GNSS Continuously Operating Reference Stations of Indonesia (Ina-CORS)

Parluhutan Manurung

Indonesia Geospatial Information Agency (BIG)

formerly BAKOSURTANAL

49th Session of UNCOPUOS Scientific and Technical Subcommittee, Vienna, 6-17 February 2012

Outline

- Why need continuous observations?

- Non-continuous observation

- Ina-CORS

- Future Development

Why Need Continuous Observations?

To provide reference frames in the gravity field, rotating Earth and moving crust

*Source: GGOS*
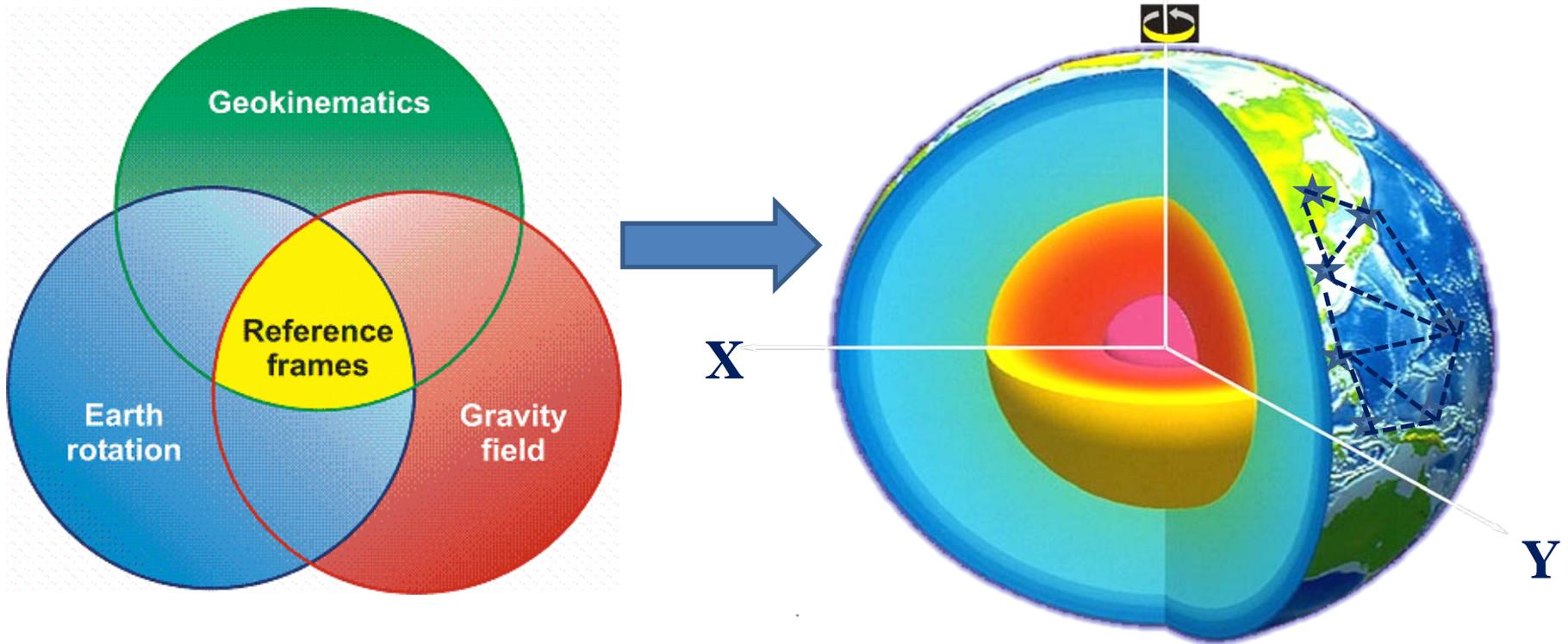
Why Need Continuous Observations?

To observe crustal deformation of areas located in the ring of fire
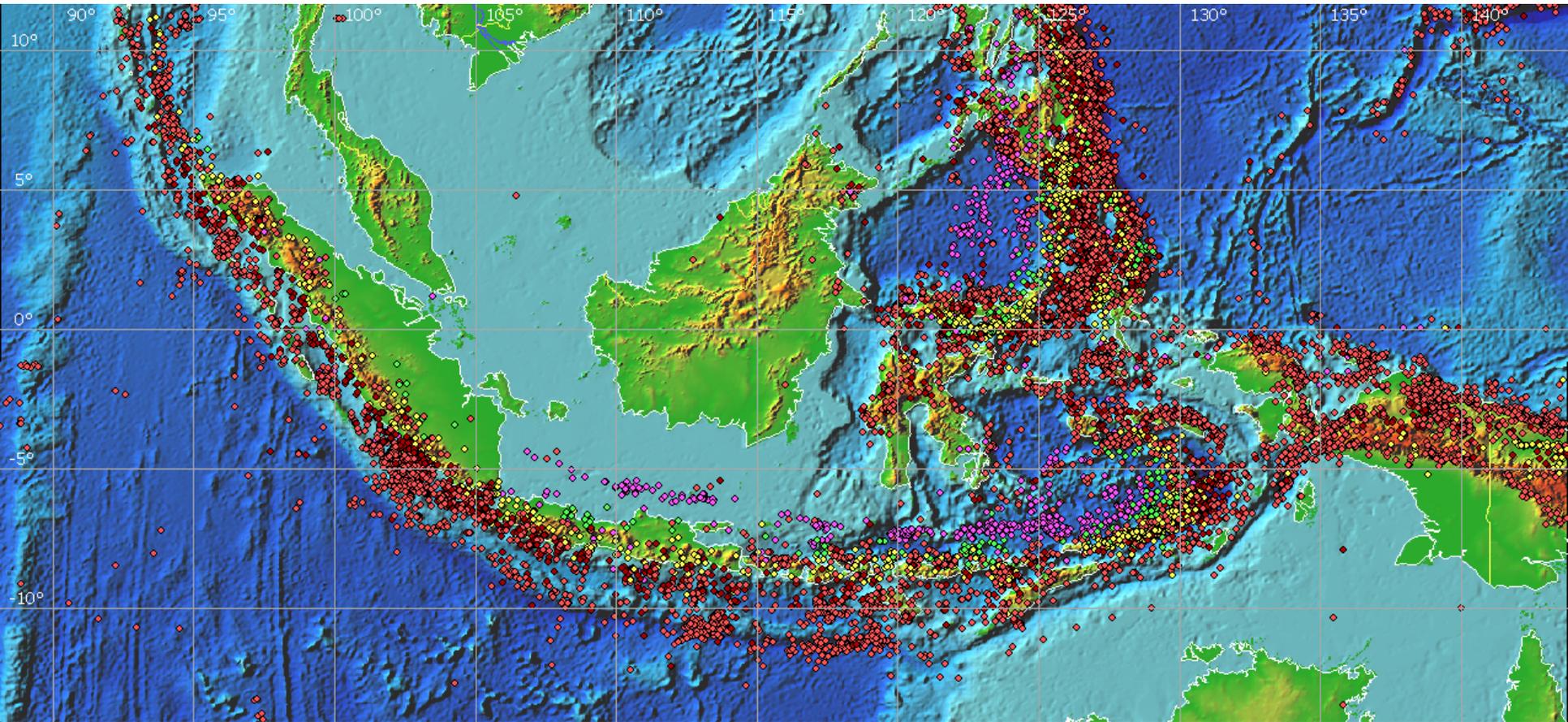

Seismicity maps of Indonesia

Why Need Continuous Observations?

- To provide a active geodetic control points for geospatial mapping
- To unify layers of geospatial information provided by many institutions in a single reference

TOPONIMI

roads

Border of administration

HIDROGRAFI

elevation

image

Geodetic Control Points
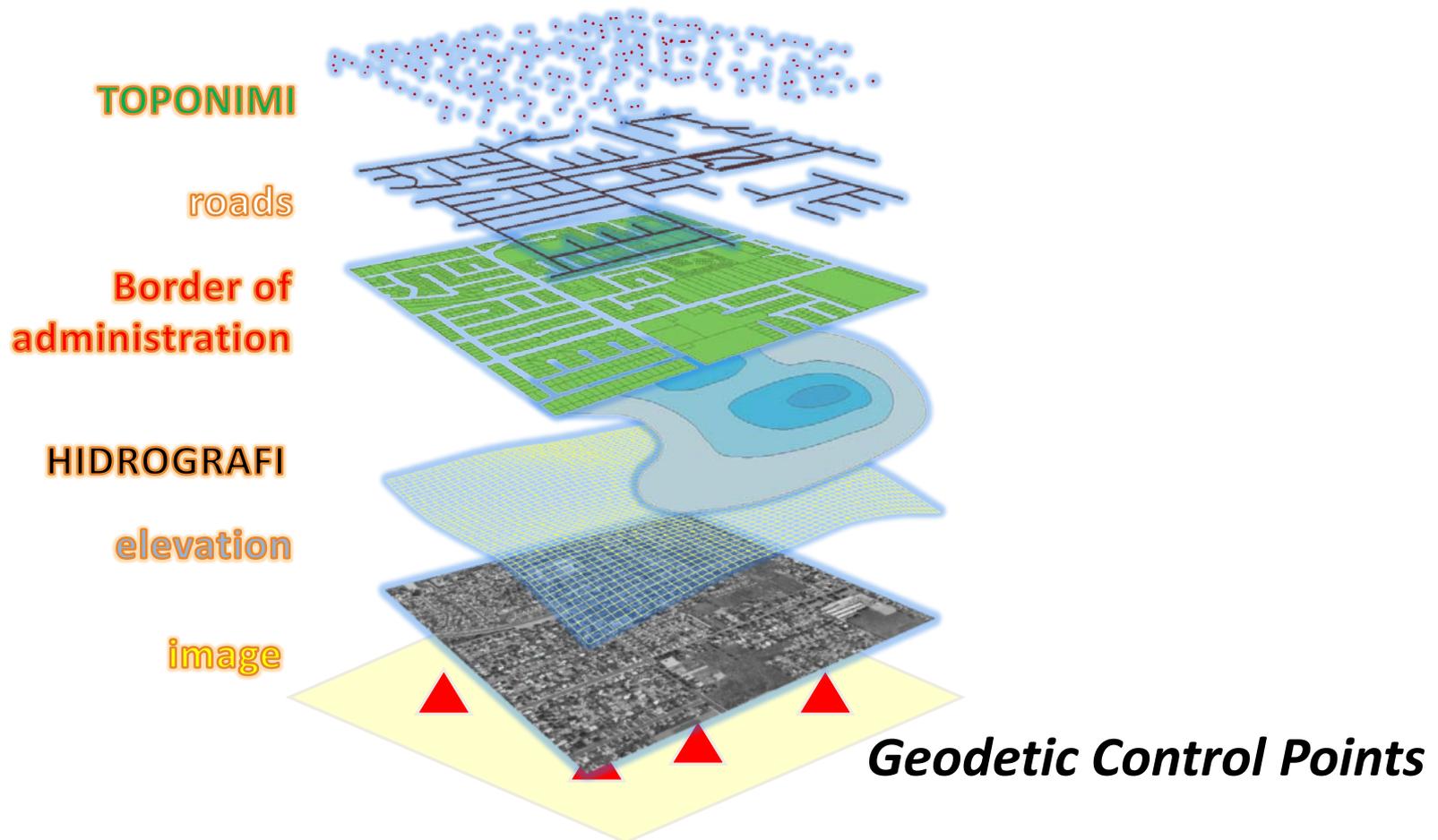
Non-Continuous Observation

630 geodetic control points observed periodically
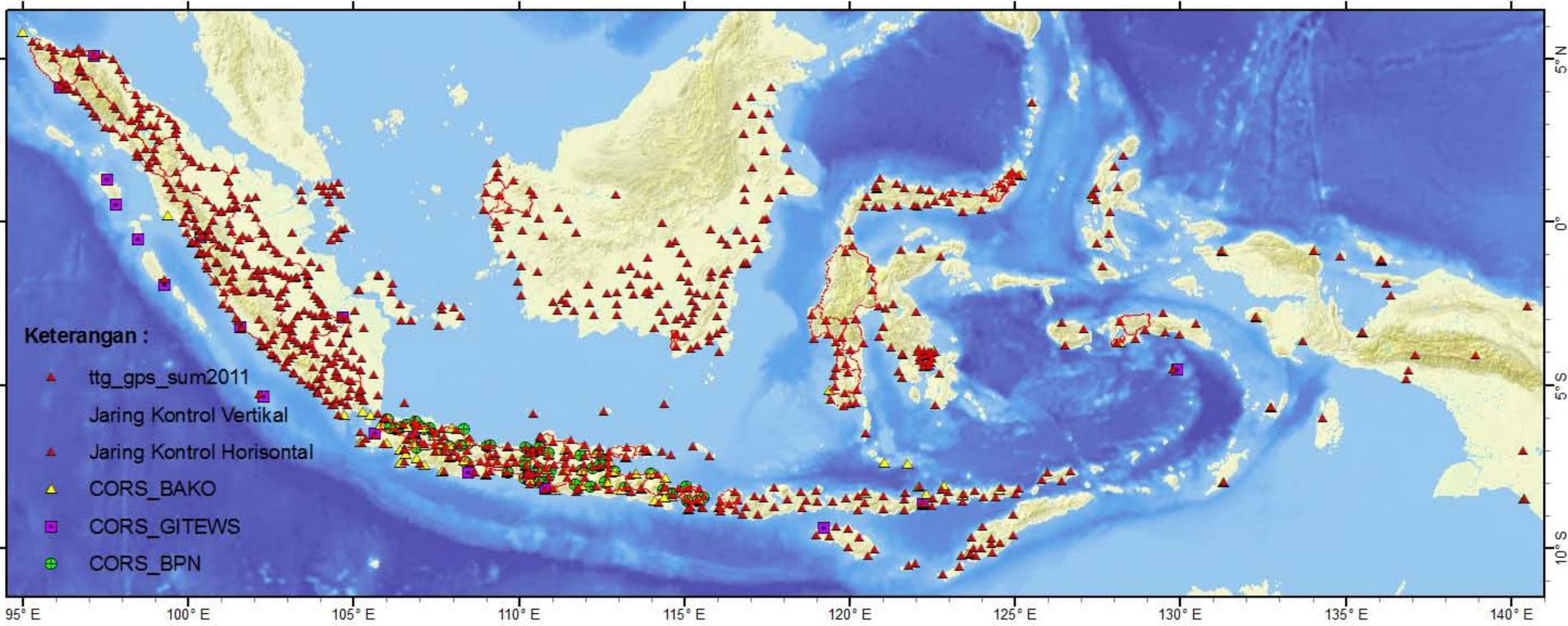
Non-Continuous Observation

Velocity rate of crustal deformation derived from GPS Repeated Observations
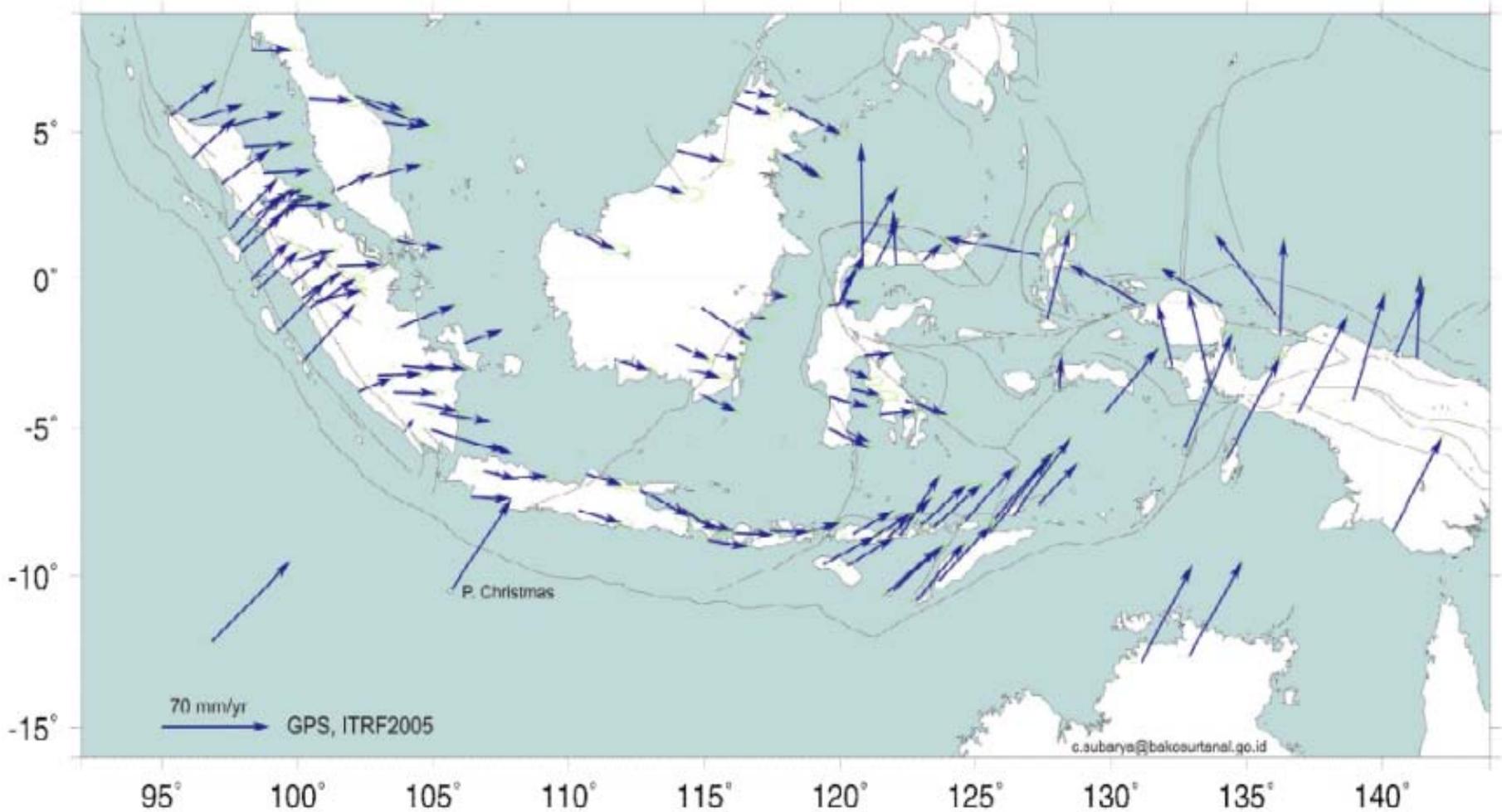
(C. Subarya 2010).

Non-Continuous Observations

Geodetic control points for land cadastral

| No.	Order	Control Points (2010)
1.	2	7.054
2.	3	14.085

Geodetic Control Points in Jakarta
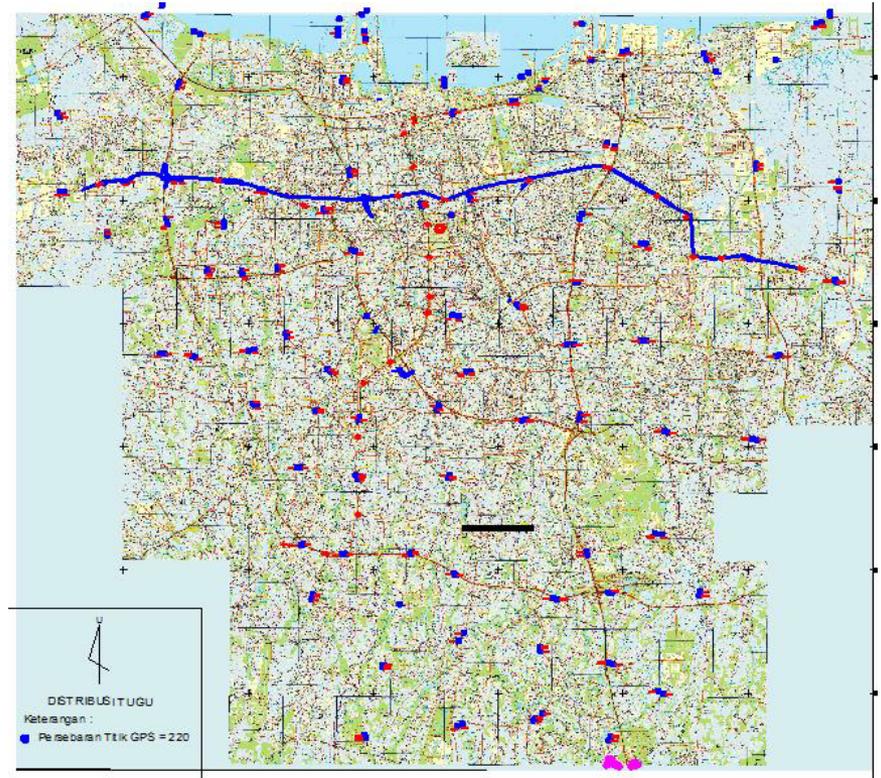
- GPS Observations in coastal areas highly affected by land subsidence
- Geodetic control points provided by local goverment of Jakarta Metropolitan

System Architecture

1. Common Satellites
2. Server Software
3. RTK Corrections
   - Resolve network ambiguities
   - Generate RTK corrections
   - Send to rover
4. RTK Solution

Network RTK Server

Reference Station

Reference Station

70 km
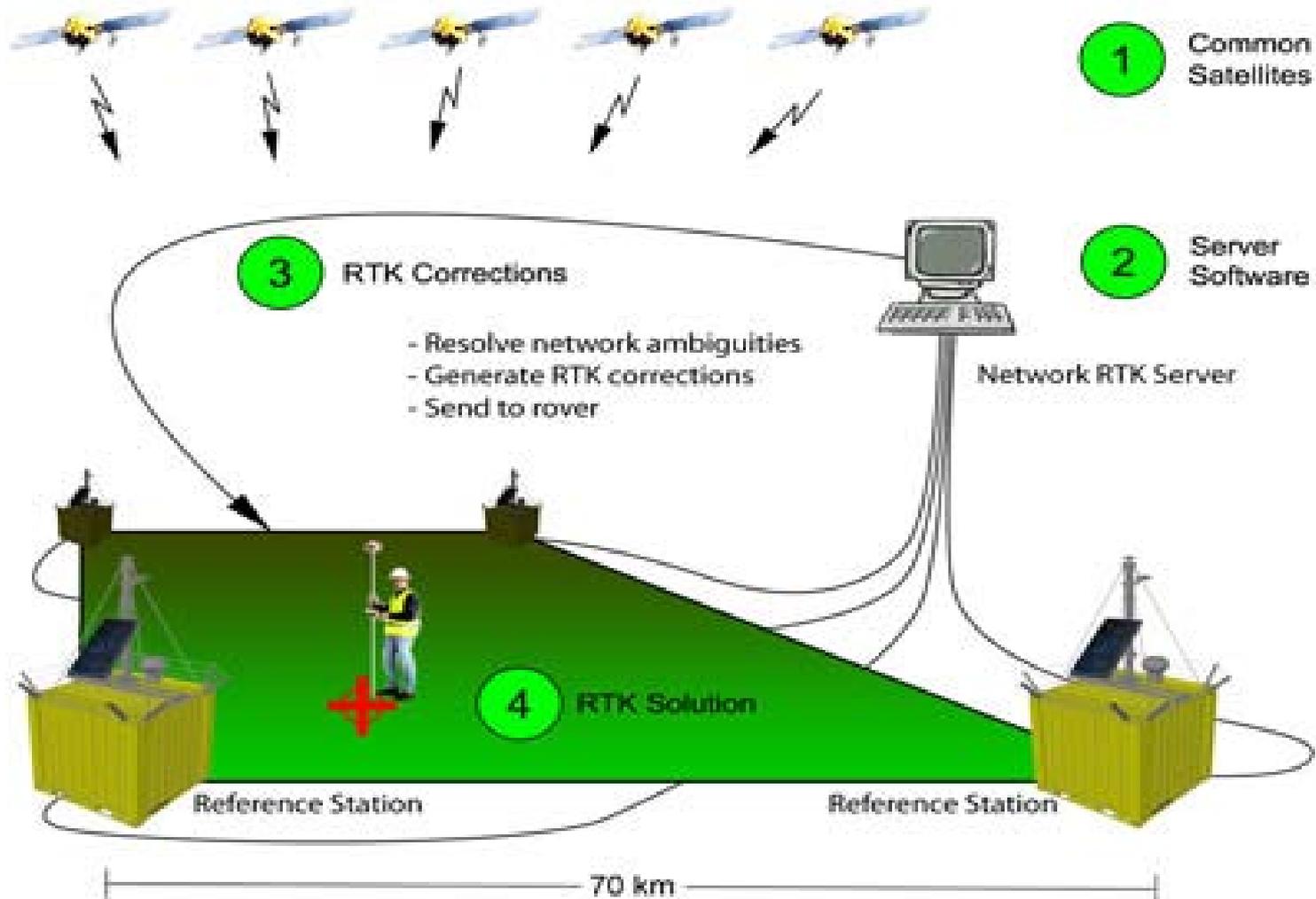
Ina-CORS

Presents stations

Legenda:
- CORS-GPS
- CORS-IGS
- cGPS-Seismometer
- cGPS@Tide Gauge
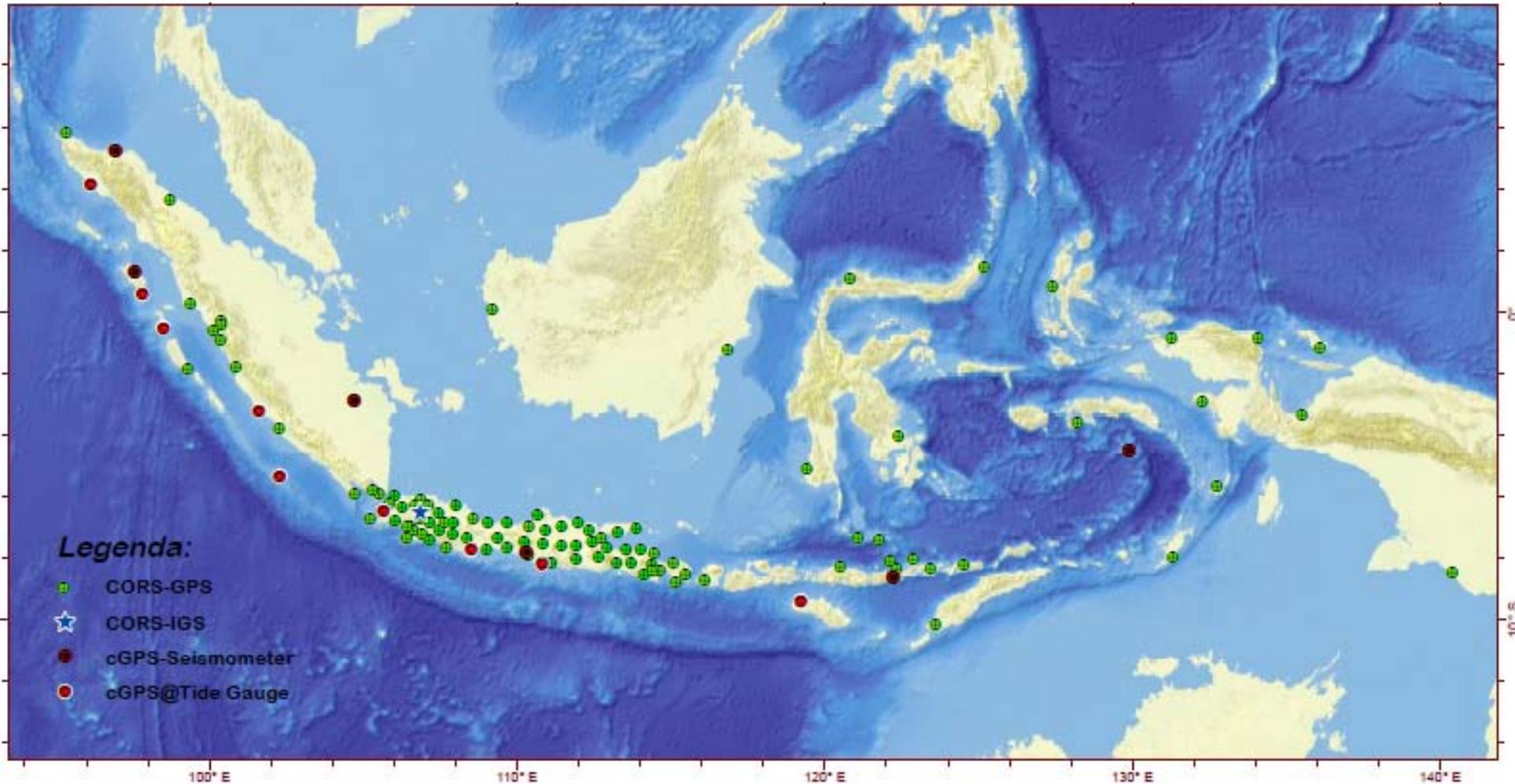
Ina-CORS

- Operated by Geospastial Information Agency (BIG) – 100 stations and Land Administration Agency (BPN) – 50 stations.
- Plan: to provide positioning corrections at centimeter level.
- Need 1000 stations distributed in the whole country.

Ina-CORS

Data Communication with Radio Link
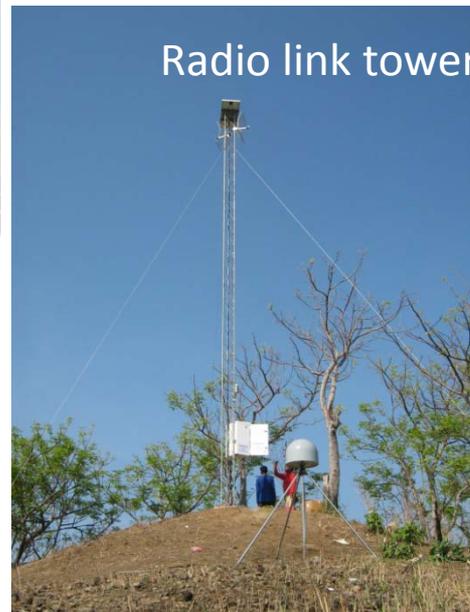
Data Communication with VPN IP

GPS Antenna

Radio link tower

Data logger

Ina-CORS

Support Tsunami Early Warning System of Indonesia
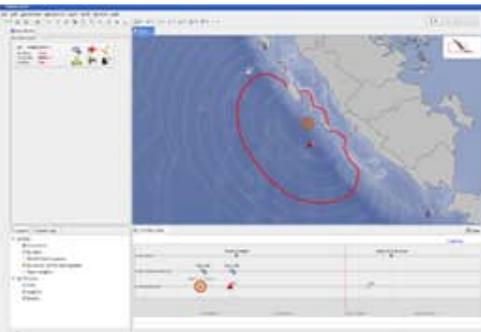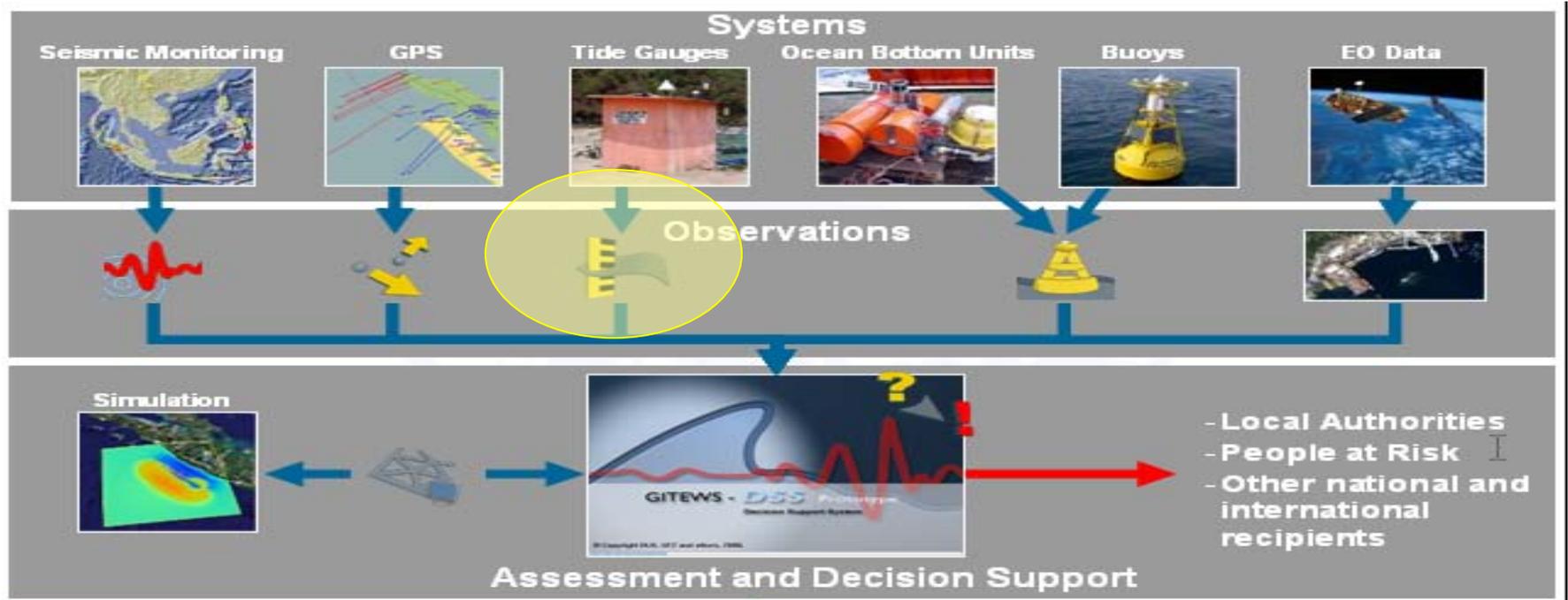
Future Development

Ina-CORS as part of Indonesian Geoportal
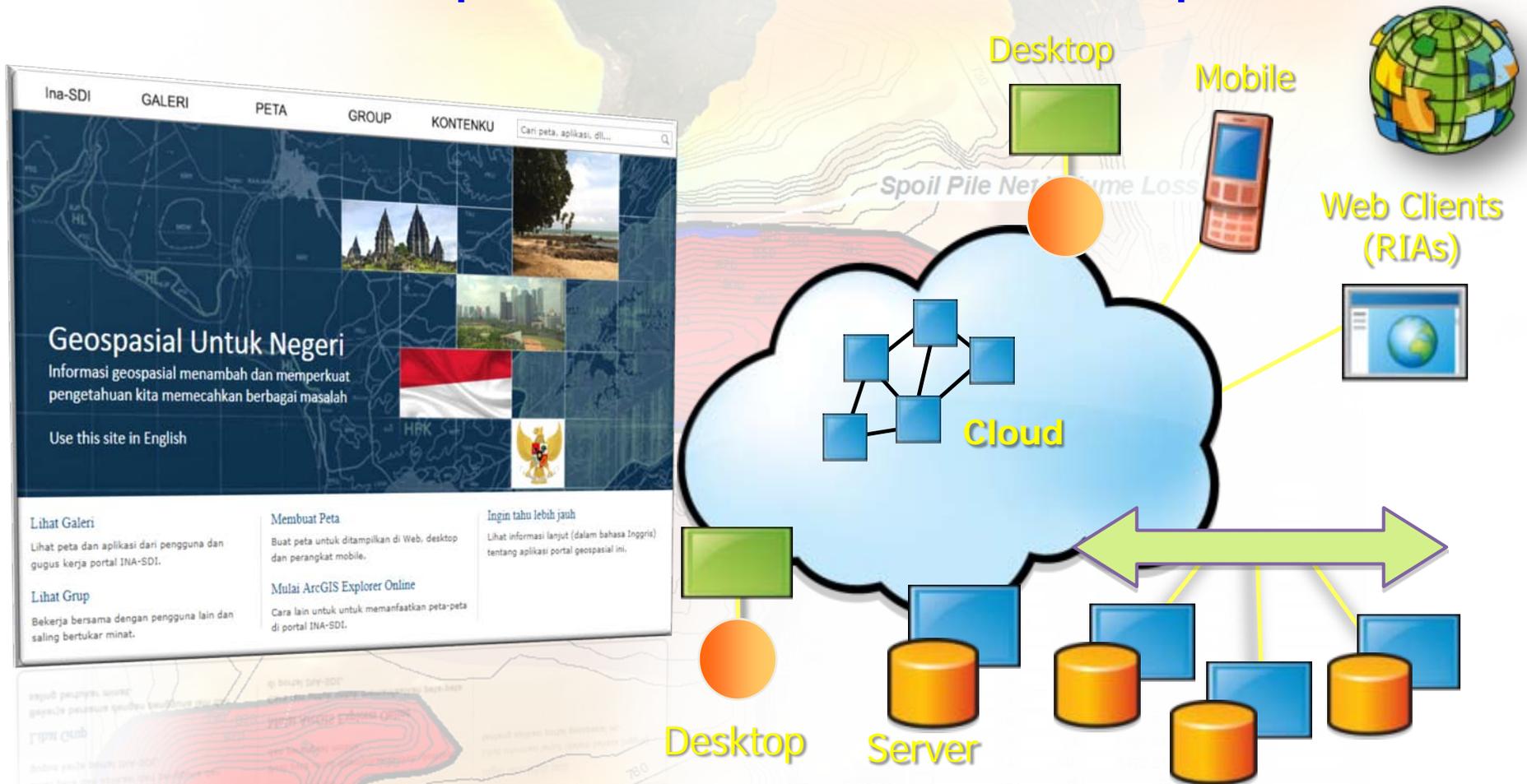
Future Development

- CORS utilisation is still limited since a high precision receiver is expensive.
- Need to a provide a high precision low cost for rover receiver
- A rover GNSS reciever design: an integration of GIS Destop, mobile data communication and precise antenna

Thanks