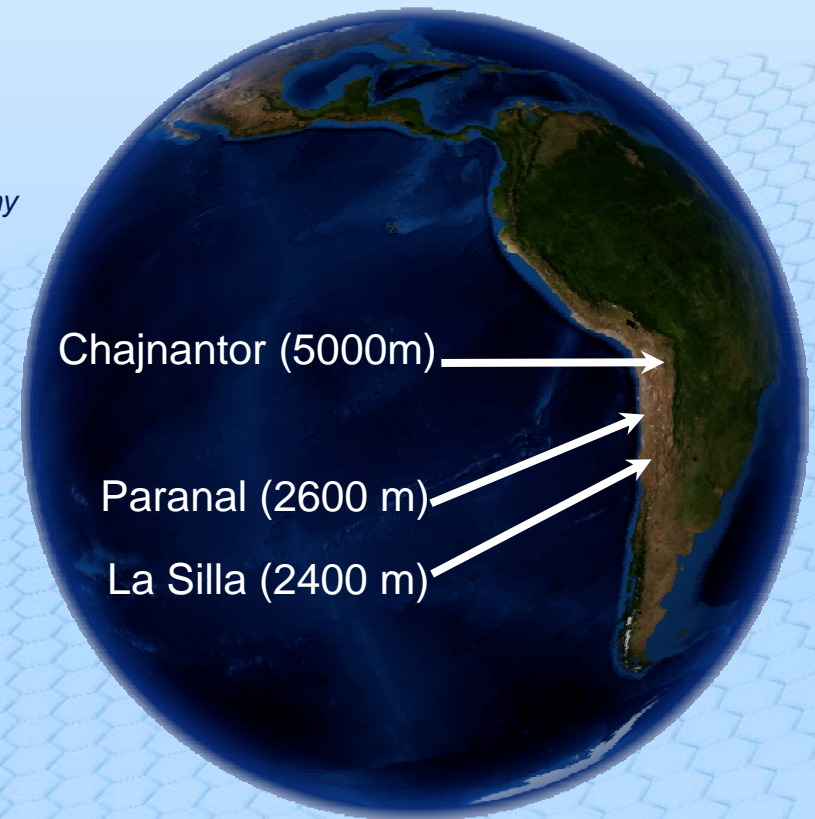
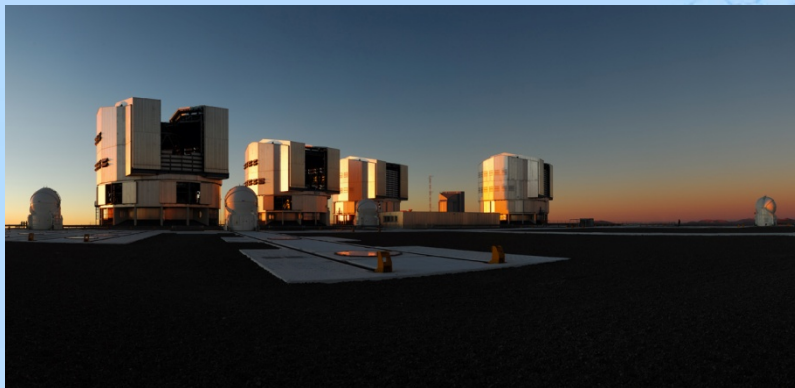


Historical lessons, inter-disciplinary comparison, and their application to the future evolution of the ESO Archive Facility and Archive Services

Paul Eglitis and Dieter Suchar

ESO, Karl-Schwarzschild Str. 2, 85748 Garching near Munich, Germany

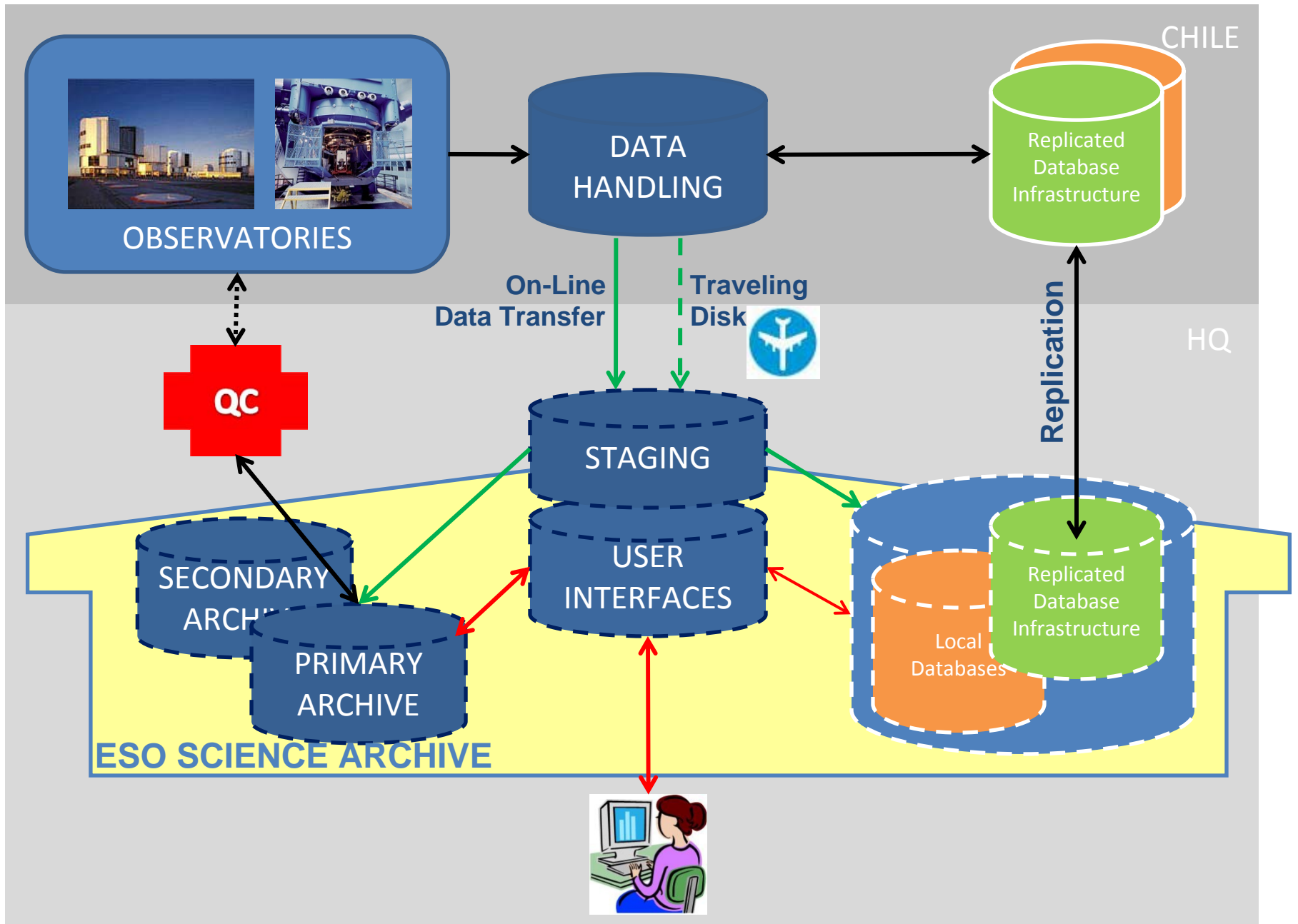


Introduction

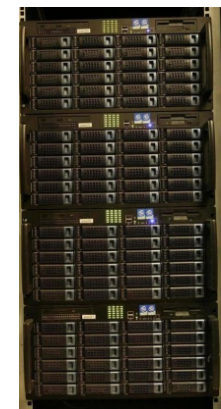
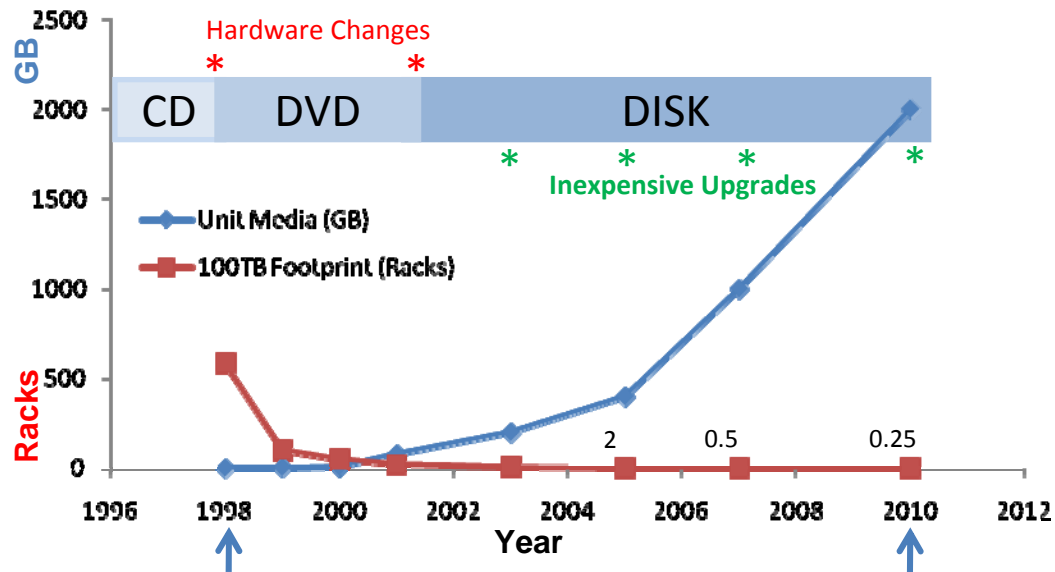
- ❖ Inter-disciplinary thoughts
- ❖ The ESO Science Archive Facility
- ❖ Physical experiences: storage and infrastructure
- ❖ Future growth requirements
- ❖ Lessons Learnt
- ❖ Future evolution

Archive Requirements: Inter-disciplinary Variation and Similarity

	Space Mission	Earth Observation	Ground-Based Astronomy	Particle Physics
Customer	Science	Service, Science	Science	Science
Configuration	Stable (Mission)	Stable (Long Term)	Variable	Variable
Data Timeliness	On Opportunity	Periodic	Variable	In-house++
Data Volume	Always more!			
Interoperability	IPDA, SPASE EUROPLANET	GEOSS, INSPIRE, GIGAS ,HMA	FITS, VO, IVOA	E-GRID
...				

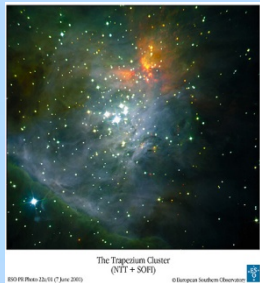


Physical Archive History

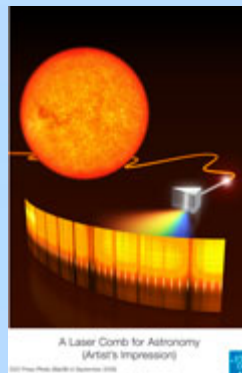


“Multi-mission” Concept in Archival Leading observatories and state-of-the-art instrumentation

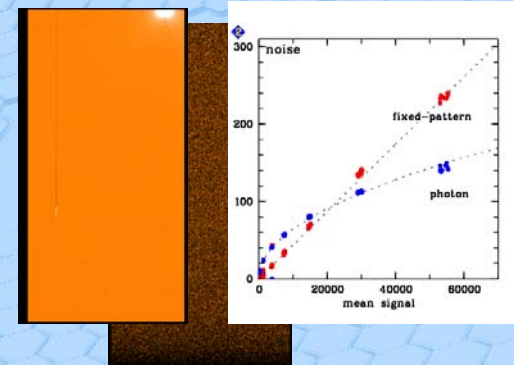
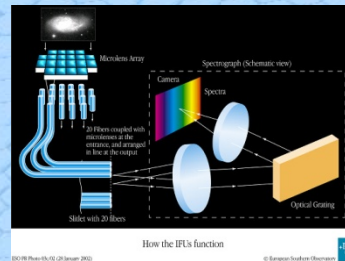
VLT	Very Large Telescope	UVES	Ultraviolet and Visual Echelle Spectrograph
CRILES	CRyogenic high-resolution InfraRed Echelle Spectrograph	VIMOS	Visible MultiObject Spectrograph
FLAMES	Fibre Large Array Multi Element Spectrograph	VISIR	VLT Imager and Spectrometer for mid Infrared
FORS1	FOcal Reducer/low dispersion Spectrograph 1	X-SHOOTER	a multi wavelength (300-2500nm) medium resolution spectrograph
FORS2	FOcal Reducer/low dispersion Spectrograph 2	VLT I	Very Large Telescope Interferometer
HAWK-I	High Acuity Wide field K-band Imager	VLT I MIDI	MID-infrared Interferometric instrument
ISAAC	Infrared Spectrometer And Array Camera	VLT I AMBER	Astronomical Multi-BEam combineR
NACO	Nasmyth Adaptive Optics System (NAOS)	VISTA	Visible and Infrared Survey Telescope for Astronomy
SINFONI	Spectrograph for INtegral Field Observations in the Near Infrared	MASCOT	Mini All-Sky Cloud Observation Tool
NTT	ESO 3.6m MPG/ESO 2.2m	ALMA	The Atacama Large Millimeter/submillimeter Array
WFI	Wide Field Imager	APEX	Atacama Pathfinder Experiment telescope
FEROS	The Fiber-fed Extended Range Optical Spectrograph	VST	VLT Survey Telescope
EFOSC2	ESO Faint Object Spectrograph and Camera	E-ELT	European Extremely Large Telescope
HARPS	High Accuracy Radial velocity Planet Searcher		
SOFI	Son of ISAAC		



Images

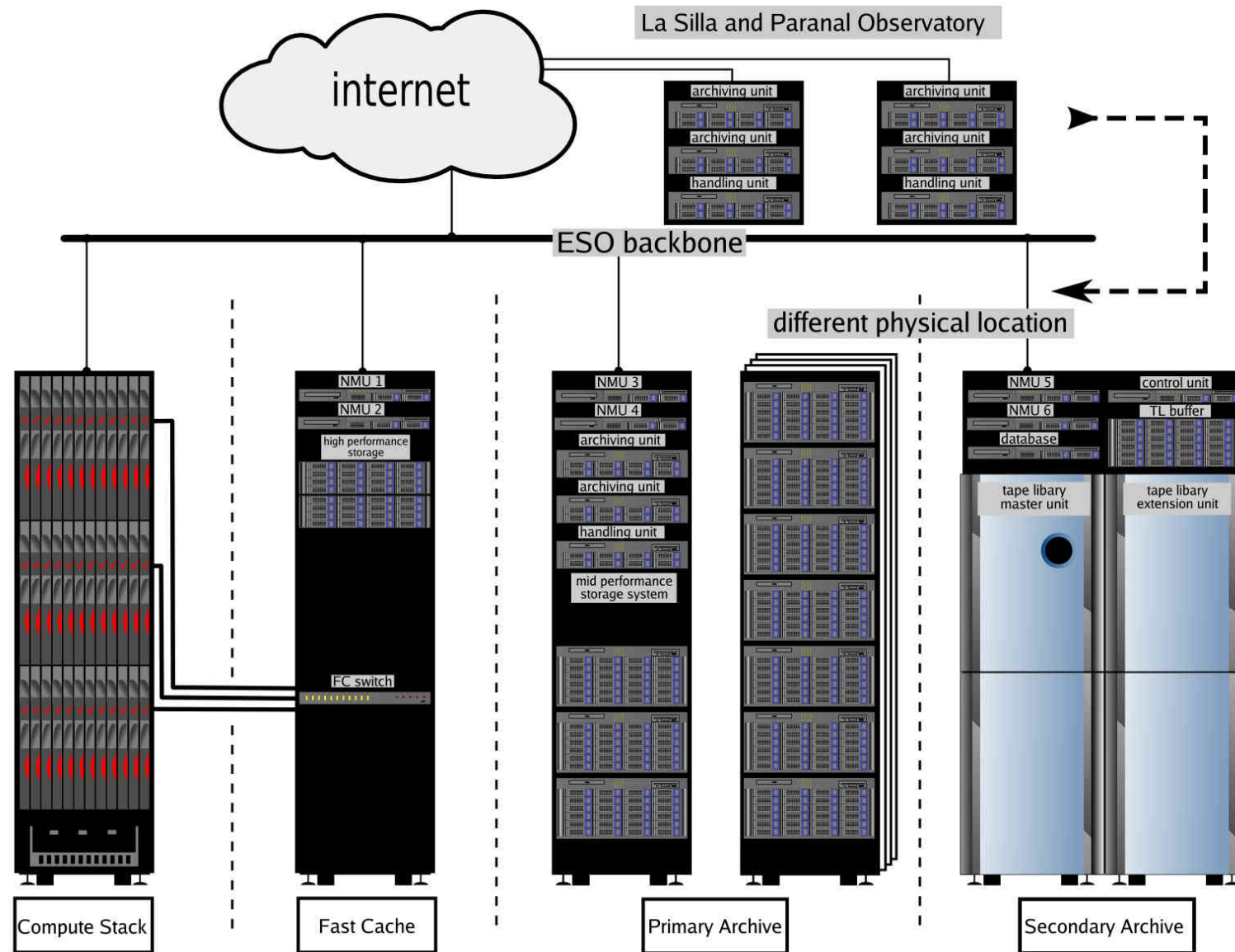


Spectra



Data products managed in the ESO Data Centre and Archive Facilities

ESO Archive System 2009



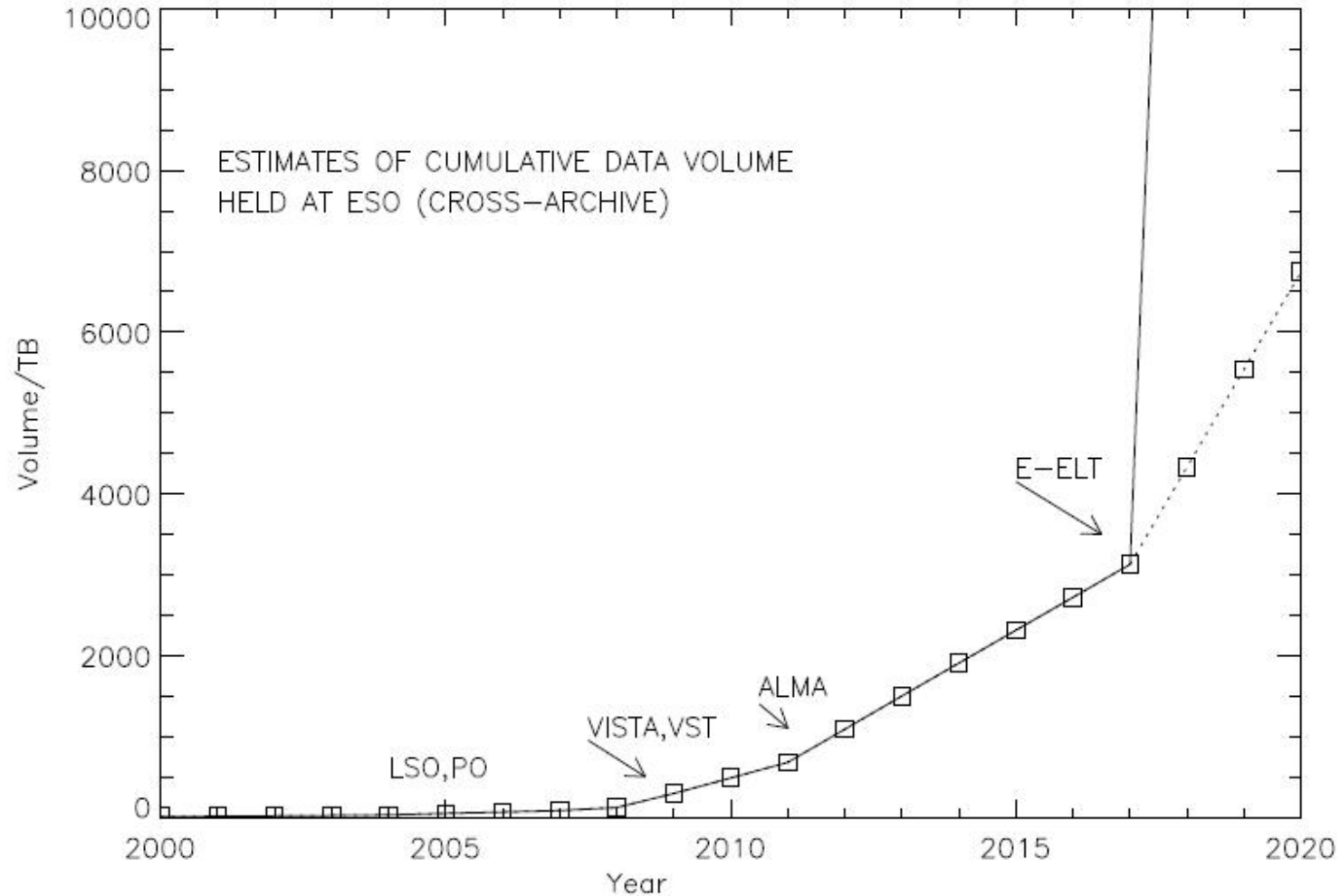
Design and construction of the ESO Data Centre



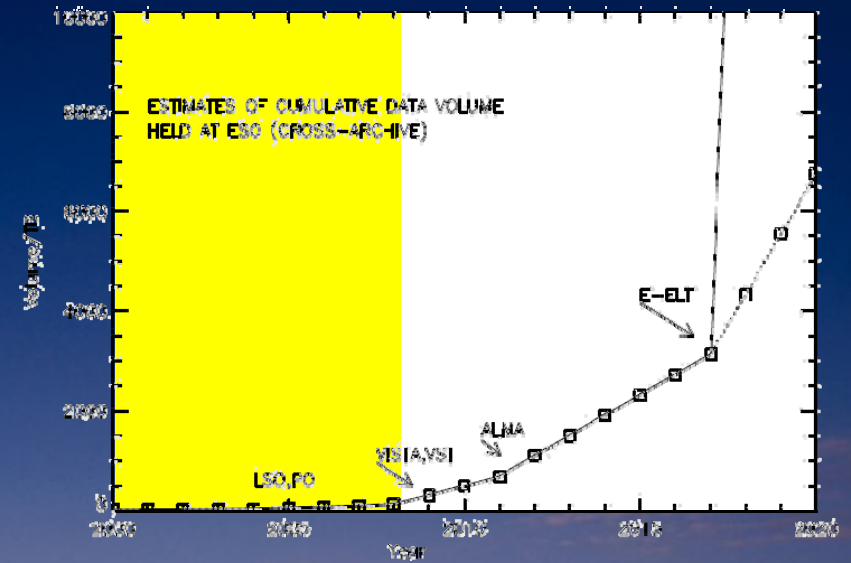
Requirements:

- Construction at different physical location.
- On an area of 7 offices in an existing building
- Modular approach: Dismantle, move and rebuild the Data Centre at ESO premises.

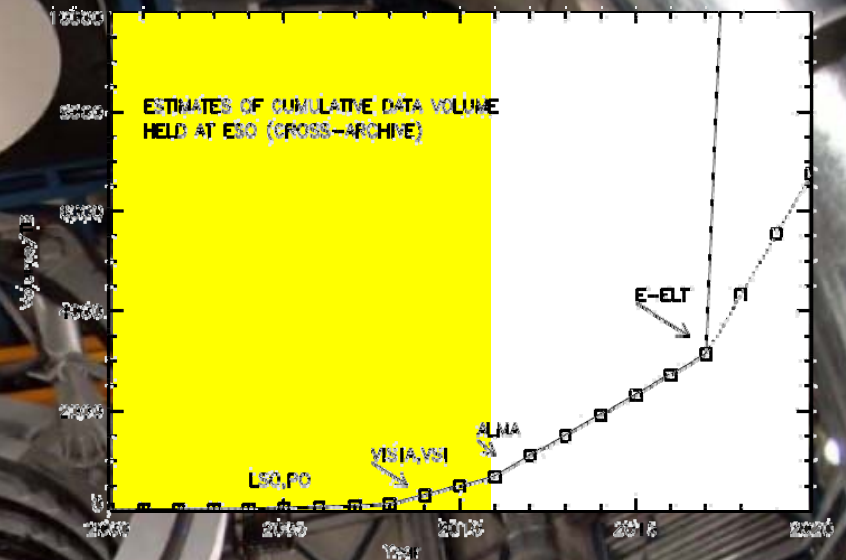
Archive Holdings Past and Projected



Paranal and the ESO Very Large Telescope

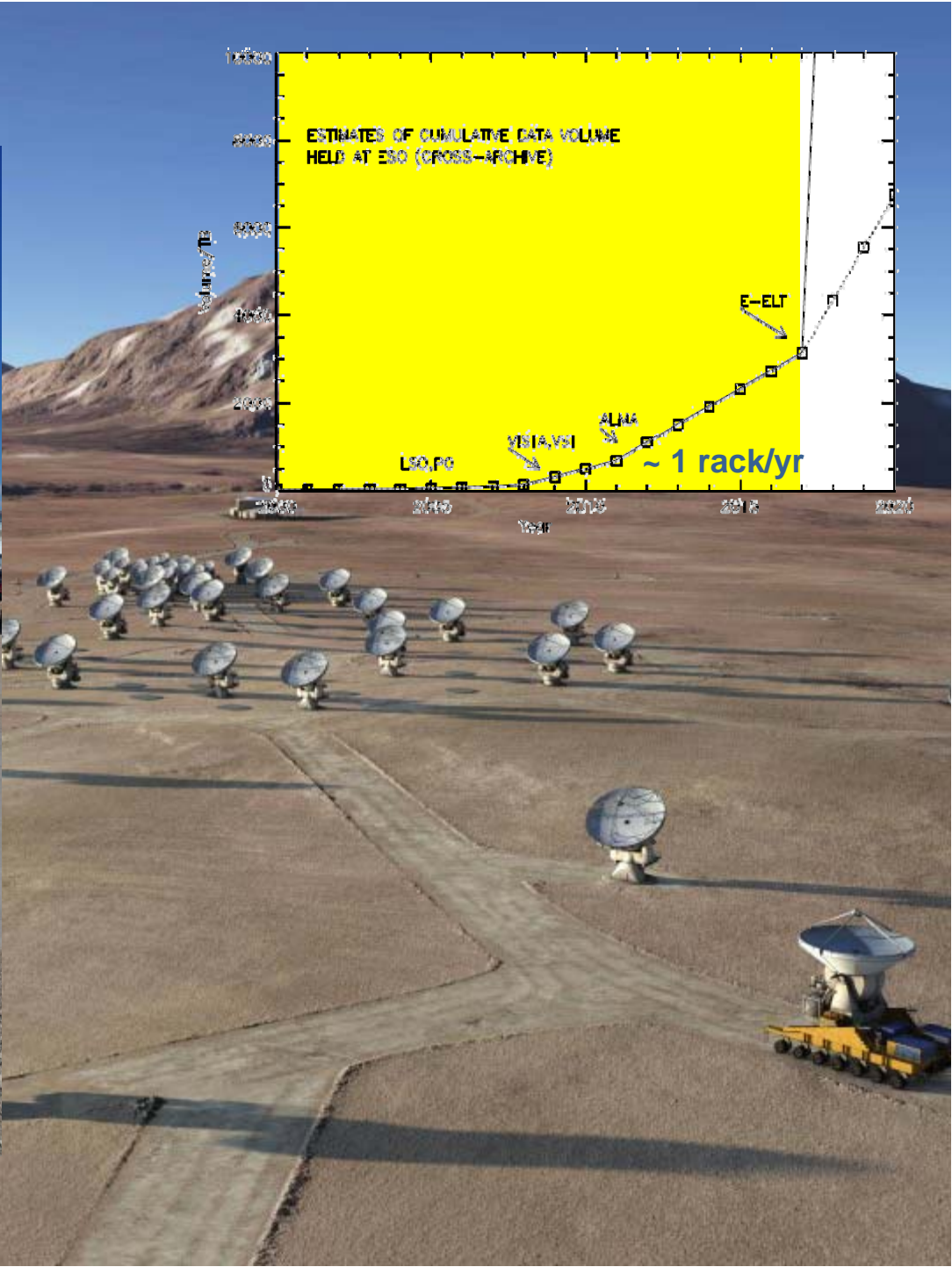


VISTA-survey-telescope

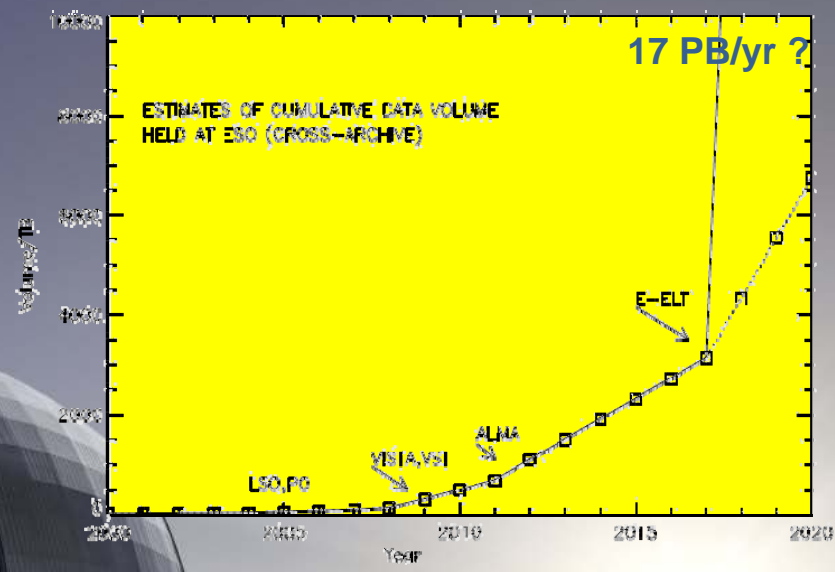
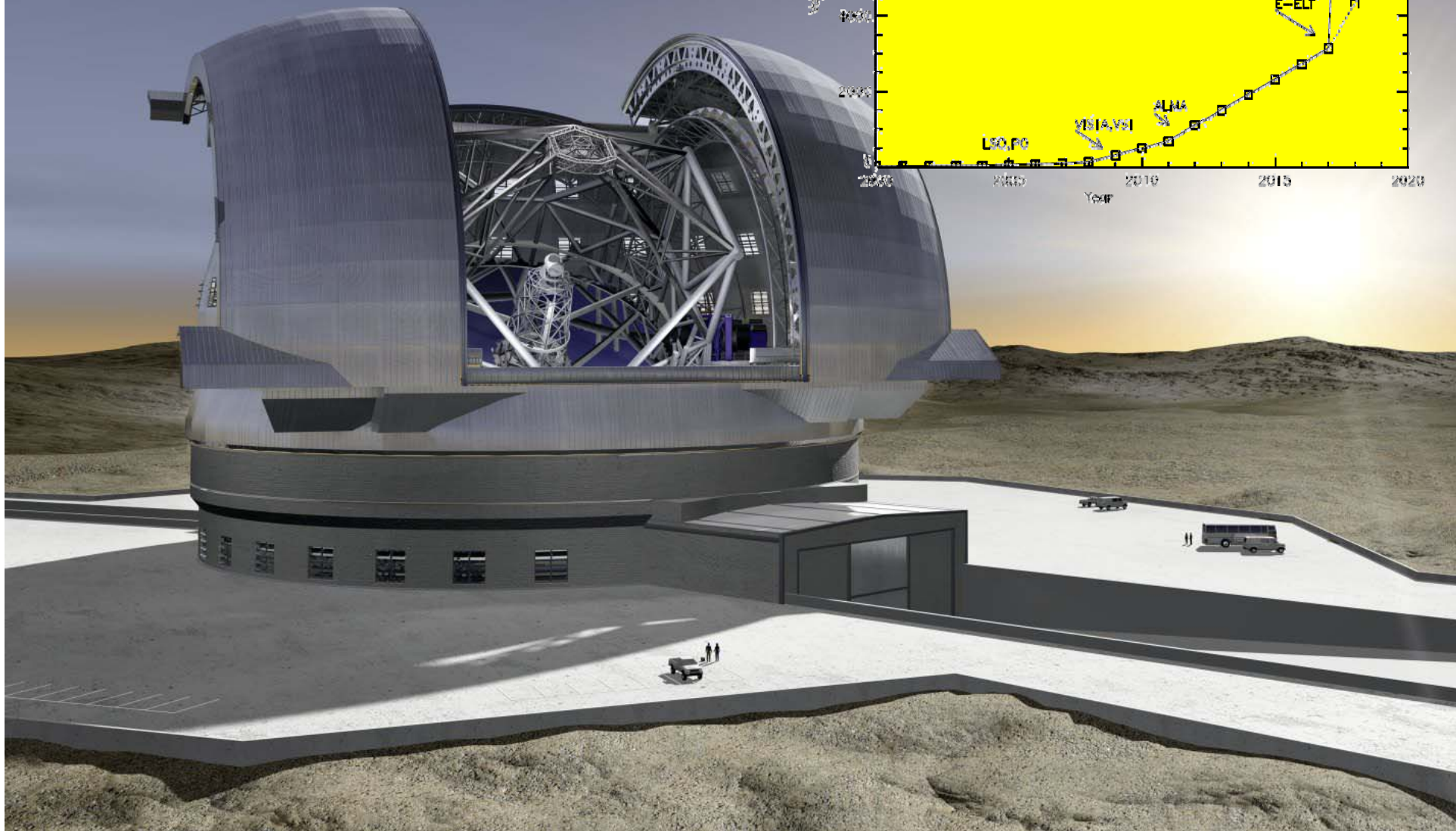


Credit: Steven Beard/UKATC/ESO

ALMA



E-ELT



Lessons Learnt

- ❖ **Preconditioning**: physical constraints of data flow a.o. domain practices bias archive solutions.
- ❖ **Physical installation**: in-house, out-source (all or part)?
- ❖ **Industry support**: risks, costs, maintenance continuity.
- ❖ **Engineering changes**: return on investment, cost of change, operational costs.
- ❖ **Art-of-balance**: especially when a facility serves multiple purposes, e.g. Operations, Preservation, Exploitation.
- ❖ **Interoperability**: many parallel efforts are ongoing.

Long-term view and **inter-disciplinary initiatives** like the **PV-Series** critical.

ESO Archive Future Evolution

“History of effective response to rapid changes has led to system heterogeneity”

- ❖ Homogenisation of metadata and interfaces
- ❖ Development of new HMIs
- ❖ Standards compliance
- ❖ Converge on next storage technology:
 - Analyse current usage of disk-based system in detail
 - Assessment of growth and access requirements
 - End-User, Operations, Maintenance and Development requirements

The ESO Science Archive is a complex part of the complete operational Data Flow System at ESO.

Thank you

Acknowledgement: observatory images courtesy of the ESO Education and Public Outreach Department. See <http://www.eso.org/gallery>