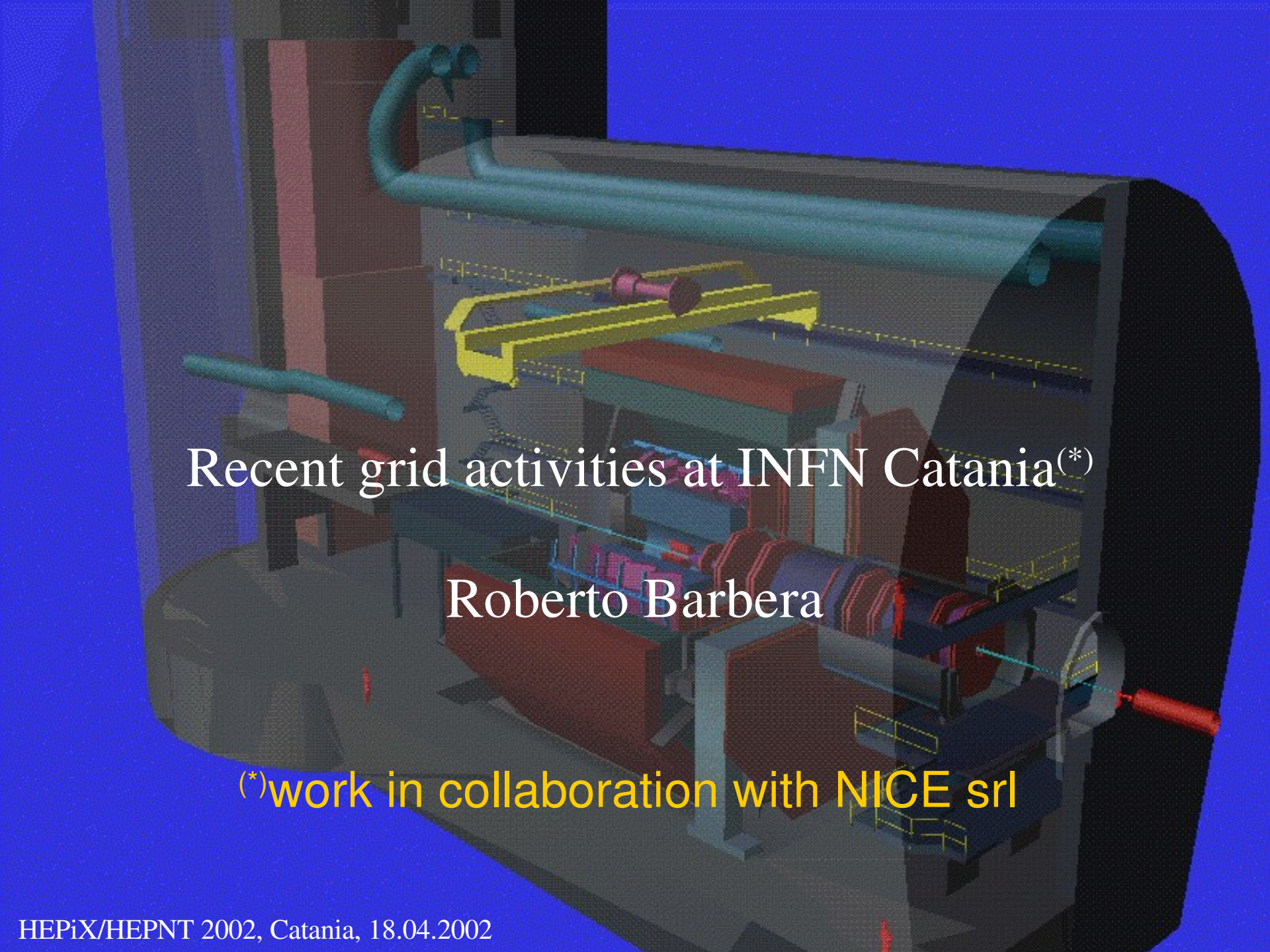


Recent grid activities at INFN Catania(*)

Roberto Barbera

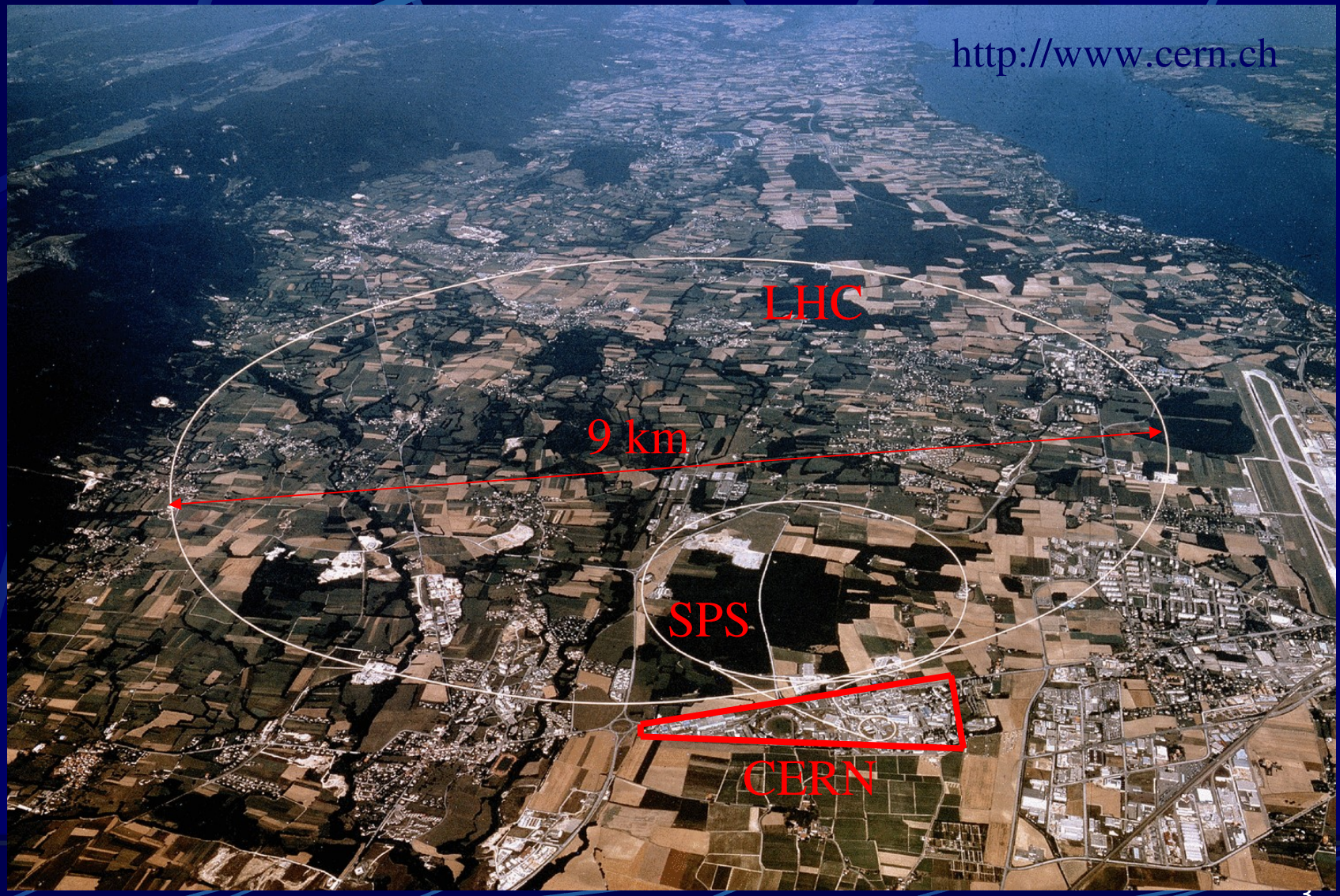
(*)work in collaboration with NICE srl

HEPiX/HEPNT 2002, Catania, 18.04.2002

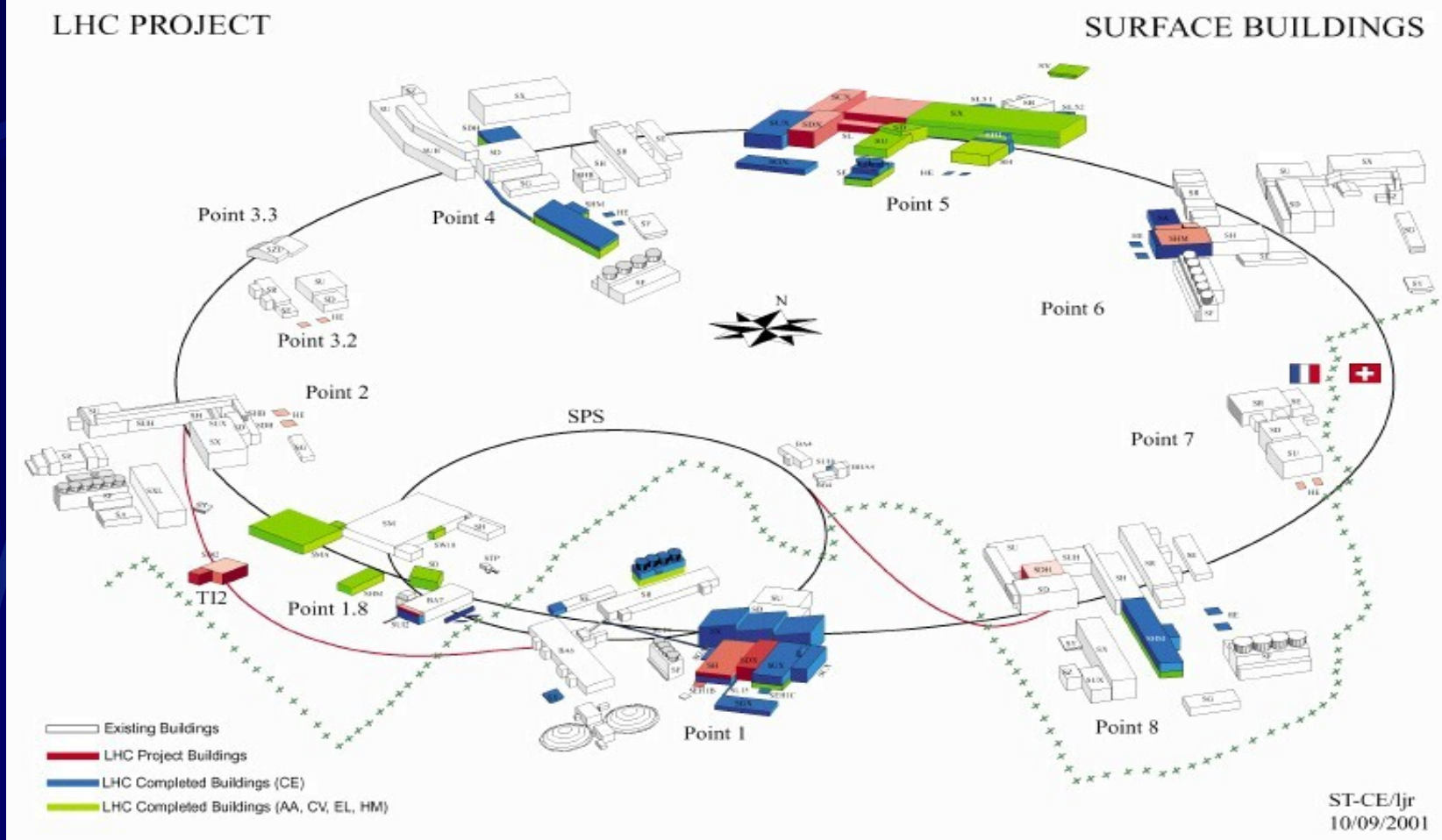
Outline

- Grid Computing:
  - why ?
  - how ?
  - who ?
  - where ?
- GENIUS: a web portal for the grid
  - live demo !
- Conclusions and outlook.

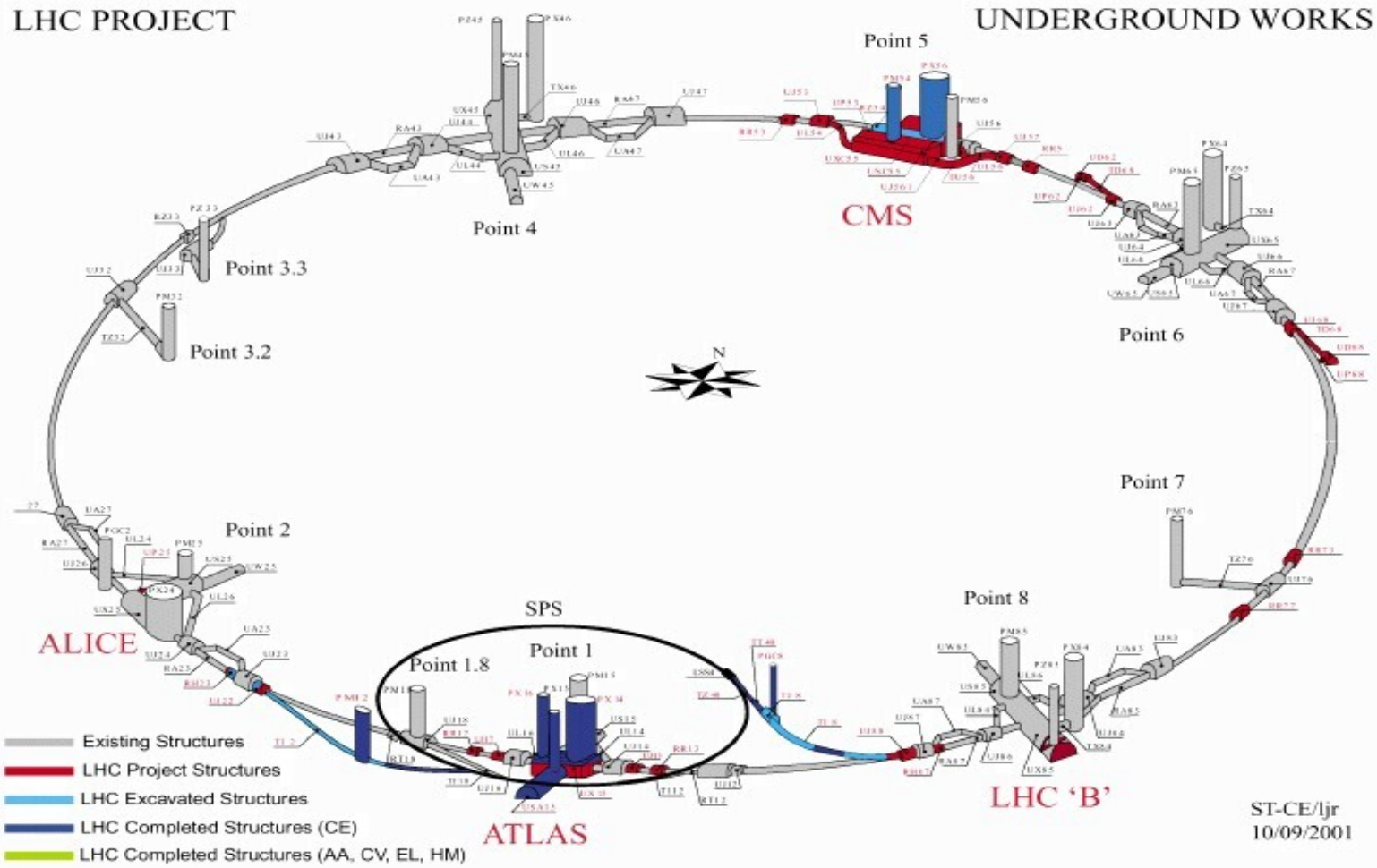
High Energy Physics



High Energy Physics



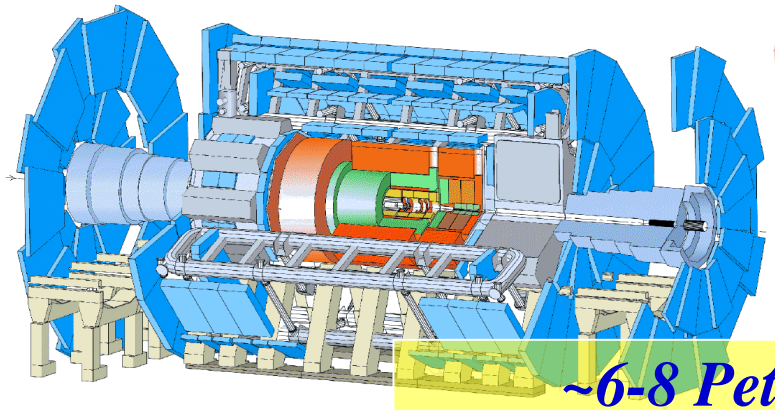
High Energy Physics



High Energy Physics

ATLAS

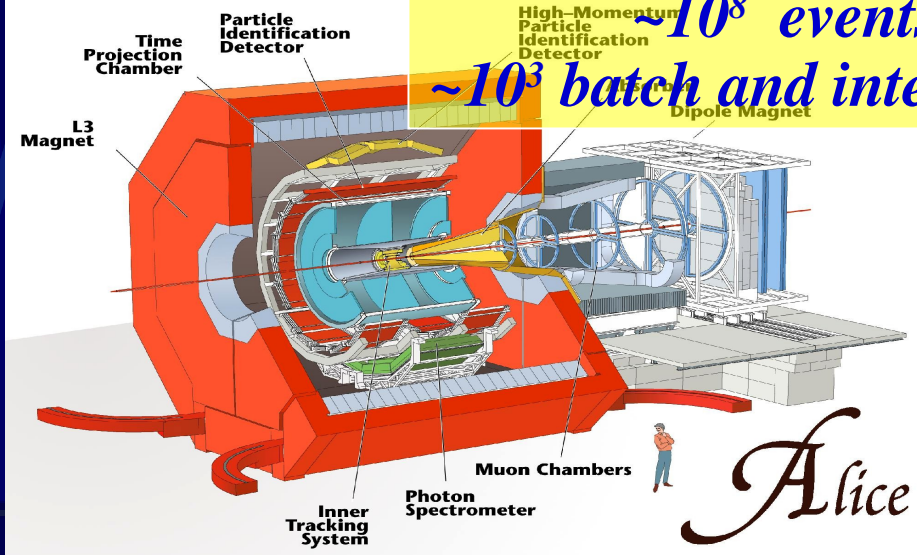
CMS

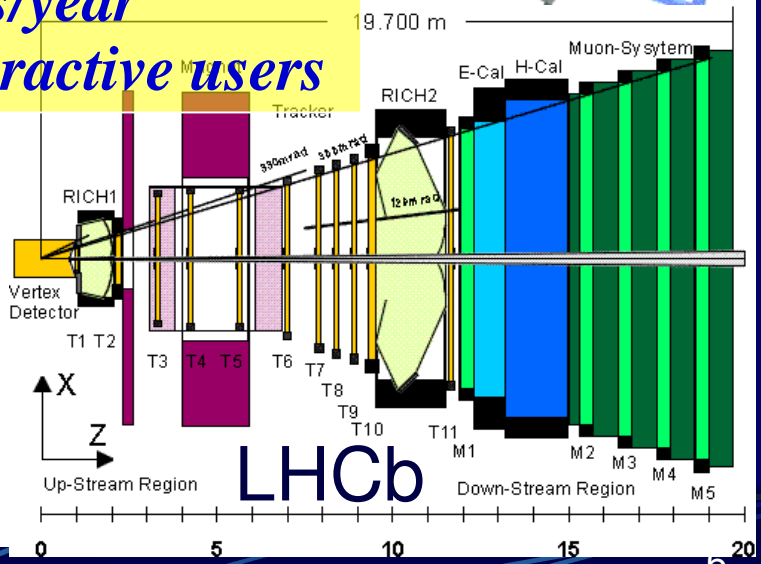


~6-8 PetaBytes / year

~10^8 events/year

~10^3 batch and interactive users

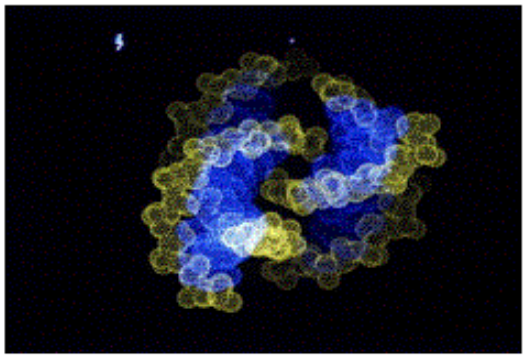


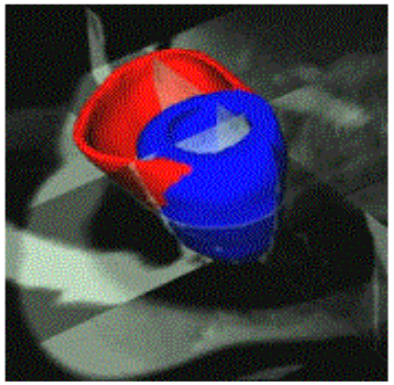


Computational bio-medicine

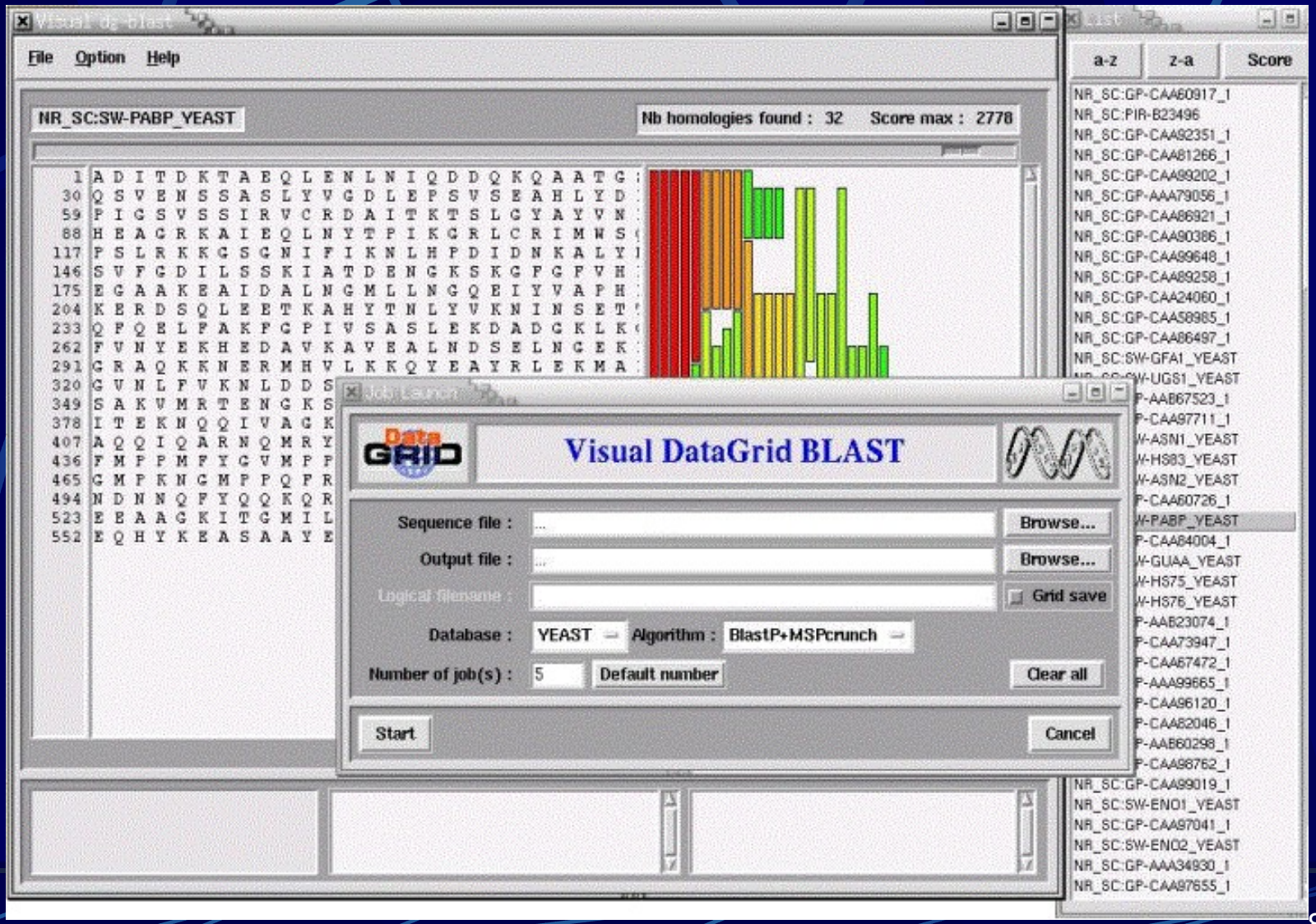
Grid added value for biomedical applications

- Data mining on genomics databases (exponential growth).
- Indexing of medical databases (Tb/hospital/year).
- Collaborative framework for large scale experiments (e.g. epidemiological studies).
- Parallel processing for
  - Databases analysis
  - Complex 3D modelling

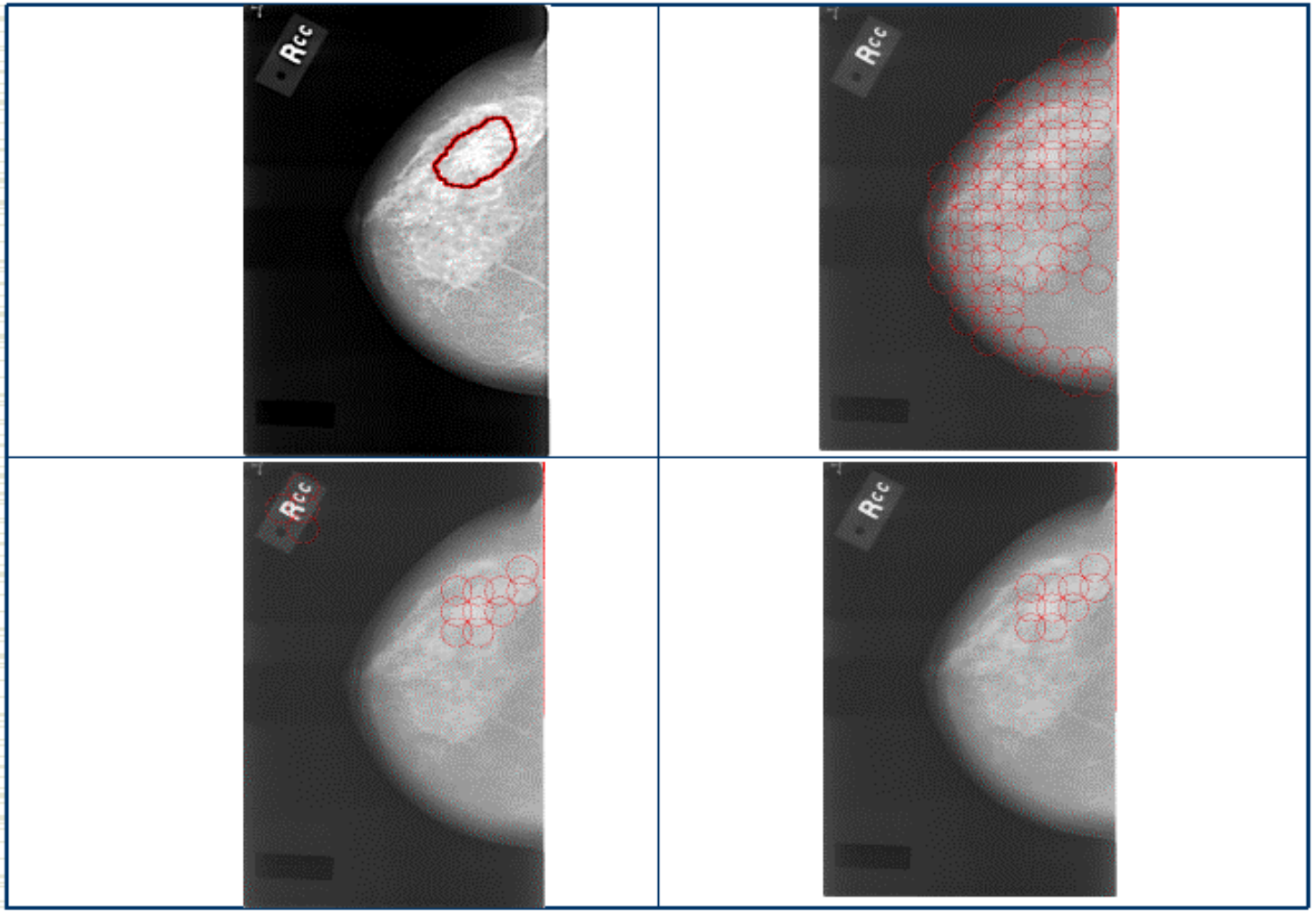




Computational bio-medicine



Computational bio-medicine



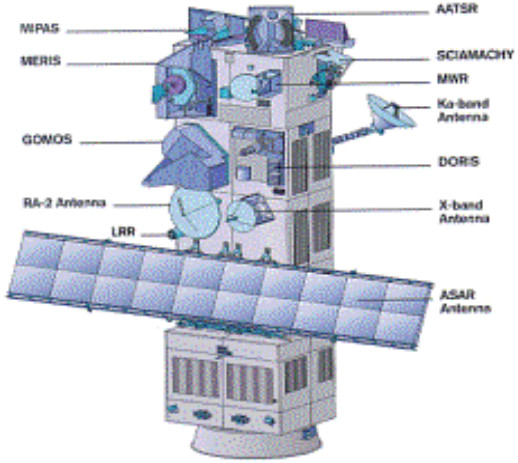
September 21st, 2001 *Datagrid Meeting, Lyon* 15

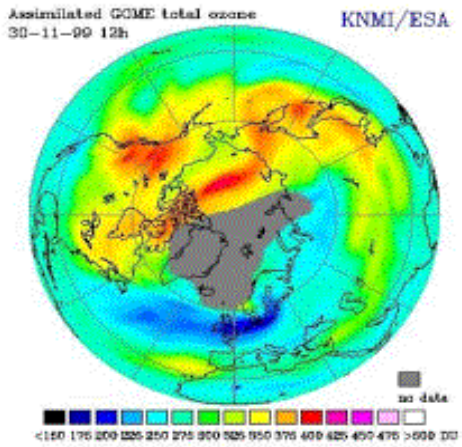
Earth Observations

Data GRID Earth Observations

ESA missions:

- about 100 Gbytes of data per day (ERS 1/2)
- 500 Gbytes, for the next ENVISAT mission (2002).





DataGrid contribute to EO:

- enhance the ability to access high level products
- allow reprocessing of large historical archives
- improve Earth science complex applications (data fusion, data mining, modelling ...)

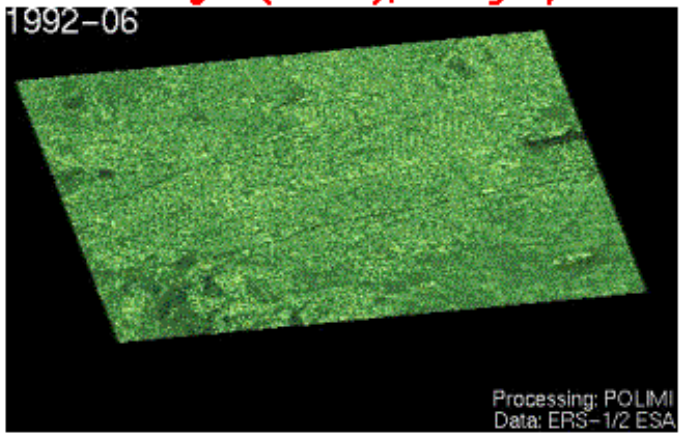
Source: L. Fusco, June 2001

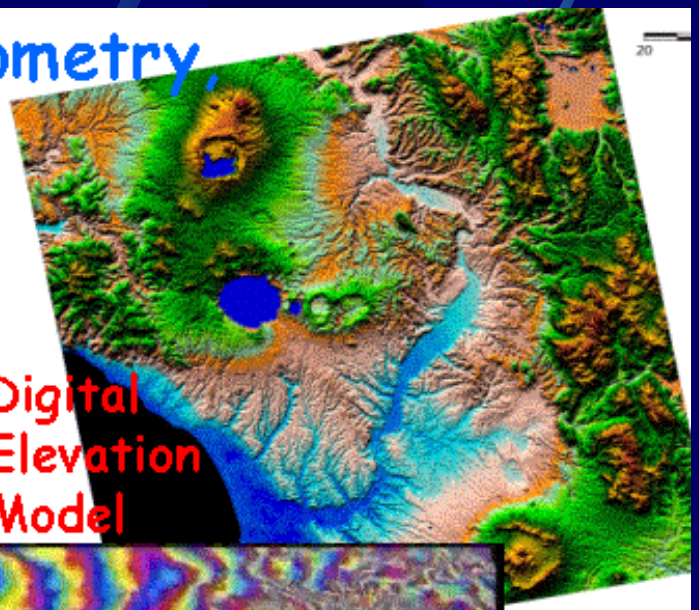
Earth Observations

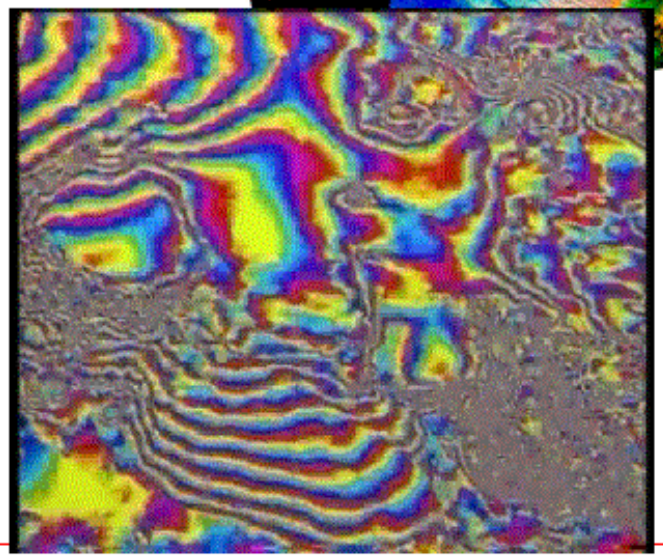
Number crunching: interferometry, subsidence, DEM generation

Pomona (Cal): subsidence velocity fields

40 ERS1/2 images (92-99), Ambiguity: 28 mm







GRID requirements:

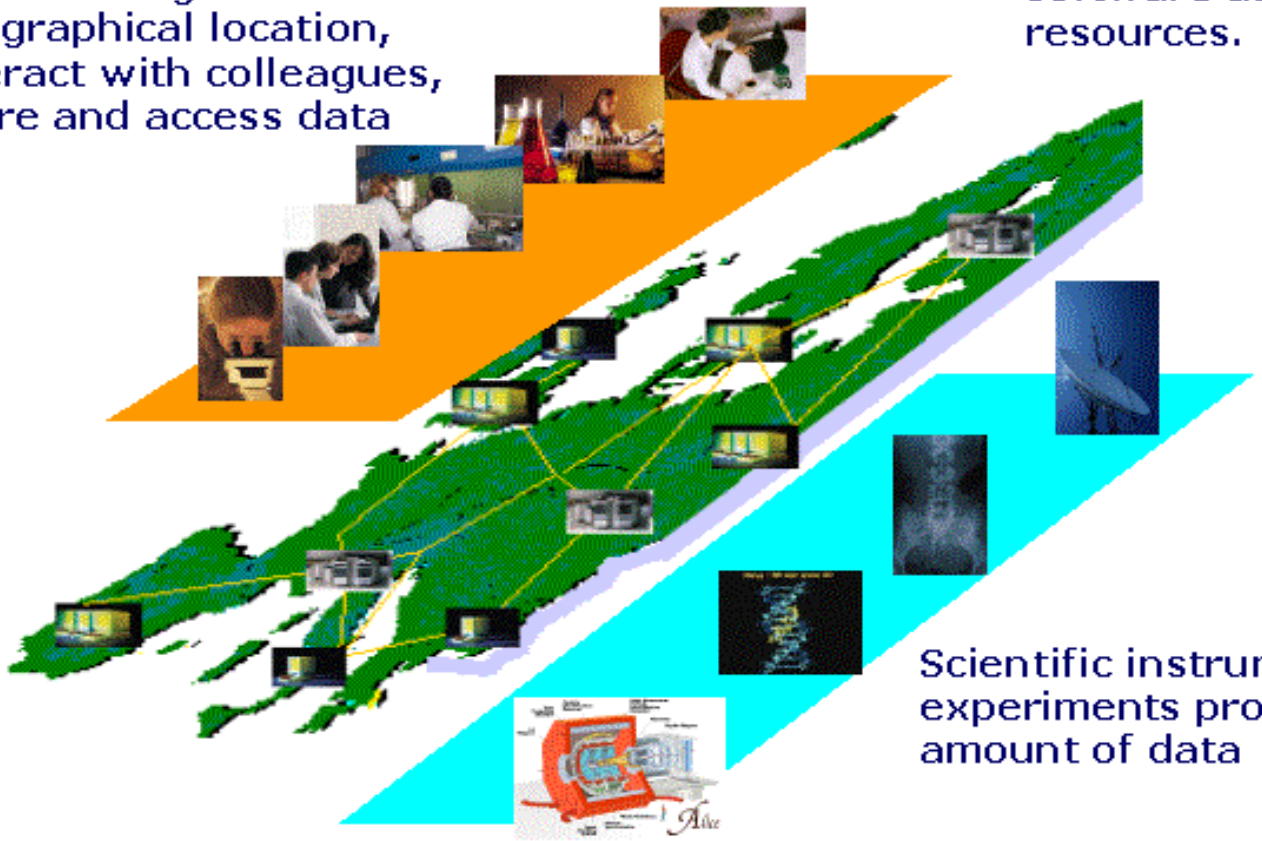
- large data files (10+ GB)
- stages with intensive processing
- science driven value adding

EC Review – 01/03/2002 – WP9 – Earth Observation Applications – n° 5

The Grid Vision

The GRID: networked data processing centres and "middleware" software as the "glue" of resources.

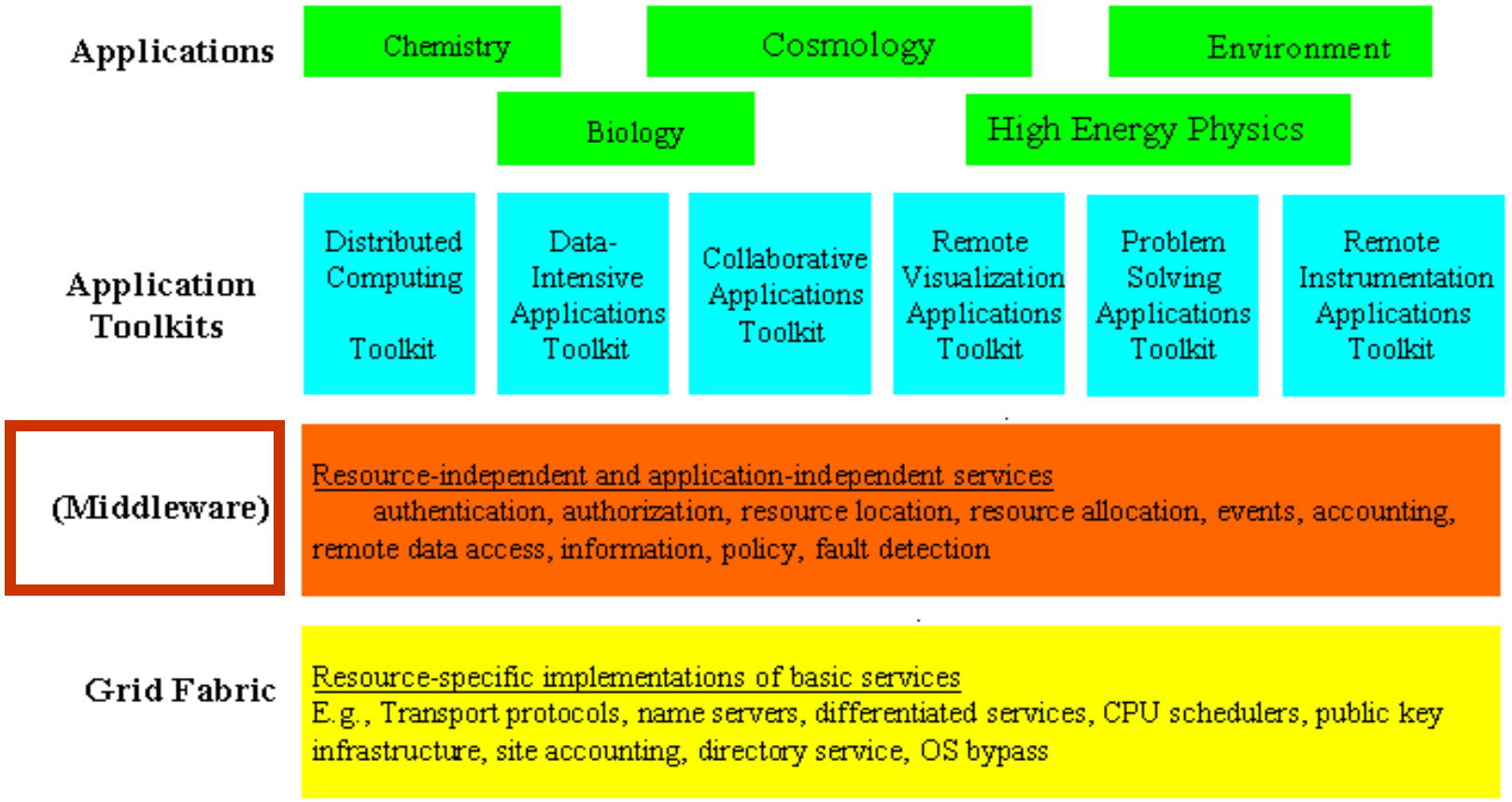
Researchers perform their activities regardless geographical location, interact with colleagues, share and access data



Scientific instruments and experiments provide huge amount of data

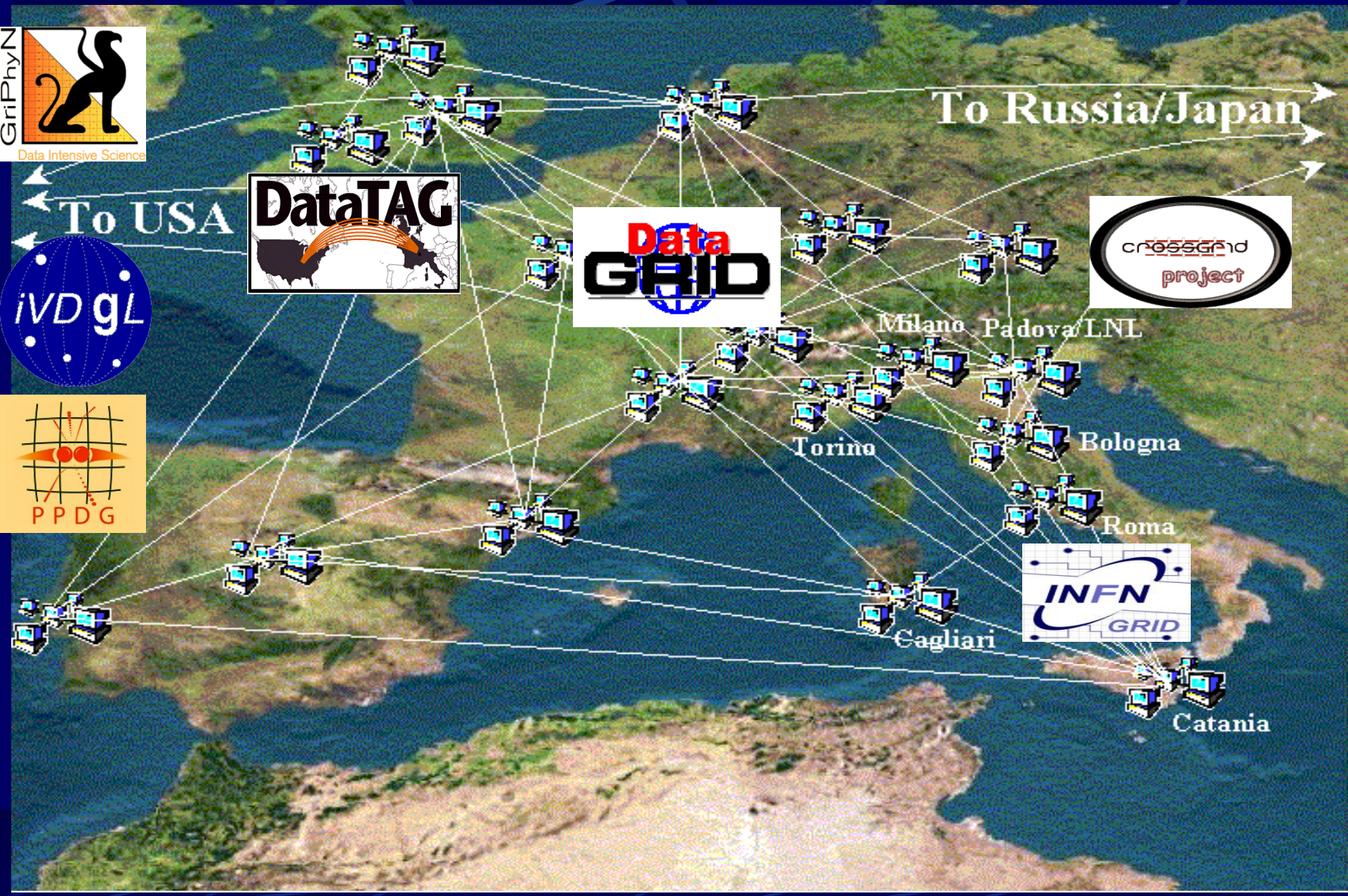
EC Review – 01/03/2002 – F.Carminati – Accomplishments of the project from the end user point of view– n° 9

The Grid from a Services View



Dipartimento di Fisica dell'Università di Catania and INFN Catania - Italy

ALICE Collaboration



Middleware has been realeased but...

- EDG software (Globus, UI, JDL, WP2, WP3, etc.) contains tens of commands/switches which also have their own logical sequences ("B" after "A", "C" before "D" and so on).
- Browsing Grid VO "directories" (users, RC's, DB's, etc.) requires LDAP "speaking" and tomorrow could require SQL "speaking".
- "User gridification" is a tough task for a "rookie" ⇒ how does this fit with the claim that we are "doing grids" for everybody and that grid computing will be as easy as surfing the Internet ?
- Furthermore, all this holds for DataGrid. What will happen when other grids' software (especially UI's) will come up (PPDG, iVDGL, etc.) ? Will users have to learn tens of "grid dialects" ?
- Today "grid computing" is a rather struggling experience which you can do only at selected machines (UI's) ⇒ how does this fit with the claim that one could do "grid computing" even from a PDA ?
- **Is there any way to set-up a "user-friendly" grid ?**

A web portal: why and how ?

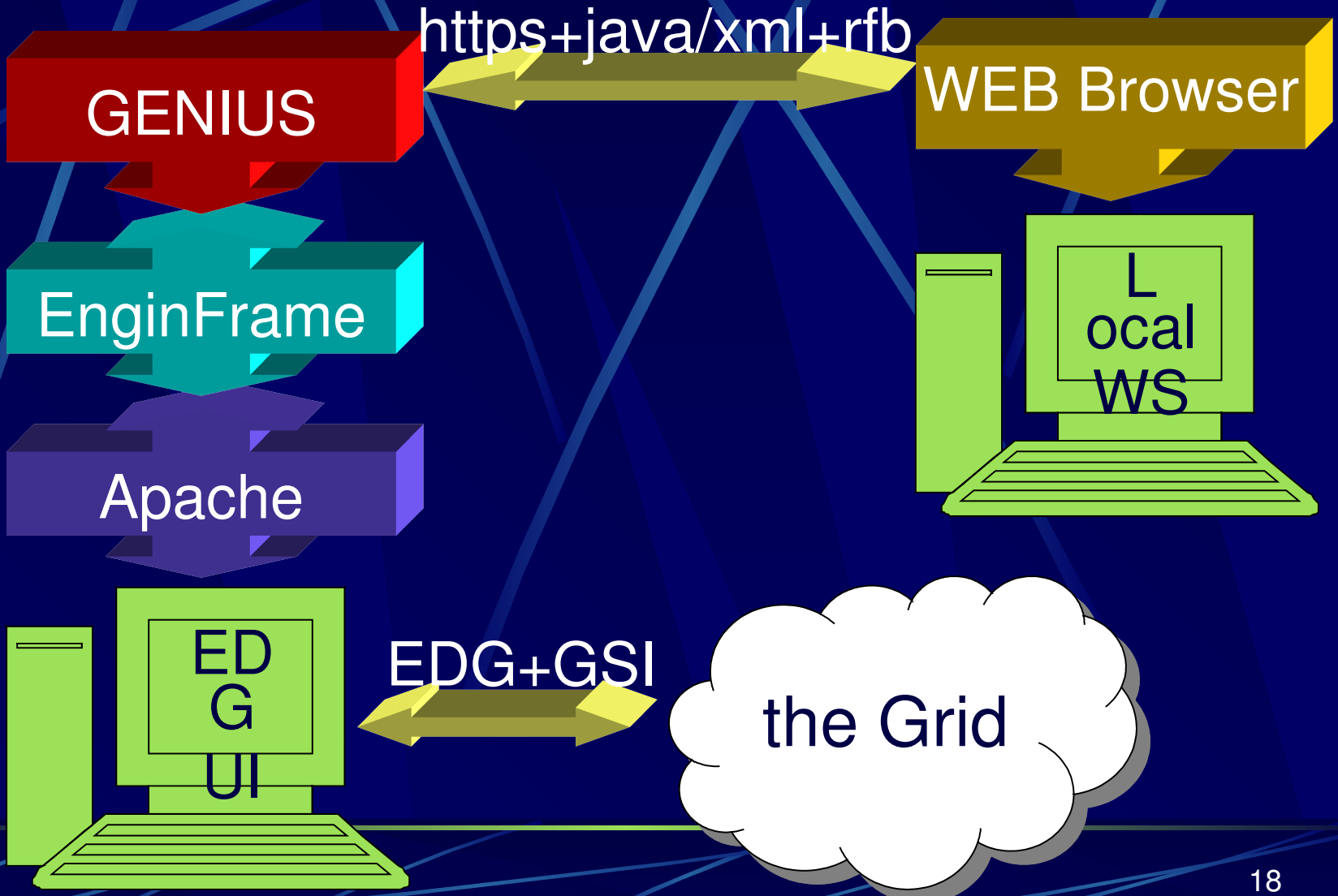
- It can be accessed from everywhere and by "everything" (desktop, laptop, PDA, WAP phone).
- It can keep the same user interface to several back-ends (grid "dialects" ⇔ command-line UI's).
- It must be redundantly "secure" at all levels: 1) secure for web transactions, 2) secure for user credentials, 3) secure for user authentication, 4) secure at VO level.
- All available grid services must be incorporated in a logic way, just "one mouse click away".
- Its layout must be easily understandable and user friendly.

GENIUS®

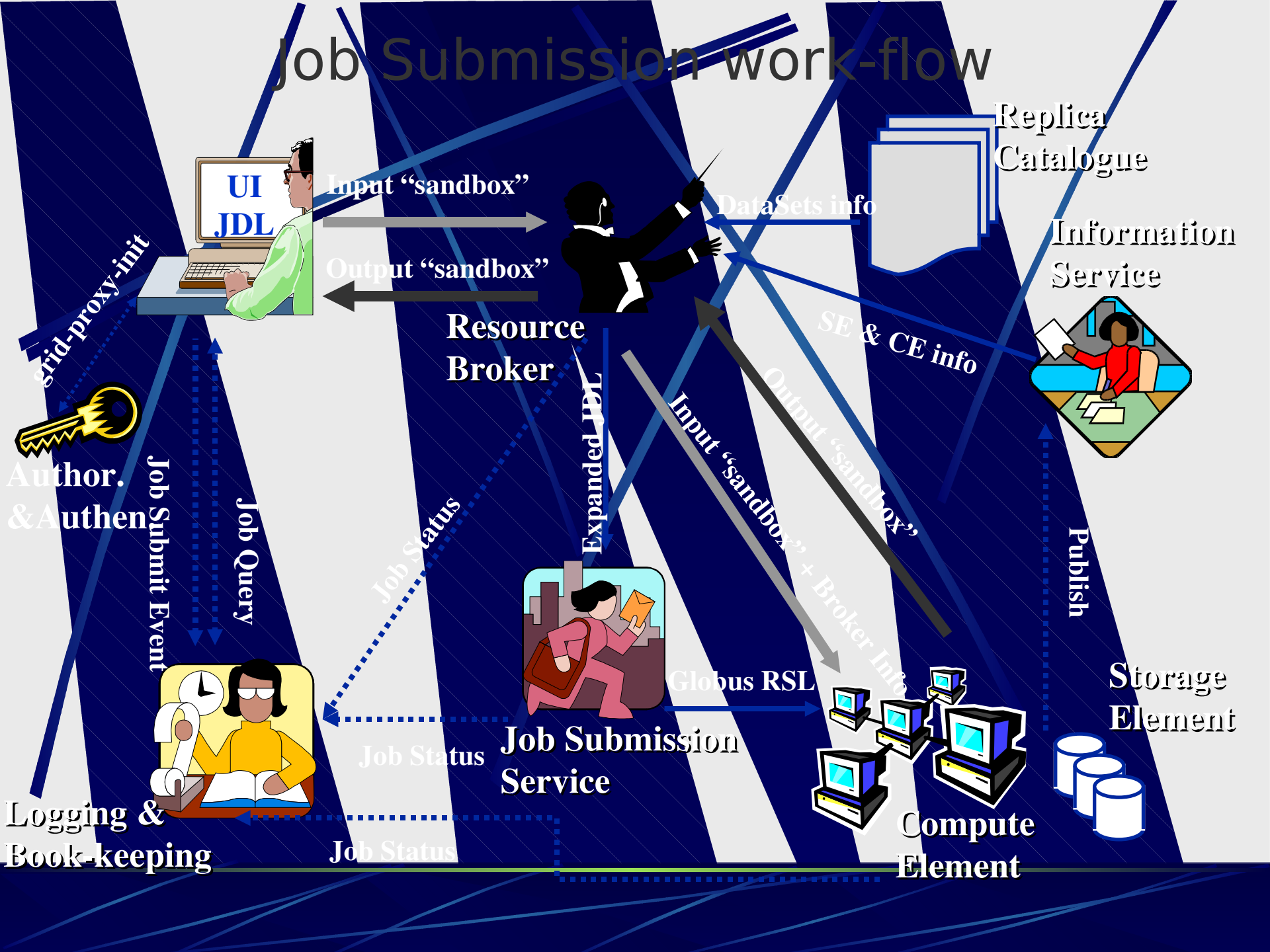
(Grid Enabled web eNvironment for

site Independent User job Submission)

GENIUS: how it works



Job Submission work-flow



Present status and perspectives

- Current implementation of GENIUS already includes:
  - secure web transactions and user authentication and authorization;
  - browsing of remote files and creation of new ones;
  - interfaces for job submission/control (multiple RB's), to VO servers (users' and RC's), and to monitoring systems;
  - persistent (personal) book-keeping and spooler system
  - interactive analysis !
- Todo:
  - multi-jobs (parallel and sequential);
  - interface to data management and other grid services;
  - more experiment-specific customizations;
  - web-guided creation of JDL scripts.

Conclusions and outlook

- Computational grids are "sold" as the framework of the highly distributed computing models of next generation high energy physics experiments, bio-medics and Earth observations.
- Grids are also presented as the solution to bring enormous computing power and mass storage to the individuals like the web did with information.

- **But, if we really want to turn dreams into reality, let's make their use simple and easy for the new users.**