La Silla Paranal Observatory Report

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39th UC Meeting, Garching, 27 April 2015
LSP Observatory Operations

Telescope Statistics P93 (April 2014 - September 2014)

- Science time
- Engineering time
- Commissioning time
- Technical Downtime
- Weather Downtime
LSP Observatory Operations

Telescope Statistics P94 (October 2014 - March 2015)

- Science time
- Engineering time
- Commissioning time
- Technical Downtime
- Weather Downtime

Nights

UT1, UT2, UT3, UT4, VLT, VISTA, VST, 3.6m, NTT, APEX
In 2014 APEX tracked sources on sky for 4412 hrs
APEX Operations

ESO PI instruments

Artemis
- >100h of ESO time requested in P95
- Final installation with full focal planes in June 2015

SuperCam
- 64 pixel heterodyne receiver at 345 GHz
- Installed in Nov/Dec 2014 as OSO/ESO visitor instrument
- Second run is planned for April/May 2015 (ongoing)
**APEX Operations**

- **ESO PI instruments**
  - **SEPIA** (Swedish ESO PI receiver for APEX)
  - ESO-ALMA Band 5 cartridge
  - OSO 3 cartridge cryostat+control
  - MPIfR FLASH+ 4x4 GHz FFTS
  - 158-211GHz
  - IF 4-8GHz
  - Dual polarization, 2 SB (USB+LSB)
  - Installation and technical commissioning in February 2015
  - Remaining sky tests May 2015
  - Science Verification May-July 2015
  - Offered for ESO Period 96
3.3 Low- and high-mass star forming regions

3.3.1 Water line at 183 GHz

Since the discovery of interstellar water by Cheung et al. in 1983, it has now been established by Herschel Space Observatory observations that gaseous water is very widespread in molecular clouds in our Galaxy. In fact, it was found to be present virtually everywhere where it was looked for by Herschel. The water $J_K a, K_c x n 1,3 m 2,0$ line at 183 GHz is an important tracer of star forming activity both as a strong maser and when the emission is near thermal. The 183 GHz line was first detected toward Orion KL by Waters et al. using the Kuiper Airborne Observatory. Later, Cernicharo and coworkers used the line to study both low and high-mass star forming regions. It is especially useful when investigating the shock compressed gas near molecular outflows, just like the ground state thermal water lines which of course can only be accessed by spaceborne telescopes. Due to the high abundances that water can reach after evaporation from ices in the warm envelopes of forming stars and star clusters, it is a unique molecule for our understanding of the physical and chemical conditions in star forming regions. Being a major carrier of oxygen, the third most abundant element in the Universe, it influences the abundances of many molecular species in both the gaseous and solid phase. It is a unique diagnostic of warm gas and energetic processes taking place during star formation. In particular, the warm environments of forming massive stars, so-called hot molecular cores, constitute the hot inner envelopes of massive protocluster in which water is evaporated from the grains. There, the gas-phase water abundance can rise to the original abundance on ices of $l \times 4$. In case of further high temperatures reactions in the gas phase, even all of the oxygen can be driven into water, leading to abundances as high as $n \times 4$.

3.3.2 High-mass star forming regions

At an excellent submillimeter site such as the Chajnantor Plateau, thermal emission of water and more $H_2O$ transitions come into reach. They are highly excited and therefore excellent probes of the water. Create Date: 2014-01-17 Page 6 Contact author: P. Bergman
ESO PI instruments

SEPIA

APEX Operations

Orion $\text{H}_2\text{O}(3_{1,3}-2_{2,0})$ 183.3 GHz SEPIA March 3 2015
Facility instruments

- APEX 1 receiver failed in March after cool-down cycle
- SIS Mixer repaired by OSO / GARD
- Installed by April 6, working, but not yet fully characterised
- VLBI run end of March lost
- Currently no APEX 1 for high PWV periods
- Re-characterisation/calibration ongoing
Access to partner PI instruments

- Discussion continued on APEX Board level
- Focus on workhorse instruments like A-MKID
- Principles agreed during April 17 Board meeting
  - Protection of targets and specific science cases of the PI
  - Contributions to construction and operation cost by the partners
  - Final agreement being written up for October meeting

Agreement Extension 2017+

- Confirmed goal by all partners: 5 year extension
- Key requirements: (facility) instrumentation plan
  - Project Scientists and Station manager tasked to prepare options
  - To be presented in October Board meeting
- Critical External Review January 2016
- Presentation to STC in April 2016, Council June 2016
Paranal Operations

- **KMOS**
  - Successful refurbishment of 24 IFU arms
  - PAC granted

- **MUSE**
  - Start of Operations 1 October 2014
  - Successful interventions on detector instabilities

- **SPHERE**
  - Start of Operations 1 April 2015
  - Main modes commissioned and offered
  - Shortcuts taken to allow early start of operation

- **VISIR**
  - Re-start of Operations April 2015
  - Main modes commissioned and offered
NACO

- Reinstalled at UT1 in September 2014
- CONICA science detector was found damaged
- Detector replaced by ISAAC Aladdin2 detector
- Science Operations re-started only in January 2015
- Planned April Intervention
  - Detector background
    - Reduced by factor 2 to ~54 e-/pix/sec in darkest parts
    - Dark map does show structures – not yet understood
    - Probably more work on detector shielding required
  - Failing Filter Wheel repaired
  - New failure of Camera Wheel detector during last days
    - requires additional opening of instrument over next 2 weeks
Paranal Projects

**ESPRESSO**

- Thermally controlled room in place
- Commissioning of Coudé Train to four UT’s on-track

- ESPRESSO room

- Combined Coudé
Paranal Projects

- **VLTI Infrastructure**
  - Science Operations stopped on 5 March 2015 as planned
  - VLTI Facility Project to prepare laboratory for arrival of GRAVITY and MATISSE + relocation of PIONIER
  - New AT maintenance station completed and in use

*Test excavation September 2014*

*New AT station April 2015*
Paranal Projects

VLTI Infrastructure

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- VLTI Facility Project to prepare laboratory for GRAVITY
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Paranal Projects

- Test excavation September 2014
- New AT station April 2015

- AT service station: I2
- I is in service:
  - The reference plates are integrated and aligned
  - The ATs control axis have been validated
  - The M12 tower is implemented and aligned
  - The first part of the upgrade of the STS AT3 and AT4 has been made in it.

Auxiliary telescopes
Paranal Projects

- VLTI Infrastructure
  - MIDI and VINCI removed, lab around being rebuilt

MIDI, VINCI table removed and volume for Gravity and MATISSE implemented.

GRAVITY comes here!
MATISSE goes there!

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Paranal Projects

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  - MIDI and VINCI removed, lab around being rebuilt
Paranal Projects

- VLTI
  - PIONIER(-3D) re-located, re-commissioning postponed
NGTS (Next-Generation Transit Survey)

- Last of 12 x 20-cm telescopes to be installed this month
- Successful robotic operation for 36 consecutive nights
- Start of fully robotic operation Q2 2015
- Start 5 year survey project
- Completion of construction Q3 2015
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Hosted Telescope Projects
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- SPECULOOS & ExTrA
  - Technical reviews of projects October/November 2014
  - Site decision taken in November
    - SPECULOOS → Paranal
    - ExTrA → La Silla
  - Hosting Agreements drafted, ready for signature
  - Both projects will start site preparation and construction during this year

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La Silla Operations

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- Back to operation after a few days, long list of infrastructure works to be carried out
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La Silla Operations

- **NTT Call for Proposals**
  - 19 proposals received by end of March 2014 in response to Call for Ideas
  - 2 projects submitted to OPC in November 2014
    - First project signed Agreement for 30 observing nights on NTT between 1 April 2015 – 30 June 2017 using EFOSC2
    - Second project postponed by one year on request by PI
  - 7 potential instrument projects invited through formal Call for Proposals to present detailed scientific–technical proposals by 13 February 2015
  - 5 proposal received by deadline
  - Proposals evaluated and ranked by internal panel with STC representation; report received on April 3
  - ESO recommendation presented to STC