Open data principles lead to more responsive and smarter government, and better service delivery. To meet the obligations of this policy, agencies must manage data as a strategic asset to be:

- Open by default, protected where required
- Prioritised, discoverable and usable
- Primary and timely
- Well managed, trusted and authoritative
- Free where appropriate
- Subject to public input.

<https://www.finance.nsw.gov.au/ict/resources/nsw-government-open-data-policy>



1 Principles

The Queensland Government recognises the importance of effectively managing the release of government data to optimise the use and reuse of open data for the benefit of the Queensland people. The Queensland Government commits to following the International Open Data Charter¹ principles:

1. Open by Default
2. Timely and Comprehensive
3. Accessible and Usable
4. Comparable and Interoperable
5. For Improved Governance and Citizen Engagement
6. For Inclusive Development and Innovation

<https://www.qld.gov.au/data/qld-data-policy-statement.pdf>



Content of a Geodetic Data Sharing Policy (7)



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What are the guiding principles of the policy?

Data Sharing Principles

The following data sharing principles aim to guide the Government agencies' Open Data efforts.

- *Data shall be made easily accessible*
- *Data shall be made available for co-creation*
- *Data shall be released in a timely manner*
- *Data shall be shared in machine-readable format*
- *Data shall be as raw as possible*



<https://data.gov.sg/about>



<http://data.gov.bd/dataset>

Content of a Geodetic Data Sharing Policy (8)



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What are the guiding principles of the policy?

New Zealand Data and Information Management Principles

The New Zealand Data and Information Management Principles (NZDIMP) are a set of seven principles under which the New Zealand government releases its open data.

The principles state that data should be:

- open
- protected
- readily available
- trusted and authoritative
- well-managed
- reasonably priced (preferably free)
- reusable.

Unless there are identifiable reasons for its release, personal and classified data remains protected. Government data and information should also be trusted and authoritative.

data.govt.nz Discover and use data

<https://www.data.govt.nz/standards-and-guidance/open-data/open-data-policy/>

For whom will this policy apply to, and what geodetic data is be shared?

- Prepare a scoping statement that expresses what this policy will do and what it applies to.
- State what geodetic data the policy refers to?
 - GNSS, gravity, height, tidal, other ?
- List the stakeholders, parties and agencies that are involved, - who will be affected, who will be responsible, who can collaborate, who will you engage?
 - Local, regional global, scientific, academic, commercial, professional, industry sectors, statutory



Content of a Geodetic Data Sharing Policy (10)



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How will the policy be administered?

- Describe the frameworks for – governance, geodetic information management
 - Refer to related legislation / other policies / strategies / initiatives / standards
 - Copyright / Intellectual Property
 - Privacy / Freedom of information
 - Records and information management
 - Technical standards and acceptable practices (...*metadata!*...)
- Noting all of the above could be local/ regional / international
- Licence or Data Sharing agreements – expressing limitations with respect to use, access, sharing, publishing? alternatively is it “open”?



Content of a Geodetic Data Sharing Policy (11)



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How will the policy be implemented?

- Outline the process for the various phases of implementation and include timelines – both short and long term activities?
 - Consultation
 - Data discovery
 - Policy development
 - Institutional matters
 - Standards / guidelines development
 - Implementation
 - Policy evaluation and review
- Describe the role and functions of each stakeholder or agency involved with the data sharing policy; and how each can be involved.

Content of a Geodetic Data Sharing Policy (12)



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Other relevant sections / appendices

- Definitions and terms used in the policy document
 - <https://opendatacharter.net/resource/definition-key-terms-charter-principles/>
- More detailed explanation of the “principles”
- Specifications of the geodetic data to be shared – quality / formats / standards / metadata
- Examples of an “open data” or “data sharing” agreement / licence
- References to geodetic data sharing “toolkits”, guidelines
- Frequently asked questions
- Who to contact



<https://data.wa.gov.au/open-data-policy>

Moving towards a Geodetic Data Sharing Policy (1)



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How do we implement change and a strategy re geodetic data sharing?

Options -

- Articulate your vision, with clear examples of benefits the geodetic data sharing will bring.
- **Secure support for the geodetic data sharing initiative from both senior government officials within the agency, and political leadership before declaration.**

Create a campaign / initiatives to advocate / educate government officials about geodetic data sharing. Fostering support for the change will help encourage early uptake and on-going ownership. Develop a resource plan.

- **Find and support “champions” of geodetic data sharing at all levels within government.**



How do we implement change and a strategy re geodetic data sharing?

Options -

- Create an accessible / simple consultative mechanism to deliver information and receive feedback about geodetic data sharing.
- **Need to have “quick wins” for your geodetic data sharing initiative to assist the momentum for change.**
- Be agile, flexible and responsive to the strengths and needs of different agencies and work units.
- Consolidate your change management efforts
- **Ensure the all members of geodetic data sharing team have open / frank / regular communication.**



Moving towards a Geodetic Data Sharing Policy (3)



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How do we implement change and a strategy re geodetic data sharing?

Options -

- **Locate stories that reflect the value of geodetic data sharing.**
Need to be tailored or aligned, depending on who the audience.
- **Gather and encourage on going support and demand for geodetic data sharing from external sources - traditional and non-traditional sectors.**
Note external support can help to maintain political will to support geodetic data sharing, and be a source of ongoing learning and dialogue.
- Have learning programs to create opportunities for other government employees to be part of geodetic data sharing.
- **Develop formal metrics to monitor and evaluate geodetic data sharing activities.**
To measure progress, benchmark success, ROI, and identify areas for improvement.



How does your place presently rate?



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|------|---------------|-------------------|---------------------|-------------|---------------|---------------------------|-------------------|-------------|---------------|------------------|------------------|------------------|-----------|---------------|---------------------|----------------|-------|
| 1 | Taiwan | Green | Green | Green | Red | Green | Green | Green | Green | Green | Green | Green | Green | Red | Red | Green | 90% |
| 2 | Australia | Green | Green | Green | Red | Green | Red | Red | Green | Red | Green | Green | Green | Red | Red | Red | 79% |
| 2 | Great Britain | Green | Green | Red | Red | Green | Red | Green | Green | Red | Green | Red | Red | Red | Red | Red | 79% |
| 4 | France | Green | Green | Red | Red | Green | Red | Red | Red | Red | Green | Green | Red | Red | Red | Red | 70% |
| 5 | Finland | Red | Green | Red | Red | Green | Red | Red | Green | Red | Red | Green | Red | Green | Red | Red | 69% |

How does your place presently rate?



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The Global Open Data Index (GODI) is an independent assessment and benchmarking tool of “**open government data**” publication from a civic perspective. GODI also enables different “**open data stakeholders**” to track government’s progress on “**open data**” release.

Government Budget

National statistics

Procurement

National Laws

Administrative Boundaries

Draft Legislation

Air Quality

National Maps

Weather Forecast

Company Register

Election Results

Locations

Water Quality

Government Spending

Land Ownership

Should we request a geospatial data index?

Navigate to - <https://index.okfn.org/methodology/> for more detailed information.

Kumamoto, Japan Resolution - Geodetic Reference Frame

<http://www.un-ggim-ap.org/meetings/pm/6th/201707/W020171105036017474658.pdf>



Nuku'alofa, Kingdom of Tonga - “Strengthening National Geospatial Information Management”

http://ggim.un.org/meetings/2018-International_Workshop_Tonga/documents/Nukualofa_Summary_Statement.pdf





Your geodetic / geospatial future is in your hands !

Thank You !

Questions?

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