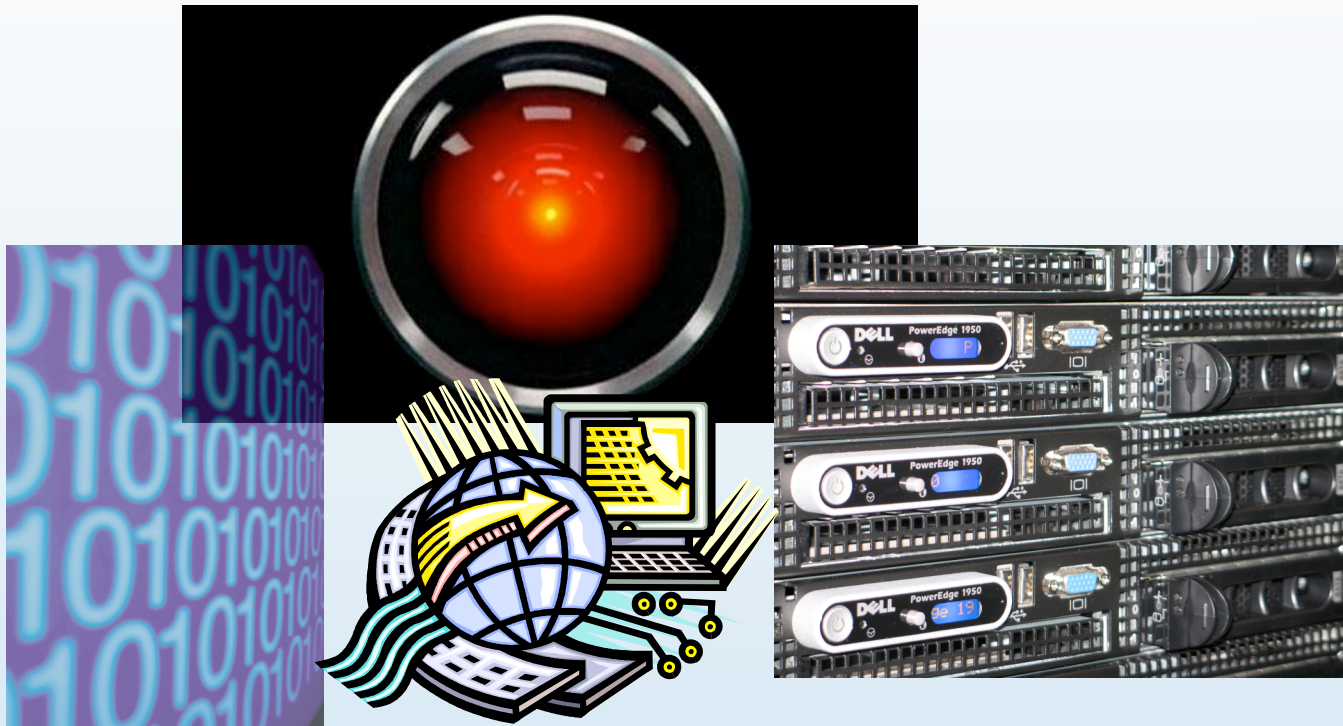


# The François Arago Centre: a Tier-2 for astroparticle physics



Volker Beckmann  
François Arago Centre, APC Paris  
P. Binétruy, M. Detournay, S. Dong,  
F. Lebrun, J. Lefur, E. Foissac,  
F. Dodu, C. Dufur





# Overview



- Motivation
- Structure
- Projects
- Status
- Perspectives
- Conclusions



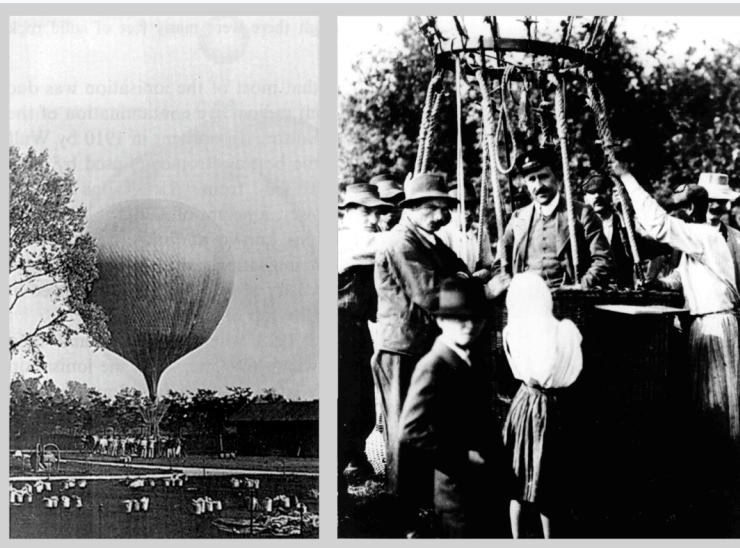
## Early days



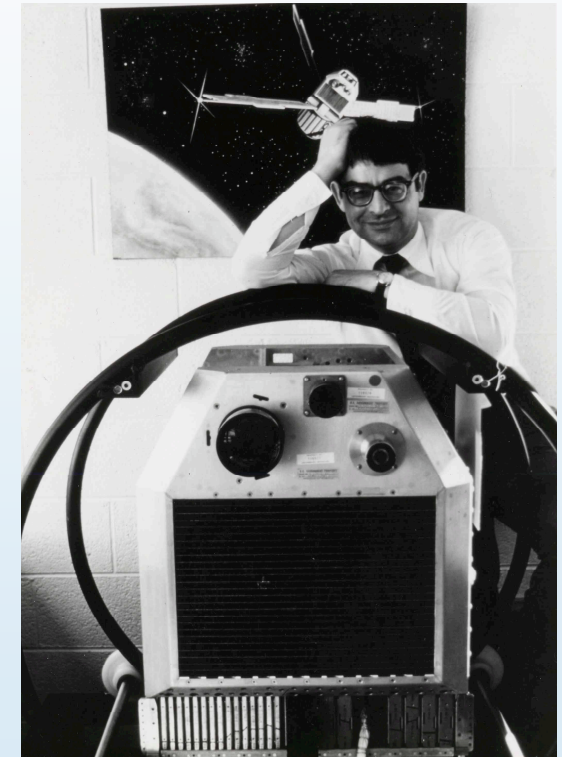
In the early days data were private...



Edwin Hubble



Victor Hess



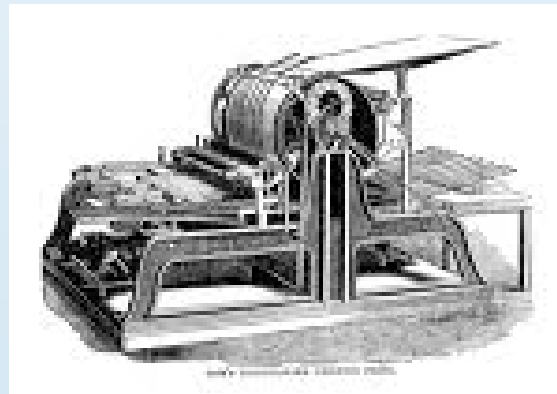
Riccardo Giacconi



## Early days



- Small (one group/person) experiments
- Technical skills
- Calibration, data taking, data analysis, scientific exploitation all in one hand
- Interface to the community: publication





# Nowadays



Many satellite missions open their archives early



NASA: first year private, then publicly available



ESA: one year private, then publicly available



# Nowadays



- Instrument teams take over calibration, processing, s/w development, archiving
- Community receives data and s/w ready for scientific exploitation
- Scientific analysis relatively light (laptop size)





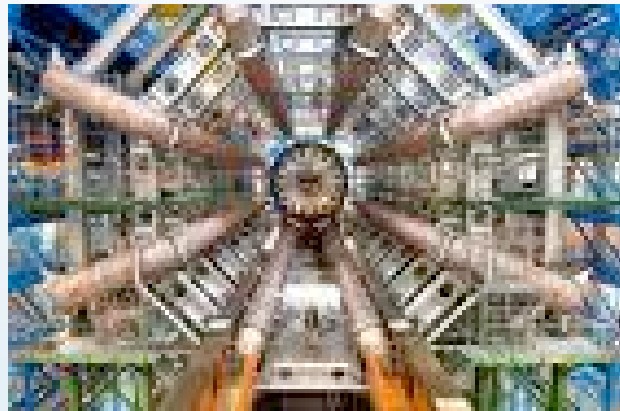
# Nowadays



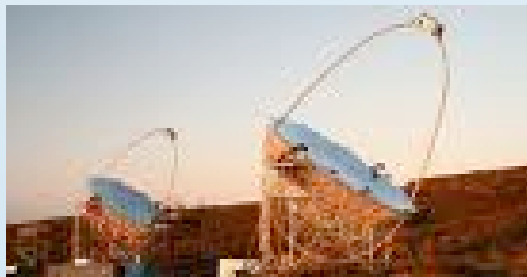
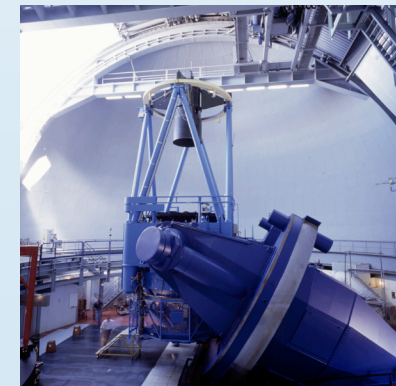
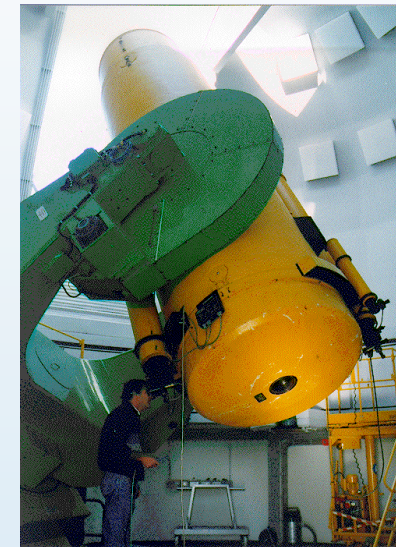
... and some projects are still with restricted access



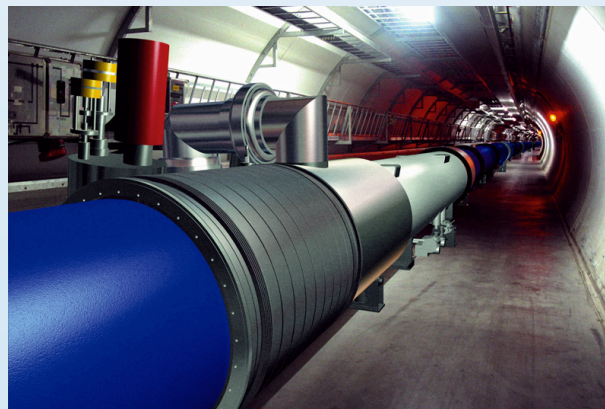
HESS



LHC



MAGIC





# Nowadays



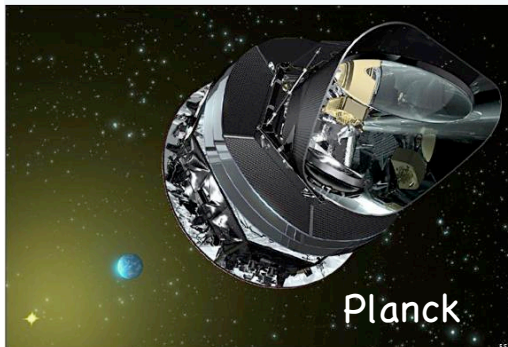
- Instruments very complex
- Large data sets and processing needs
- Therefore: Full exploitation of the data before results are presented to the community via publication



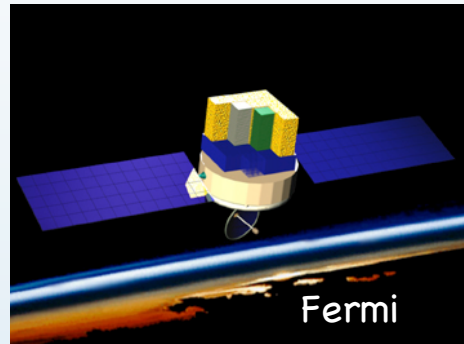
# Challenges



- Data analysis for new missions gets more and more complex

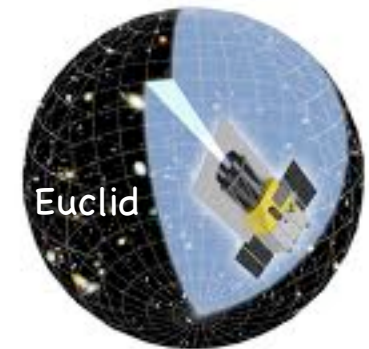
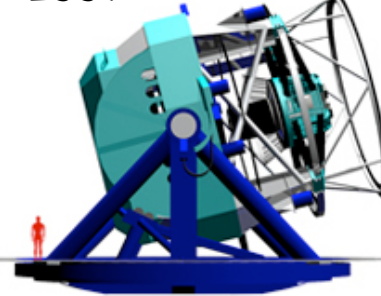


Planck



Fermi

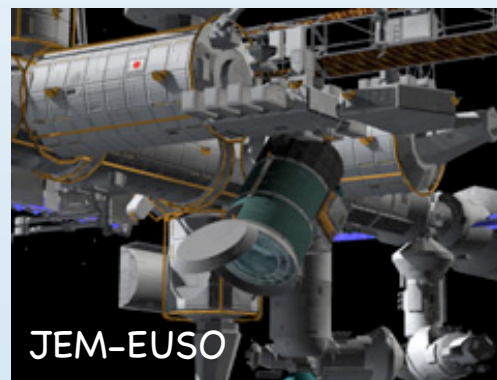
LSST



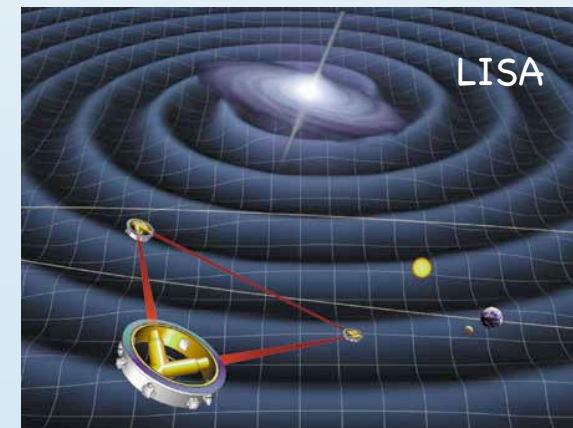
Euclid



CTA



JEM-EUSO



LISA



# Future



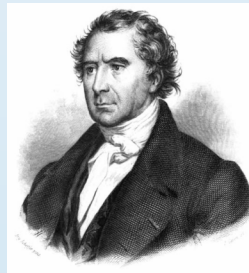
- Instruments and data grow even more complex
- Large data sets and processing needs
- Multi-national experiments
- Funding agencies expect involvement of whole community, open access
- Resources (h/w, s/w, knowledge) have to be accessible to every scientist
- “Not to worry about the infrastructure” (Steven Newhouse’ talk on EGI.eu)
- Ideally, produce results ready for input into IVOA (Fabio Pasian)
- Not everything can be virtual; we need real people in real places and real hardware



# Answers



- GRID: distributed processing & storage
- Large data computing and data centers: data storage, availability & safety, heavy processing
- Local processing needs, knowledge
- Temporary work/computing/storage space
- Not every institute/group has the resources



François Arago Centre (FACe)



# François Arago Centre



- Heavy support by IN2P3
- Many partners
- Project at APC (Université Paris 7)
- Develop into a mature structure in ~5 years

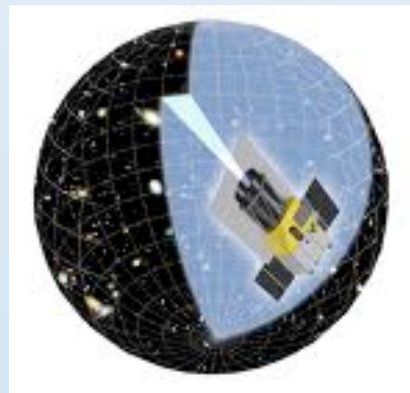
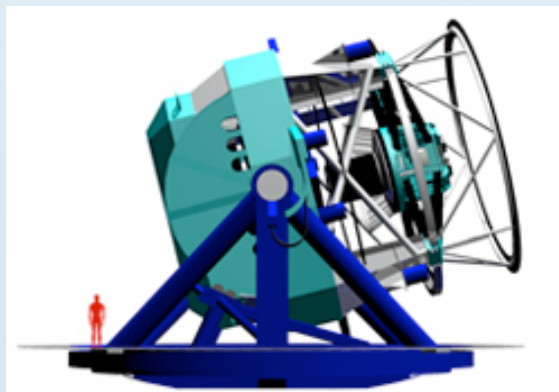
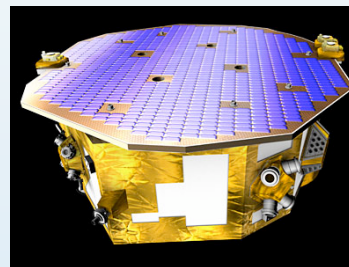
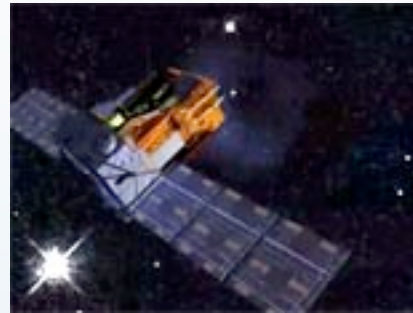




# Projects



- INTEGRAL
- HESS
- LISA-Pathfinder
- Geoscope (geoscience)
- LSST
- Euclid
- CTA
- LISA
- ...

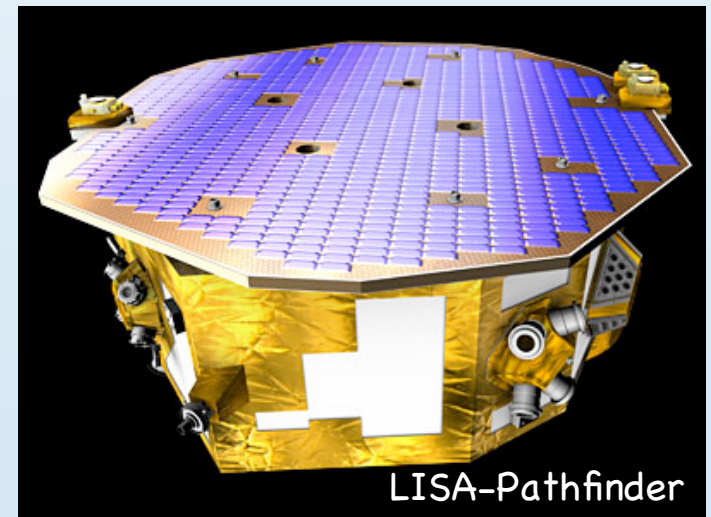
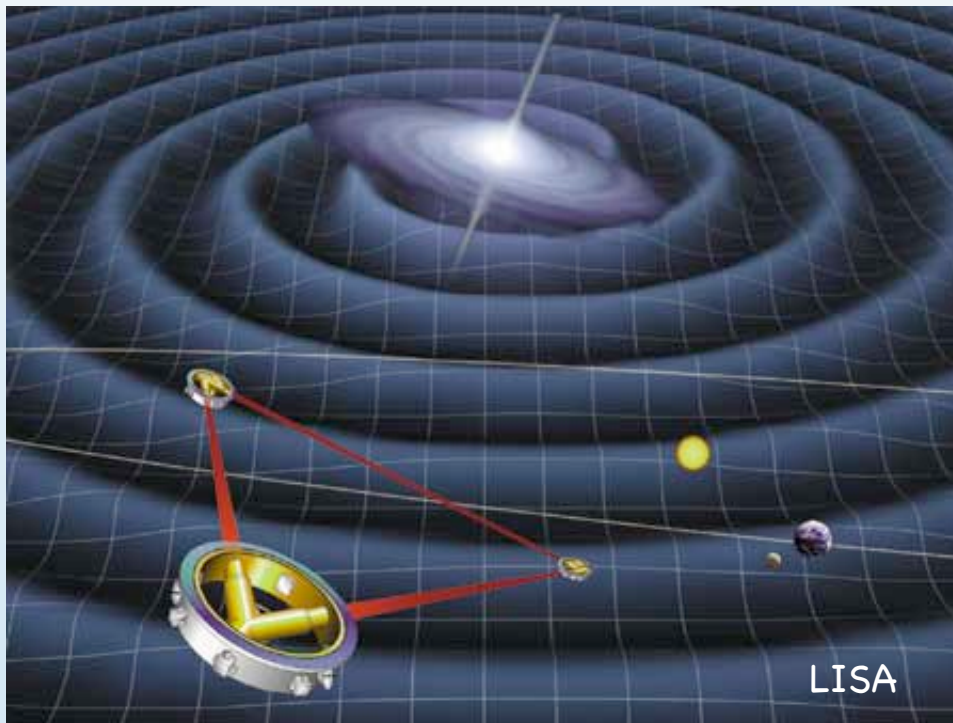




# LISA Pathfinder



- Technology demonstrator for LISA (launch 2013)
- Proof that we can measure and navigate with sufficient precision in space

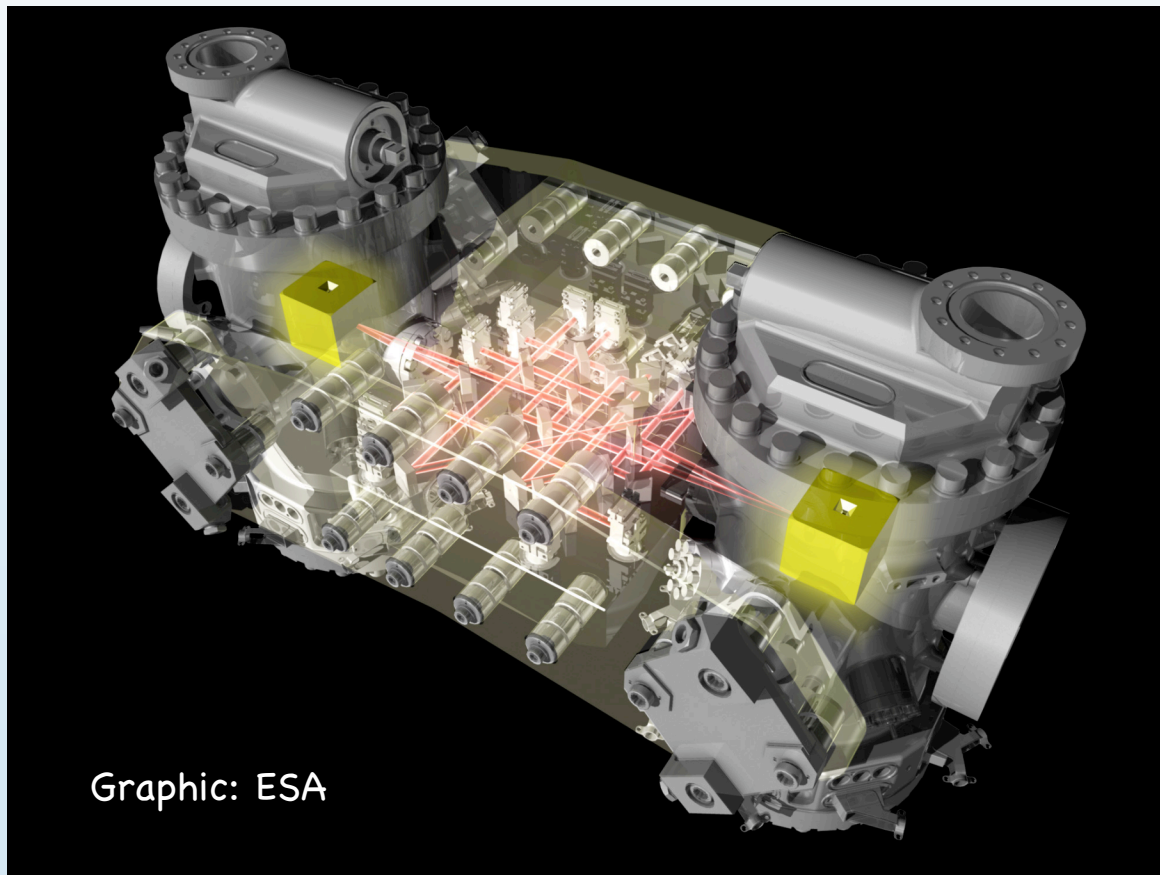




# LISA Pathfinder



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Graphic: ESA

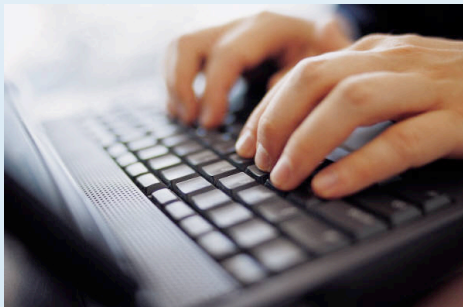




# LISA Pathfinder

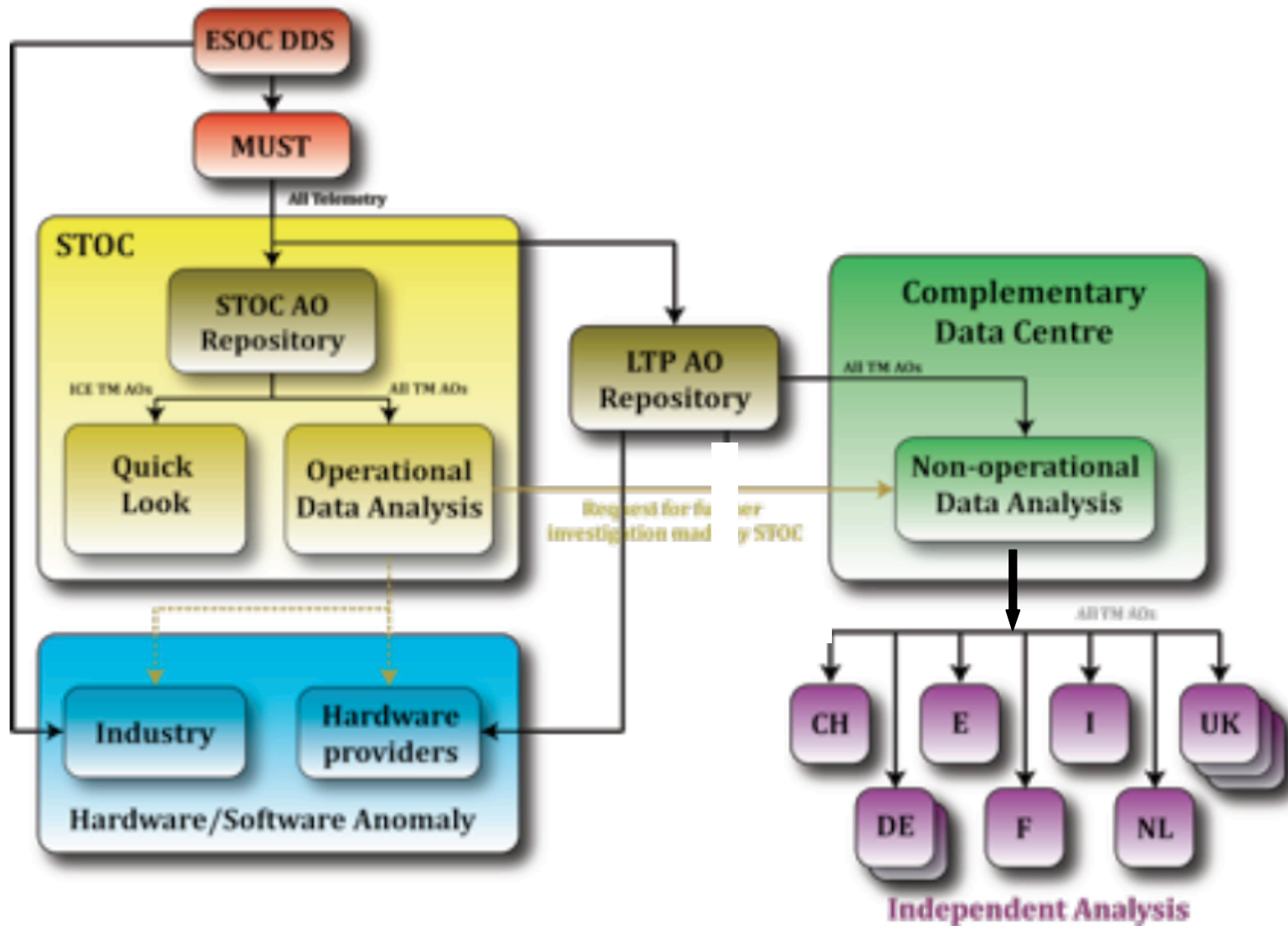


- Need for in-depth analysis of data in near-real time in order to plan the upcoming experiments
- François Arago Centre as “Complementary data centre”
- Provide work/meeting/computing/archive environment for colleagues involved in LISA-PF





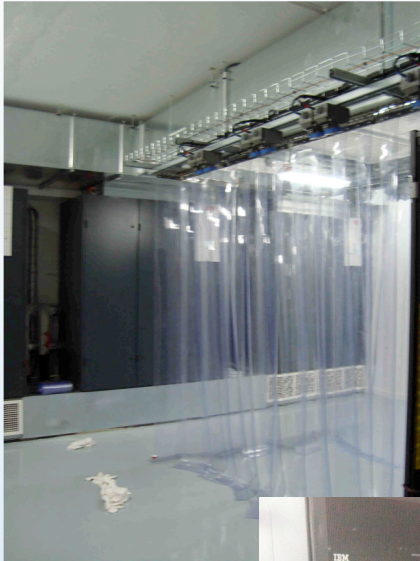
# LISA-PF & FACe



Graphic: ESA/Paul McNamara



Centre François Arago,  
Rue Watt 13



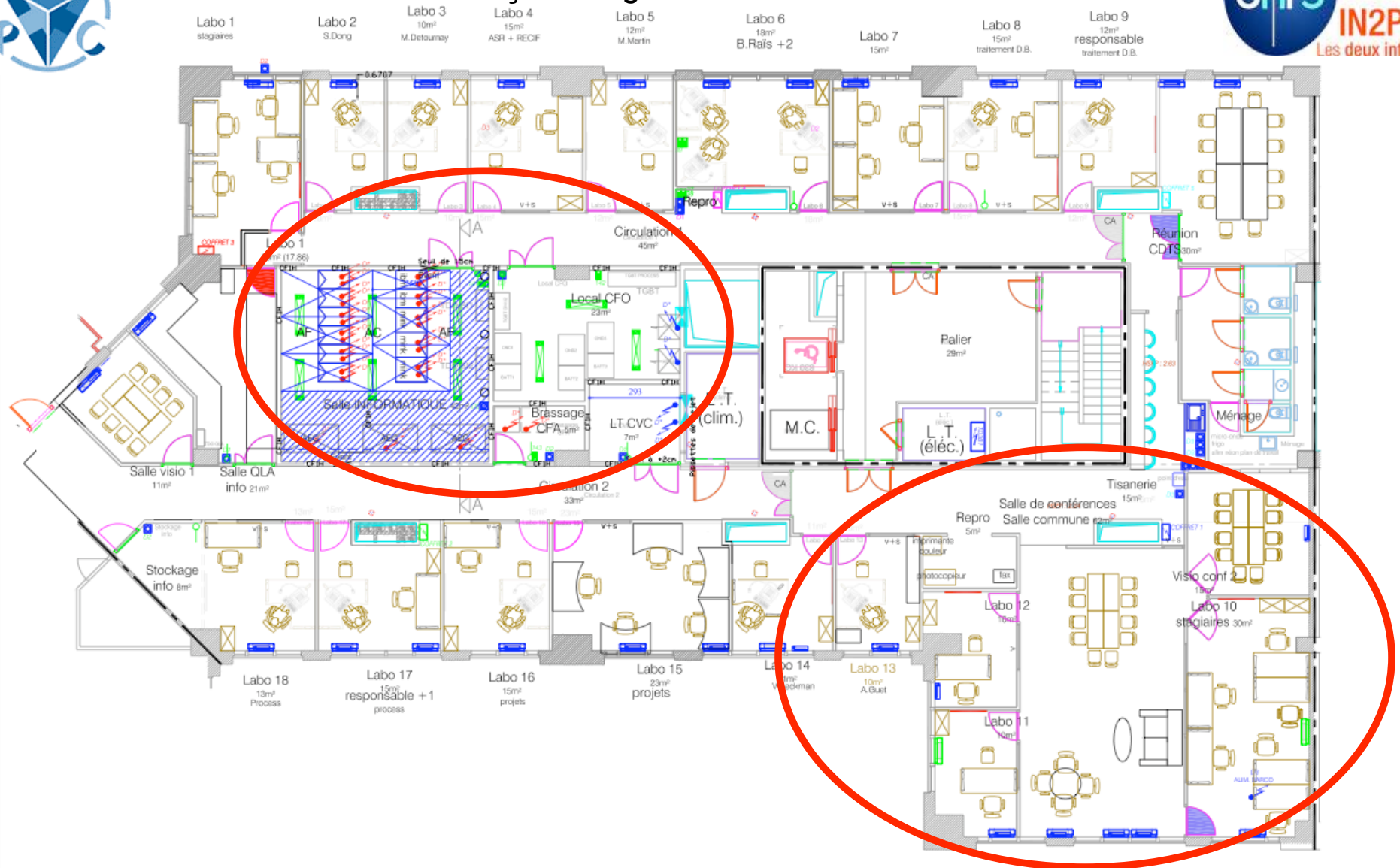
Computer  
room



Battery backup



# François Arago Centre, Rue Watt 13



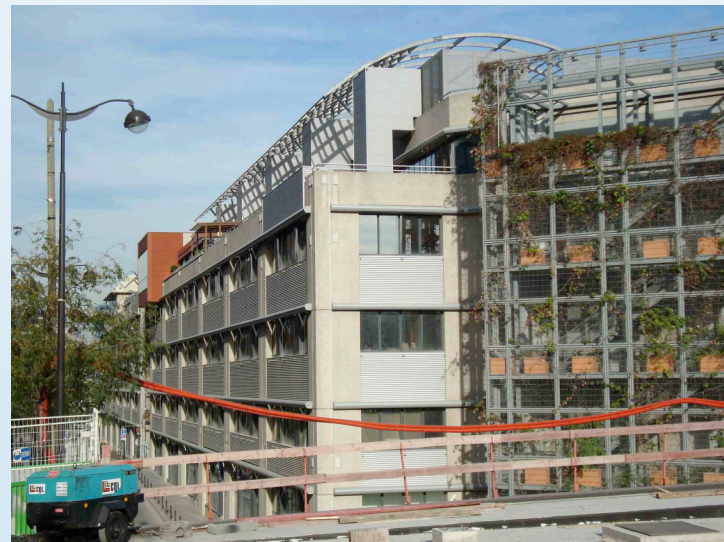
Office and Circulation - FAC area : 312 m2 /Group area 153 m2, Technical room - 106 m2 (electrical power: 100 kW)



## Next steps



- 2 racks DELL (600 cores) provided by CC-IN2P3
- 10 Gbit/s connection (e.g. to CC-IN2P3 in Lyon)
- 50 Tbyte (IPGP)
- Building finished July
- Moving in right now





# Conclusions



- The François Arago Centre is a multi-mission centre
  - Ease connection between users/projects and large centres/Grid
  - The centre can enhance the visibility of the projects and increase the community involved in
  - The centre started in 2010 with a small team
- [http://www.apc.univ-paris7.fr/APC\\_CS/](http://www.apc.univ-paris7.fr/APC_CS/)

