

El Observatorio Virtual: una infraestructura básica para la investigación astronómica

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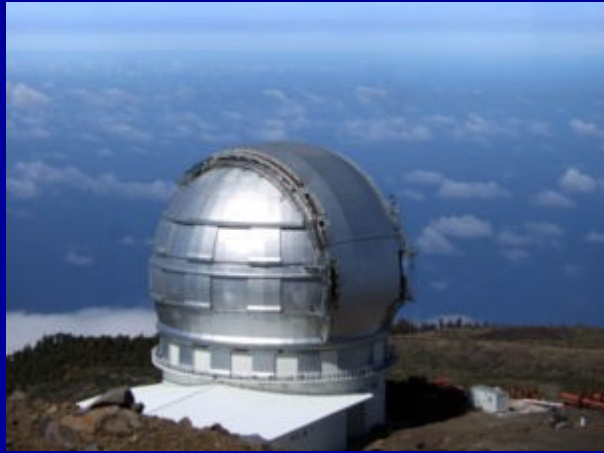


Outline

- The astronomical research framework
- The information resources in Astronomy
 - Archives: Potentialities and limitations
- The Virtual Observatory

The astronomical research framework

- Exploration of the Universe in a multi-parameter space through community-oriented infrastructures.



The astronomical research framework

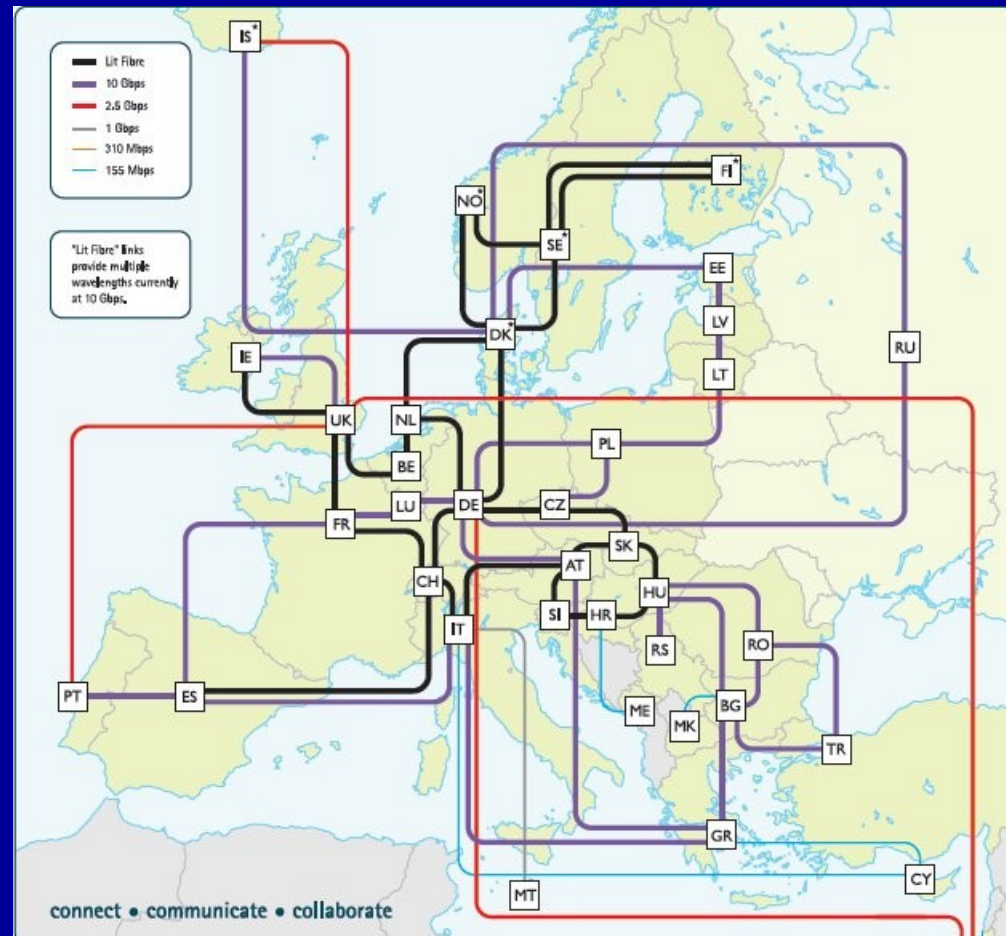
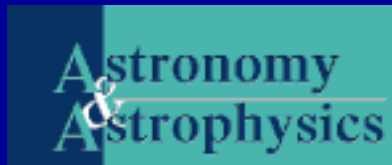
- Community-oriented S/W. Common format (FITS) since the 70's



- Public data (after short proprietary times)

The astronomical research framework

- Access to on-line archives and information resources through high capacity networks.



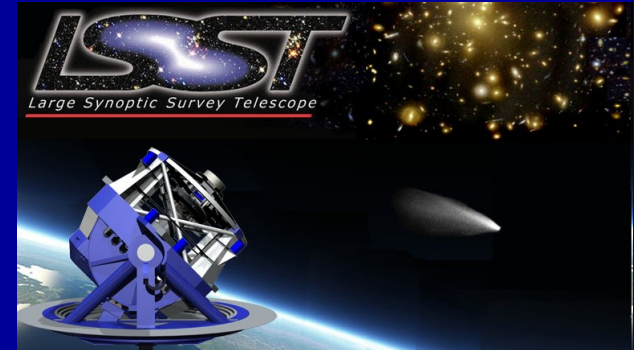
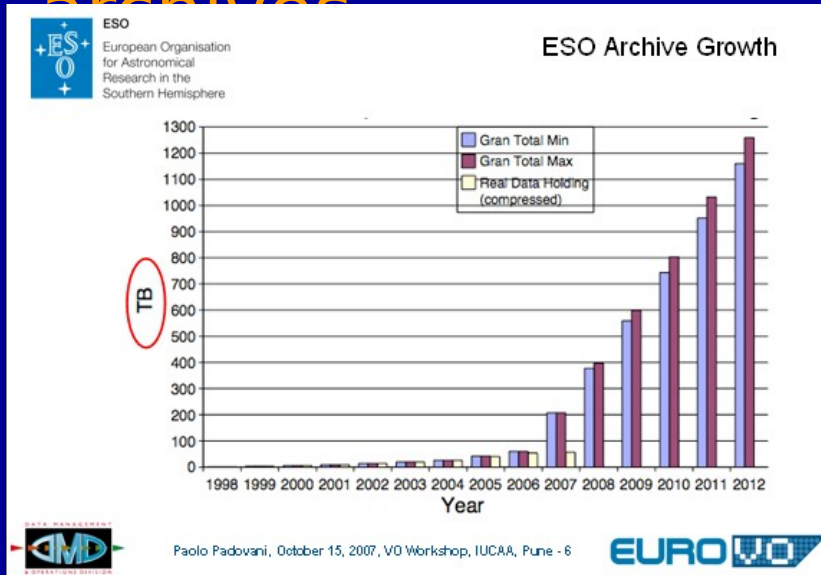
The astronomical research framework

- Archives have become a fundamental tool for modern Astronomy.



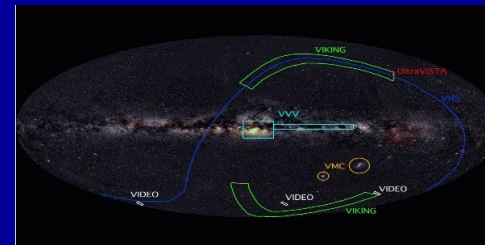
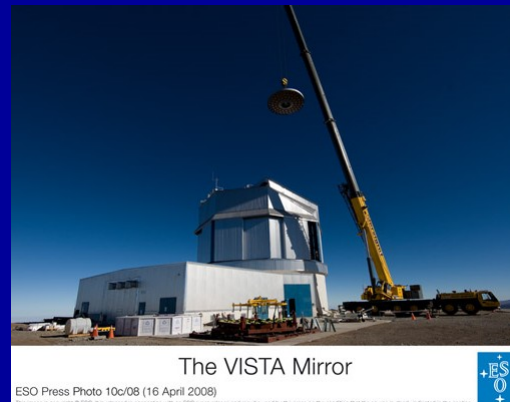
Archives in Astronomy: Potentialities

- Huge amount of information available from archives



Cerro Pachón.

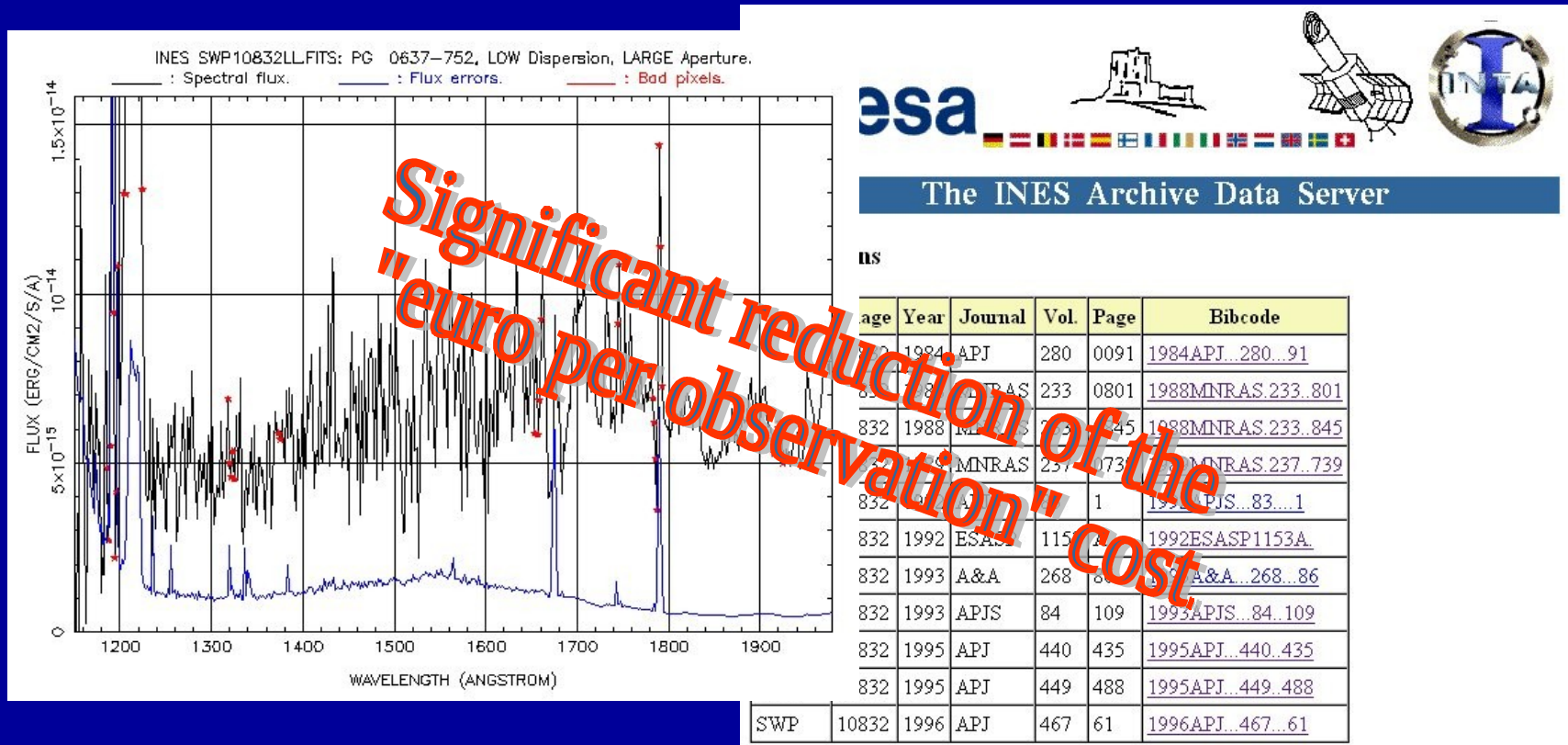
First light 2014 - 5 PB/yr



Paranal. In operation - 100 TB/yr

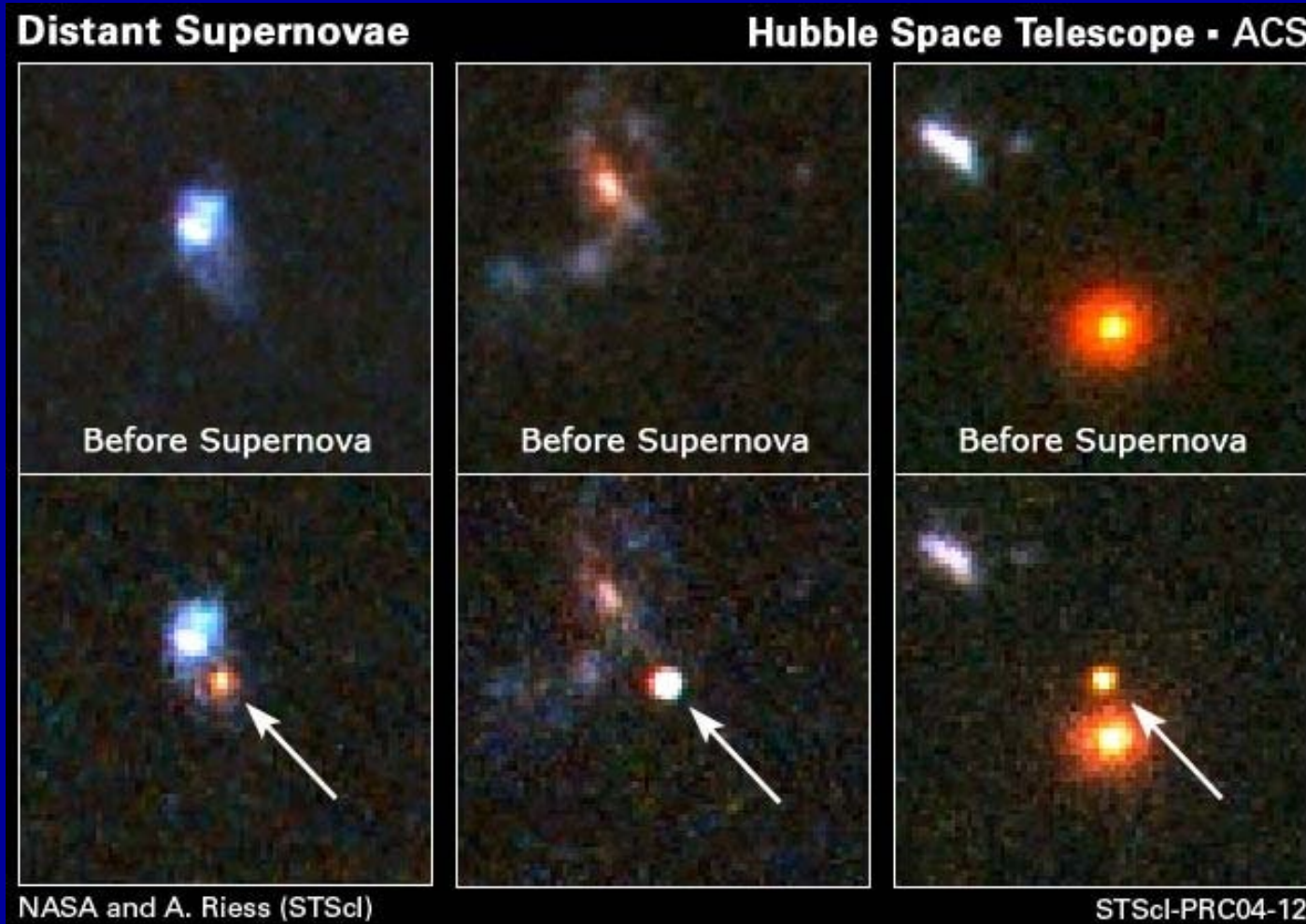
Archives in Astronomy: Potentialities

- **Efficiency:** One set of observations can serve many different scientific purposes, including some not considered when the observations were made.



Archives in Astronomy: Potentialities

- Exploitation of the time domain (transients)



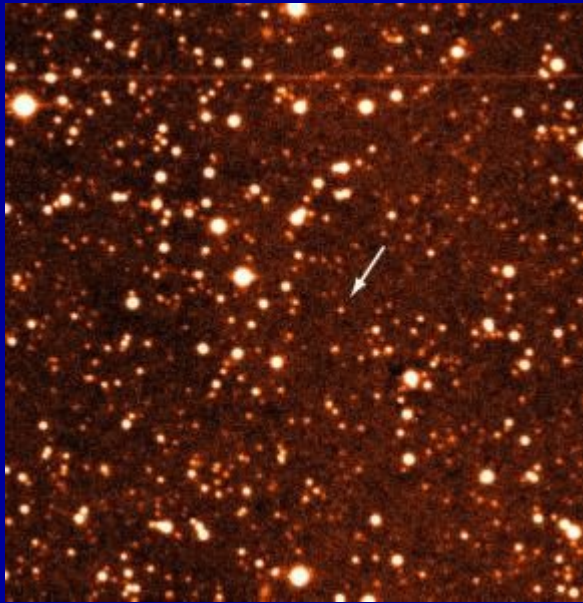
Archives in Astronomy: Potentialities

- Exploitation of the time domain (periodic phenomena)

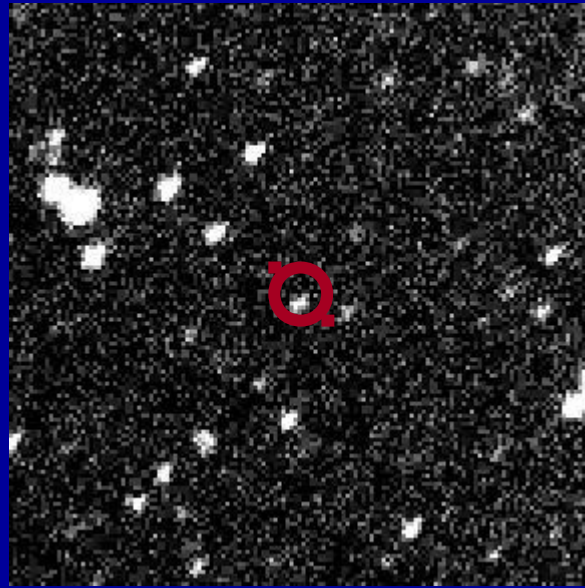


Archives in Astronomy: Potentialities

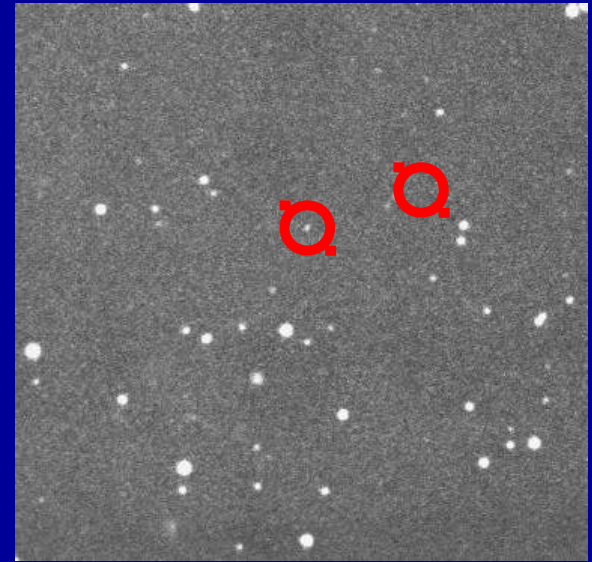
- Exploitation of the time domain (periodic phenomena)



Jun02:Discovery
images



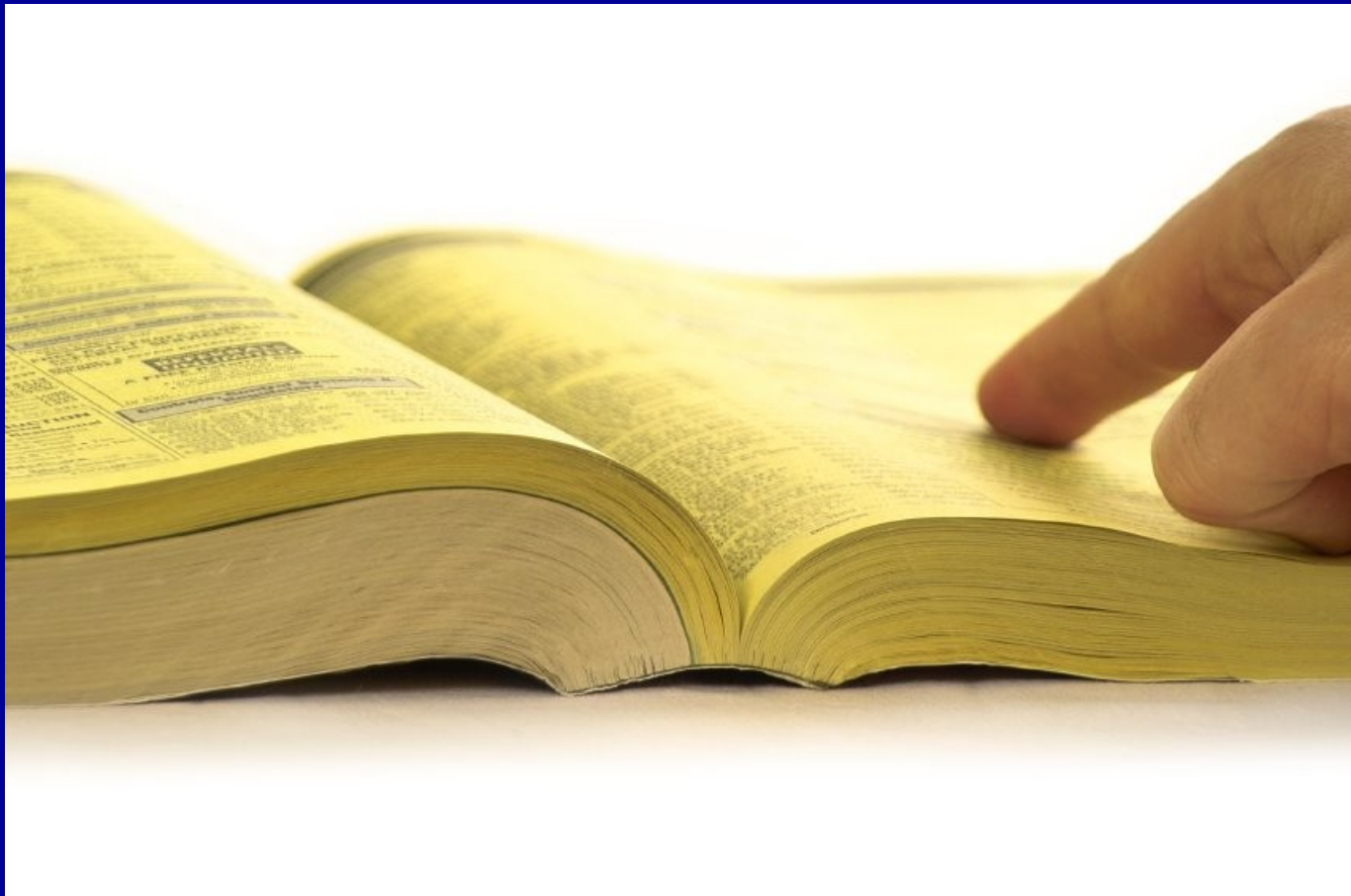
Aug01



May 83

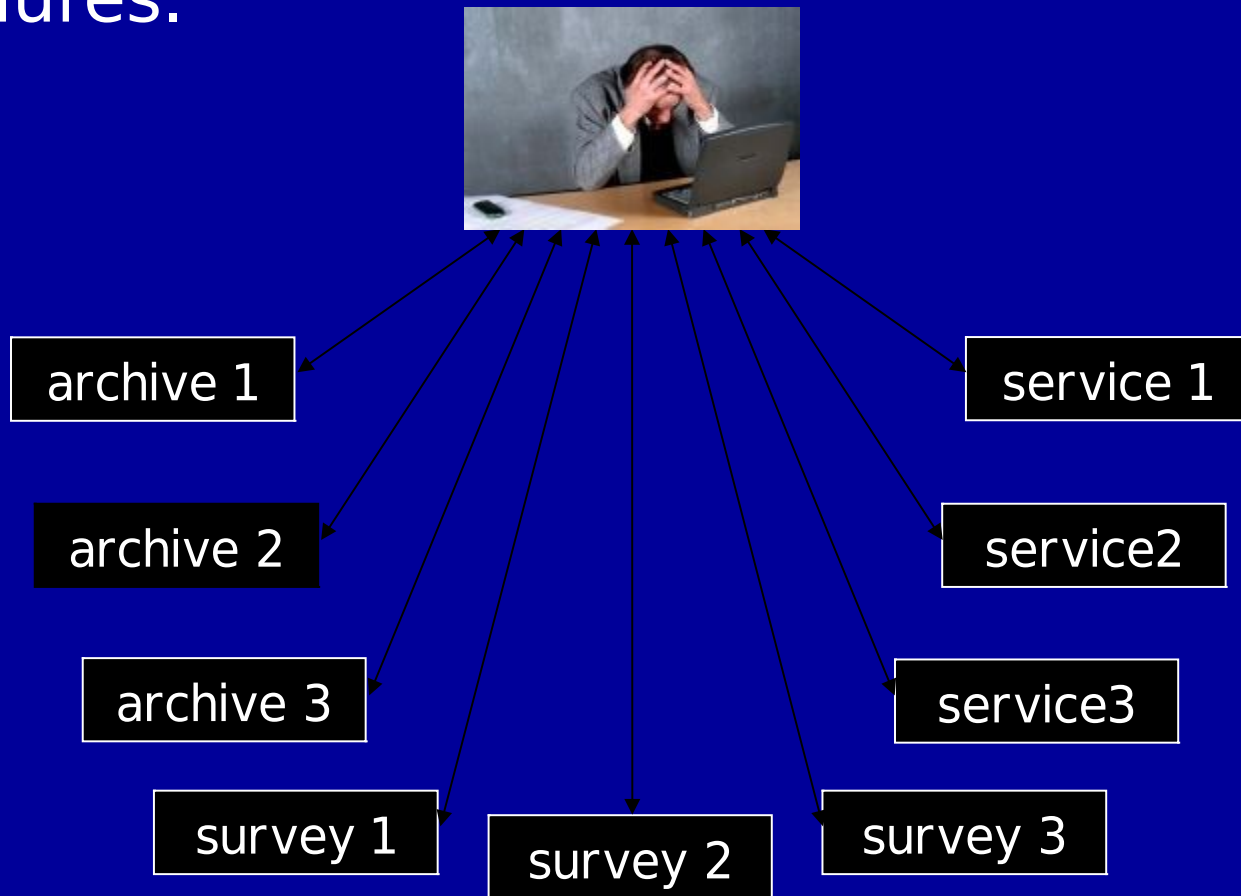
Archives in Astronomy: Limitations

- **Data Discovery:** How can astronomers find the relevant data to their scientific needs?



Archives in Astronomy: Limitations

- **Data Access:** Astronomers need to learn about different user interfaces, access and download procedures.



Archives in Astronomy: Limitations

- **Data Characterization:** lack of Data Models to describe similar observations in the same way.



Archives in Astronomy before VO



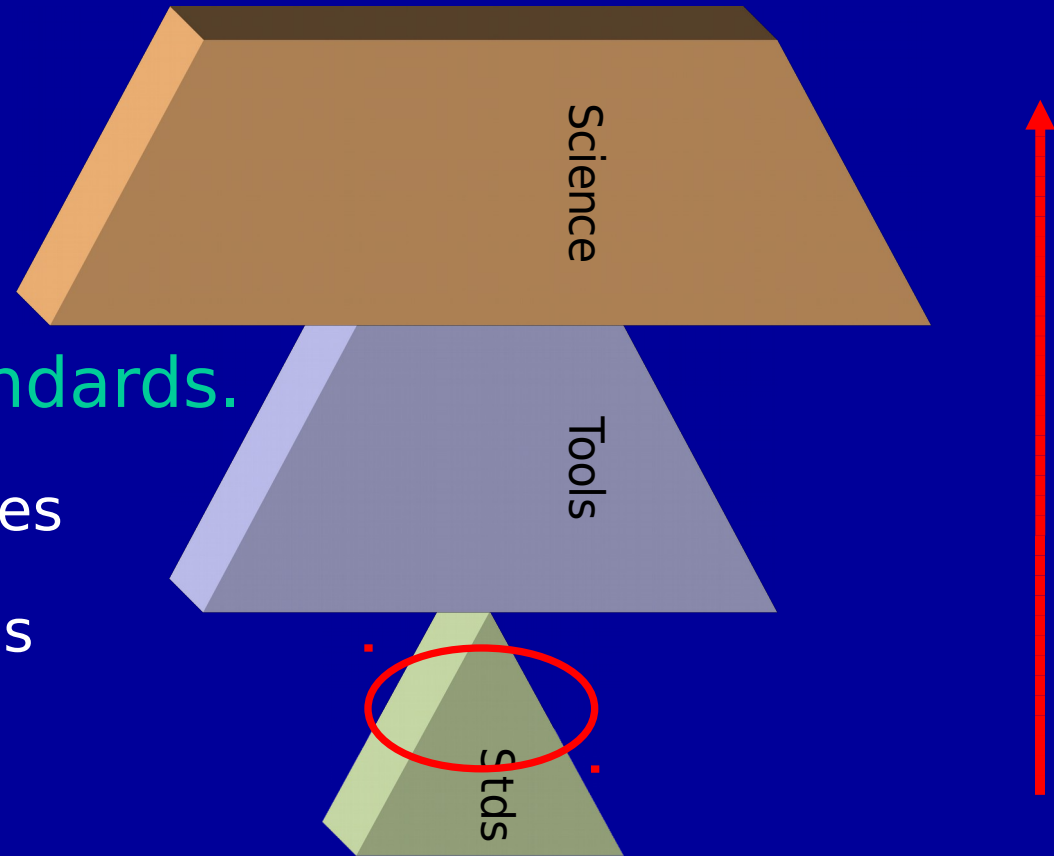
The Virtual Observatory (VO)

- **Goal:** Efficient management of the information available in astronomical archives (access and analysis)



The VO is NOT a centralized database but a data grid

The Virtual Observatory: Roadmap

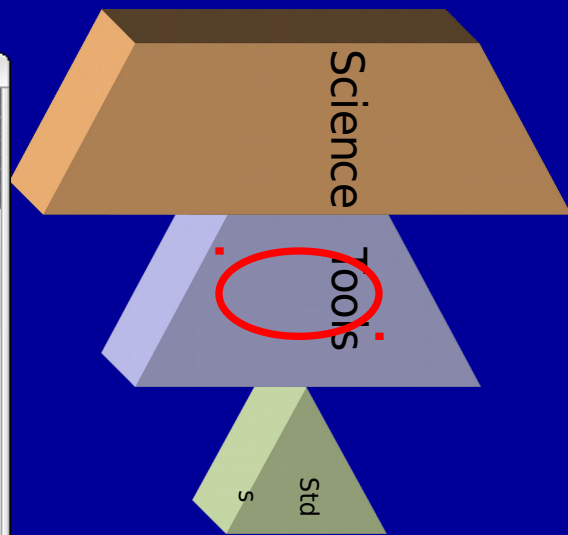
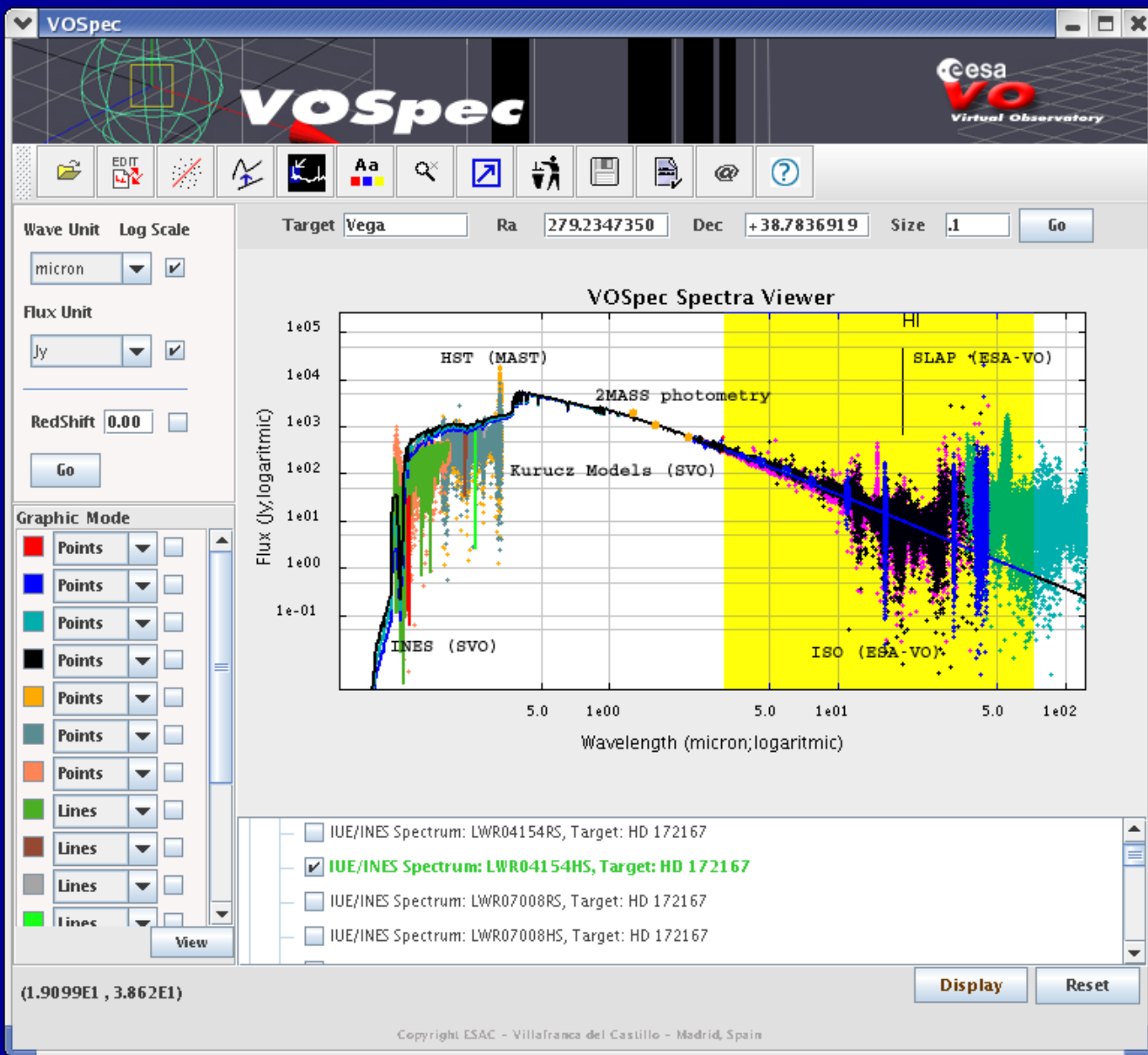


- Agree and build standards.

- Discovery → Registries
- Data access protocols
- Data models
- Semantic

- Uptake of standards by the data services.

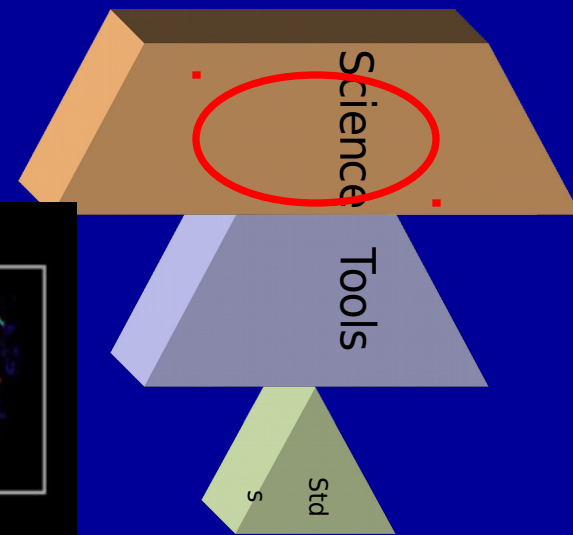
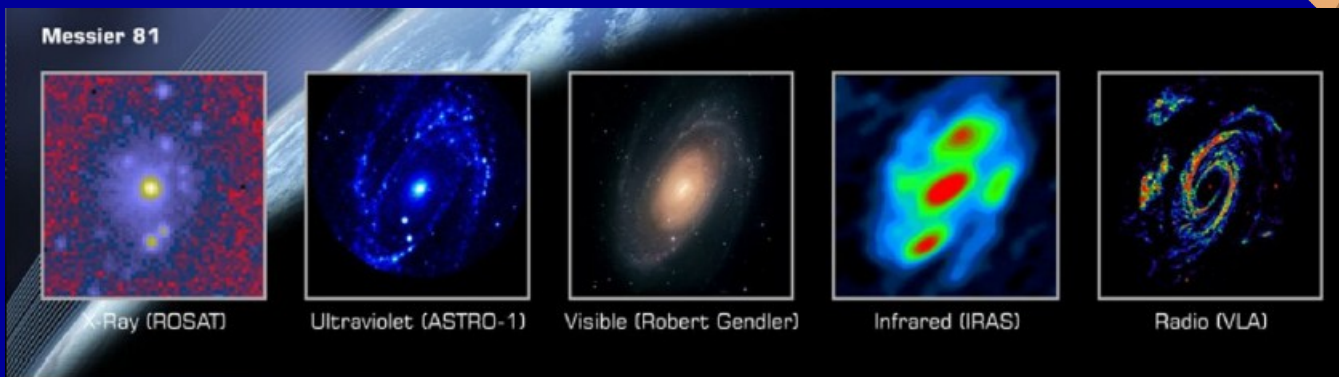
The Virtual Observatory: Roadmap



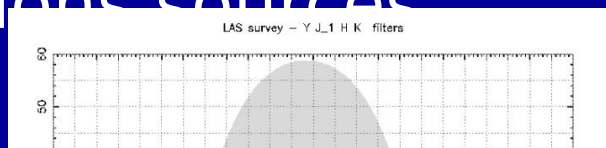
Remote data as if
it were local.

The Virtual Observatory: Roadmap

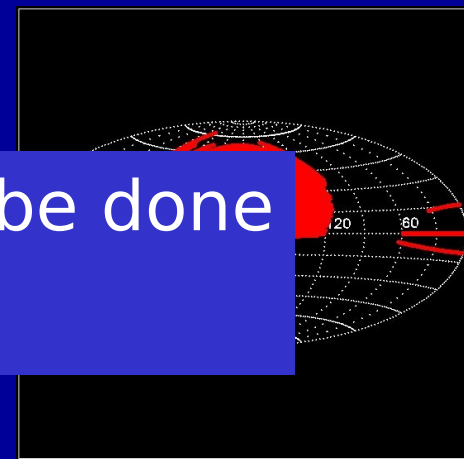
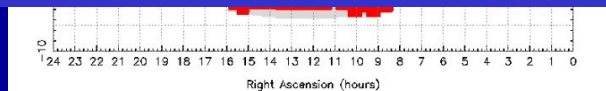
- Multiwavelength astronomy



- Discovery of exotic objects through the analysis of millions sources



- VO-Science:** Science that cannot be done (or very inefficiently) without VO.



Conclusions

- VO deals with science-ready data distributed world-wide. → Networks play a fundamental role.
- Despite its short history (2000-), VO is a successful initiative
 - Basic standards agreed and adopted by Data Centers
 - Most important data providers (NASA, ESA, ESO) are adapting their contents to VO requirements
 - Robust and stable VO-tools
- VO represents a new methodology to do new science.