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Grid Initiatives & Projects

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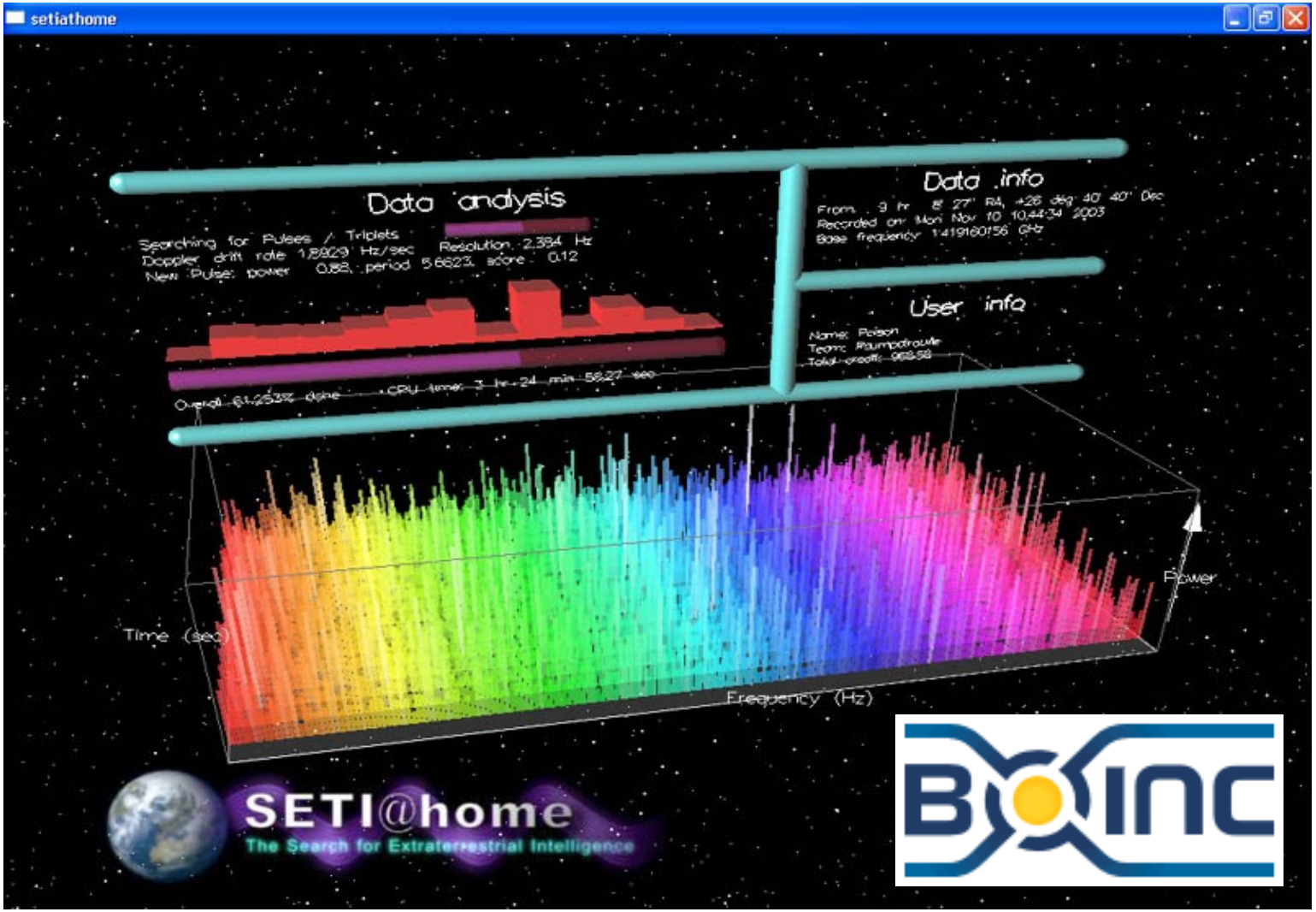
Geoprocessing in GRID computing
Workshop at GI Days 2008, Münster.

Overview

1. Levels (Global, Europe, Germany)
2. Projects

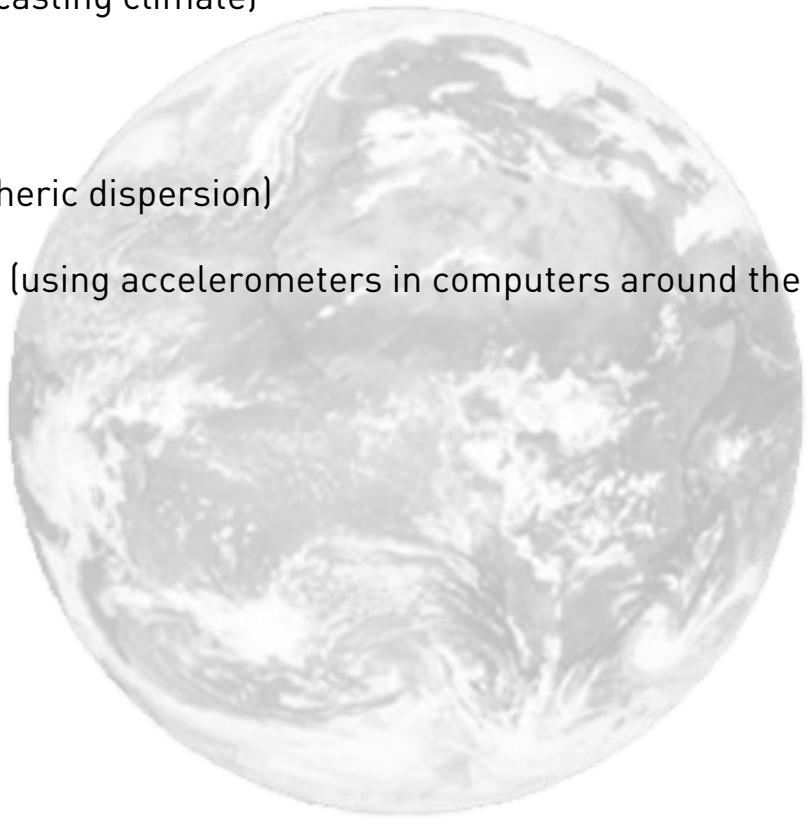
Global Grid Intitiatives

Volunteered Computing



Volunteer Computing Projects

- SETI@home (finding extraterrestrial life)
- ClimatePrediction.net (forecasting climate)
- Upcoming
  - APS@Home (effects of atmospheric dispersion)
  - Quake Catcher Network (using accelerometers in computers around the world)



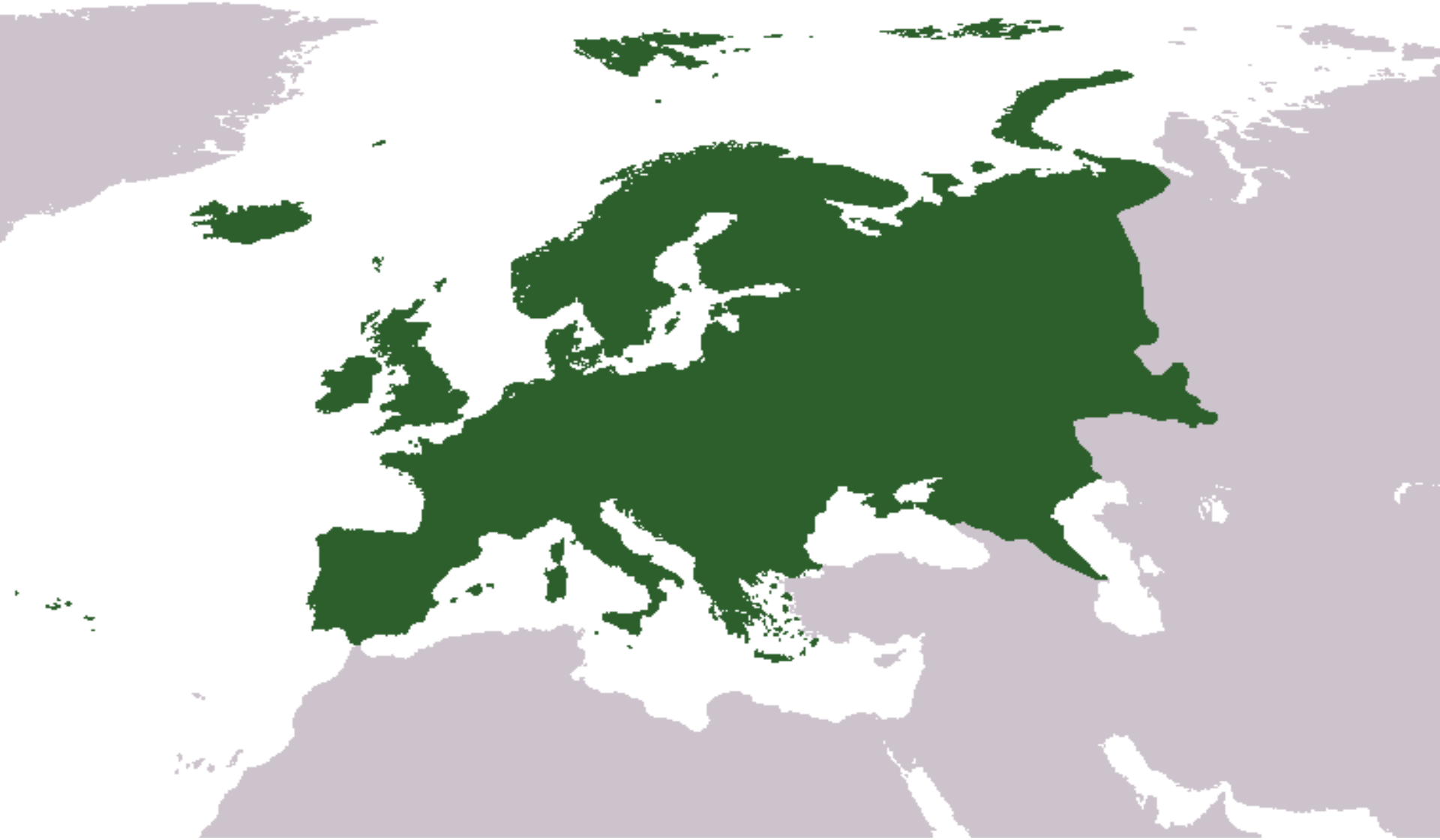
GeoGrid

- providing an E-Science infrastructure for worldwide Earth Sciences community.
- http://www.geogrid.org/

Global Grid Initiatives

- Grid projects in other continents
  - China Grid
  - NAREGI (Japan)
  - US TeraGrid

European Global Grid Intitiatives



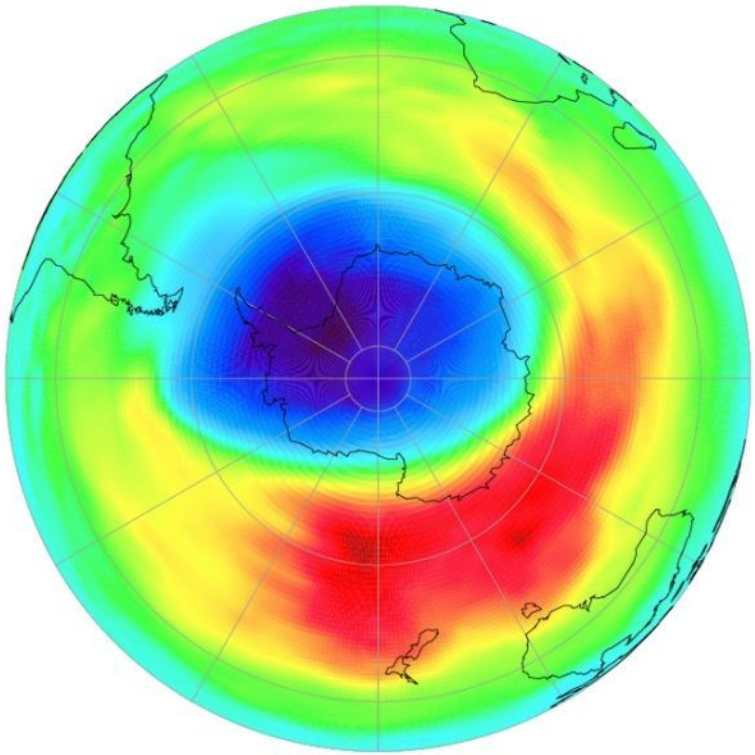
EGEE

- Enabling Grids for E-Science
- „largest multi-disciplinary grid infrastructure in the world" (1)
- Original Setting: High Energy Physics and Bioinformatics
- CERN as driving force (Large Hadron Collider)
- EGEE III coming up

(1) http://www.eu-egee.org/

“GEO” in EGEE

- Earth Observation (Gome satellite, ozone profiles)
- Solid Earth Physics (numerical simulation of earthquakes)
- Hydrology
- Climatology (flood forecasting)



(1) http://www.eu-egee.org

Earth Observation

- Atmospheric ozone chemistry by satellite observation and validation by the Lidar instrument.
- **Goal:** Feasibility study for generic processing tools of satellite data. Validation of 7 years data of gnome.
- **Challenge:** Complex Algorithms, nno (Neural networks), and large number of relatively small distributed data files.

Solid Earth Physics

Seismological Operations

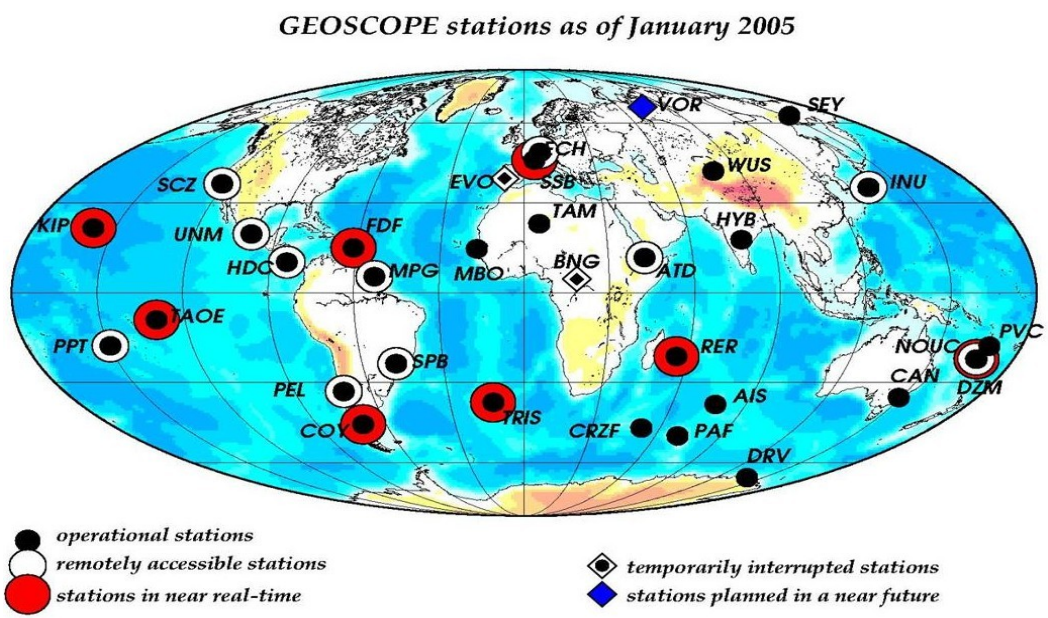
- **Anelastic Wave Propagation**
  Computation of the propagation and attenuation of seismic waves from a fault rupture to a target site.

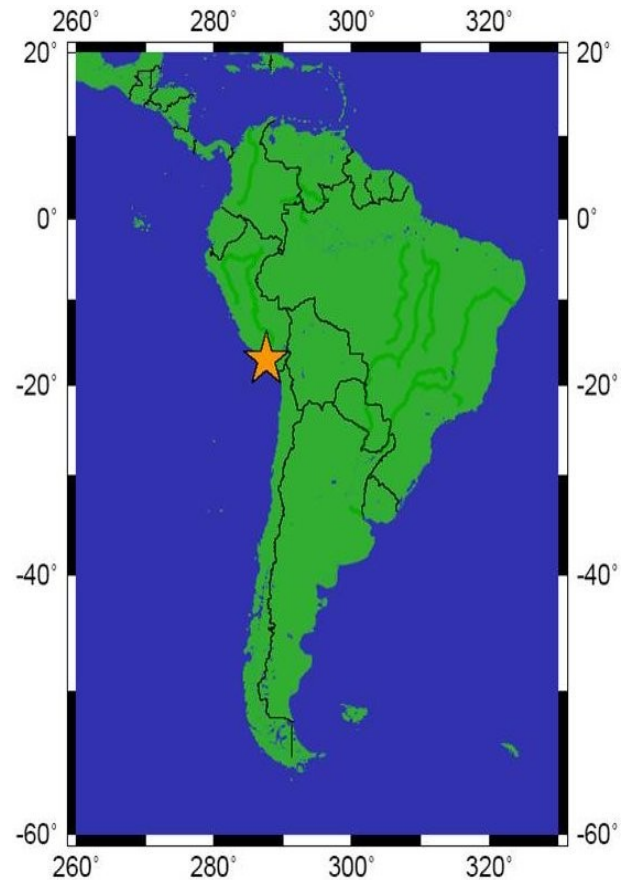
(1) http://www.eu-egee.org/

Solid Earth Physics

Seismological Operations

- **Earthquake source mechanism**





National Grids

- D-Grid (German)
- Grid5000 (French)
- GARUDA (Indian)
- National Grid Service (UK)
- Open Science Grid (USA)
- VECC (Calcutta, India)
- China Grid Project
- INFN Grid (Italian)
- KnowledgeGrid Malaysia
- NAREGI Project
- Singapore National Grid Project
- Thai National Grid Project
- LitGRID (Lithuanian)
- EestiGrid (Estonia)
- Hellasgrid (Greek)
- SNGA (Swiss)
- Swegrid (Sweden)
- RDIG (Ruassia)
- NorGrid (Norway)
- Rogrid (Rumania)
- Austrian Grid (Austria)
- TR-Grid (Turkey)
- ...

Why national Grids

In an era of increasing dynamics, shrinking distances, and global competition, those organizations are in an advantageous position which have access either to natural or to highly specialized resources, on demand, in an efficient and effective way.

Why national Grids

- Big scale research (High energy physics, nuclear research)
- Competition (supporting for local markets)
- Lack of trust (data should stay within one countries borders)

D-Grid

- German Grid Initiative
  - long-term strategic grid research and development initiative
  - Development driven by Core and Community Projects
- D-Grid 3 Call
  - Focus on Usability, Reliability
  - Tight integration of companies
- Example Projects
  - TextGrid
  - C3-Grid
  - AstroGrid
  - GDI Grid

C3-Grid

has the goal to develop a highly proficient grid-based research platform for the German earth-system research community to efficiently access and analyze distributed, high-volume scientific data from earth-system modeling and observation.

GDI-Grid

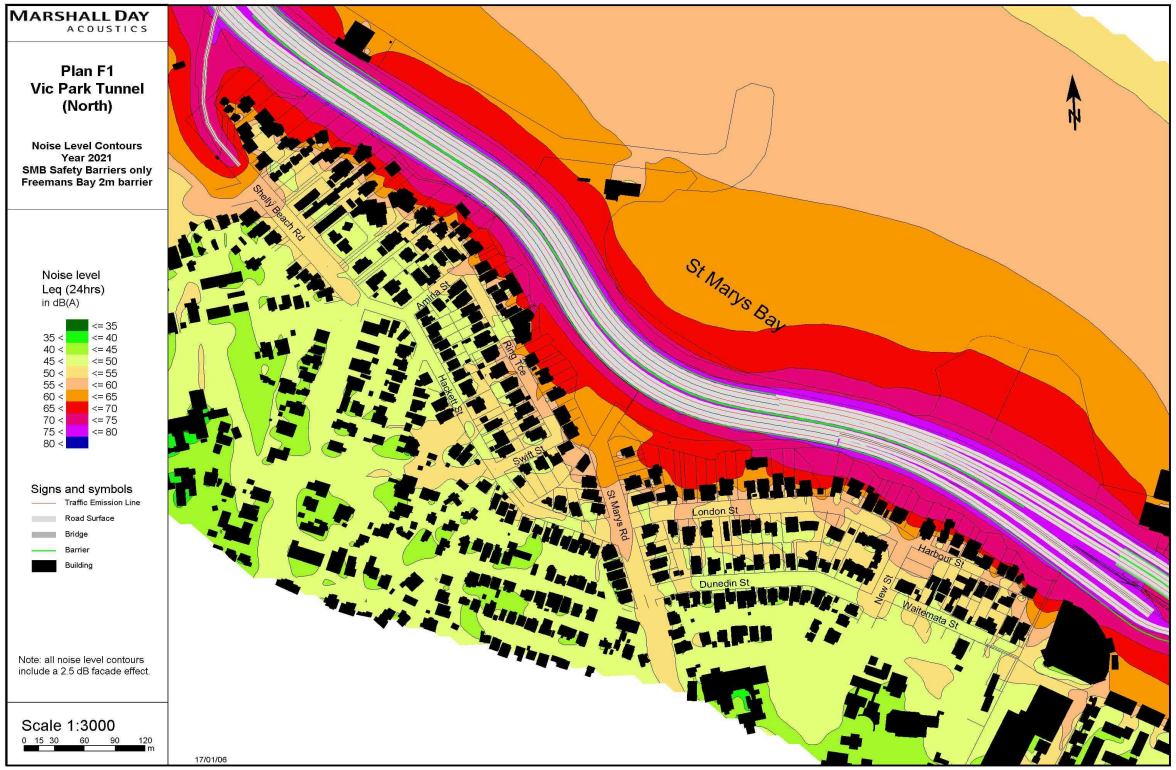
- focuses on solutions for efficient integration and processing of geodata based on ... spatial data infrastructure (SDI) ... it will integrate GDI and Grid technologies ...
- looking at data, models, services and workflows for SDIs.

- **Closing the gap between OGC Web Services and Grid technologies**

GDI-Grid Scenarios

- Flood forecasting (rainfall-runoff, streamflow routing)
- Noise dispersion
- Navigation (using real-time sensor data)

Noise dispersion



Workflows

- Splitting the simulation into several processes
- Grid-enabled WPS perform these steps
- Noise dispersion
  - Preperation of required data
  - Computation of noise dispersion

That's it