



# VST operations: the Paranal perspective



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VST in the era of large scale surveys, June 5-8 2018, Naples





# Outline

VST at Paranal and ESO

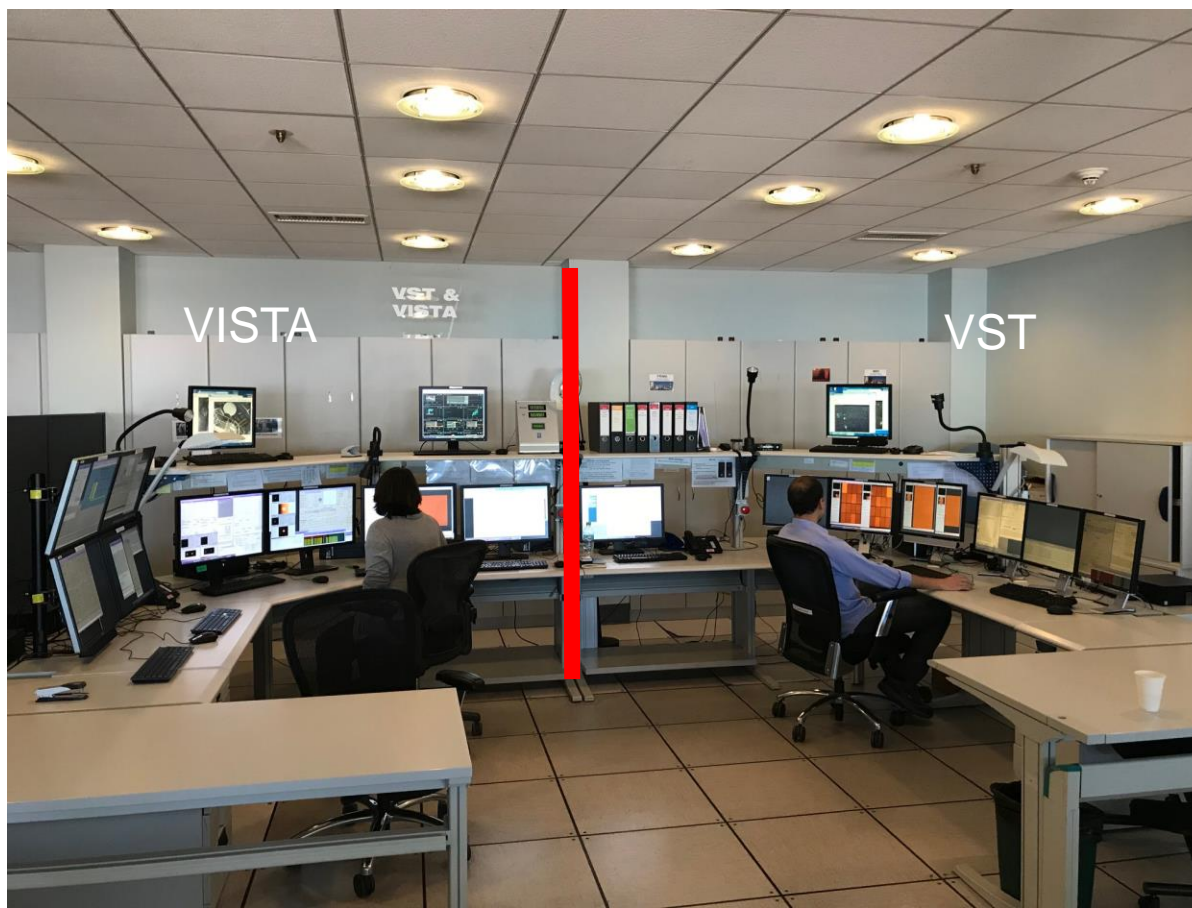
Stabilisation 2013-2016

Surveys 100+ project

Outlook

# A night and day with the VST

- Nighttime operations of the VST are performed by one telescope instrument operator (TIO), without astronomer support



# A night and day with the VST

- Operations require careful definition of procedures to be robust against varying human habits

## OmegaCAM

OmegaCAM		
General Information	Documents, Reports	Procedures, Troubleshooting, References
<ul style="list-style-type: none"> <li>OmegaCAM@VST in a nutshell</li> <li>Daily Operations Summary</li> <li>IOT meetings and members</li> <li>Communicating with USD/QC</li> <li>Surveys Operation Webpage</li> <li>Surveys CASU</li> <li>VST Public Surveys</li> </ul>	<ul style="list-style-type: none"> <li>Calibration Plan</li> <li>OmegaCAM User Manual and Documentation</li> <li>VST Checklist</li> <li>NLT Overview</li> <li>Other reports</li> <li>Survival Guide</li> <li>Maintenance QC0 scripts and Manual</li> <li>VST TIO Training Checklist</li> </ul>	<ul style="list-style-type: none"> <li>P2PP accounts and runs</li> <li>VST/OCAM Troubleshooting</li> <li>Post-Earthquake procedure</li> <li>M1 &amp; M2 positions and how to verify pointing after M2 INIT</li> <li>Changing default Calibration lamp set</li> <li>Synchronise / recover the OCAM_... scripts (for ISs; or SC if major failure)</li> <li>How to handle truncated output of the tooGetIQ script</li> <li>New Harcoded Onecal and Adjustment of M2</li> <li>Minimize downtimes with M2 oscillations</li> <li>VST &amp; Wind</li> <li>Anisotropy script</li> <li>Delegated VM with POEM</li> <li>Guidelines during Surveys 100</li> </ul>
Daytime Operation	Nighttime Operation	Tools
<ul style="list-style-type: none"> <li>OmegaCAM Daytime Operations</li> <li>Guideline for Reference ZP update</li> <li>CalChecker how to execute</li> <li>OT queue preparation for the night</li> <li>Quality Control Garching               <ul style="list-style-type: none"> <li>CalChecker</li> <li>HealthCheck</li> <li>Dedicated 32 chip overview</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Latest News!!</li> <li>Uncertified operator for VST</li> <li>Operation Guidelines</li> <li>Guideline for twilight flats</li> <li>Nighttime Operations Plan               <ul style="list-style-type: none"> <li>QC0 classification and Image Quality Checks</li> <li>Sky Transparency Monitoring</li> </ul> </li> <li>Special Calibrations for PHOT and empty queues: secondary standards</li> <li>Managing Ellipticity on VST</li> <li>OB re-classification procedure with OT3</li> <li>New automatic procedure to select IA/AG stars</li> <li>Preparation of ToO runs with OmegaCam</li> </ul>	<ul style="list-style-type: none"> <li>The OmegaCAM MTS page</li> <li>ETC</li> <li>Axis Plots for ellipticity monitoring</li> </ul>



# A night and day with the VST

## ■ Operations require careful definition of procedures to be robust against varying human habits

### ■ Evening twilight:

- [Skyflats](#) in 2-3 filters (if CLR). OT queue OmegaCAM Sky Flats. Takes about 20-30 minutes.
- Equatorial photometric standard in the five key bands ugriz (if CLR). OT queue OmegaCAM Phot Stds. Start ~40-45 min after sunset, takes about 25 minutes (Use AO.TYPE=AO\_ONE in aquisition).
  - Once per week: include an equatorial standard observation in the composite u\_g\_r\_i filter: right after the above equatorial standard OB finishes, fetch the OB "u\_g\_r\_i Standard" from the queue OmegaCAM Phot Stds, **skip the aquisition**, and execute only the img\_cal\_zp template.
- Polar Field Monitoring OB in the composite filter u\_g\_r\_i. OT queue OmegaCAM Phot Stds. Start ~1h after sunset, takes about 10 minutes (Use AO.TYPE=AO\_ONE in aquisition). Check the [transparency conditions](#).

### ■ Nighttime:

- Science Observations, QC0 with [Image Quality Checks](#) and [Photometric Monitoring Scripts](#). **Special QC0 criterion for GTO OBs:** give it a 'D' if the Mean IQ (=FWHM) goes out of constraints during execution.
  - Middle of the night: **HIGH AIRMASS equatorial standards** (select OB with ORANG from the OmegaCAM High Airmass Phot STDs queue). It requires PHOT-CLR conditions. Only select OBs named Landolt, unless there is strong wind from the North when you can select OBs named Northwind. There is not always an OB observable at the requested airmass. There are sidereal time intervals defined when the target/OB is at the right airmass. Start after midnight to look for an executable OB in the queue, try it an hour later if there is none, or two, or at any time later until the morning twilight if still there is none. The optimum airmass range is from 1.6 to 1.9, (but airmass 1.4 to 2.0 is tolerable). Leave a public comment in the NLT report if it was not possible to take the data. You can as well take the high airmass standard at the start of the night and the normal equatorial standard later.
  - Middle of the night: Polar Field Monitoring OB in the composite filter u\_g\_r\_i (Use AO.TYPE=AO\_ONE in aquisition).
  - End of the night: If science observations in any of the **user bands (B, V, v\_Str, NB\_659, H\_alpha) are done in CLR-PHOT conditions**, then also observe a standard in the user filter (Queue 'OmegaCAM Phot Stds USER', or 'OmegaCAM Phot Stds SOUTH USER' for wind from north). Tip: if you observe the standard in user band after the key band, skip the aquisition template. No need for guiding or additional IA iterations. Use the QC0 script and [CalChecker to select the filters](#). Please skip the filters which were not used. You can go up to 30 min into twilight. This has priority over the Polar Field Monitoring (or high airmass standards).
  - End of the night: Polar Field Monitoring OB in the composite filter u\_g\_r\_i (Use AO.TYPE=AO\_ONE in aquisition). You can go up to 30 min into twilight.

### ■ Night end:

- Run the OSF end-of-night script
- **CLOSE TELESCOPE.**
- After the end of the closing procedure, open again the M1 cover to be ready for calibrations, as long as humidity is below 50%. **If humidity is above 50%**, keep the M1 cover closed and skip all flats (quick-check/dome-flat/gain) in the Daily Calibration OB. Send a PSO to daytime crew notifying of this condition.
- Start the Daily Calibration OB (without flats if M1 cover kept closed due to humidity >50%)



# A night and day with the VST

- Selection of observations during the night fully automated via filtering and ranking of OBs

The screenshot shows the VST observation selection software interface. The main window displays a table of observations with columns for Rank score, OB ID, Container, OB name, Image Quality, Execution Time, Target, RA, Dec, Prog ID, Sky, Airmass, and Moon. The table is filtered to show 105 rows. The interface includes various filtering options on the left, such as Weather-Conditions, Visibility-Constraints, and a Rank VST button. The top menu bar includes options like Obs, Readme, Ephemeris File, Reports, Finding Charts, OB Reports, and Options. The status bar at the bottom indicates a Next Failure check in 57 minutes and the current date and time: Wed May 30 16:00:22 GMT 2018.

Rank score	OB ID	Container...	OB name	Image Q...	ExecTime	Target	RA	Dec	Prog.ID	Sky...	Airm...	Moo
21948850	+		KDS_177.0_1.5_j	1.100	00:29:21.000	KDS_177.0_1.5	11:48:00.000	01:29:20.440	177.A-3016(T)	2CLR	2.000	60
21948856	+		KDS_178.0_0.5_j	1.100	00:29:21.000	KDS_178.0_0.5	11:52:00.000	-00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948859	+		KDS_178.0_0.5_j	1.100	00:29:21.000	KDS_178.0_0.5	11:52:00.000	00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948862	+		KDS_178.0_1.5_j	1.100	00:29:21.000	KDS_178.0_1.5	11:52:00.000	-01:29:20.436	177.A-3016(T)	2CLR	2.000	60
21948866	+		KDS_179.0_0.5_j	1.100	00:29:21.000	KDS_179.0_0.5	11:56:00.000	00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948874	+		KDS_180.0_0.5_j	1.100	00:29:21.000	KDS_180.0_0.5	12:00:00.000	00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948883	+		KDS_180.5_2.5_j	1.100	00:29:21.000	KDS_180.5_2.5	12:02:00.334	02:28:40.879	177.A-3016(T)	2CLR	2.000	60
21948886	+		KDS_181.0_0.5_j	1.100	00:29:21.000	KDS_181.0_0.5	12:04:00.000	-00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948889	+		KDS_181.0_1.5_j	1.100	00:29:21.000	KDS_181.0_1.5	12:04:00.000	01:29:20.440	177.A-3016(T)	2CLR	2.000	60
21948895	+		KDS_181.5_2.5_j	1.100	00:29:21.000	KDS_181.5_2.5	12:06:01.003	-02:28:40.872	177.A-3016(T)	2CLR	2.000	60
21948898	+		KDS_182.0_0.5_j	1.100	00:29:21.000	KDS_182.0_0.5	12:08:00.000	-00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948901	+		KDS_182.0_0.5_j	1.100	00:29:21.000	KDS_182.0_0.5	12:08:00.000	00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948910	+		KDS_182.5_2.5_j	1.100	00:29:21.000	KDS_182.5_2.5	12:10:01.671	-02:28:40.872	177.A-3016(T)	2CLR	2.000	60
21948913	+		KDS_182.5_2.5_j	1.100	00:29:21.000	KDS_182.5_2.5	12:10:01.671	02:28:40.879	177.A-3016(T)	2CLR	2.000	60
21948916	+		KDS_183.0_0.5_j	1.100	00:29:21.000	KDS_183.0_0.5	12:12:00.000	-00:30:00.000	177.A-3016(T)	2CLR	2.000	60
21948919	+		KDS_183.0_0.5_j	1.100	00:29:21.000	KDS_183.0_0.5	12:12:00.000	01:29:20.436	177.A-3016(T)	2CLR	2.000	60





# A night and day with the VST

## Quality control (QC) grading is based on average IQ, ellipticity, and IQ variation across the field

The following are **QC0 rules of OB classification** which the script above uses. For OBs that have more than one filter, all filters must have A classification to justify A for the OB. **Note the special rules for concatenations below**

### A classification:

- Average IQ has to be within the requested IQ.
- Average ellipticity must be  $< 0.10$ .
- All individual chips have ellipticity  $< 0.20$ .
- Image quality variation inner-vs-outer is less than 10%.

**Grade A:** IQ  $\leq$  requested, ellipticity & IQ variation  $< 10\%$

### B classification:

- Average IQ is between 0% and 10% of requested IQ.
- Average ellipticity is between 0.10 and 0.15.
- Only up to 16 of the 32 chips of any single exposure have ellipticity  $> 0.15$
- Image quality variation inner-vs-outer is between 10% and 25%.

### C classification:

- Any of the criteria for B classification is not met
  - Special case for image quality variation: if IQ variation is  $> 25\%$ , but MeanIQ is  $< 0.70''$ , still give a B.

**Grade C:** IQ  $> 1.1 \times$  requested, or ellipticity  $> 0.15$ , or IQ variation  $> 25\%$

### CONCATENATIONS:

#### A classification for OBs in a concatenation:

- As for individual OBs

#### B classification for OBs in a concatenation (slightly more relaxed):

- Average IQ is within 0% and 20% of constraint.
- Average ellipticity is  $< 0.15$ .
- Average image quality variation is between 10% and 30%.

If the non-concat 'B' constraints (10% in IQ, 25% in IQ variation) are met on average over the full concatenation, then one can tolerate for individual OBs:

- Between 0% and 10% of individual OBs have IQ more than 20% out of constraint (QC grade D instead of C)
- Between 0% and 10% of all chip exposures have ellipticity  $> 0.20$  (QC grade D instead of C)
- Between 0% and 10% of individual OBs have IQ variation beyond 30% (QC grade D instead of C)

#### C classification of at least one OB $\rightarrow$ Concat is repeated:

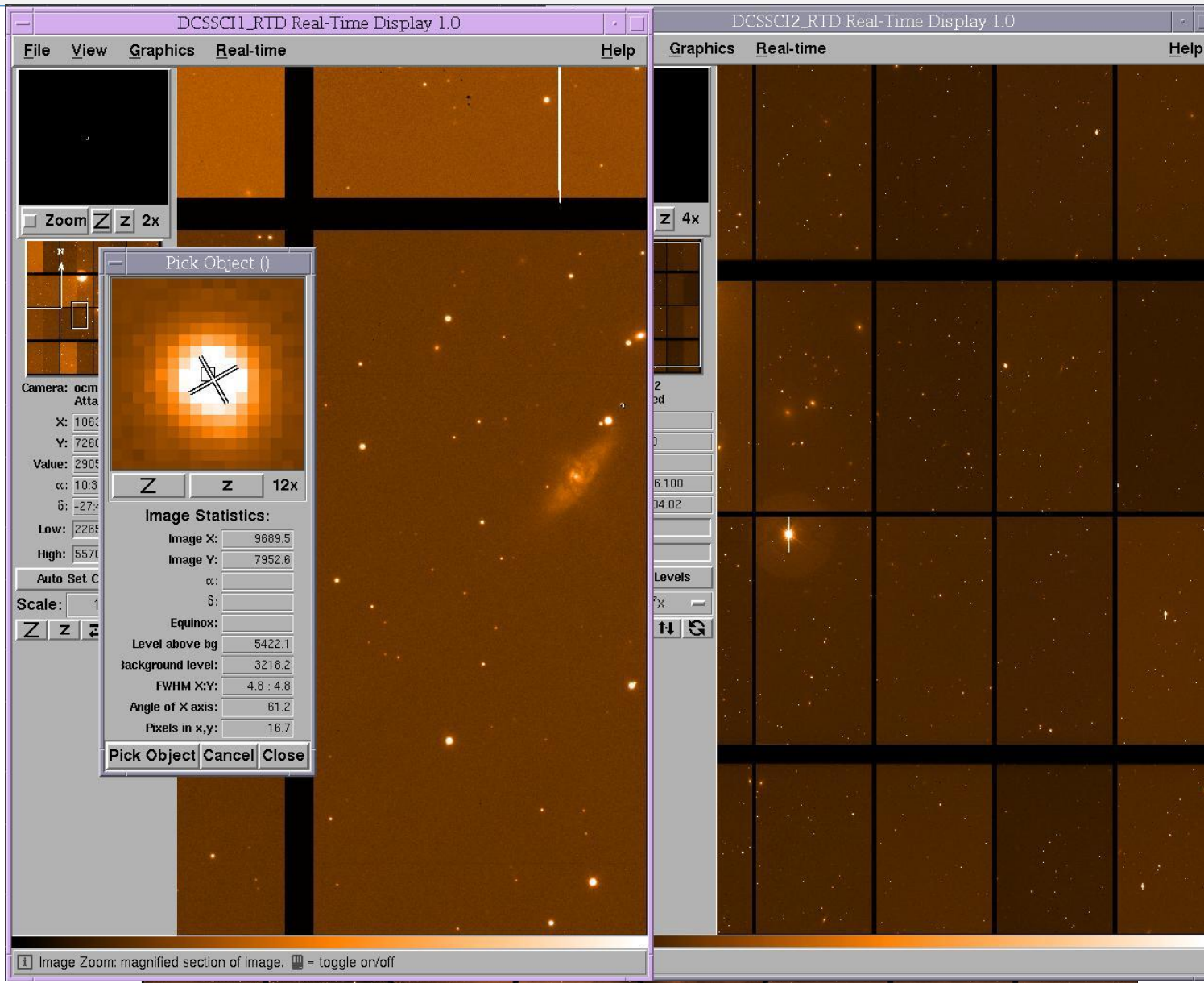
- Average IQ over all OBs is more than 10% of constraint.
- Average ellipticity over all OBs is  $> 0.15$ .
- Average Image quality variation inner-vs-outer over all OBs is beyond 25%.

If none of the above constraints is violated, then the concatenation can still go 'C' if one of the three following conditions apply:

- More than 10% of individual OBs have image quality variation beyond 30% and at the same time MeanIQ is  $> 0.70''$
- More than 10% of all chip exposures have ellipticity  $> 0.20$
- More than 20% of individual OBs have IQ more than 20% out of constraint.



# A night and day with the VST





# A night and day with the VST

- Suggested QC grading provided by a script that queries the pipeline output and applies grading

i_SDSS	0.74"	7	0.91"	14	0.90"	14	0.82"	8	0	0.81"	-	16.2	-	9.9	-
i_SDSS	0.76"	7	0.66"	4	0.68"	4	0.81"	6	0	0.72"	-	17.6	-	5.6	-
i_SDSS	0.69"	4	0.70"	6	0.71"	6	0.75"	4	0	0.70"	-	4.0	-	4.6	-
i_SDSS	0.66"	8	0.66"	10	0.69"	12	0.77"	11	0	0.68"	-	6.7	-	9.4	-
i_SDSS	0.66"	6	0.68"	8	0.69"	7	0.69"	5	0	0.66"	0.71"	1.9	9.3	5.6	7.0

i_SDSS	0.72"	5	0.69"	3	0.69"	4	0.73"	4	0	0.69"	-	5.2	-	3.4	-
i_SDSS	0.68"	5	0.63"	3	0.65"	3	0.69"	5	0	0.64"	-	6.6	-	3.6	-
i_SDSS	0.71"	6	0.67"	3	0.67"	2	0.73"	5	0	0.67"	-	6.2	-	3.0	-
i_SDSS	0.84"	8	0.86"	6	0.86"	10	0.84"	7	0	0.84"	-	1.3	-	7.5	-
i_SDSS	0.73"	5	0.72"	3	0.72"	3	0.71"	4	0	0.70"	0.71"	0.9	4.1	3.2	4.1

i_SDSS	0.75"	5	0.69"	4	0.70"	3	0.75"	5	0	0.70"	-	4.4	-	3.5	-
i_SDSS	0.71"	2	0.71"	5	0.71"	3	0.70"	4	0	0.69"	-	0.2	-	4.0	-
i_SDSS	0.70"	4	0.72"	7	0.73"	5	0.70"	4	0	0.70"	-	2.5	-	4.8	-
i_SDSS	0.77"	5	0.79"	9	0.80"	7	0.79"	4	0	0.77"	-	0.9	-	5.9	-
i_SDSS	0.75"	5	0.76"	6	0.75"	4	0.73"	4	0	0.74"	0.72"	1.6	1.9	5.5	4.7

i_SDSS	0.68"	4	0.71"	4	0.71"	2	0.70"	4	0	0.69"	-	2.6	-	4.1	-
i_SDSS	0.57"	3	0.59"	3	0.61"	3	0.60"	4	0	0.57"	-	1.4	-	3.4	-
i_SDSS	0.62"	2	0.65"	3	0.66"	3	0.65"	3	0	0.63"	-	1.8	-	3.1	-
i_SDSS	0.73"	3	0.73"	3	0.73"	5	0.73"	4	0	0.72"	-	0.3	-	3.3	-
i_SDSS	0.75"	3	0.77"	3	0.77"	2	0.78"	3	0	0.76"	0.67"	0.5	1.3	2.8	3.3



# A day with the VST

## ■ Daytime checklist

ARRIVING AT THE CONSOLE						
Order Weight	Item Text	Link	Check	N/A	Warning	
2	<input type="checkbox"/> Inform TCO when daytime calibrations are finished		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3	<input type="checkbox"/> Check for PROP tickets	<a href="#">🔗</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
4	<input type="checkbox"/> Check daily notes section (night time checklist)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
5	<input type="checkbox"/> Run copy/Q 20xx-xx-xx on wocoff (last night date)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
6	<input type="checkbox"/> Check Quick Check A and B (HC pages)	<a href="#">🔗</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
7	<input type="checkbox"/> Check NLT last night, update next night's personnel	<a href="#">🔗</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
8	<input type="checkbox"/> Health Check, CalChecker, Cal4Cal (pending flats?)	<a href="#">🔗</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
9	<input type="checkbox"/> On Sunday: Go through all HC plots for the instruments on VST and follow up on suspicious trends		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
10	<input type="checkbox"/> Check for failed OBs in ORANG (top left item Obs)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
11	<input type="checkbox"/> OB report in ORANG: verify night & concatenations		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
12	<input type="checkbox"/> Once per week update reference ZP (e.i Saturday, see wiki for details)	<a href="#">🔗</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
13	<input type="checkbox"/> Check VisasTool for VM and dVM	<a href="#">🔗</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

OPEN RELEVANT QUEUES						
Order Weight	Item Text	Link	Check	N/A	Warning	
15	<input type="checkbox"/> OmegaCAM Skyflats		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
16	<input type="checkbox"/> OmegaCAM Phot Stds (only)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

PREPARE EXECUTION SEQUENCE						
Order Weight	Item Text	Link	Check	N/A	Warning	
18	<input type="checkbox"/> One Skyflat_Field position (check coordinates for beginning of night)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
19	<input type="checkbox"/> Three filters for flats (u.g.r,i, etc) check for pending flats on CC		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
20	<input type="checkbox"/> Two STDs: One Landolt Master Key STD and the Polar Master segmented STD.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Before sunset, in ORANG:						
Order Weight	Item Text	Link	Check	N/A	Warning	
22	<input type="checkbox"/> Force rank on OT, SMTS OMEGACAM TODAY (right-click on 'Rank VST')		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

INSTRUMENT STARTUP						
Order Weight	Item Text	Link	Check	N/A	Warning	
24	<input type="checkbox"/> Instrument startup (~15:00) login: ocam & usual password		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	





# A night with the VST

## ■ Nighttime checklist

### VST NIGHT

**Order Weight Item Text**

Link Check N/A Warning

2	<input checked="" type="checkbox"/>	Check for PROP tickets (PSO,USD,QC).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	Check for PPRS tickets		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input checked="" type="checkbox"/>	Check Inbox for Operational related matters		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### NIGHT OPERATIONS:TIOS

**Order Weight Item Text**

Link Check N/A Warning

6	<input checked="" type="checkbox"/>	Check M1 Covers Segments are open		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input checked="" type="checkbox"/>	Execute Twilight Flats		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input checked="" type="checkbox"/>	List the good ones on Sticky Note & NLT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	Once per week take Flats at ABSROT=0		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input checked="" type="checkbox"/>	Check Thermal WSVD is in NIGHT Mode		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	<input checked="" type="checkbox"/>	Check AG Integration Time is 4(s)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input checked="" type="checkbox"/>	Check AG Box Size 64x64		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### BEGINNING OF THE NIGHT

**Order Weight Item Text**

Link Check N/A Warning

14	<input checked="" type="checkbox"/>	Execute Equatorial STD key (u-g-r-i-z)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/>	Once per week execute u_g_r_j STD. SKIP ACQ		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	<input checked="" type="checkbox"/>	Execute Polar Monitoring Field		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### MIDDLE OF THE NIGHT

**Order Weight Item Text**

Link Check N/A Warning

19	<input checked="" type="checkbox"/>	Execute High Airmass Equatorial STD Key Bands (u-g-r-i-z)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input checked="" type="checkbox"/>	Execute Polar Monitoring Field		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### END OF NIGHT

**Order Weight Item Text**

Link Check N/A Warning

22	<input checked="" type="checkbox"/>	Execute Polar Monitoring Field		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	<input checked="" type="checkbox"/>	Execute STD for recent PHOT OB filters		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	<input checked="" type="checkbox"/>	Execute STD User Band (Only when Science in User band was done)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	<input checked="" type="checkbox"/>	Check the proper execution of the calibration plan using CalChecker		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### END OF NIGHT AT THE CONTROL ROOM

**Order Weight Item Text**

Link Check N/A Warning

27	<input checked="" type="checkbox"/>	Set AC Temperature		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	<input checked="" type="checkbox"/>	In wtvst run Telescope Shutdown OSF Script		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	<input checked="" type="checkbox"/>	In wocam run END OF NIGHT Script		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	<input checked="" type="checkbox"/>	If RH is greater than 50 Close M1 cover & Do not start Calibrations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	<input checked="" type="checkbox"/>	Check NLT/OT for classifications and gaps.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32	<input checked="" type="checkbox"/>	Check that all problems have been reported in PPRSs.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33	<input checked="" type="checkbox"/>	Check NLT Report page for time accounting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34	<input checked="" type="checkbox"/>	Send a PSO ticket with handover information for the daytime team.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	<input checked="" type="checkbox"/>	Start Calibrations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# VST in ESO's end-to-end data flow



# VST maintenance

- VST & OmegaCAM operations rely heavily and crucially on work done by Maintenance, Support and Engineering department at Paranal



Ricardo Schmutzer

Software



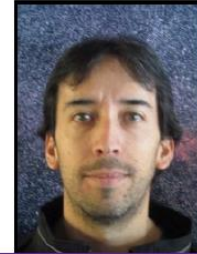
Rodrigo Badinez

Instrument



Sebastian Sanhueza

Enclosure



Rodrigo Huerta

M2 & hexapod



Alfredo Leiva

Telescope &  
M1 cell



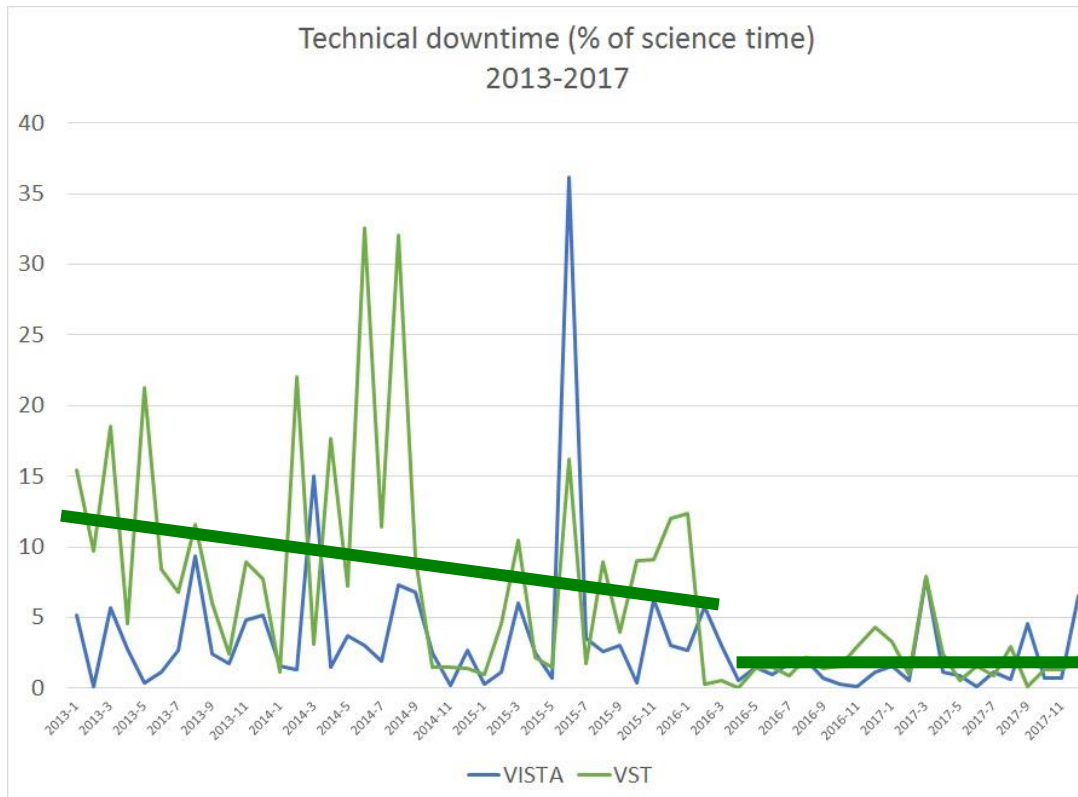
Miguel Riquelme

Ricardo Parra  
(retired)



# VST stabilisation efforts 2013-2016

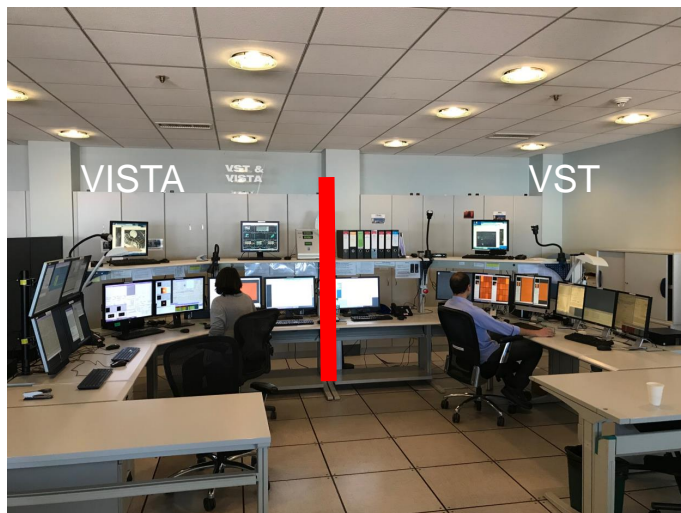
- Substantial efforts from Maintenance, Support and Engineering Department and Consortium between 2013 and 2016 to make VST + OmegaCAM operations more stable (M1 & M2, axis control, WFS, SW)



A	B	C	D	E	F	G
<b>VST action plan, V1.5, updated 31 May 2015</b>						
original info extracted from document VST status by T. Seeber on 12 May 2014						
#	Action name	Assignee	Requirements/Comments	W	Priority	Status - Deadline
1	Automate triggering of ONCA: at present SW allow effort to neighbouring fields for mapping up to 2.2 degrees off.	Thomas	create a MCK for SW		3	Closed
2	ensure ONCA parameters are not lost after SW rebuild	SW	see PPS5283, merge the changes into the main trunk		3	Open
3	speed up M1 force reading	SW	why does it take 250ms to take the temperature for C&K bus access?		3	Open
4	understand speed of semaphore	SW	check data with measurement using the SPRINTS		3	Open
5	update ONCA table with field dependent terms of spherical aberration	Thomas	see CR1 C03-641		2	Open
6	inspect ESW	Huerta	confirm with S&O		2	Open
7	some A0 control loop parameters	Huerta	confirm with S&O		2	Open
8	download a new config file for M&M	SW	requires M2 to be stable		3	Open
9	Refine focus law vs temperature, altitude and airmass filter	SW	script collecting data from VCS log files. Review in next months now that M2 is stable		3	Open
10	gather and analyze observations statistics to update ONCA	Thomas	requires regular update to be made??		3	Open
11	improve tracking precision	Huerta	check M1 interpolated weight table		3	Open
12	check M1 interpolated weight table	Thomas	Thomas to ask Ricardo		3	Open
13	check refreshing rate of M1 forces after any SW changes	Schmider	done?		3	Open
14	change the sequence to acquire targets	Thomas	done?		3	Open
15	stabilize the M2 position in operations and after installation	Parrá	see able to trust values of M2 position after installation		3	Open
16	refine the optical axis	Thomas/S&O	probably not needed after laser align procedure is implemented		3	Open
17	refine the pointing model with M2 in middle of target	Thomas/S&O	done?		3	Open
18	correct coma manually and check WFS data in medium seeing	Thomas/S&O	done?		3	Open
19	install new baffles	Huerta	design sent by Gariching, taking measurements to fabricate. Coma baffle will be ready in January, integral baffles will be ready in March		3	Open
20	modify OmegaCam image analyzer program to calculate the field astigmatism and include it in the active optics correction	Thomas/Rafael	SW to be done by K. Kuhn and SW person in Padova starting around February. Ongoing tests, procedure for manual corrections to be written by Andrew for T10s. Plan a mission around June 2015 for field implementation?		3	Open
21	M2 Hexapod: Procure M2 driver spares and test check cabling	Huerta	spares found to be non-functional Dec 5		3	Open
22	Specular corner ghost	Rafael	Maybe the most bothering ghost left happening when bright stars are in the CCD corners simulated in Zemax. Need to inspect space between dewar window and filter box when OmegaCam is mounted next. Use schedule an intervention sometime in 2015.		3	Open
23	memorize last onca offset before preset	Thomas/SW	save time on IQ optimization. Currently ONCA, corrects coma and spherical, no need for astigmatism and focus		3	Open
24	Abblute axis oscillations at polar fields	Pozobon	Warning might be needed see PPS 437030/040/029		3	Open
<b>Actions described in the report file with DMF status, October 14</b>						
1	Image quality: determine the intrinsic image quality of the VST	Rafael/Huerta	The focal plane coverage in S.I.2 is large, such that the margin for the passive and active control of the mirror is very small and in the current situation we have a serious fraction of images with a bad M1 astigmatism which requires repeating observations. To be followed up by the improvement project. Need to measure comstar to focal plane distance to confirm location of correction. To be done when installing baffles into deep cooler and optimized. Currently it is a bit of 0.5, while normally this value is lower. To be followed up by Engineering. And done with S&O		3	Open
2	OmegaCam A0 performance: check guiding in different rotator angles in each quadrant	Huerta	done		3	Closed
3	A0 optics: verify performance	Rafael	S&O proposes to wave this. Apparently the A0C is not built/assembled as designed. To be followed up by Gariching within the scope of the improvement project. Rafael will suggest a simple test to complete the diagnosis.		3	Open
4	Fire alarm system: system test	Huerta	Natural fire alarm activation not yet operational. Proceeding and followed up by Engineering.		3	Open
5	Fire alarm system: measure range and repeatability	Huerta	Natural fire alarm activation not yet operational. Proceeding and followed up by Engineering.		3	Open
6	Abblute axis operations: verify functionality	Parrá	Second pair of altitude motors not operational. Under investigation and followed up by Engineering.		3	Open

# Stability of VST & VISTA since 2016 enables synergies

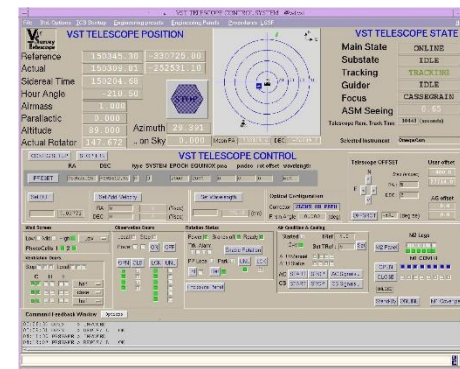
- Single TIO operations of the two survey telescopes in the second half of the night (Surveys 100+)
  - Regular mode of operations since June 2018
  - Provides TIO resources to support more complex systems (VLTI, AOF)





# Stability of VST & VISTA since 2016 enables synergies

- List of changes implemented to enable single TIO operations of VST & VISTA in H2
  - Several operation panels re-engineered, examples:





# Stability of VST & VISTA since 2016 enables synergies

- List of changes implemented to enable single TIO operations of VST & VISTA in H2
  - Several operation panels re-engineered
  - VST & VISTA: Enclosure thermal automatization
  - VST: New AG/IA + TCS panel
  - VST: Dome closing procedure
  - VST & VISTA: Screen redistributions
  - VISTA: M2 hexapod following error workaround



# Stability of VST & VISTA since 2016 enables synergies

- Further improvements necessary to maintain and ease single TIO operations of VST & VISTA in H2
  - Full automatisation of the OmegaCAM aquisition
  - Automatic propagation of OB classification from script to database
  - Improve ergonomometry
  - Further concentration of operational screens and panels
  - VISTA anemometer reallocation



S. Cerda

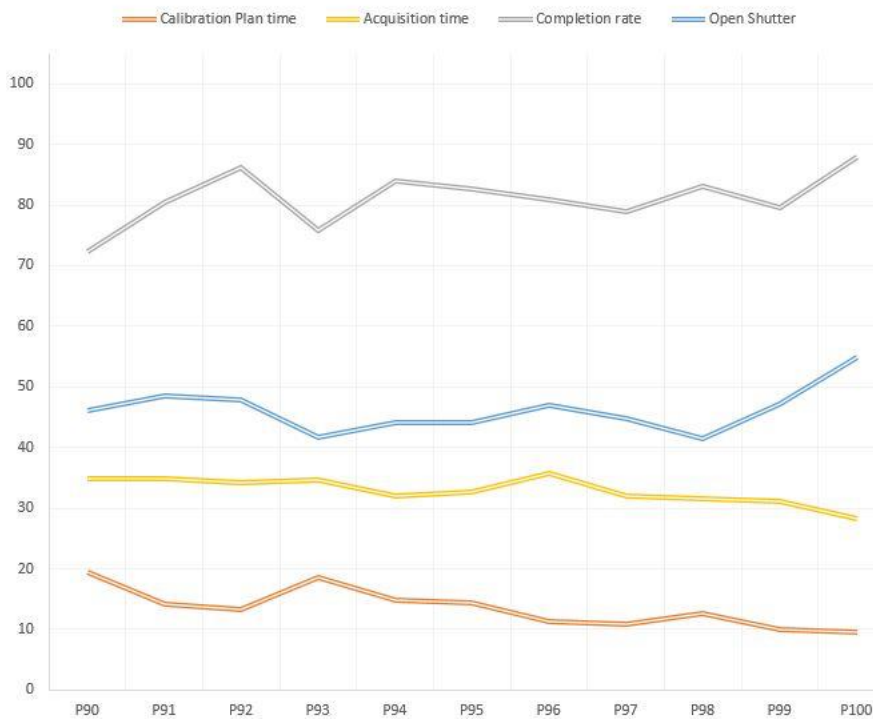




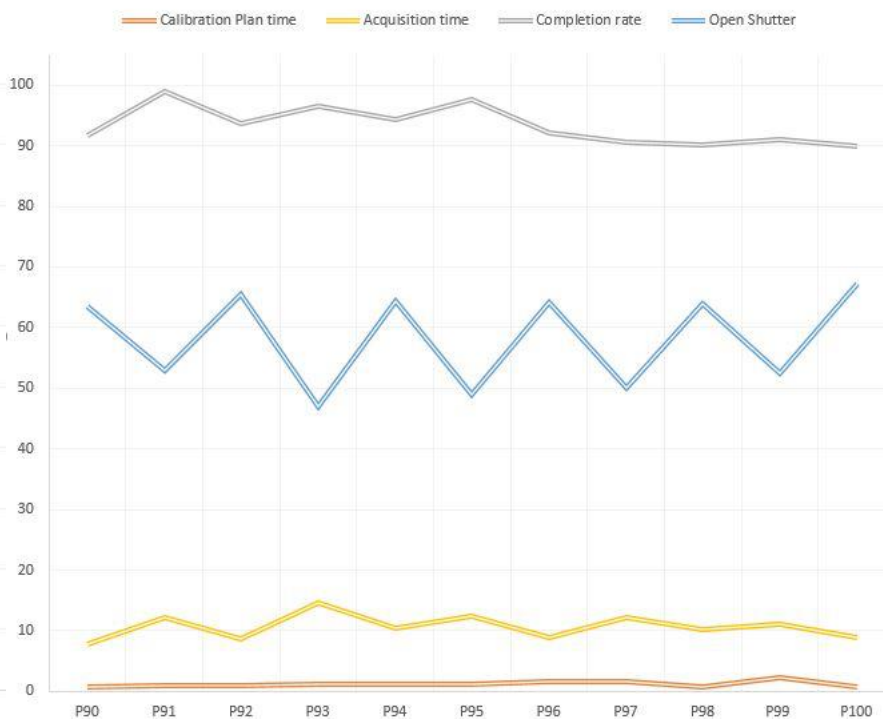
# Many years with the VST: positive trends

## OB execution KPIs of OmegaCAM and VIRCAM

OMEGACAM KPIs



VIRCAM KPIs





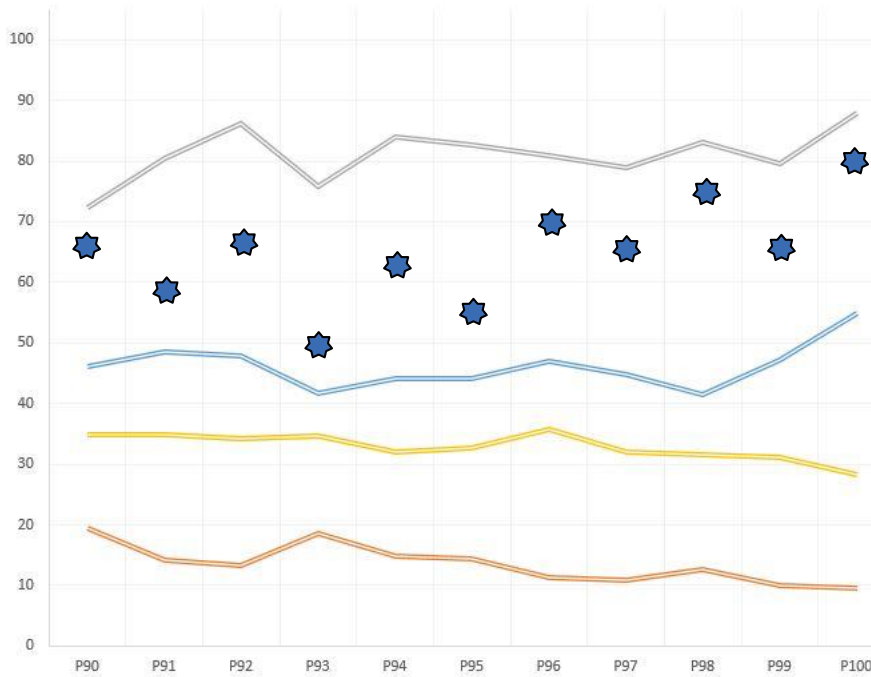
# Many years with the VST: positive trends

## OB execution KPIs of OmegaCAM and VIRCAM

★ Time available for science (after weather, idle, tech)

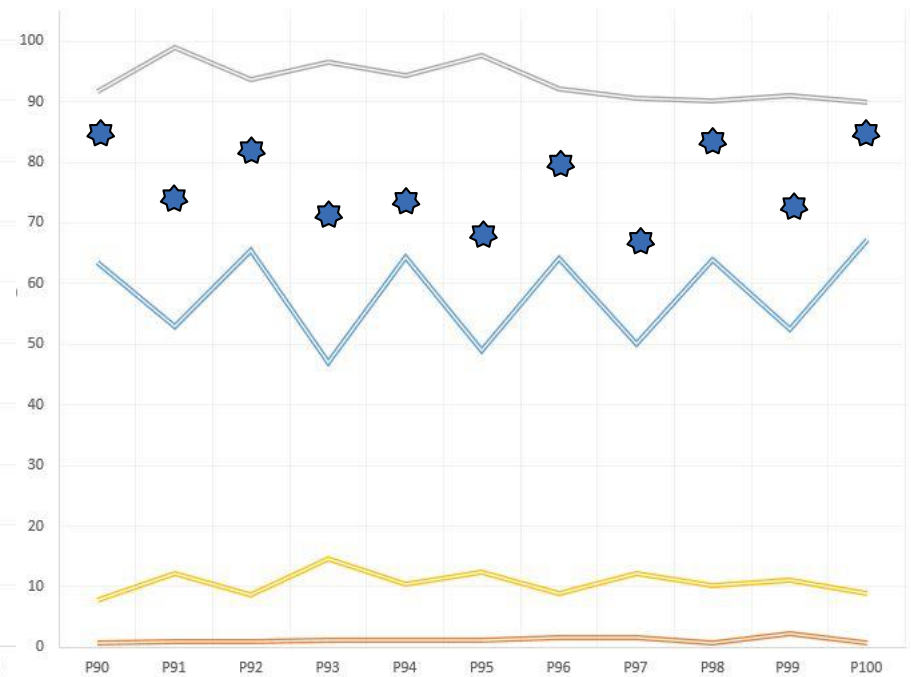
### OMEGACAM KPIs

— Calibration Plan time — Acquisition time — Completion rate — Open Shutter



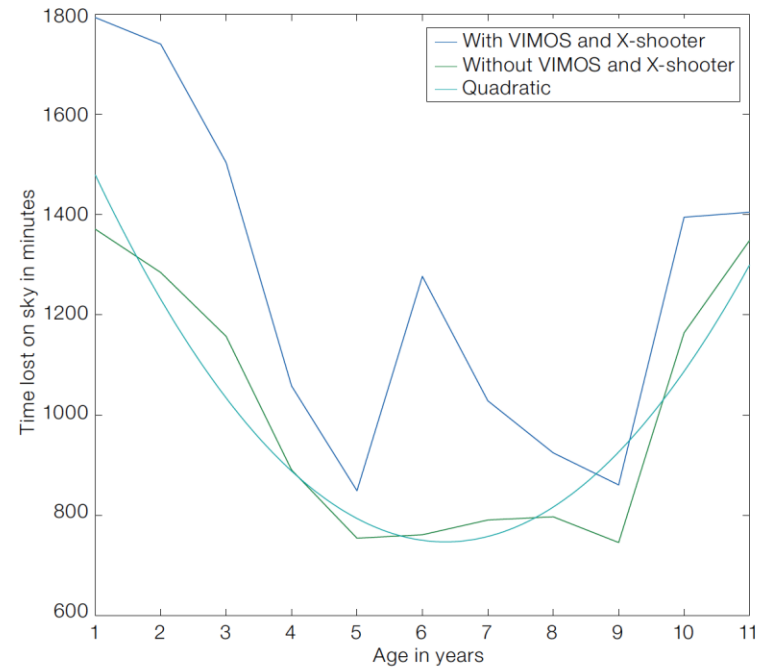
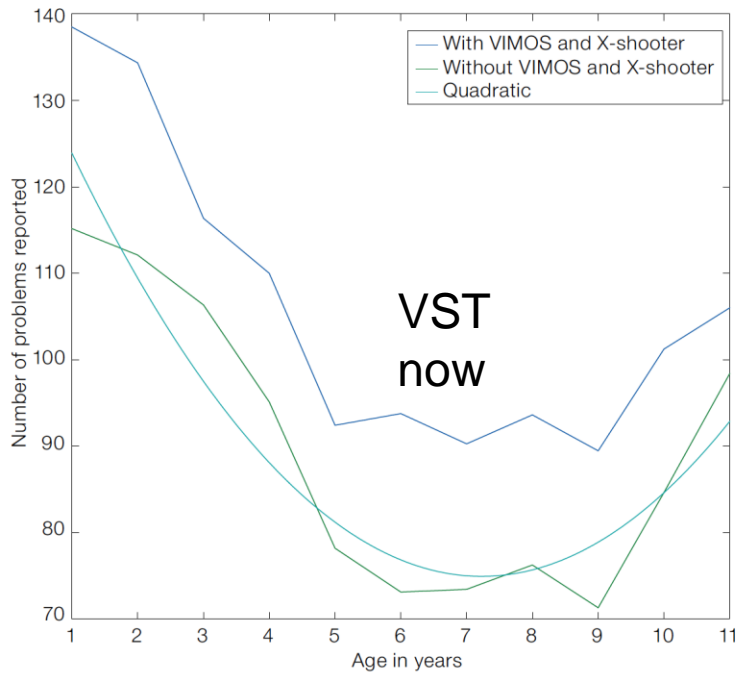
### VIRCAM KPIs

— Calibration Plan time — Acquisition time — Completion rate — Open Shutter



# Outlook: be aware of aging + obsolescence

- Maintaining and further streamlining current operations model will require (increasing) engineering maintenance effort, in particular when system grows beyond ~10 years



Gonté et al. 2014