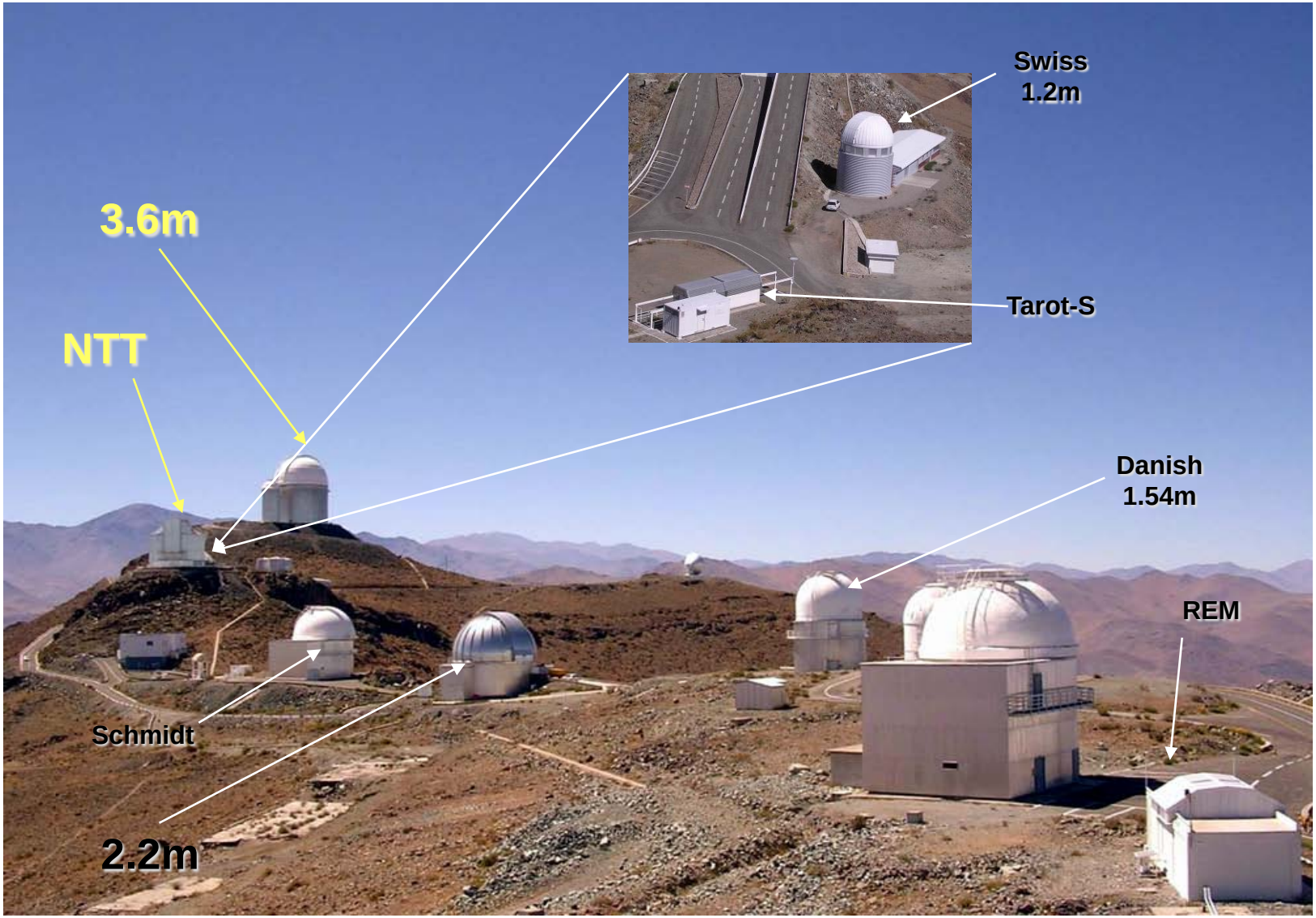

ESO 2013

ESO's Programme

- Visual/infrared light
  - La Silla telescopes
  - VLT, VLTI, VISTA and VST on Paranal
  - E-ELT to come on Armazones
  - Instrumentation development
- Submillimeter radio waves
  - APEX operations
  - ALMA construction and development
  - Both at Chajnantor, in partnerships

La Silla

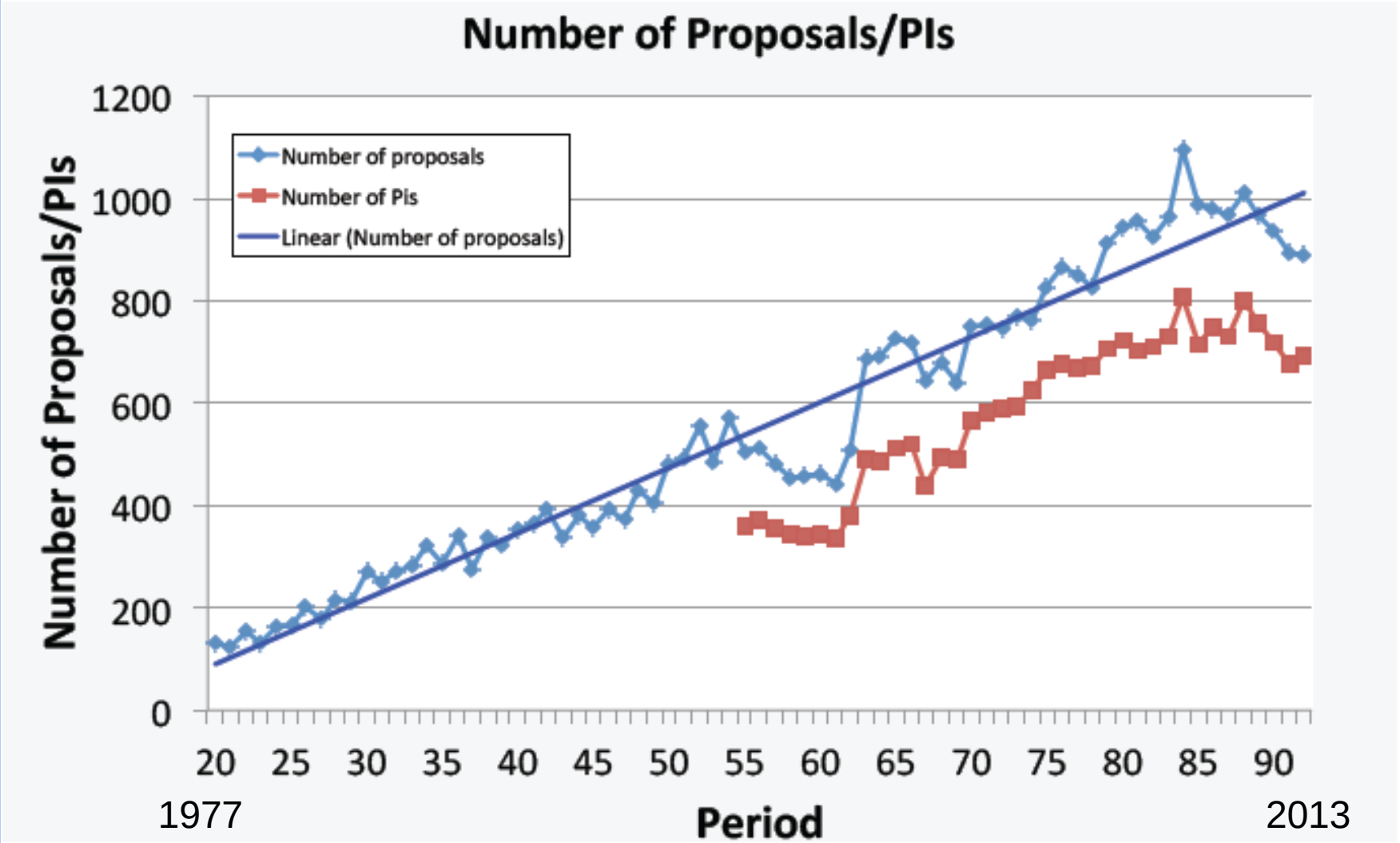


Paranal

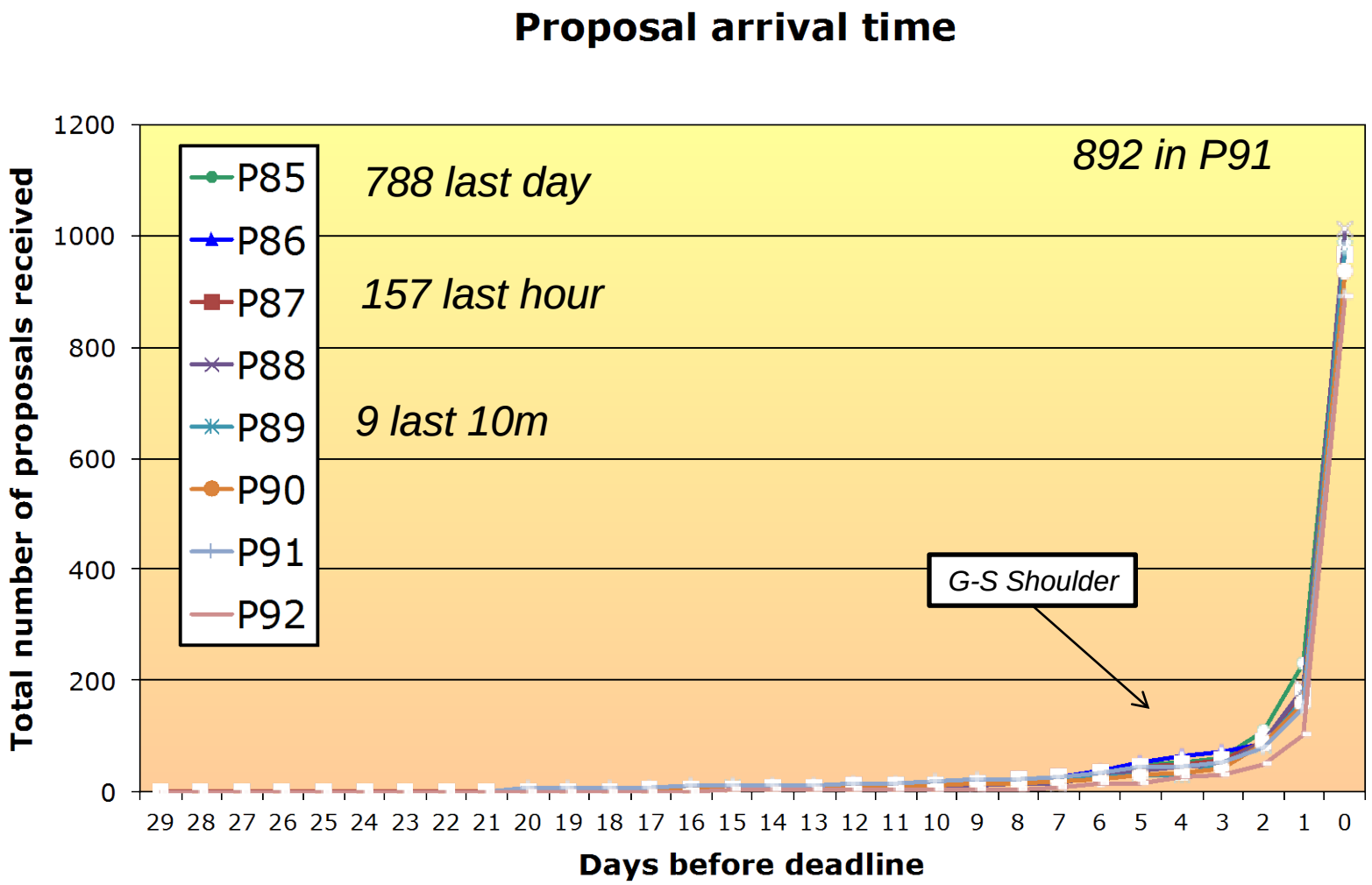
Observing Programmes

- Observing proposals
  - ~900 proposals per semester (incl ~50 DDT)
    - La Silla, Paranal, APEX
  - Observing Programmes Committee
    - Two meetings/year; 13 sub-panels
    - Time allocated on scientific merit
- Separate process for ALMA
  - ~500 proposals for 33.75% ESO share

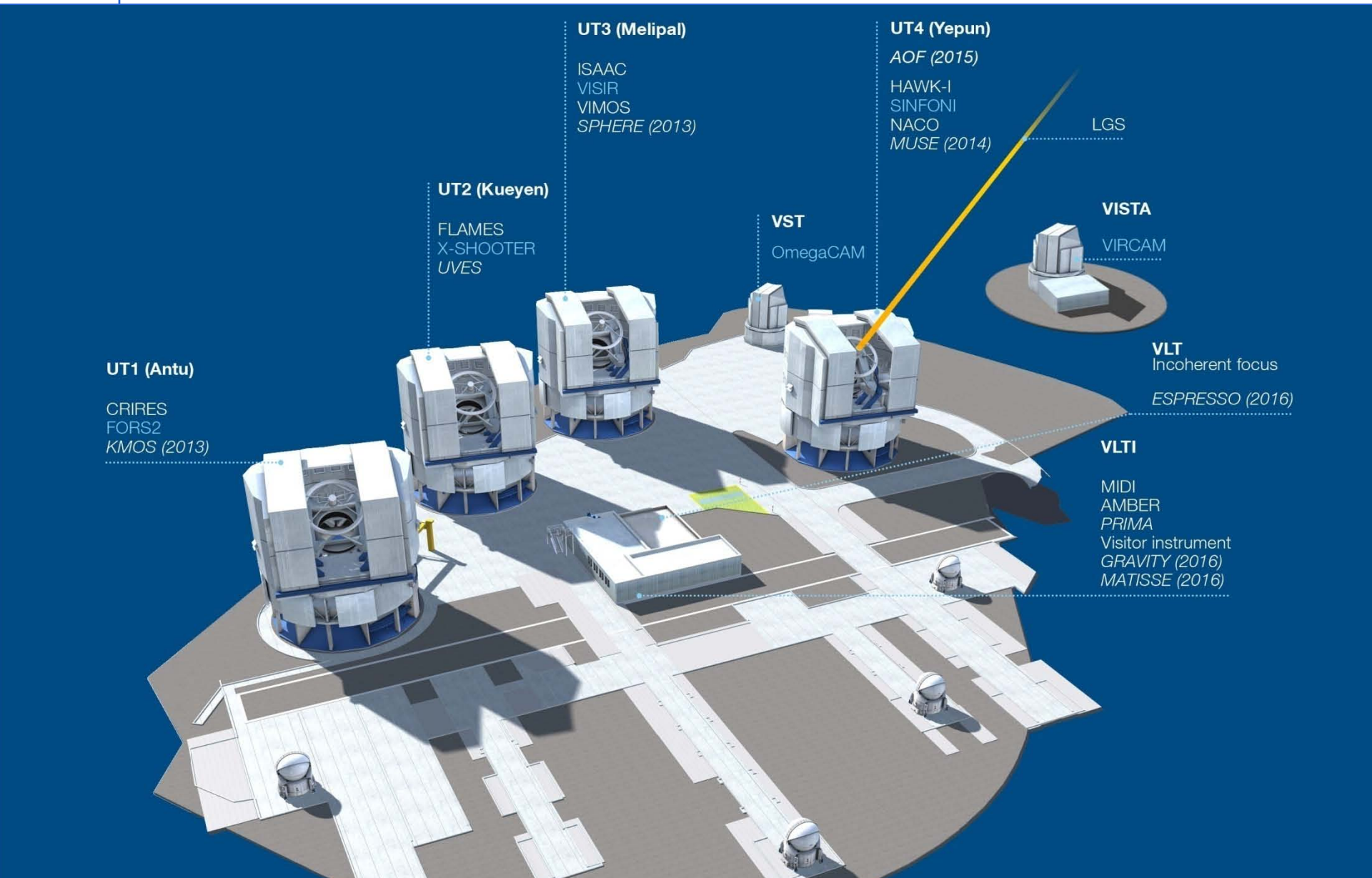
Evolution of proposal submissions



Proposal submission



Integrated System

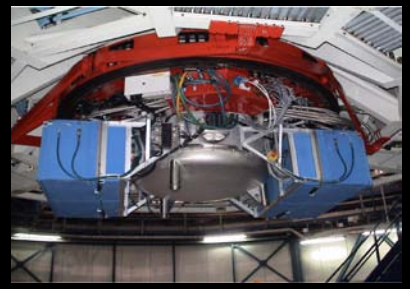


VLT Instruments

FORS2

FLAMES

VISIR

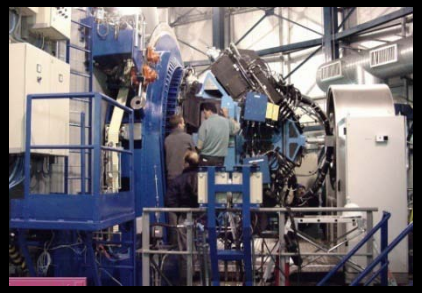


SINFONI

CRIRES

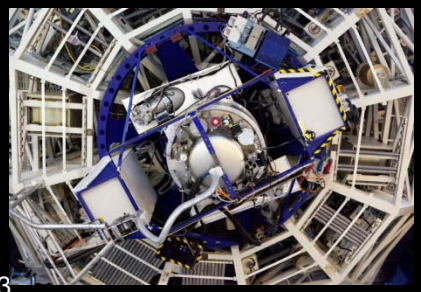
UVES

VIMOS

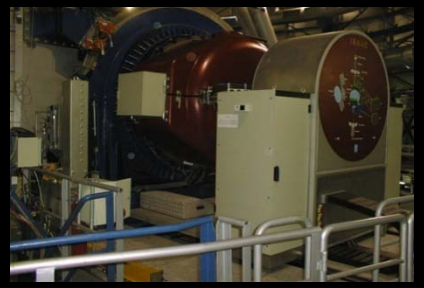


NACO

X-shooter



ISAAC



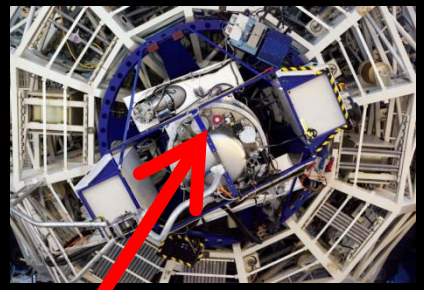
HAWK-I

VLT Instruments 2013/4

FORS2

FLAMES

X-shooter

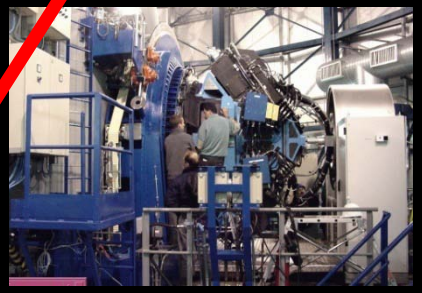


SINFONI

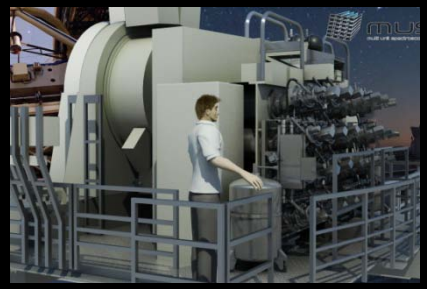
CRIRES

UVES

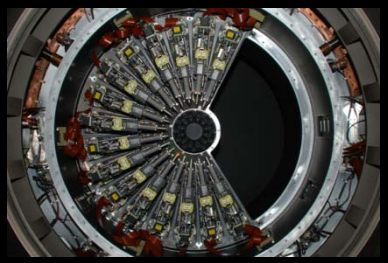
VIMOS



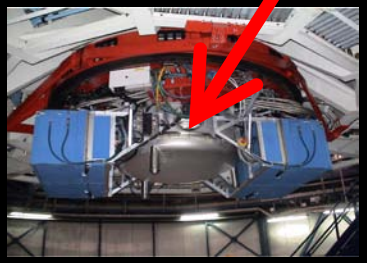
MUSE



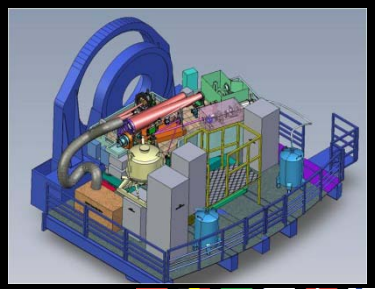
KMOS



VISIR



SPHERE



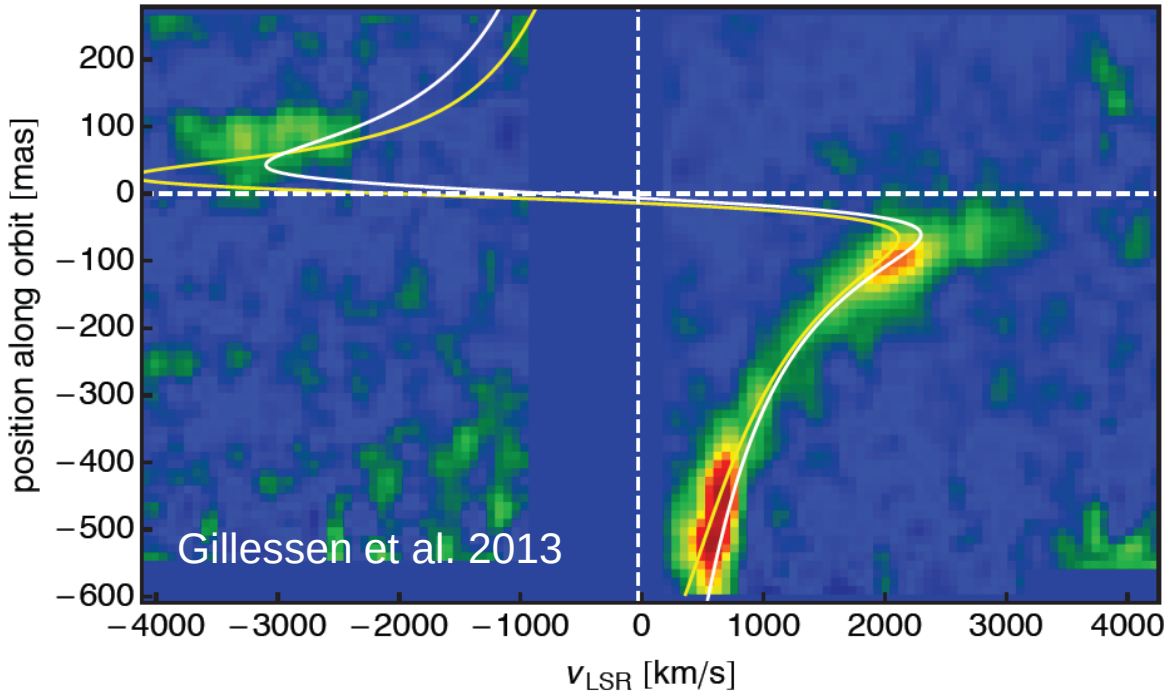
HAWK-I

VISIR Upgrade: AQUARIUS

- Problems with AQUARIUS detector
  - noise, linearity, QE
- High-priority lab testing
  - AQUARIUS suffers from Excess Low Frequency Noise (ELFN)
    - Each pixel has its own ELFN, not correlated
    - Cannot be reduced by read modes, clocking or bias changes
    - Is proportional to detector output signal
    - Always there, seen in past generation of detectors, but not noticed because of high chop rates
- Likely that fast chopping solves noise problem (e.g. drift scan or focal plane chopper)
- Solutions are being worked on

News from the Galactic Centre

- Cloud passing close to the black hole
  - periastron near 2000 R_S (about 20 light hours)
  - first material already passed periastron
  - periastron passage ~2014.25



VIMOS Public Surveys

- VIMOS Call for Letters of Intent for Public Spectroscopic Surveys
  - No projects approved in first round (2010/2011)
    - most interesting RA ranges blocked by ongoing LPs
    - upgrade of instrument ongoing
- Timescale
  - Call for Letters of Intent → July 2013
  - Deadline for Letters of Intent → 15 October 2013
  - Evaluation → November/December 2013
  - Inform applicants → January 2014
  - Proposal deadline P94 → 31 March 2014
  - Start survey(s) → P94 October 2014

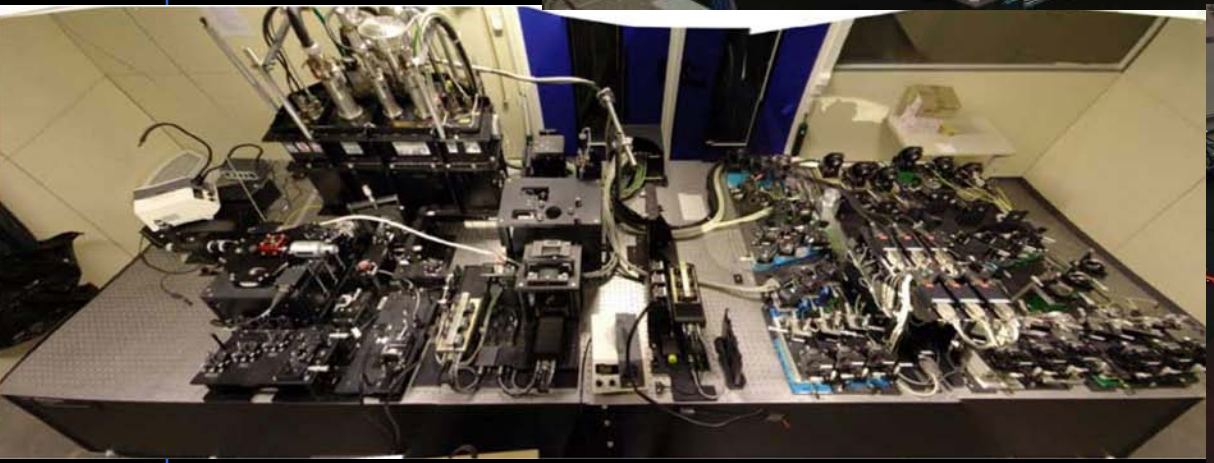
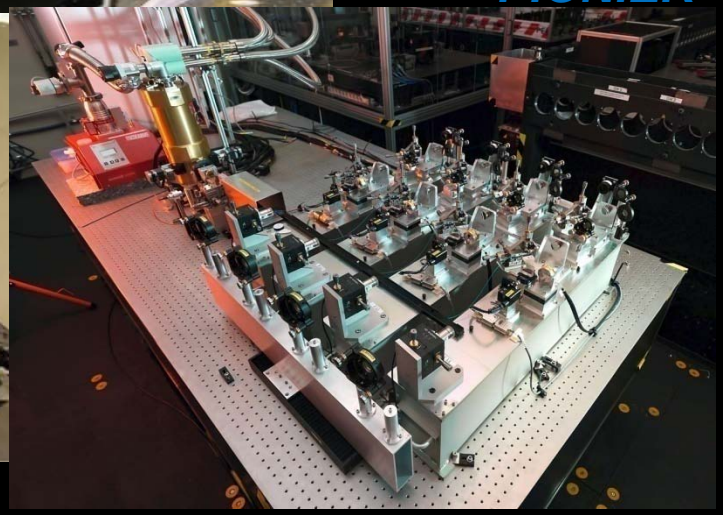
VLTI Instruments




MIDI

AMBER

PIONIER

VLT/I Instrument Programme

- ESO development programme
  - Detectors, controllers, edge-sensors
  - Advanced adaptive optics systems
  - Innovative powerful lasers (PARLA)
- Infrastructure upgrades
  - Adaptive Optics Facility on UT4 in 2015
  - Key components for VLTI (e.g., NAOMI: AO for ATs)
- Most instruments built by consortia of institutes
  - ESO pays hardware costs (~1/3 of total)
  - Consortia provide personnel costs; compensated in Guaranteed Time

PRIMA

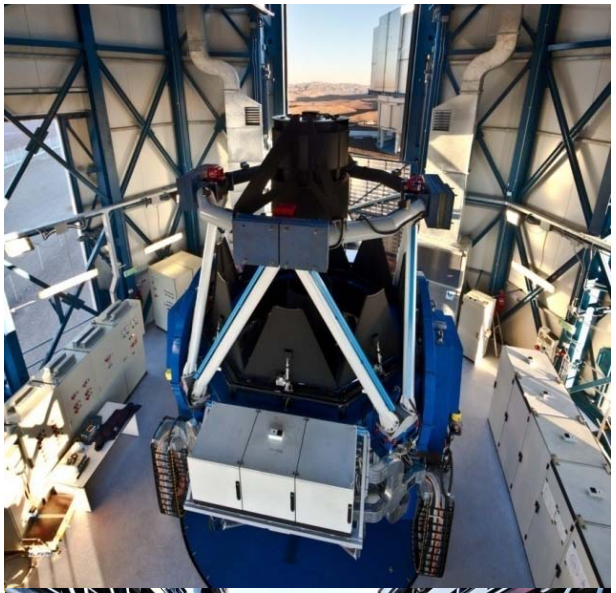
- Encountered a severe technical hurdle
  - general issue with metrology
- Astrometry between bright sources in engineering mode in September
  - Understand how much of the current astrometry error budget has been removed and to get a much clearer view of the way forward
- After this study a formal stage gate review will be held to consider the technical, financial and programmatic implications
- Establish a strategy to deal effectively with potentially conflicting drivers
  - Ensure success of GRAVITY and MATISSE
  - Ensure all stakeholders involved

2nd Generation Instrumentation

- VLT instruments in development
  - ESPRESSO: High-resolution ultra-stable spectrograph at incoherent combined focus (can use all UT's; 2016)
  - CUBES: blue-optimized spectrograph
    - depends on Brazil
  - ERIS: AOF imager and spectrograph (2017)
- VLTI instruments in development
  - GRAVITY: K Band, 4 tel. astrometry near GC (2014)
  - MATISSE: L, M, N band, 4 tel. image/spec (2015)
- Additional VLT instruments planned
  - Phase A completed: MOONS (wide-field MOS)

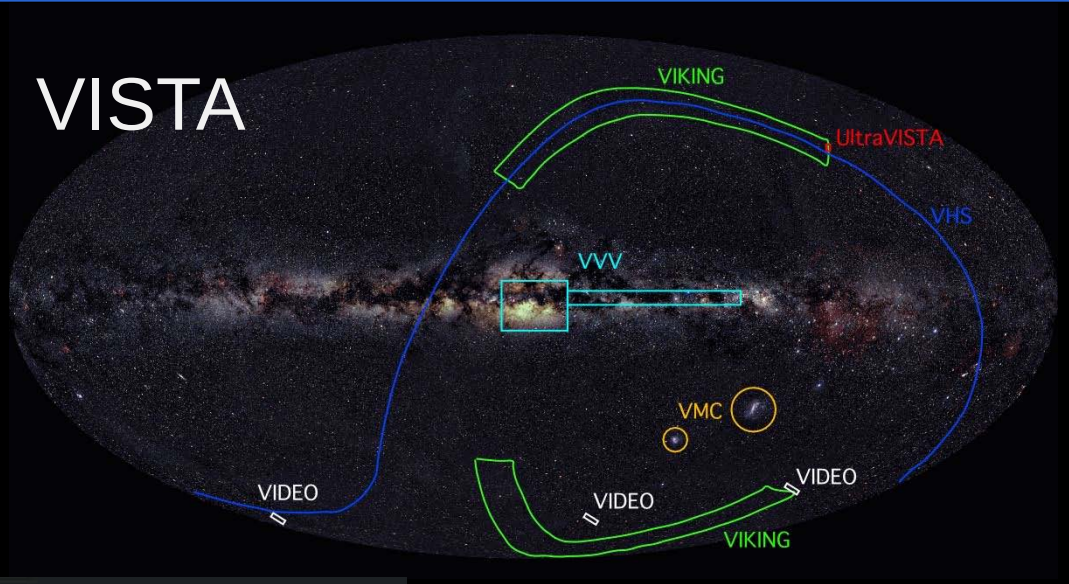
Survey Telescopes

- VST 2.6m for optical
  - Operations start Oct 2011
  - Three+ years of public surveys
- VISTA 4.1m for infrared
  - Operations start Apr 2010
  - Five+ years of public surveys
  - Pipeline data reduction done outside ESO
  - Wide-field MOS (4MOST) proposed for 2018+

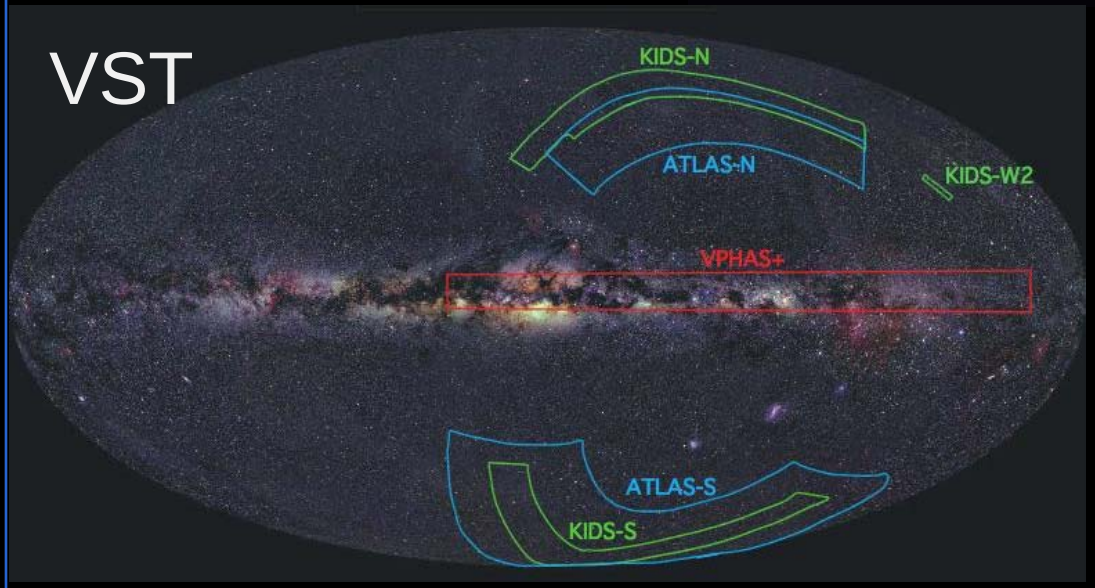


Imaging Public Surveys

VISTA



VST



VISTA second data release

Phase 3 - News and Changes

Please find below any news regarding the Phase 3 process and a record of the past evolution in reverse chronological order.

28 June 2013

Second Release of ESO/VISTA Public Survey Imaging Data

New data products resulting from the VISTA public surveys are now available via the dedicated Phase 3 query interface at the ESO Science Archive Facility. The current release of data from the VVV, VHS, VIKING, and VMC surveys (6.2 TB) covers mostly the period from October 2010 to September 2011 and consists of astrometrically and photometrically calibrated mosaiced and coadded images (each 1.5 deg²), weight maps and associated single band source lists in the different bands of each survey.

The new data largely complement the first release of VISTA public survey data products from 2011 adding up to 12 TB of (compressed) imaging data. Each public survey data release is accompanied by a comprehensive description.

Other data pro

This form provi
starting April 2(
types of data pr

Search

Phase 3 observing programme

Programme..... : Any / VVV / VIDEO / VMC / VHS

Collection... : Any / VVV / VIDEO_XMM3 / VMC / VHS

Release version... : default: latest

Run/Program ID..... : PPP.C-NNNN(R) (eg 179.B-2003)

Phase3 user..... :

Target Information

Target name..... : SIMBAD name

Coordinate System..... : Equatorial (FK5) RA DEC RA: sexagesimal/hours, decimal/degrees

Search Box..... : 02 09 00 Equatorial Output Format Sexagesimal

Input Target List..... : Browse...

Observation Parameters

VLT White Paper Process

- Provide a scientific vision for the VLT in the E-ELT era
  - first draft presented at ESO@50 conference (September 2012)
  - discussed with STC (April 2013)
  - formulate a new version for discussion with the STC and the community next year
- Roadmap of the next VLT/I instruments until 2020
- Re-assessing the VLTI implementation plan to fully prepare for GRAVITY and MATISSE.

ALMA 2013
(a dream in 2010)

ALMA 2013 - reality

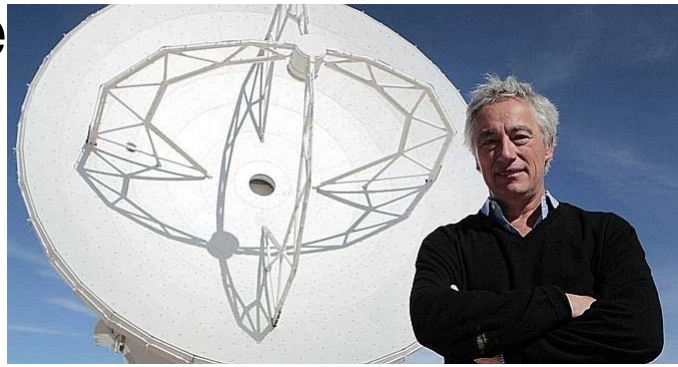
- Cycle 0 and Cycle 1 produced stunning science results
- *The First Year of ALMA Science* conference held in Puerto Varas (Chile) 12-15 December 2012
- Cycle 1 to continue until May 2014
  - With 32 12m antennas and partial Compact Array
- Cycle 2 deadline in December 2013
  - Definition of capabilities ongoing

ALMA Inauguration

- Major milestone for astronomy and science
  - Attended by 500+ persons and media representatives

ALMA status

- Construction nearly complete

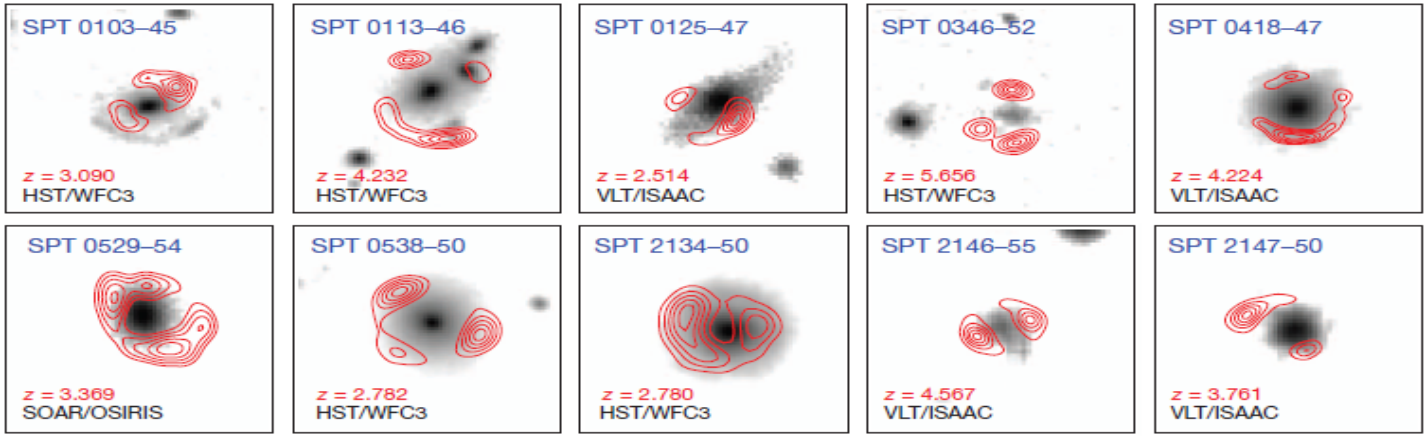


  - 22 AEM antennas accepted
    - 3 to go
  - All Front End deliveries completed
  - Permanent Power System in operation
  - Residencia design finished, location agreed
    - Construction 2014/2015

ALMA Science Results

Distant galaxies with ALMA

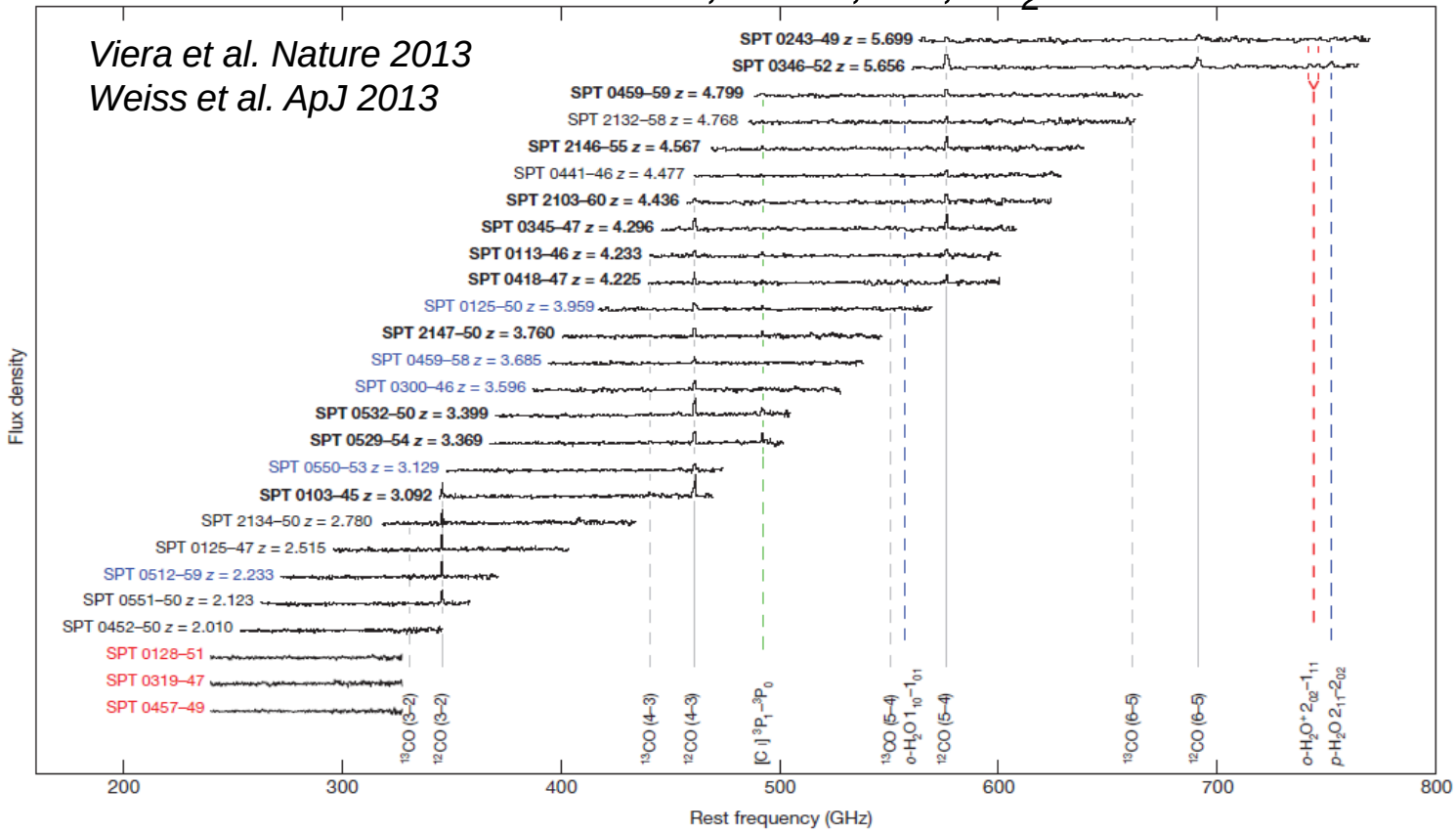
- Follow-up of mm sources discovered with the South Pole Telescope (SPT)
  - Detected many high-redshift galaxies (<z>=3.5)
  - 860μm ALMA imaging (Cycle 0 – 16 antennas)
    - 47 candidates → several clearly lensed sources
    - Integration times 1 minute
    - 2 objects at z=5.7 with high star formation rate > 500 $M_\odot$ yr^{-1}



Viera et al. Nature 2013; Hezaveh et al. ApJ 2013

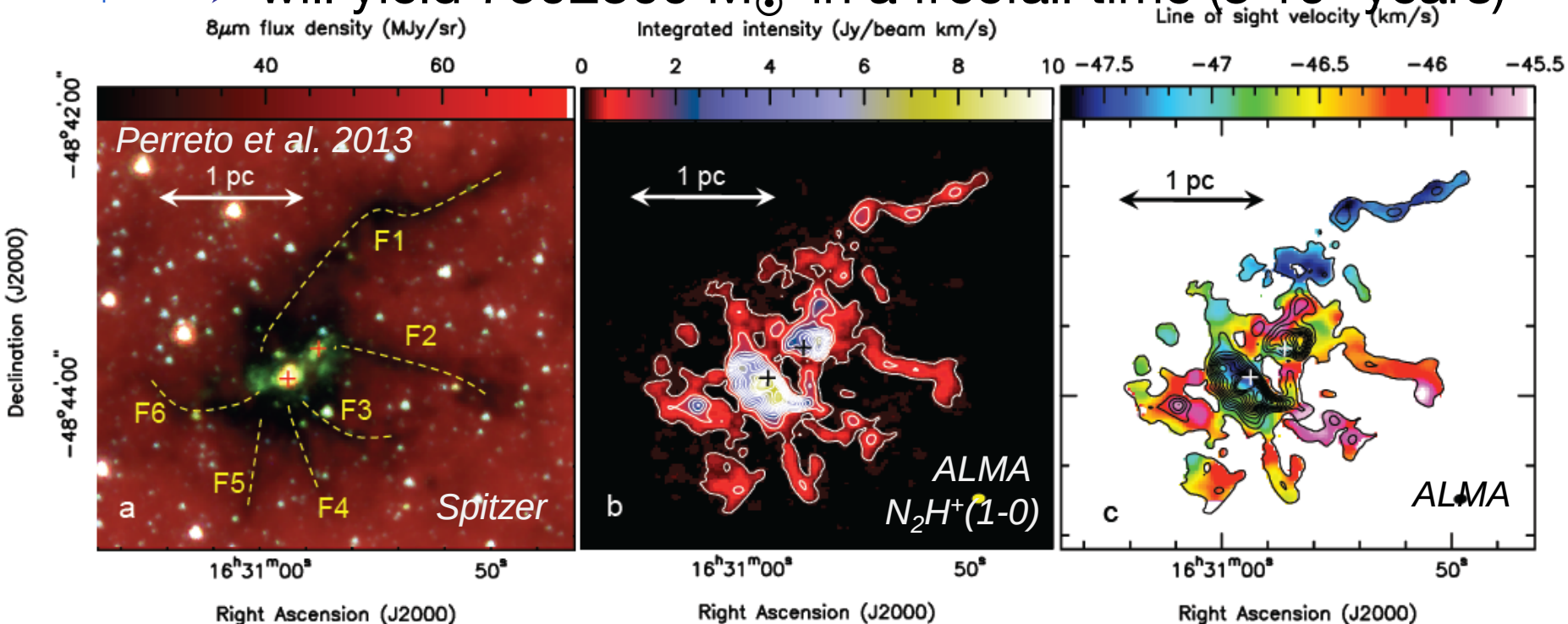
Distant galaxies with ALMA

- Secure redshifts for many sources
  - ALMA 3mm spectroscopy
  - Integration times about 10 minutes
    - Lines detected of ^{12}CO, ^{13}CO, CI, H_2O



Formation of supermassive stars

- Infrared Dark Cloud SDC335.579-0.272
  - 5500±800 $M_\odot$ complex
  - Two massive star forming cores
- M1: 545^{+700}_{-385} $M_\odot$ core
  - mass infall rate: $\dot{M}_{inf} = (2.5 \pm 1.0) 10^{-3}$ $M_\odot$/yr
  - will yield 750±300 $M_\odot$ in a freefall time ($3\ 10^4$ years)



Outlook on ALMA's future

- ALMA is now in a consolidation phase, focusing at completing construction
- Additional capabilities will be added in the coming years in Cycle 2, 3 and towards Full Science
  - Polarization, Solar, Long baselines, additional bands
- APEX Extension/ARO
  - Submm Survey Telescopes
- Full Science & Development
  - Expected from 2014/2015

ALMA Development ESO

- Underlying concepts
  - Work with institutes in ESO Member States
  - Develop a strategy based on science priorities from the user community
- Procedures and policies
  - Competitive open Calls for Studies to develop science cases, designs, limited R&D in synergy with European/national/institute funding
  - Mature study results are brought to ALMA for implementation as projects
- Overarching goal
  - Future key science requires: expanded frequency range, improved sensitivity, efficiency in spectral scans

E-ELT

E-ELT Programme

- Funding comes from
  - Regular ESO income
  - Additional contributions from 14 Member States
  - Accession of Brazil (entrance fee + annual contributions)
- E-ELT Programme approved in Dec 2012
  - When required two-thirds majority (10 MS) was reached
  - 13 Member States have now committed
    - 695 MEUR pledged for E-ELT Construction
    - Not counting extra funding in MS for instrumentation development

E-ELT Construction

- Spending on major items authorized once 90% of cost-to-completion pledged (975 MEUR)
  - Reached once Brazil ratifies Accession Agreement
- Baseline procurement plan is being implemented
  - CfT for construction of road and platform in May 2013
    - Contract award planned for Nov 2013
  - CfT for construction of dome & main structure in 2013
    - Contract award planned for Nov 2014

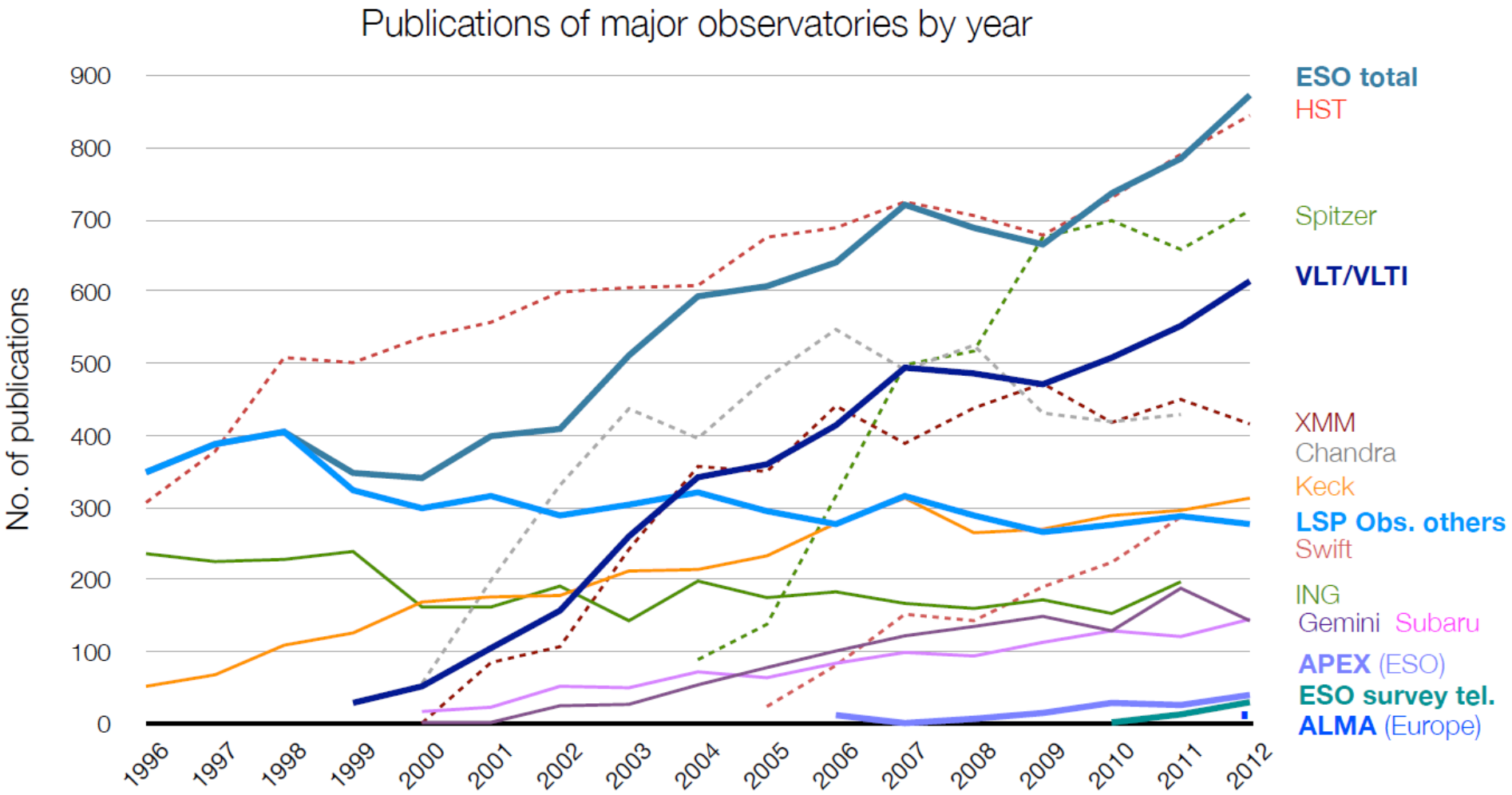
E-ELT Instrumentation

- Instrumentation
  - Science cases developed in collaboration with the E-ELT Project Science Team
  - Two first-light instruments (in Phase B)
    - ELT-CAM (MICADO)
    - ELT-IFU (HARMONI)
  - Next three (top level requirements in definition)
    - ELT-MIR (METIS)
    - ELT-MOS
    - ELT-HIRES
- Construction philosophy
  - Follows ‘VLT model’ of consortia working closely with ESO

Perspective through 2025

- Keep the Paranal Observatory world-leading
  - White Paper process
  - Integrated system of VLT, VLTI, VISTA, VST...
  - Add the E-ELT on Armazones to this system
- Further develop ALMA on Chajnantor
  - Initial steps defined (e.g., Band 5)
  - New development studies
- Continue successful partnership with community
  - Student and fellowship programme
  - Construction of instrumentation
  - Data archive including science products
  - Smaller telescopes and targeted experiments on La Silla

Scientific Productivity



http://www.eso.org/sci/libraries/edocs/ESO/ESOstats.pdf

Science Newsletter

- Migration from eNews to a full fledged Science Newsletter
- Started March 2013
- Editor: Jeremy Walsh

1 March 2013: The Call for Proposals for observation at ESO telescopes during Period 92 (1 October 2013–31 March 2014) has been released. Note that the Call for Proposals document has undergone a substantial change in Period 92; it now focuses on listing the main news items and policies related to applying for time on ESO telescopes. The technical information about the ...

Read more

New PARLA Laser for the LGSF

1 March 2013: A new and more powerful laser has successfully been tested at the Paranal Observatory and formally accepted. This new laser source, called PARLA, forms a vital part of the VLT Laser Guide Star Facility (LGSF), currently used by the adaptive optics instruments NACO and SINFONI on UT4. PARLA will greatly improve the reliability and flexibility in operating the LGSF. ...

Read more

ALMA Director's Discretionary Time

1 March 2013: The ALMA Observatory will accept submission of Director's Discretionary Time (DDT) proposals from 1 March 2013. In Cycle 1, a maximum of 5% of the total observation time available may be dedicated to the execution of DDT programmes. A description of proposals eligible for DDT and the applicable policies are available. ALMA DDT requests can be submitted p>

Read more

ALMA Inauguration and Live Streaming

1 March 2013: On 13 March 2013 from 11:30–13:00 CLST (15:30–17:00 CET), the official inauguration of the Atacama Large Millimeter/submillimeter Array (ALMA) will take place at the observatory's Operations Support Facility (OSF) at the Chajnantor Plateau, in the Chilean Andes. Hundreds of guests, including the president of Chile, Sebastian Piñera, and representatives from the global scientific community, current and former ALMA personnel ...

Read more

X-shooter Data Products

1 March 2013: Science verification of the X-shooter data products for SLIT mode observations has been completed. Issues with the data products, such as the noise model, bad pixel propagation and interpolation, and flux calibration, were found and a new improved version of the pipeline has been released and can be downloaded. Improved flux standards and a more detailed pipeline tutorial ...

Read more

ESO Fellowships

- Brochure appeared in March
  - Collected all articles by Fellows in the Messenger over past 10 years
  - Very good feedback

http://www.eso.org/public/products/ brochures/fellows/

Director for Science

- Position of Director for Science open
  - deadline 8 September

For its Headquarters in Garching near Munich, Germany, ESO is advertising the position of

Director for Science

The Director for Science reports directly to the Director General and assists him in developing the overall strategy for the science programme at ESO. He/she coordinates and administers all aspects of ESO's scientific activities including Outreach and is accountable for their execution. As a member of the ESO senior management team he/she works closely with the Director General and the other Directors in the development of overall policy and strategic planning across the Organisation. He/she reports as required to the ESO Council (main decision making body of ESO) and internal and external advisory bodies and interacts with the astronomical community via membership of strategic committees, participation in conferences and special events. As an active scientist and Full Astronomer of the ESO Astronomy Faculty he/she also maintains personal scientific and technical contacts internationally at the highest level.