Policy Intervention for promoting use of geospatial information

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Japan's experience

1. Basic Act on the Advancement of Utilizing Geospatial Information

2. Survey Act

3. GSI's main activities

4. Economic and social impact of surveying and mapping

5. Conclusion

1. The Basic Act

- Basic Act on the Advancement of Utilizing Geospatial Information (2006)
  - Purpose
    - To promote policies for the advancement of utilizing Geospatial Information
  - Basic principles (extracted)
    - Comprehensive and systematic implementation of measures including accurate and proper Geospatial Information and promotion of GIS, PNT
    - Enhancing the synergy among policies pertaining to Geographic Information Systems and Satellite PNT
    - The improvement of integration, flexibility and transparency of policies
    - Contribution to the vitalization and sustainable development of the economy and society

1. The Basic Act

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- Basic Act on the Advancement of Utilizing Geospatial Information (2006)
  - Formulating a Basic Plan for the Advancement of utilizing geospatial information
  - The Basic Plan includes:
    - Basic policies for utilizing Geospatial Information
    - Policies for Geographic Information Systems
    - Policies for PNT
  - Policies for GISs
    - Preparation of Fundamental Geospatial Data as open data
  - Others
    - Dissemination of Knowledge, development of human resources

1.The Basic Act built in 2006

- What happened during this decade?
  - Many of government officials come to know “geospatial information”
  - In government plan such as national disaster Management Plan, “GIS” has been used.
  - Activities of local governments are progressing, but limited.
  - Fundamental data are provided free of charge
    - Data received at GNSS control station from positioning satellite
    - Fundamental geospatial data including road, building,waterline, seashore etc with good accuracy
- Next decade?

2. The Survey Act

- The Survey Act (1949, latest rev. in 2011)
  - Purpose
    - To set the standard for land survey
    - To avoid redundancy in surveys
    - To assure survey accuracy
  - Definition of survey is land survey, mapping, and taking aerial photos.
  - Survey standards
  - Defining main survey schemes
    - Basic Surveys ------ executed by GSI
    - Public Surveys ------ executed by public organizations
    - Other Surveys ------ executed by private sectors

2. The Survey Act

- The Survey Act
  - For the guarantee of accuracy
    - Public Survey shall be based on Basic Surveys (& precedent other public surveys)
    - Public surveys are under control of GSI in terms of pertaining survey accuracy and avoiding redundancy
    - Using survey results requires the approval of the organizations which executed the surveys, to confirm the accuracy of original survey results.
  - The Survey Act has an important role to promote use of geospatial information in terms of secured use of accurate data

Fundamental Geospatial Data(FGD) in the Basic Act are mainly prepared by the Basic Surveys

3. GSI's Main Activities

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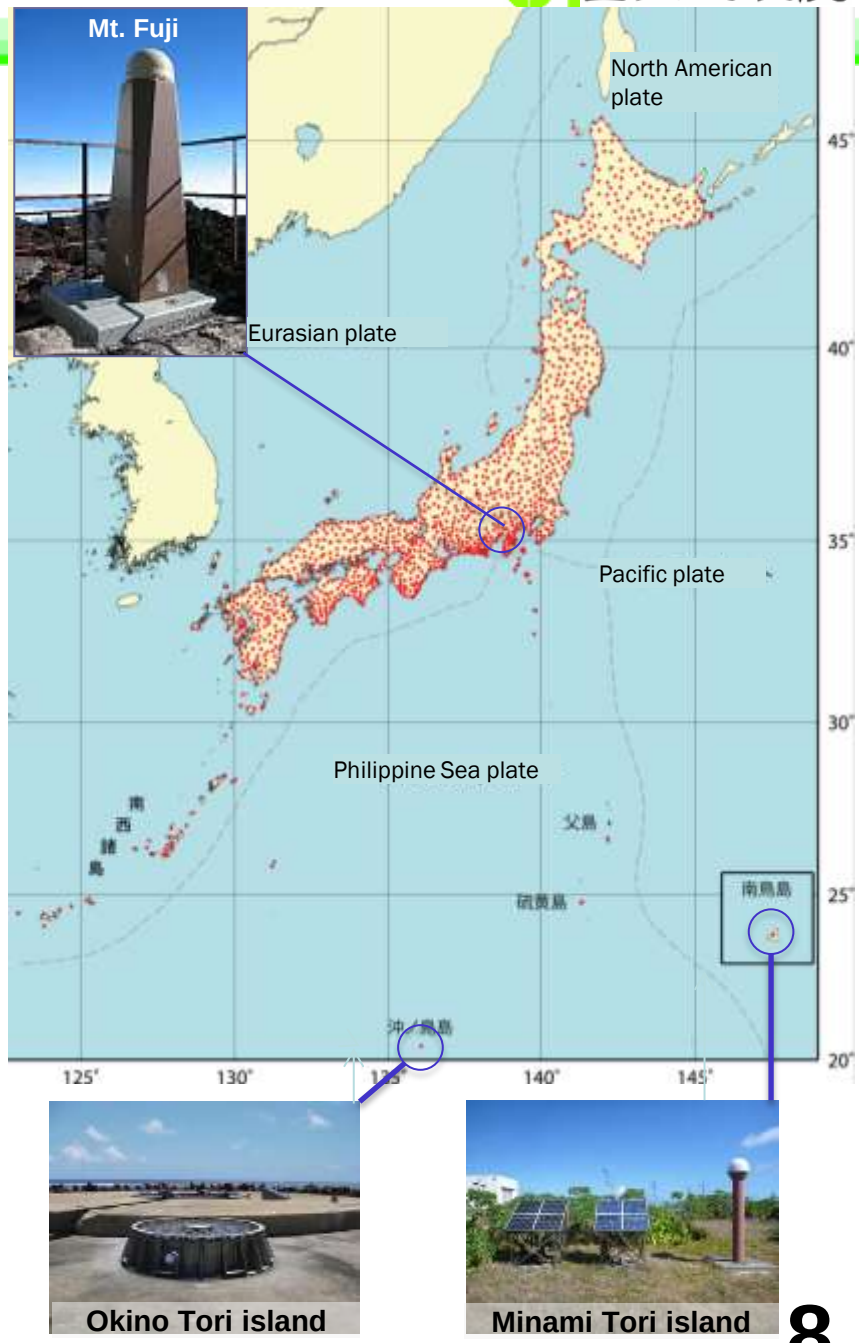
GEONET stations
(GNSS-based control points)

Model 93	Model 94	Model 95	Model 02
1993	1994	1995-1997	2002-



3. GSI's Main Activities

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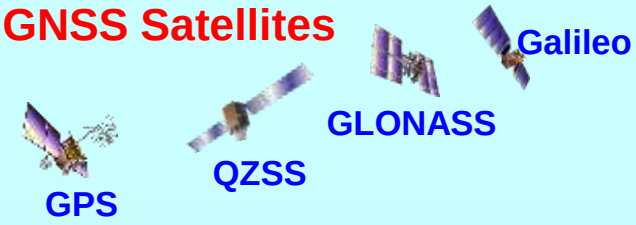
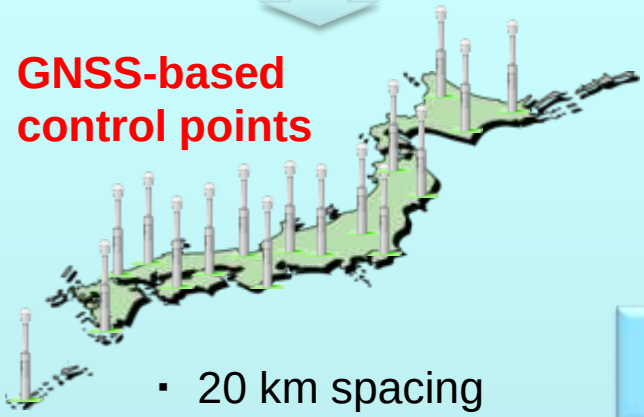
GEONET data / outcomes

GNSS Satellites

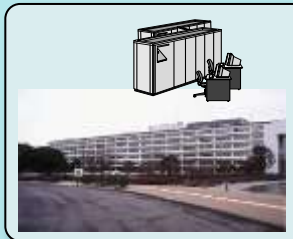


GNSS-based control points



- 20 km spacing
- Transferring real-time observation data

Analysis Center in Tsukuba



Data Collection

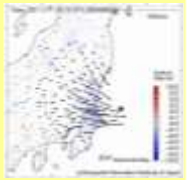
Data Analysis

Observed data (every 30 sec)

Survey & Mapping

- Data open to the public via web page, free of charge, with official site coordinates

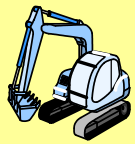
Analyzed data (coordinates)



Crustal deformation Monitor

- Monitoring of Earthquakes and Volcanic activities
- (new) Tsunami early warning

Real-time data

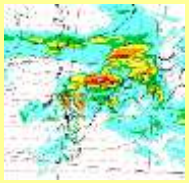


Provided to the Industry

Precise real-time positioning

- I-Construction
- precise farming
- Source of QZSS augmentation

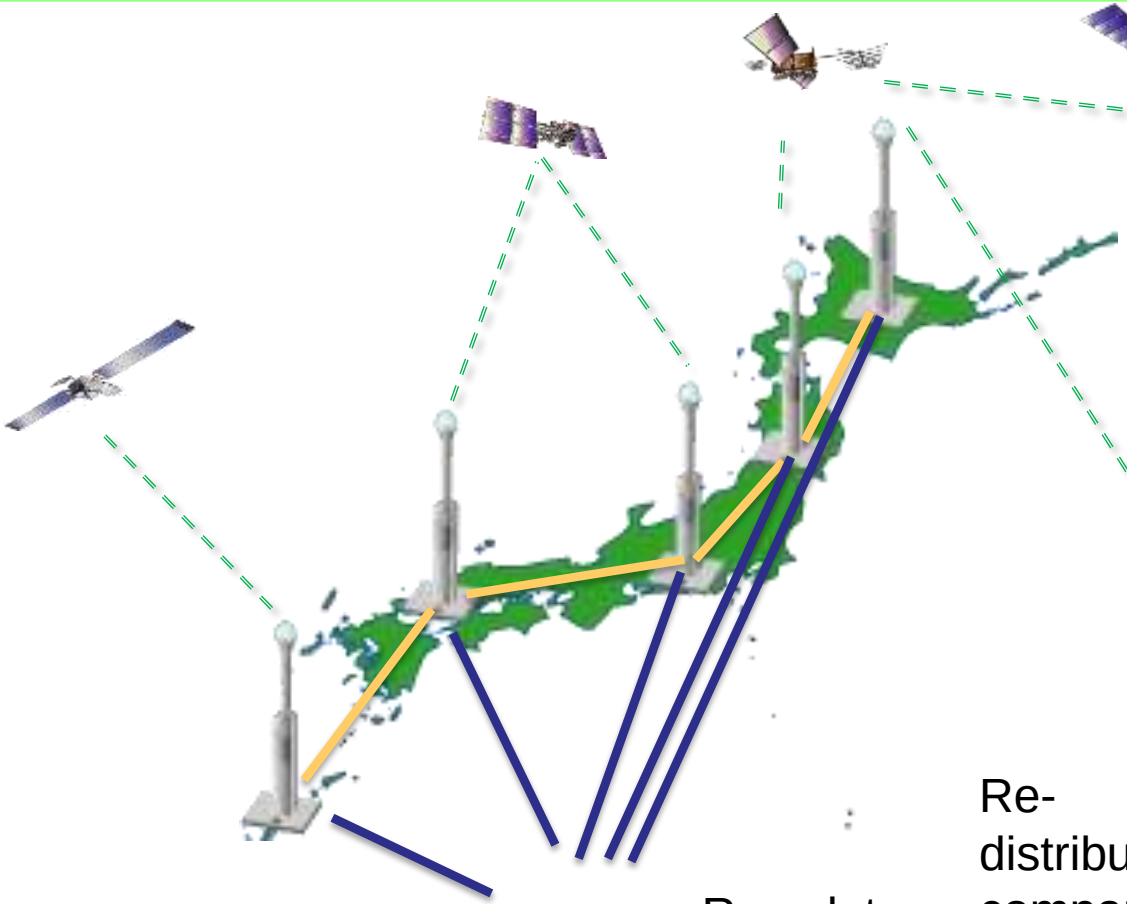
Other data

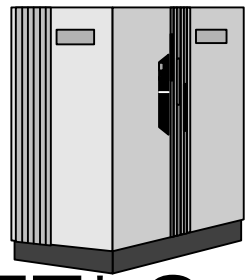


Applications

- Weather forecast using water vapor info from GNSS
- Ionosphere studies

3. GSI's Main Activities





GEONET* Central Analysis Center

Raw data free through internet

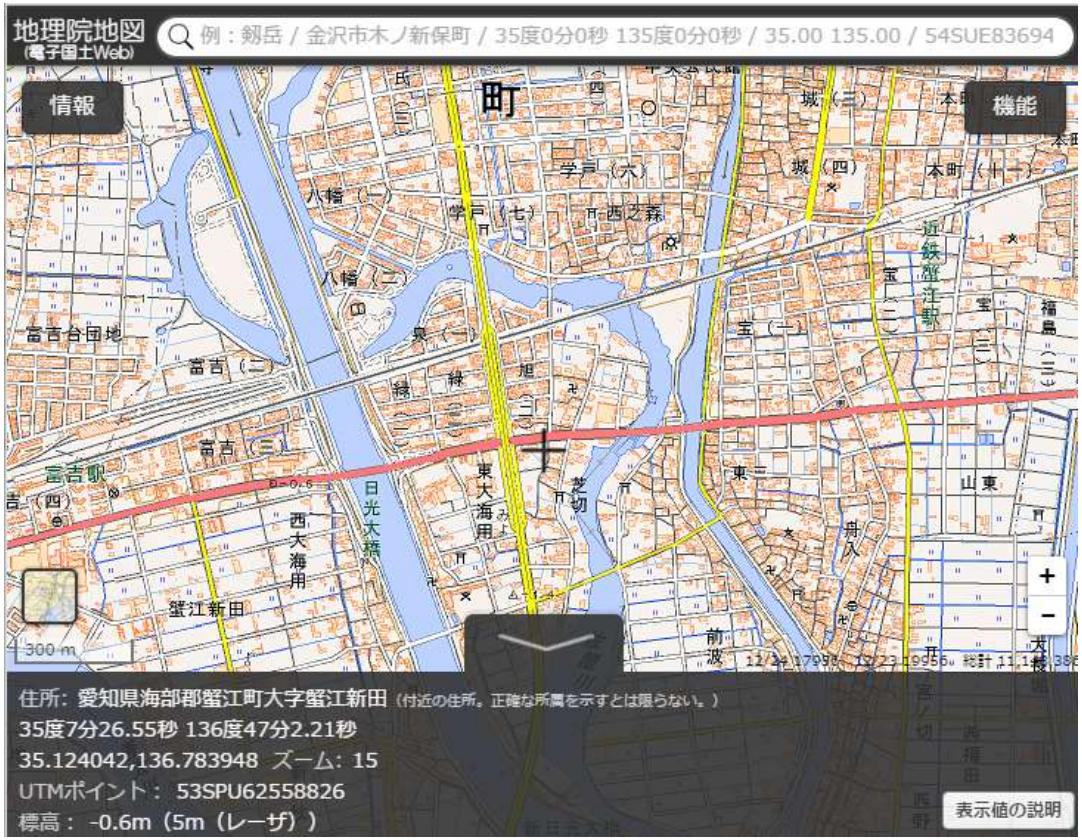
Re-distribution company (with other information such as estimated accuracy:
(Condition of ionosphere, moisture)

Various survey

i-Construction

For precise survey

GSI Maps (Various maps including FGD and photos)



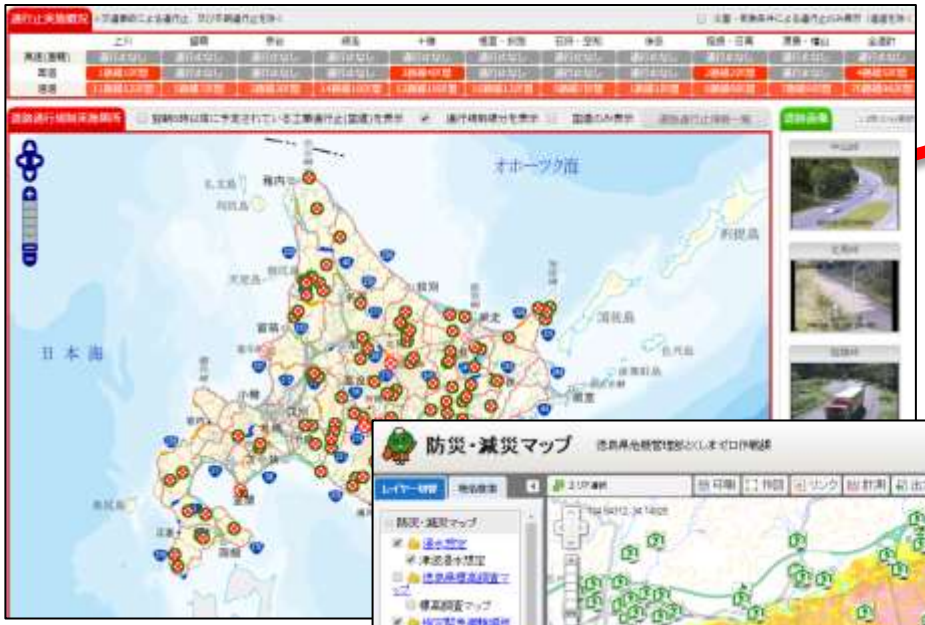
We can display any combinations of maps, aerial photos and thematic maps. Specific photos at disaster area can also be overlaid. (currently only in Japanese)

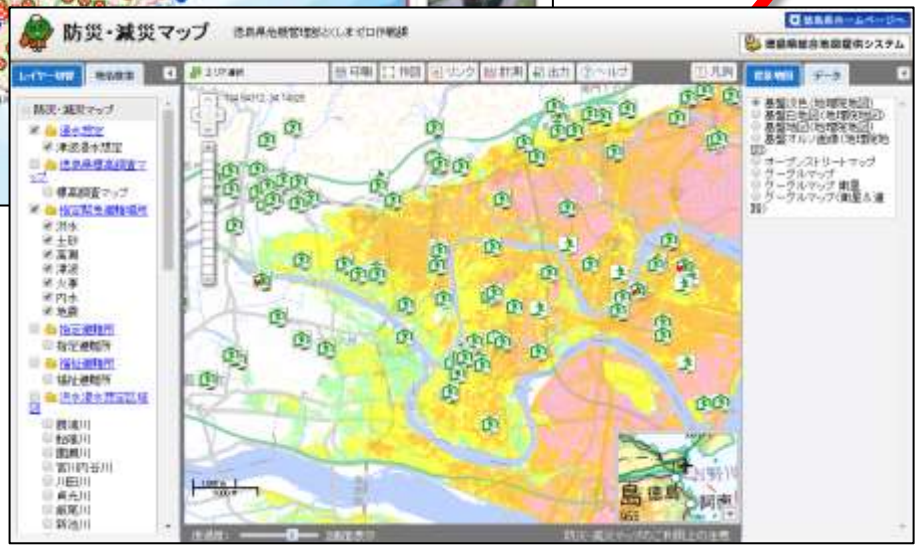
Three basic policy of GSI Maps

- Open data policy
- Open source policy
- Open innovation policy

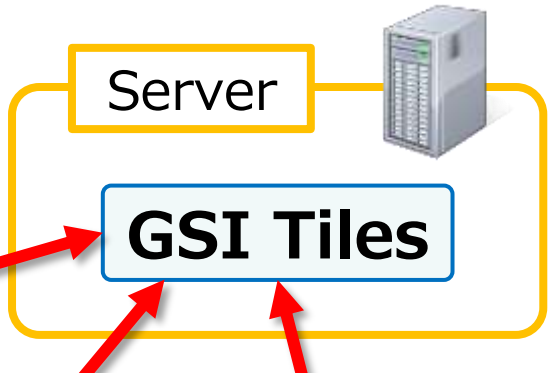
Open data policy
with various application

Road information website





Hazard map website



Smartphone application

Open source policy

- Open Source Software
  - Free / Open Source Software (FOSS) for web maps emerged since the latter half of 2000s.
    - e.g. Leaflet, OpenLayers, Cesium, ...
  - GSI also introduced such FOSS to serve its service more efficiently and effectively.

Open innovation policy

- GSI Maps Partners Network
  - A participatory network of software developers and tool providers to promote wider application of geospatial information through extensive use of GSI Tiles.

4. Economic and social impact of surveying and mapping

- How can we explain the importance of geospatial fields?
- Let's explain "geospatially", not by sentence.

4. Economic and social impact

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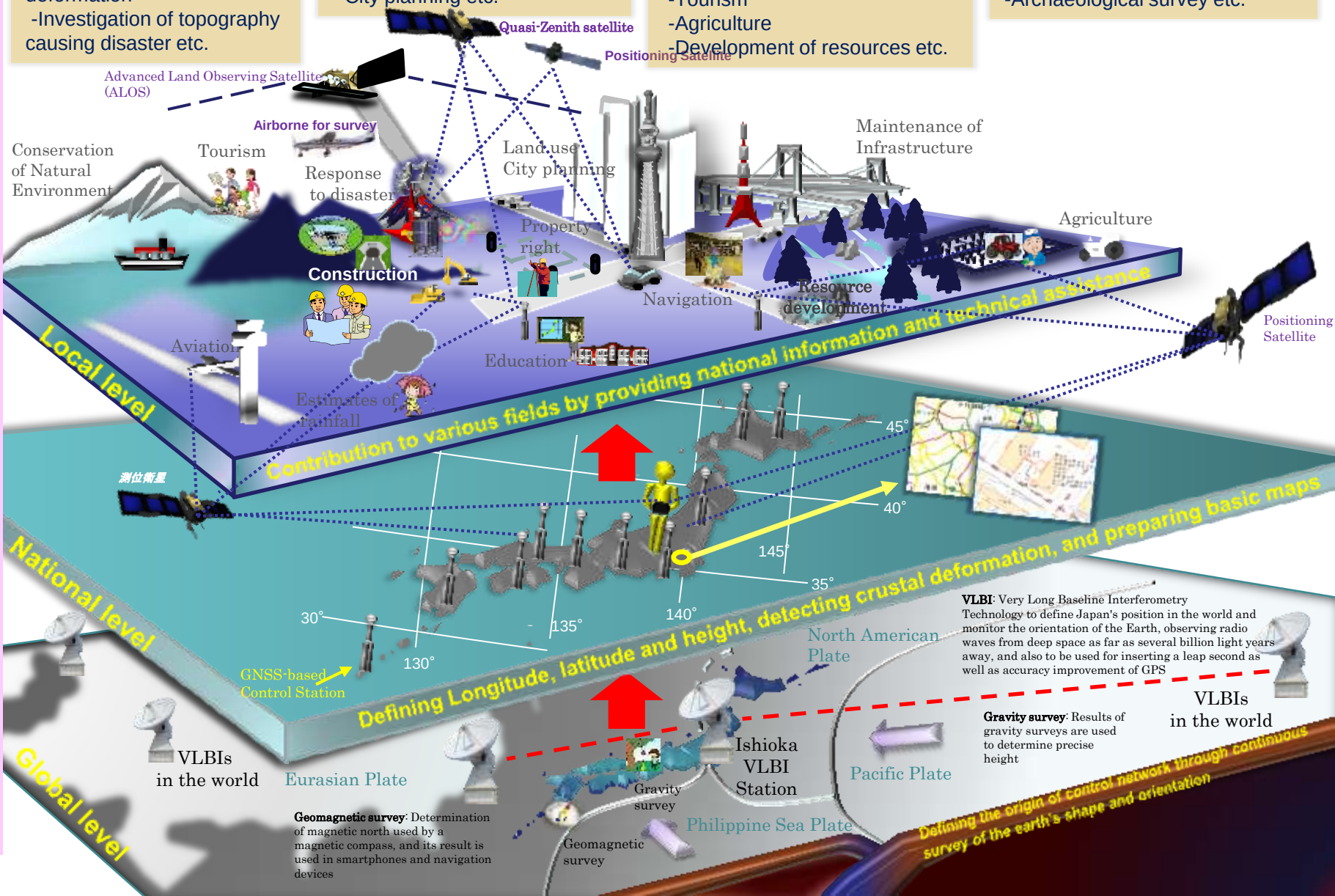
Mapping and surveying contribute to various fields in our society.

For safety and security
-Response to earthquake, volcanoes, water disaster
-Monitoring crustal deformation
-Investigation of topography causing disaster etc.

For more valuable lives
-Construction and maintenance of infrastructure
-Establishing land boundary
-City planning etc.

For industrial development
-Navigation (supporting cars or people to decide a route)
-Tourism
-Agriculture
-Development of resources etc.

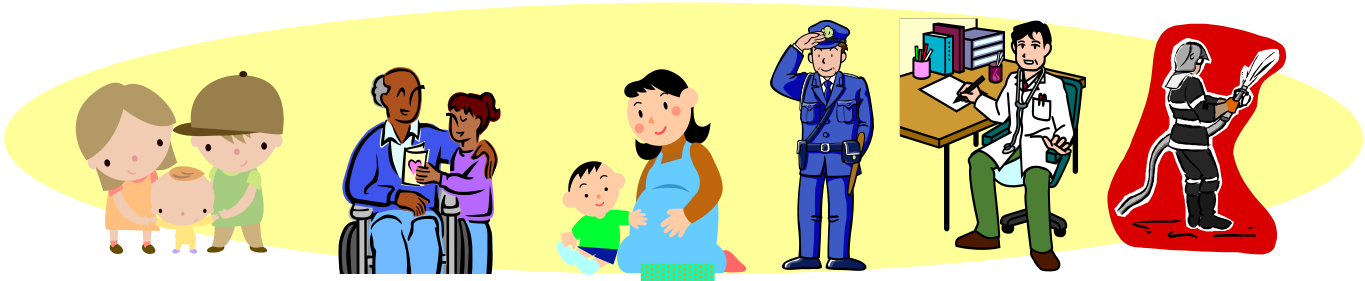
For education, historical survey and culture
-Education of geography
-Understanding changes of land
-Archaeological survey etc.

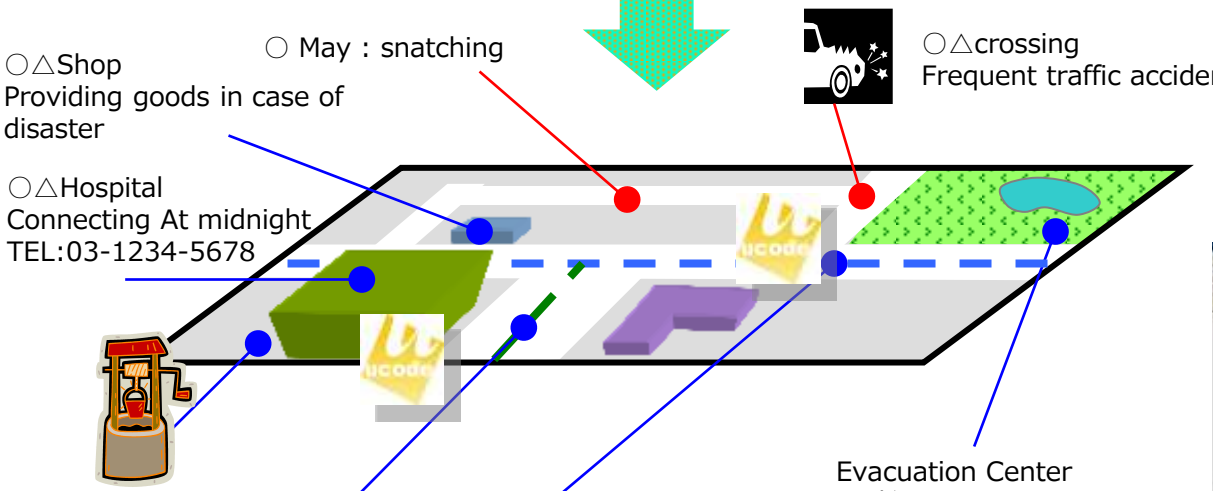


Safeguarding children and older people

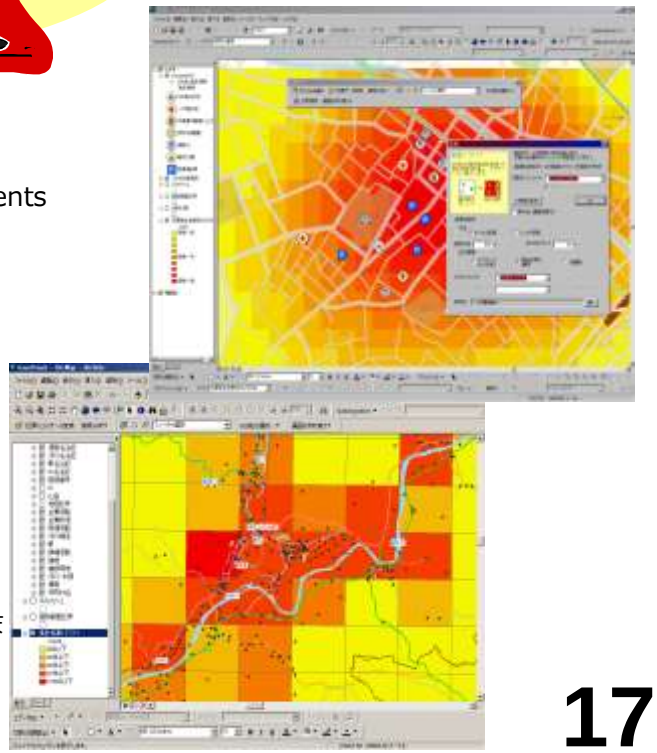
How to safeguard children and older people is a strong concern of society.

Visualizing the places of some accidents or other information through basic map and positioning system enables them to live more prepared/peaceful life.





Where did crimes/accidnts happen?



4. Economic and social impact

Analysis of cost reduction using GNSS Control Stations

- Control points survey at public sectors by GNSS control points in 2014 (JFY)
  - Probably about 40% total cost reduction is achieved, compared to the former survey method (by electronic tacheometer)
- Airborne survey for mapping at public sectors by GNSS control points in 2014 (JFY)
  - Airplanes are equipped with GPS receiver and IMU for getting the position, and GNSS control stations make the position of airplane more accurate (airborne photo, airborne Lidar etc)
  - About 5% total cost reduction estimated, compared to the mapping by manual orientation.

Conclusion

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- The next decade
  - Based on the Basic Act, enhancing the administrative framework is strongly required.
  - GNSS data and Fundamental Geospatial Data(FGD) should have guaranteed accuracy, be updated properly and avoid the duplication of survey based on the Survey Act, and be provided by open data policy
  - Proper outreach of geospatial information/technology should be carried out to the people including explanation of social and economic impact.
  - Educational scheme and contents for understanding importance of the geospatial information is also important.
  - Introduction of innovative technology is also required.
- When government sectors keep these key factors, business sectors can more positively be encouraged to invest in geospatial information/technology.

Thank you for your attention

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