Paranal Science Operations Revisited (SciOps\textsuperscript{v2.0})

C. Dumas
European Southern Observatory
Paranal Observatory

Open for business since 1999
Paranal and its instruments

16 instruments in operations

ISAAC
FORS
FLAMES
VIMOS
NACO
HAWKI
MIDI
UVES
CRiRES
SINFONI
VISIR
AMBER
VIRCAM + OMEGACAM
XSHOOTER
SciOps within ESO Operations

1. Preparation of Programs + User Interface
   - Presentation by F. Primas (tomorrow afternoon)

2. Execution of Programs + Quality Control
   - Presentation by M. Rejkuba (tomorrow afternoon)

3. Archive, data-base content
   - Presentation by M. Sterzik (yesterday)

4. Proposal Submission and Selection
   - Presentation by G. Hussain (this afternoon)

5. Data-Reduction Tools
   - Presentation by M. Romaniello (tomorrow morning)
   - Presentation by J. Retzlaff (Friday morning)

Uta Grothkopf on science papers (tomorrow afternoon)
LPO organizational chart

Poster on TIO operations Wednesday evening
Paranal SciOps in a few numbers

- One of the largest department of LaSilla-Paranal-Apex Observatory (along w/ Paranal engineering)

- Telescopes:
  - Four 8m telescopes (w/ up to 3 instruments each)
  - Two survey telescopes: VISTA (4m), VST (2.6m)
  - Four auxiliary telescopes for use in interferometry mode

- More than 20,000 hours of telescope time/year

- 365 days/year operations

- Around 60 staff (2/3 astronomers, 1/3 operators)
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Paranal SciOps: Objectives

- Produce astronomical data of the highest quality
- Maintain (at minimum) & enhance (desired) instrument scientific capabilities:
  - science modes, performances, pipeline products, calibration plan
- Improve operational efficiency to increase time available for science
- “Educate” users community to VLT(-I) operational requirements
Paranal SciOps: Tasks

- **Daytime support**
  - Science + calibration QC
  - Preparation for observing night
  - Visitor support + SM support (with USD)
  - Work w/ engineering/maintenance (troubleshooting, instrument characterization)

- **Night-time**
  - Execute SM and VM programs
    - Adapt strategy & priorities with changing meteo conditions
      - Use of new generation observing/ranking tool (talk by M. Rejkuba)
  - Apply calibration plan of each instrument mode
    - Data available in archive a few minutes later
Each astronomer is Instrument Scientist of a VLT(-I) instrument

- S/He leads IOT
- Responsibility shared with Engineer, depending on activity ("IS loans instrument, engineer owns instrument": M. Sterzik, 2009)

Other IOT members:
- USD astronomer
- Software/instrumentation engineer
- Instrument fellow
- QC/pipeline scientist
- Garching IS
SciOps: Fast rotating world

- **6-month cycle** driven by OPC (aka TAC) review of science proposals

  - Service Mode programs: SM account for ~70% time
  - Visitor Mode programs: VM ~30%
    - delegated VM (dVM) programs (some restrictions apply on run duration and technical complexity)
      - dVM is different from “Remote Observing”
  - Science programs are consolidated before start of period, but flexibility injected via:
    - Target of Opportunity programs (ToOs)
    - Rapid Response mode programs (RRMs)
    - Director Discretionary Time programs (DDTs) *(unlike ToOs & RRRs, those are evaluated internally)*
    - Target and instrument set-up changes approval
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The "famous" egg-shape end-to-end model
Why changing model?
Why changing model?

- Without breaking the egg!
Why changing model?

- Cost improvement
- Job satisfaction
- Ops efficiency

(change is not death.
fear of change is death.)
Paranal SciOps: Before and Now

- **Goal 1:** Reinforce instrument + operations teams
- **Goal 2:** Improve job satisfaction and staff engagement
  - Re-organize activities to free-up time for high quality tasks
  - Explore creation of new staff categories and improve job prospects
- **Goal 3:** Streamline operations, improve interfaces and use of resources
  - Terminate visitors' backup, relocate activities to Santiago, implementation of new/revised operations tools
  - Implement SciOps project team
- **Goal 4:** Improve communication and team-work
  - Quarterly all-hands meetings
  - Build-up mutual trust, engage staff in decisions
  - Team-building training
- **Goal 5:** Improve synergy science-operations/engineering
  - New morning operations meeting
  - Establish remote access facility (RAF) in Santiago to increase inter-departmental staff cross-section
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- **Goal 1:** Reinforce instrument + operations teams
  - Stronger department + team structure

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  - Quarterly all-hands meetings
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- **Goal 5:** Improve synergy science-operations/engineering
  - Start new morning operations-meeting
  - Establish remote access facility (RAF) in Santiago to increase inter-departmental staff cross-section
SciOps within LPO structure

La Silla
Paranal Observatory

Director's Office
Logistics
Science Operations
Engineering
Maintenance
La Silla
APEX

Dpt Head + Secretary
Staff astronomers
Fellow astronomers
Telescope Instrument Operators
Data Handling

2 FTE
26 FTE
15x0.5 = 7.5 FTE
19 FTE
5 FTE

2 FTE
26 FTE
12x0.5 = 6 FTE
22 FTE

Before

SciOps2.0

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ESA/ESO SCIOPS 2013
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Moving to Santiago (OpIT)

SciOps2.0

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Right people for the right job. New functions of:
- Operations Specialists
- System Scientists

Increase staff engagement across dpt activities.

Measure impact of changes via monitoring of KPIs

Communicate about (cultural) changes, explain, re-assure, prepare.
Meetings, meetings, meetings.

To be further improved via enhanced instrument + operations support

Assess risks (culture changes), mitigate them via:
(i) Re-inforced training,
(ii) Communication,
(iii) Comfortable timeline,
(iv) Project-management

Budget cannot increase, ideally the new scheme must be cheaper.

Pressure was mitigated. Timeline spanned over a 2-year period.
Tasks re-organization
Process kicked-off in summer 2011

- experimenting “classical-shift”

Full deployment reached 2 years later

Timeline

- Process kicked-off in summer 2011
  - experiment “classical-shift”

- Full deployment reached 2 years later

- Hiring of TIOs
- Training + certification of new TIOs
- Certification of current TIOs

Operations Specialists
- Advertisement → Selection ← Announcement of OS
- Partial OS coverage + training → Full OS coverage implemented

Astronomers
- Training of night shift-coordinator function

Classical-shift
- Experimentation → Implementing changes → Partial implementation of classical-shift → Classical-shift im Classical-shift implemented

SciOps
- Development of operations performance metrics

Tools
- Update ← OT3/NLT installed at UT2 ← Full deployment of Next Generations Operations Tools (NGNL, OT3) completed
Dpt structure

* Management team (a.k.a. “Musketeers”):
  - Dpt deputy
  - Instrument Scientist
  - VLTI Scientist
  - CCB Chair

Activities

- Core operations
- Instrument Operations Teams
- General Operations
- Training & Documentation
- VLTI
- Survey Telescopes
- Adaptive Optics
Metrics/KPIs

From VM reports:

From SM reports (see F. Primas talk):

From operations statistics (night report):

Execution loss < 0.5% science time
Remote Access Facility (RAF)

Why?
- Needed for DHA (relocated to Santiago)
- Support of SciOps:
  - technical time, emergency support, additional support for commissioning, special programs, etc
- Improve team-work with engineering

Potential for future evolution and expansion
- Garching support
- Remote observing?
Evaluating changes

- Currently: Phase of consolidation, evaluation, adjustment
  - Engagement is high (LSM, ISM)
  - Review planned for mid-2014 (one year into new scheme)
Thank you!