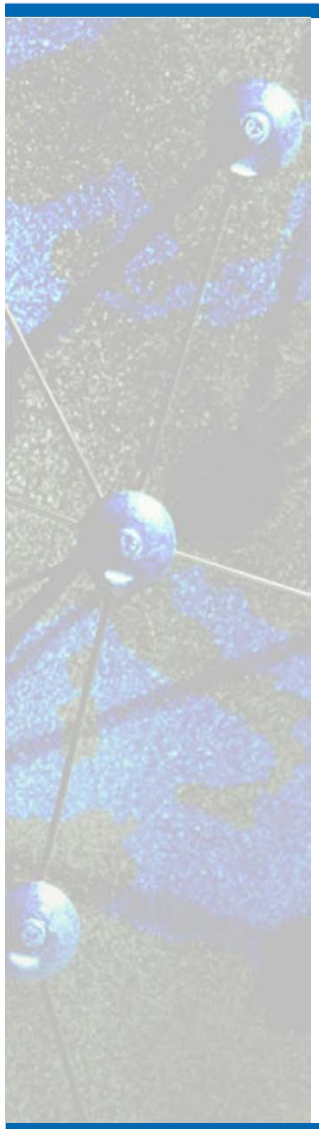


Grid Use Cases

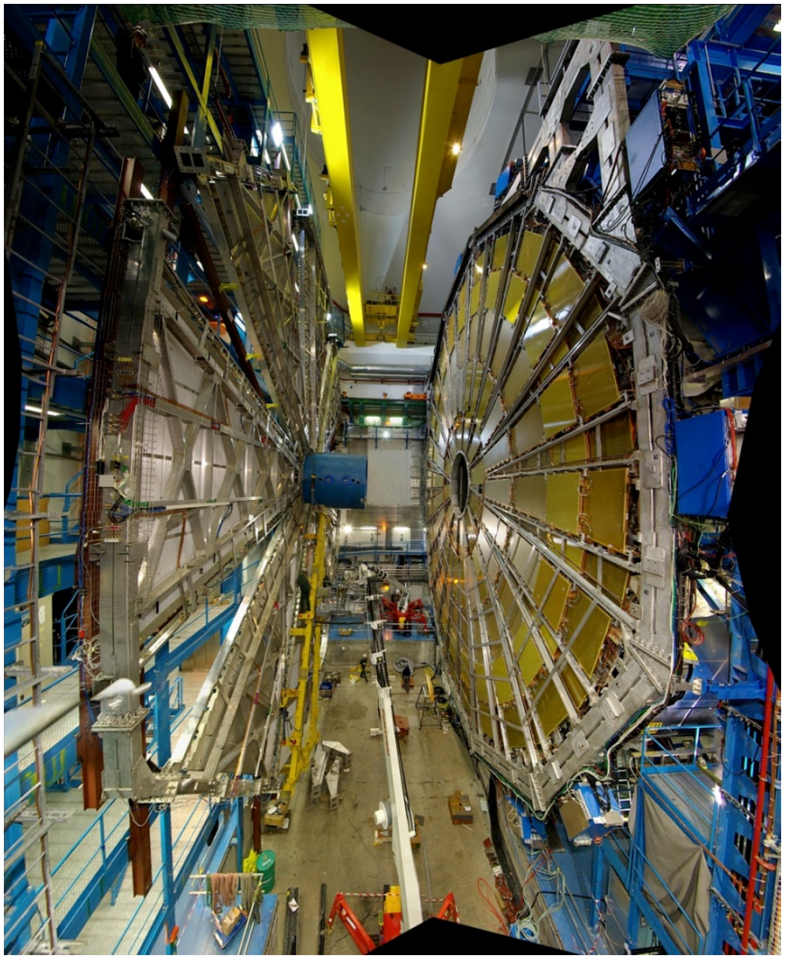
Grid Use Cases

These case studies show some of the advantages of using the grid:

- allows world-wide multi-disciplinary collaboration;
- integrate distributed resources into a single whole;
- customised grid services to meet the unique demands of researchers;
- reliable service for computation, data transfer and storage of large sets of data;
- reduced analysis time and analysis on-demand;
- scientifically useful results are generated more quickly;
- long term support;
- sharing sensitive data securely among a trusted community;
- allows member institutions to contribute computing power to the community;
- generate data-intensive stimulations in a shorter amount of time;
- reduce technical workload (by following grid standards), so scientists can concentrate more effort on the science

Use Case: Large Hadron Collider

- World's largest particle accelerator
- Supports 8,000 researchers
- 1 billion CPU hours in the last 12 months
- 15Pb of data created annually



Use Case: Large Hadron Collider

Some advantages of using the grid:

- allows worldwide mass collaboration with thousands of physicists;
- customised grid services to meet the unique demands of the experiments;
- large data storage facility;
- physicists can access the data using their own computer locally.

Use Case: GoNL

- Mapping the genome of the Netherlands
- Plan to sequence the genomes of 750 Dutch people
- Currently 30Tb of data
- Will generate 20 times that amount

Use Case: GoNL

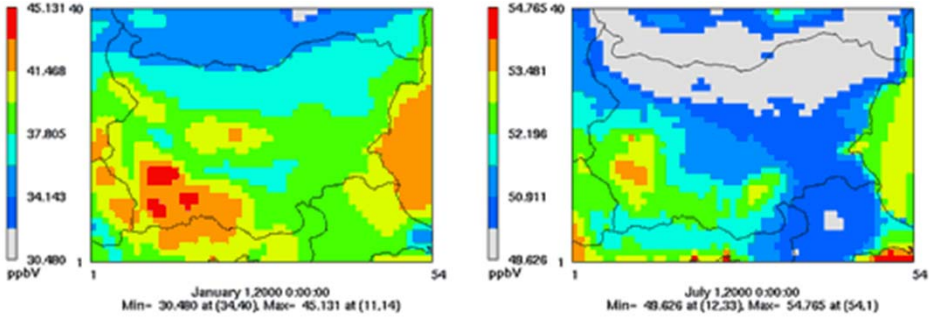
Some advantages of using the grid:

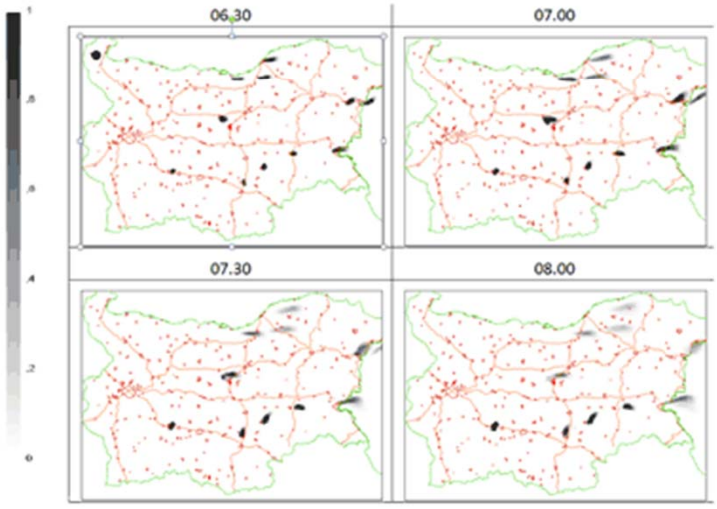
- analysis time reduced by 80%;
- on-demand analysis – can be carried out as and when researchers need it;
- provide development and support to help researchers get the most out of using the grid.

Use Case: Environmental Modelling

- Bulgarian researchers have ported three applications to the grid

1. Study the impact of climate change on air quality
2. Model atmospheric composition
3. Investigate emergency responses to the release of harmful substances into the atmosphere





Use Case: Environmental Modelling

Some advantages of using the grid:

- improved response times and decreased failure rate, so scientifically useful results are generated more quickly;
- reliable service for computation, data transfer and storage of large sets of data;
- using existing software with standard protocol means a quicker start-up time and compatibility between resource providers.

Use Case: ASTRA

- Ancient instruments Sound/Timbre Reconstruction Application
- Has recreated 4 instruments so far
- Held concerts using these instruments

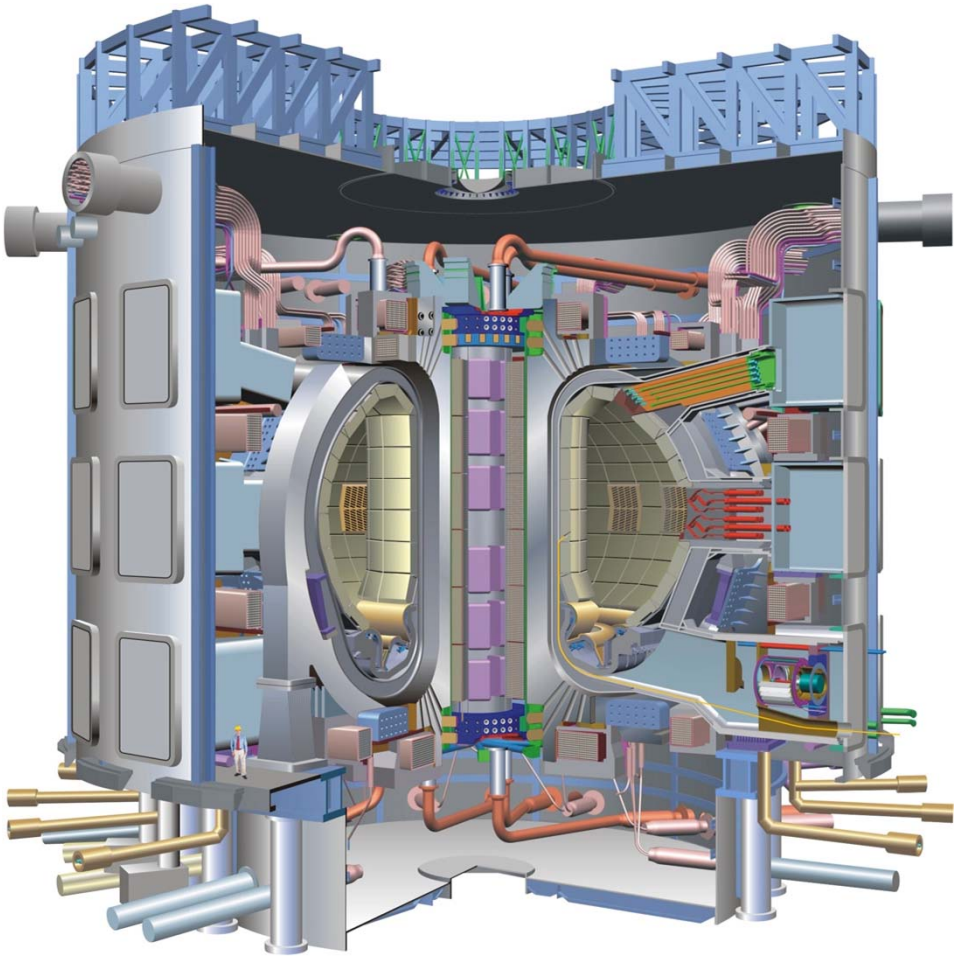
Use Case: ASTRA

Some advantages of using the grid:

- can meet high demand for network and computing requirements;
- high reliability;
- allow multi-disciplinary collaboration between researchers, musicians and historians;
- longevity: ASTRA running since 2006.

Use Case: ITER

- Investigating viability of fusion as a power source
- Modelling and simulating the reactor
- Used 1 million CPU hours in the last 12 months



Use Case: ITER

Some advantages of using the grid:

- perform the intensive computations needed to test the feasibility of fusion power before building the reactor;
- open to future development: dedicated project ‘EUPHORIA’ was set up to further push the limits of existing state-of-the-art computing resources.

Use Case: DECIDE

- Diagnostic Enhancement of Confidence by an International Distributed Environment
- Diagnostic tools for the medical community
- Example: Their Statistical Parametric Mapping application can help doctors to diagnose Alzheimer's disease in its early stages and track the progress of the symptoms over time

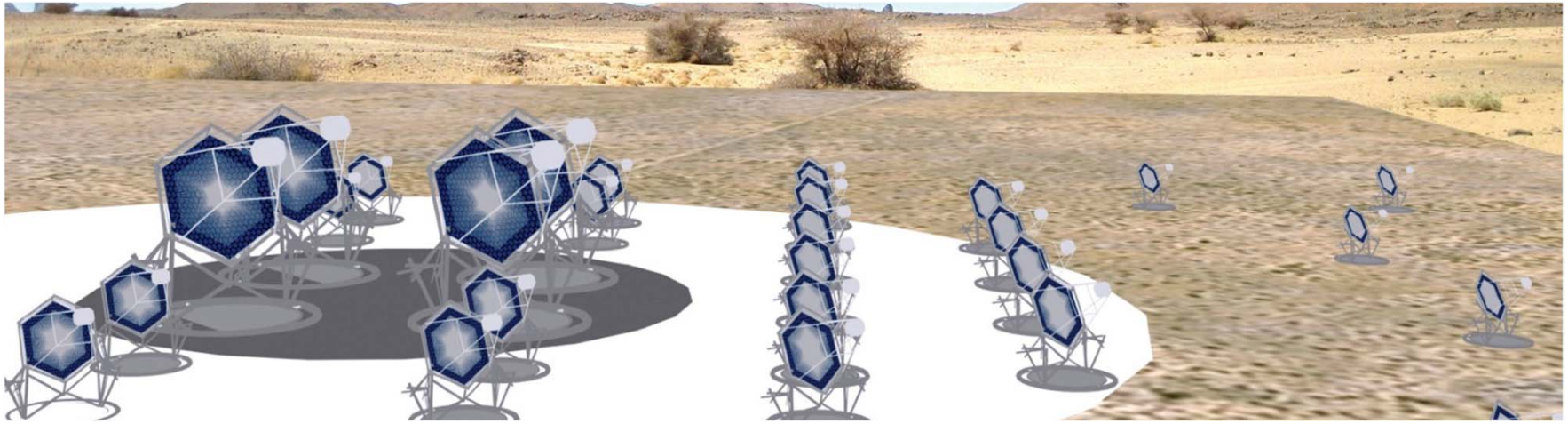
Use Case: DECIDE

Some advantages of using the grid:

- a single European-wide master database of images stored on the grid for doctors to use;
- can set up diagnostic tools with a dedicated grid infrastructure;
- customisable: dedicated software to track progression of the disease over time;
- sharing medical data securely.

Use Case: CTA

- The Cherenkov Telescope Array
- Future ground-based high energy gamma-ray instrument
- 132 institutes in 25 countries
- Using applications and grid technology provided by the European grid



Use Case: CTA

Some advantages of using the grid:

- allows member institutions to contribute computing power to the CTA community;
- generate data-intensive stimulations in a shorter amount of time;
- reduce technical workload (by following grid standards), so scientists can concentrate more effort on the science.