



International  
Centre for  
Radio  
Astronomy  
Research

# VLT End-to-End Changing the way ground based astronomy is done

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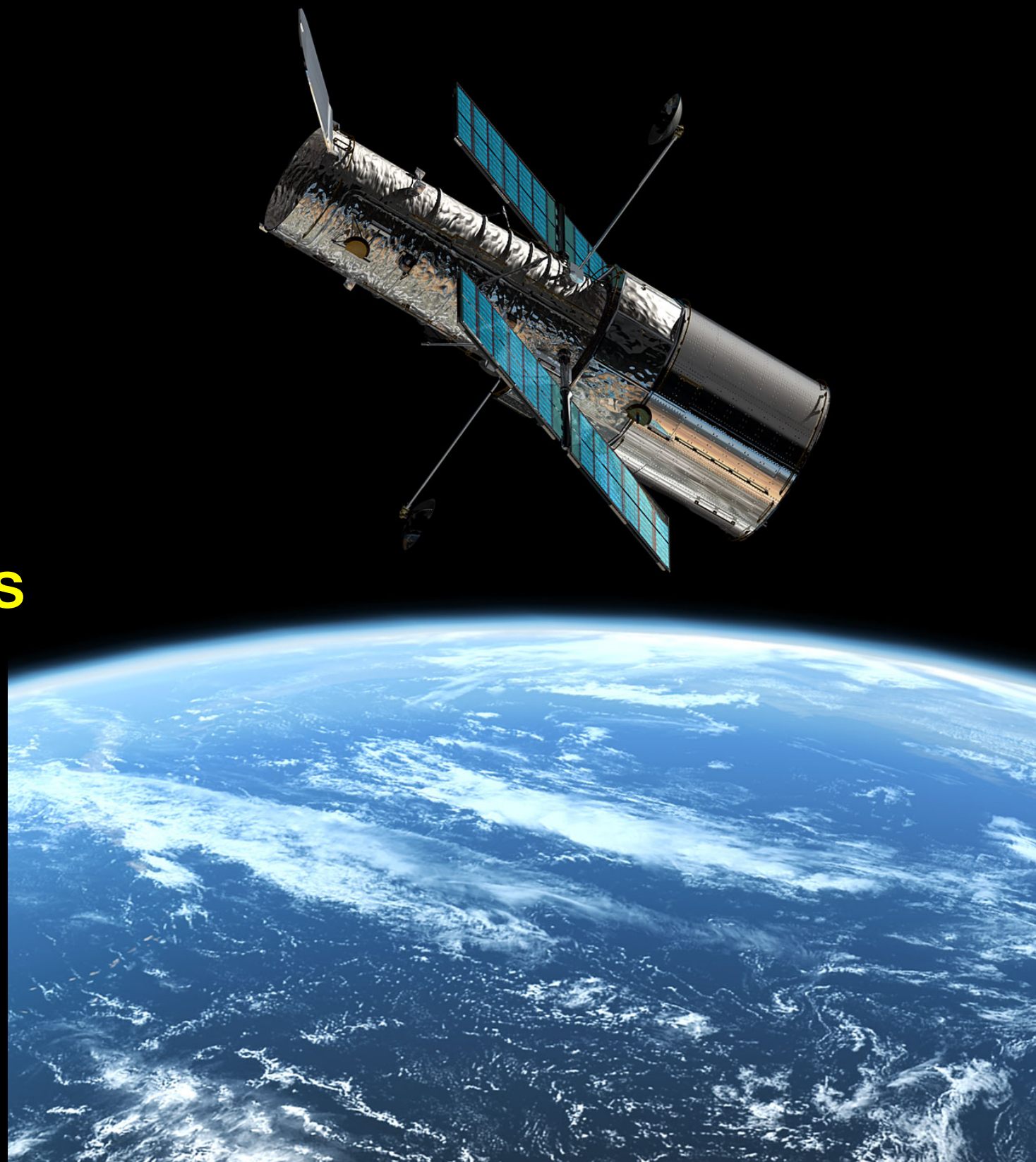


# The Riccardo Challenge

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Space is a great place

- ★ **Stable configuration** - no tinkering
- ★ **Stable environment** - calibratable
- ★ **Predictable constraints** - schedulable
- ★ **Consistent output** - data products
- ★ What will it take to achieve this on the ground?



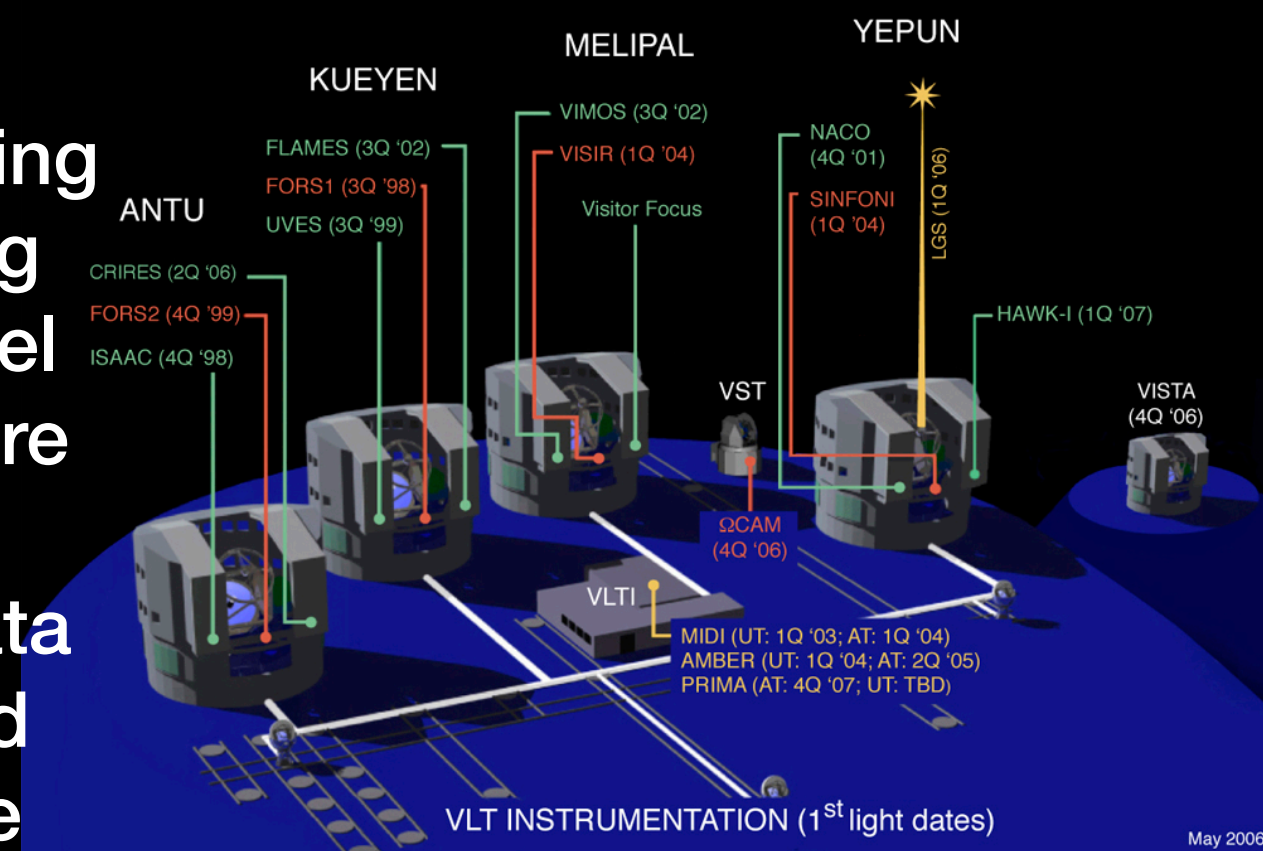
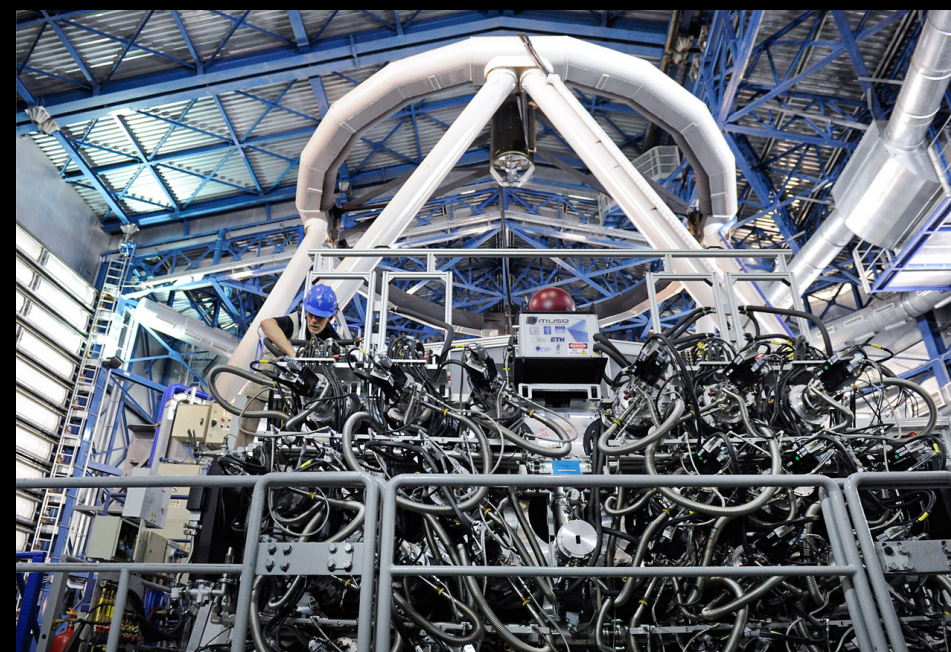




# Riccardo's Courage

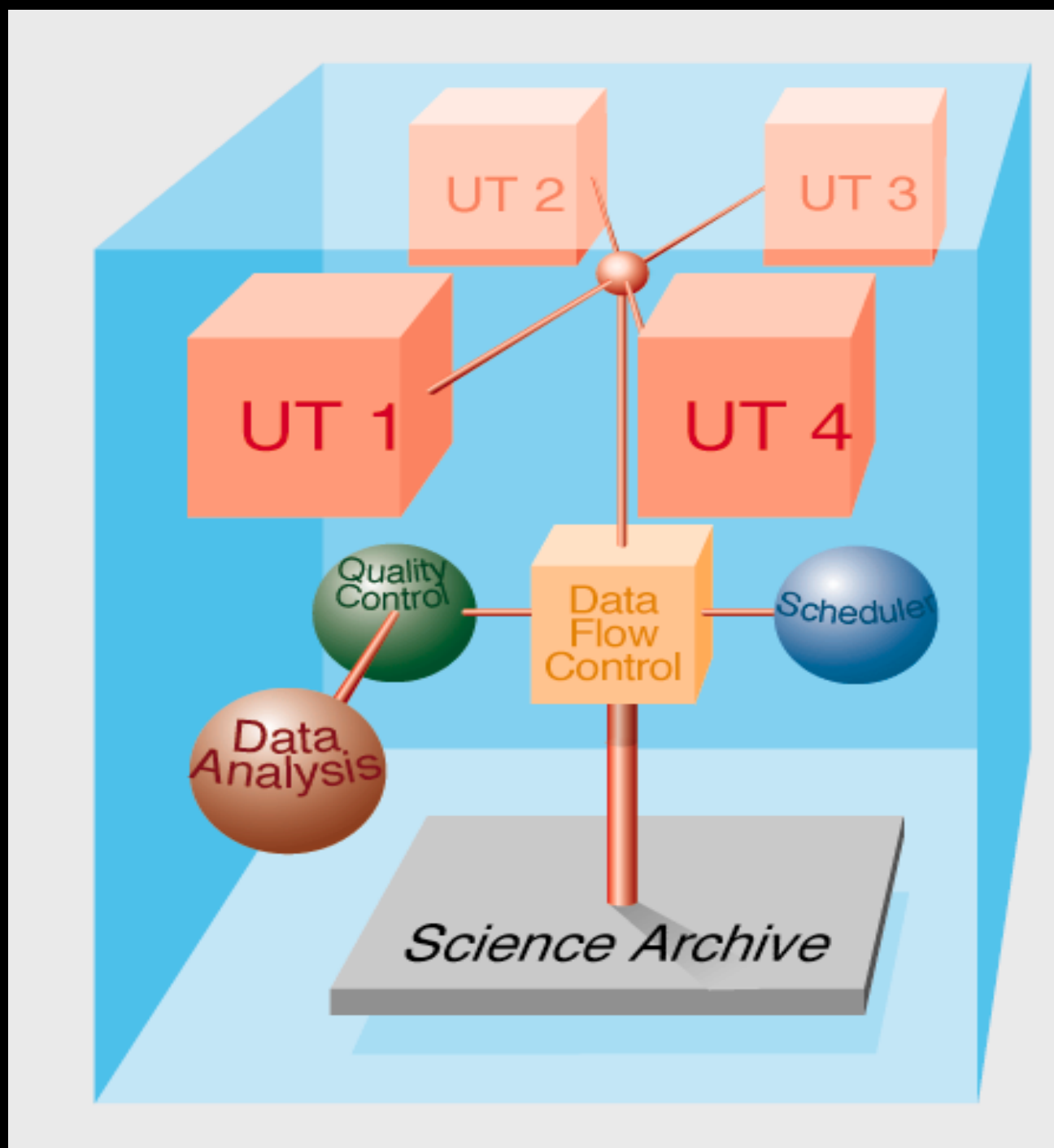
## Changes to the way ground based astronomers work

- ★ **Stable configuration** - ESO controlled facility instruments
- ★ **Stable environment** - Spend 10% of (precious) telescope time on a calibration plan
- ★ **Predictable constraints** - defeating the weather by active scheduling at the individual observation level - you don't really need to be there ...
- ★ **Consistent output** - data and data products - quality controlled and delivered and archived for future use



# The F word ..

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## Factory or Facility ?





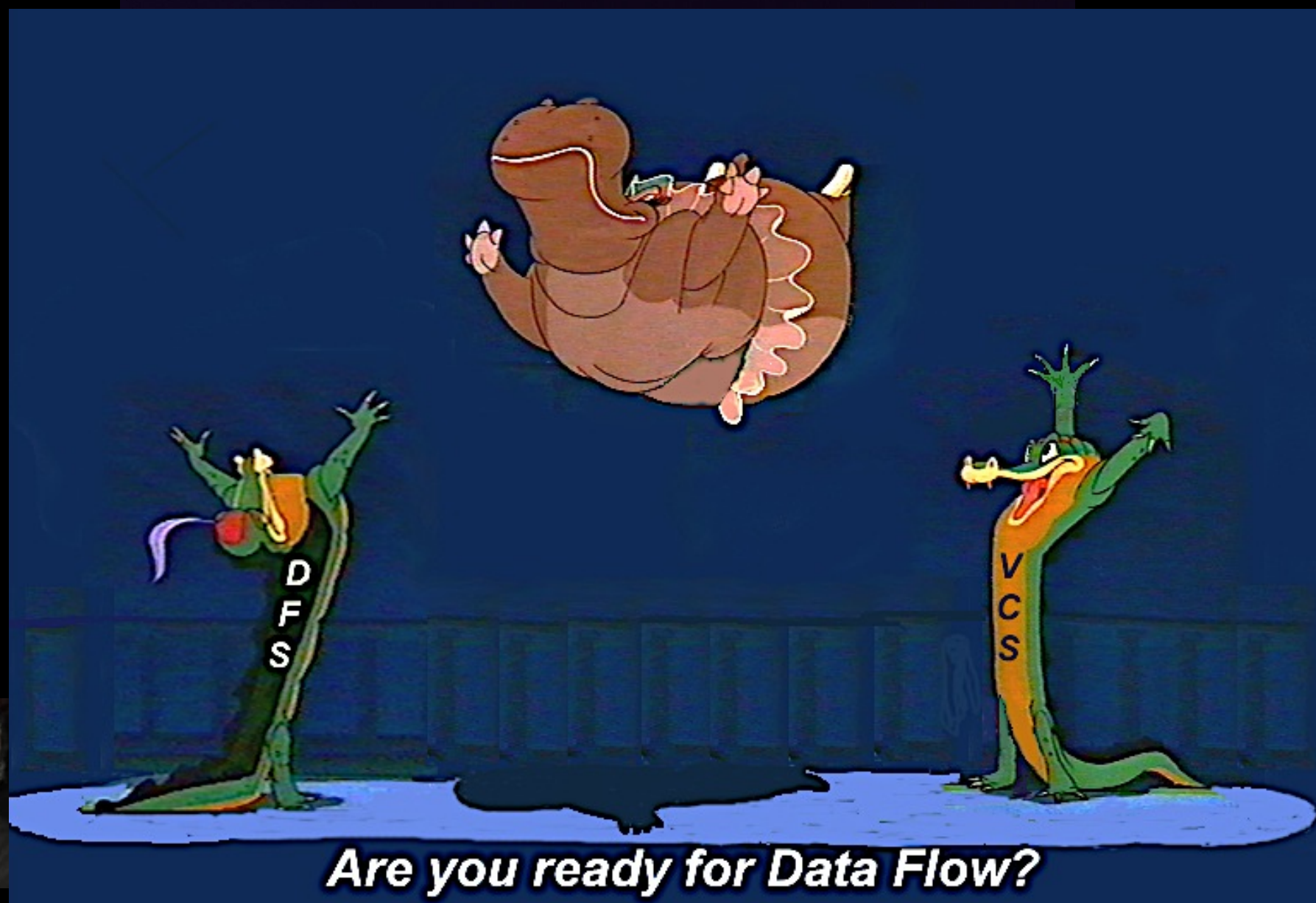
# Riccardo's Trust







# Riccardo's Trust

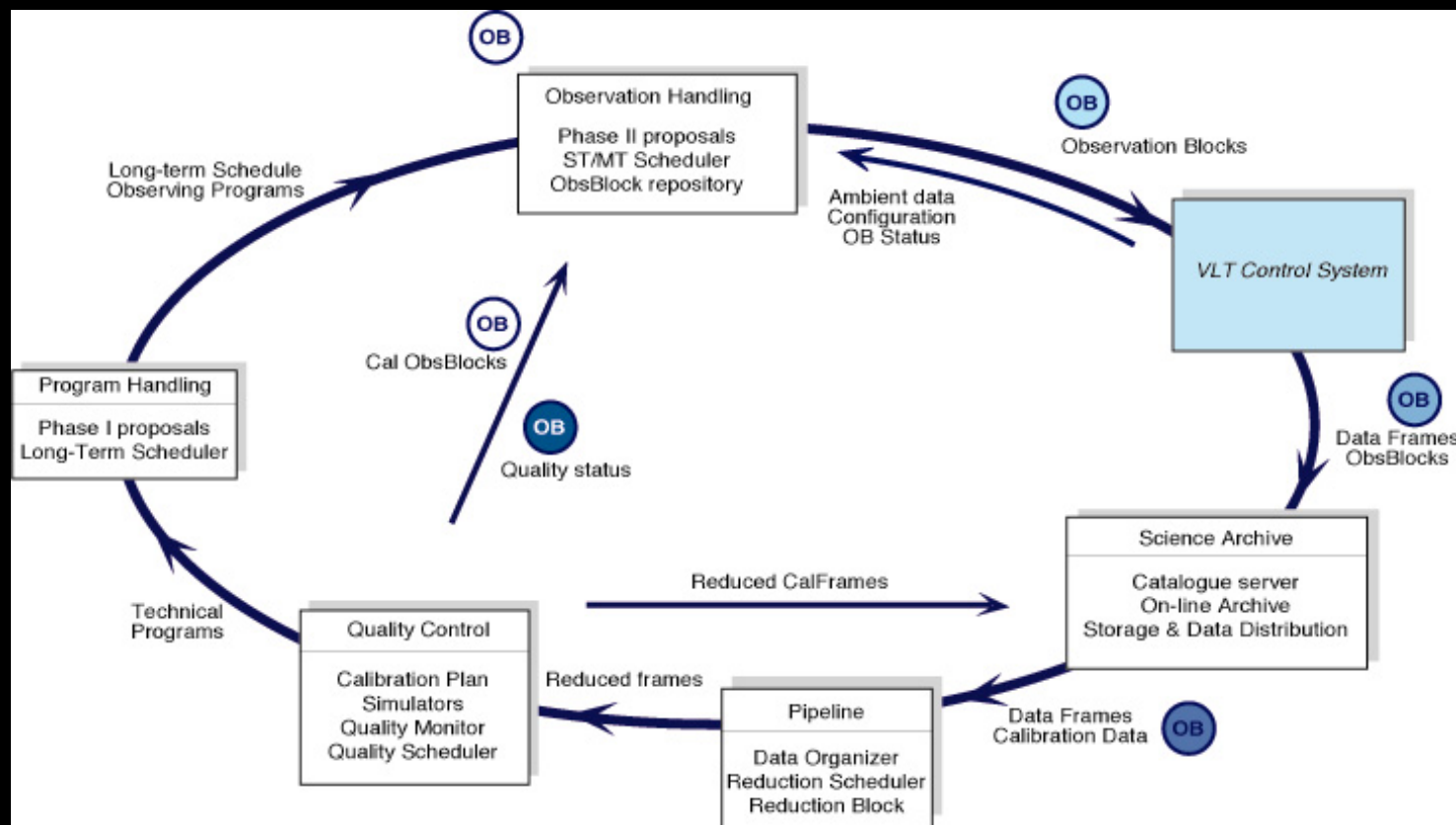
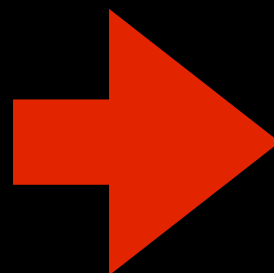
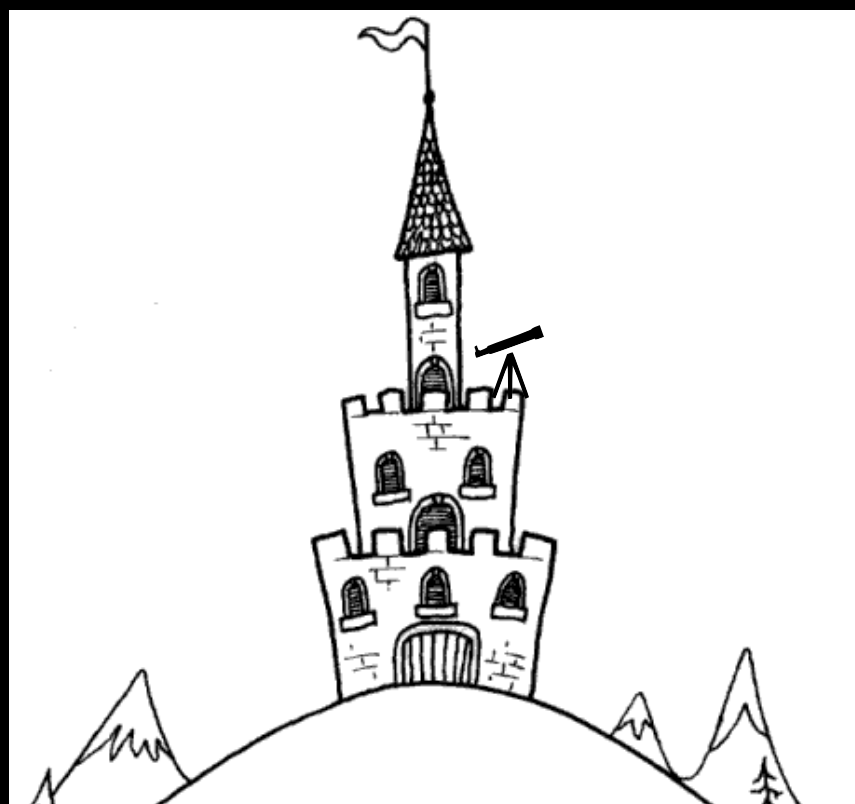


## Terabyte Ballet

VLT Control System and Data Flow System



# Changing view of observatories



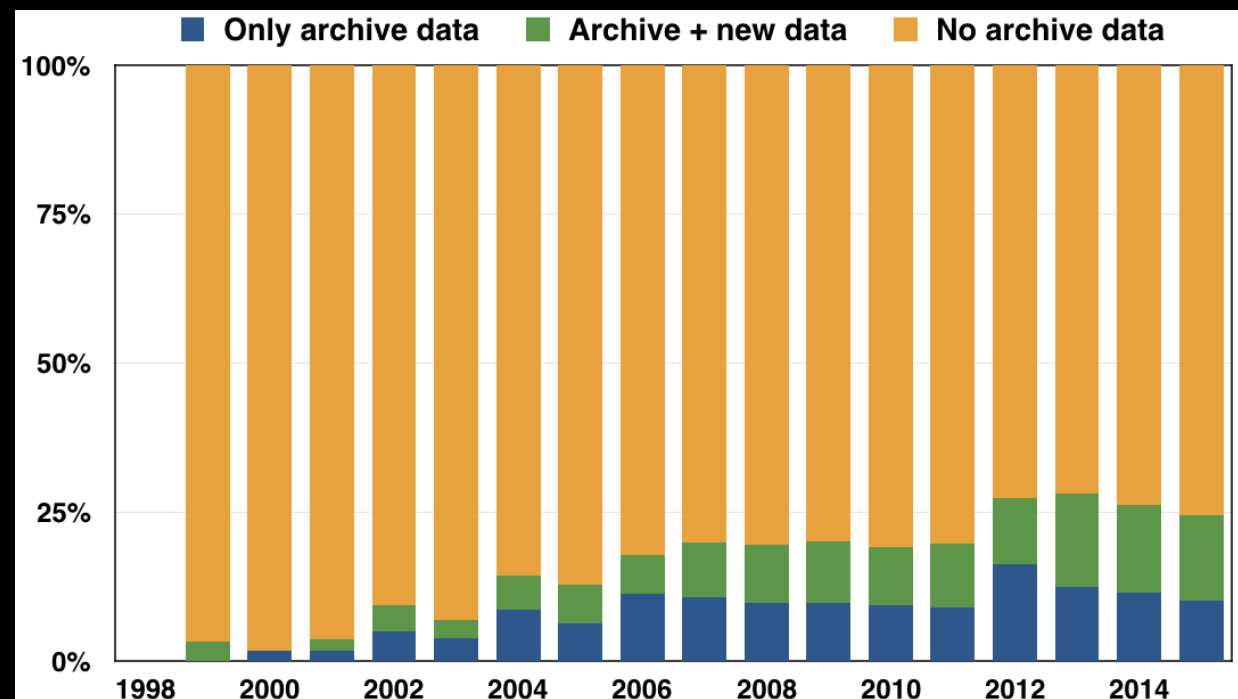
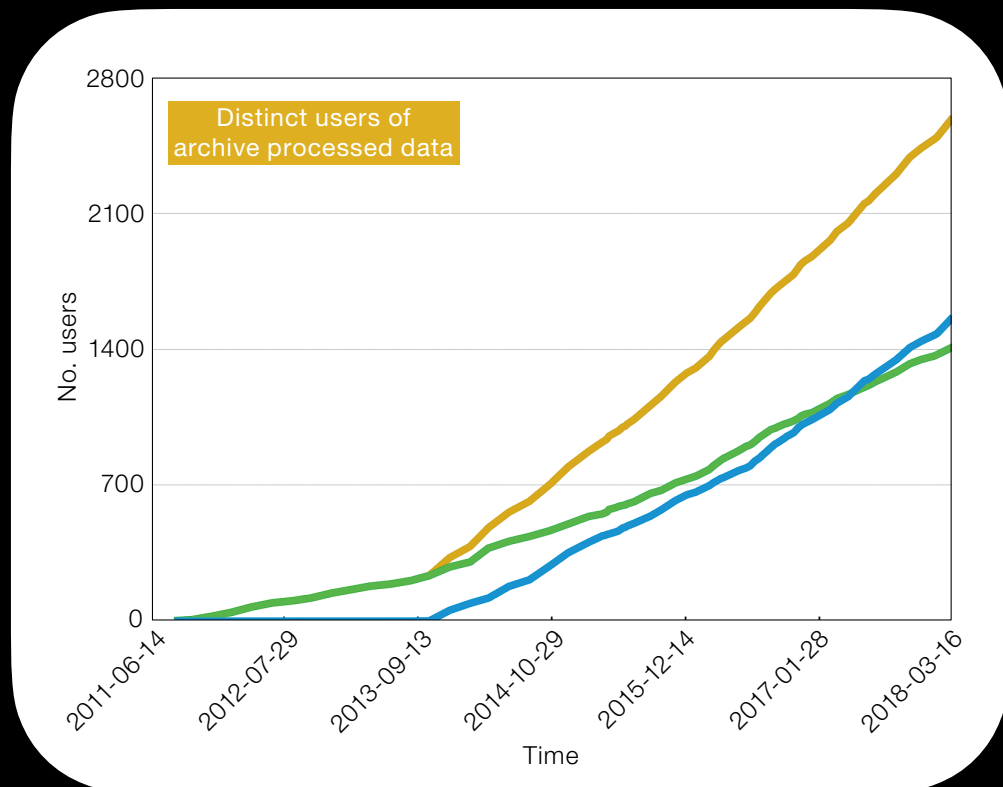
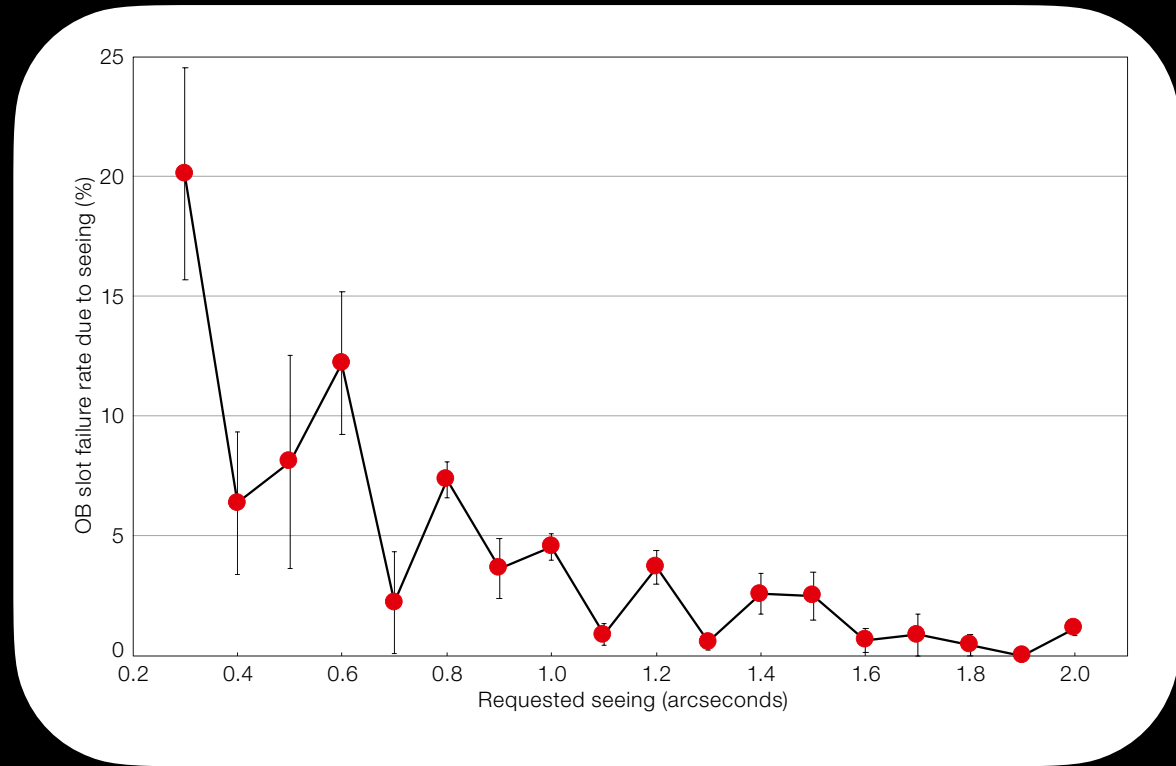
NTT, VLT, ALMA,  
Gemini, CFH, Subaru,  
ELT, SKA,,,





# Outcomes

- ★ “Shutter Open” efficiencies  $> 80\%$
- ★ Delivering projects needing 10’s-100’s hours of seeing  $\ll 1$ ”
- ★ 25% of publications from archive data
- ★ new community of users - non-PIs using data products
- ★ 80% demand for Service Mode







# Riccardo - the mentor

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**“Always make a decision - with a bit of luck you’ll be right half the time ..”**



**“Early to bed .. Early to rise ..Work hard .. and advertise....”**