


Ranking of service mode observations and relative priorities



What happens after the whistle?

P2PP 3.2

Help



Status	Target	OD	CS	Acquisit
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl
(P)artiallyD...	No name	No name	No name	UVES_bl



Your User Support
Astronomer
revises
Phase 2 material



After approval the
OBs are included
into the
observing queue

Paranal:

The Observation Tool (OT)

The night astronomer sets the current constraints

The night astronomer chooses the first OBs for execution

The screenshot displays the ORANG DB server interface (acdb.hq.eso.org:2025). The left panel shows various configuration options for observations, including UT Start-Time (2012-01-09T22:41:30), Duration in Hours (4), and Weather-Conditions (Seeing 600nm Max. 1.4, Wind-Direction 0, Sky-Transparency Variable, thin cirrus). The right panel shows a table of observation blocks (OBs) ranked according to a ranking algorithm (guideline). The table columns include Rank, OB ID, Status, Container, Container ID, Sched ID, and OB name. The first few rows of the table are circled in red, indicating the first OBs chosen for execution.

Rank	OB ID	Status	Container	Container ID	Sched ID	OB name
1	559503	+	C	559502	25057896	SMC-CY2_vmc_P87_smc_1_6_5
1	559506	+	C	559502	25057896	SMC-CK1_vmc_P87_smc_1_6_5
1	559550	A	T	559537	25057896	SMC-TK5_vmc_P87_smc_1_6_5
2	491815	+	T	491815	25056311	SMC-TK5_vmc_survey_smc.xml
2	492646	M	T	492645	25056311	SMC-TK1_vmc_survey_smc.xml
3	555329	M	G	555325	25056991	vikingKH_sgp_m30_1_1_20
4	596608	+	G	596604	25059255	vikingKH_sgp_m31e_1_1_1
4	596650	+	G	596646	25059255	vikingKH_sgp_m32e_1_1_1
5	555350	+	G	555346	25056991	vikingKH_sgp_m30_1_1_23
5	555235	+	G	555231	25056991	vikingKH_sgp_m34_1_1_19
6	596573	+	G	596569	25059255	vikingKH_sgp_m30e_1_1_1
6	555221	+	G	555217	25056991	vikingKH_sgp_m34_1_1_17
6	555228	+	G	555224	25056991	vikingKH_sgp_m34_1_1_18
6	555249	+	G	555245	25056991	vikingKH_sgp_m34_1_1_21
6	555256	+	G	555252	25056991	vikingKH_sgp_m34_1_1_22
6	555242	M	G	555238	25056991	vikingKH_sgp_m34_1_1_20
7	491733	+	C	491732	25056311	Bridge-CY2_vmc_survey_bridge1
7	491736	+	C	491732	25056311	Bridge-CK1_vmc_survey_bridge1
8	596622	+	G	596618	25059255	vikingKH_sgp_m31e_1_1_3
9	596615	+	G	596611	25059255	vikingKH_sgp_m31e_1_1_2
9	596629	+	G	596625	25059255	vikingKH_sgp_m31e_1_1_4
9	596636	+	G	596632	25059255	vikingKH_sgp_m31e_1_1_5
9	596643	+	G	596639	25059255	vikingKH_sgp_m31e_1_1_6
9	596657	+	G	596653	25059255	vikingKH_sgp_m32e_1_1_2
9	596664	+	G	596660	25059255	vikingKH_sgp_m32e_1_1_3

Filtered rows: 146

Ranking-Algorithm: VISTA Survey v0.03

Buttons: Rank, Re-Load and Rank

The OBs are ranked according to a ranking algorithm (guideline)

Filtering

- 1) OB is observable,
i.e. above horizon
- 2) OB fulfills
requested con-
straints (airmass,
seeing, moon,
transparency)
- 3) Time windows
are valid

Rank score	OB ID	Status	Container	Container ID	Sched Id	OB nam
1	559503	+	C	559502	25057896	SMC-CY2_vmc_P87_smc_1_6_5
1	559506	+	C	559502	25057896	SMC-CK1_vmc_P87_smc_1_6_5
1	559550	A	T	559537	25057896	SMC-TK5_vmc_P87_smc_1_6_3
2	491843	+	T	491815	25056311	SMC-TK10_vmc_survey_smc.xml
2	492646	M	T	492645	25056311	SMC-TK1_vmc_survey_smc.xml
3	555329	M	G	555325	25056991	vikingJ/KH_sgp_m30_1_1_20
4	596608	+	G	596604	25059255	vikingKHJ_sgp_m31e_1_1_1

Filtered rows: 146

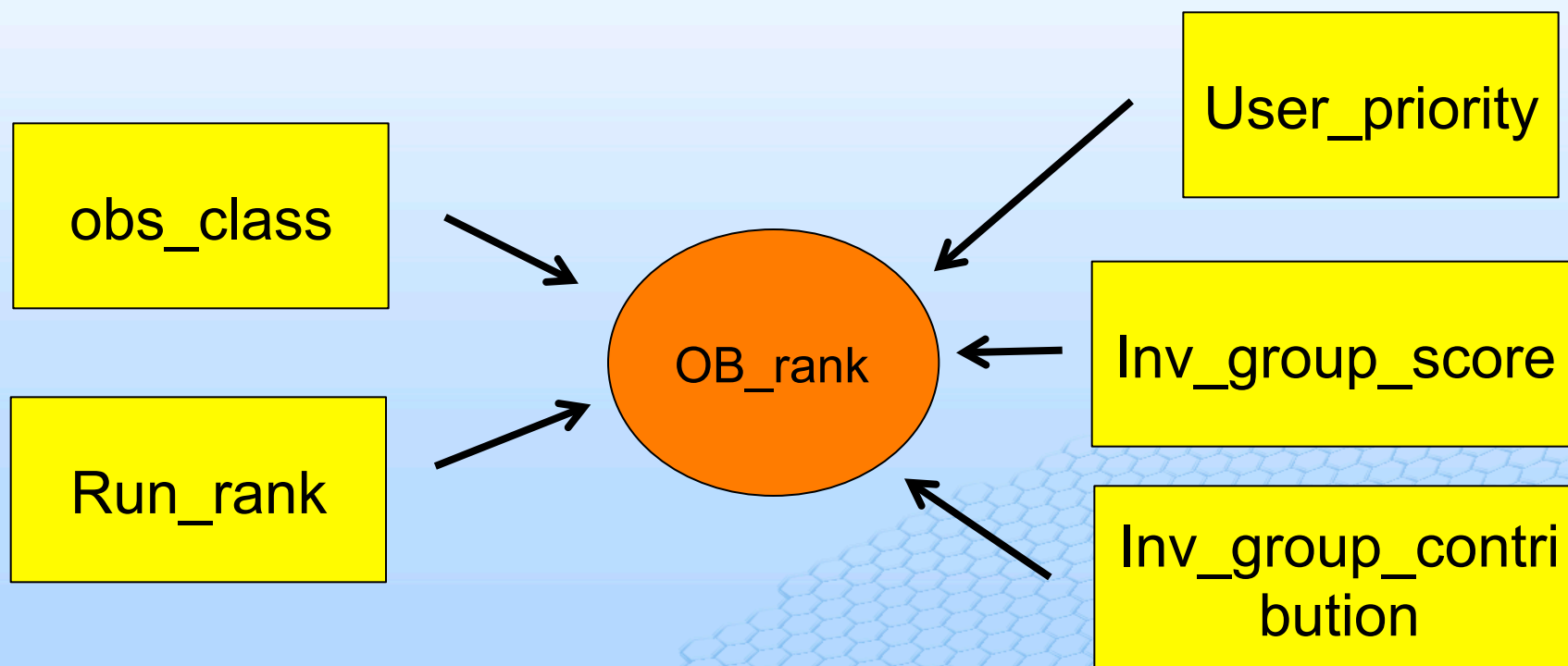
Container Info: Con-YK_vmc_P87_smc_1_6_5

Rank Justification for 559503

Ob Tree View: SMC-CY2_vmc_P87_smc_1_6_5

START DATE: Mon Jan 09 22:41:30 GMT 2012 | END DATE: Tue Jan 10 02:41:30 GMT 2012
 RA | DEC: 01:21:22.488 | -70:46:10.920 degrees
 AIRMASS AT START: 1.44 | LST AT START [hhmmss]: 01:14:53.701 | LAMBDA FILTER: 1020.00
 REQUESTED CONSTRAINTS: Airmass: 001.60 | Seeing: 1.200 | Seeing(@600nm): 1.153 | Seeing(@600nm,AirmassLimit): 1.152 | FLI: 1.00 | Sky
 EXECUTION TIME [hhmmss]: 01:05:21.000
 TEMPLATE FILTER: 'Y' BLUEST FILTER: 'Y'
 LST AT DUSK [hhmmss]: 03:37:12.064
 PROBABILITIES: p_z: 0.657 | p_sky: 0.900 | p_fli: 1.000 | p_set: 0.068 | p_seeing: 0.911 | p_total: 0.037
 TIME RANK: 100.00%
 OBSERVABILITY CLASS: 000
 RANK CLASS: C
 USER PRIORITY: 03
 INVERTED GROUP SCORE: 100.00%
 INVERTED GROUP CONTRIBUTION: 100.00%
 #####
 EXEC NOW OFF
 seeing within constraints
 sky transparency within constraints
 wind within constraints
 lst start date: 01:14:53.701
 lst at dusk: 03:37:12.064
 Twilight Delay requested: 0.0 minutes(tolerance:0%).
 setting time: Tue Jan 10 01:01:32 GMT 2012 rising time: Tue Jan 10 08:36:32 GMT 2012
 OB observable
 OB not executable.
 Duration interval (hours:minute): 4:0
 ##### NO TIME CONSTRAINT

OBs ranking

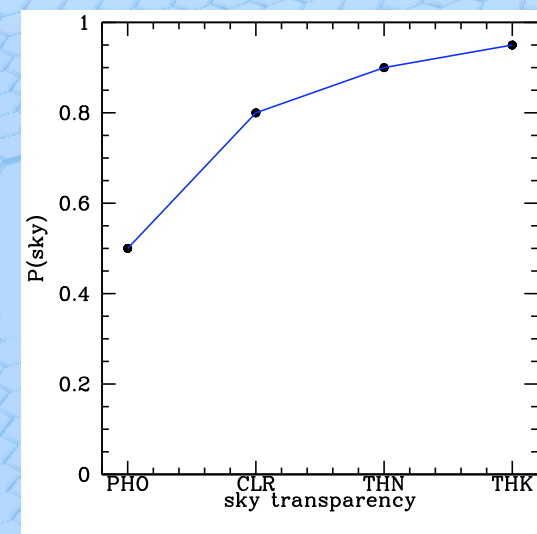
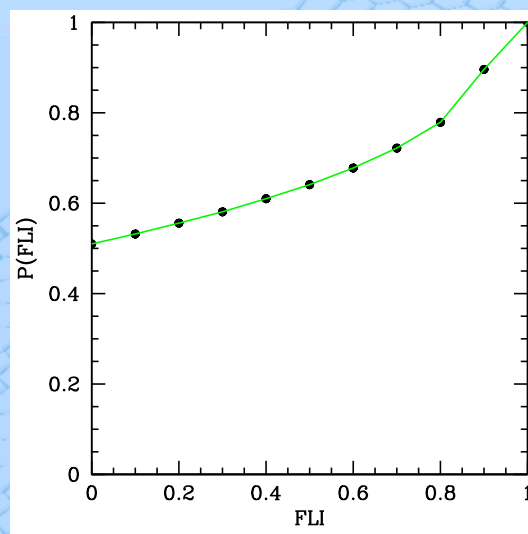
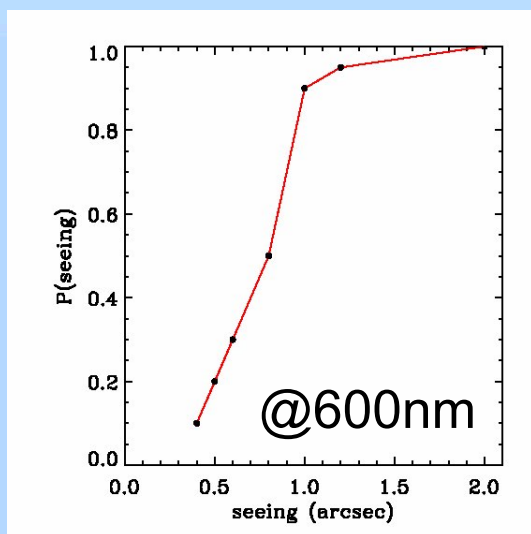


Important: Ranking algorithm works such that setting targets and OB with constraints of low probability are preferred.

OBs ranking

$$\text{obs_class} = 10 * \text{NINT}(10 * R_{\text{time}} * R_{\text{constraint}}) + \text{PP}$$

- **PP** = [-100...0...100] in order to reflect different rank classes
- **R_{time}** = $\min[1.0, (\Delta t_{\text{TotRemaining}} - \Delta t_{\text{OBexecute}}) / 30 \text{ days}]$
- **$R_{\text{constraint}}$** = $P_{\text{seeing}} * P_{\text{FLI}} * P_{\text{sky}} * P_{\text{set}} * P_z$



Rank classes among service mode programs

1. RRM (Rapid Response Mode)
 2. ToO (Target of Opportunity)
-
3. Carry over from previous periods
 4. Large programs
 5. Chilean programs
 6. Normal A queue
 7. Normal B queue
 8. Normal C queue

So far selection of top-ranked OBs judged by the night astronomer, now help of sophisticated ranking algorithm.

Some advices

P2PP 3.2rc2

File Edit Finding Charts Ephemeris File Readme File Reports Help

OB CB G C T X

Observing Runs

Obs/Calib Blocks Schedule

Name	Priority	Contrib. to Group	Abs. Time Interval	Earliest After Prev.	Latest After Prev.
60.A-9253(N)/SM/VIRCAM					
60.A-9253(P)/SM/XSHOOTER					
60.A-9252(B)/SM/SUSI2					
60.A-9252(C)/SM/SOFI					
60.A-9252(D)/SM/FORS1					
60.A-9252(E)/SM/ISAAC					
60.A-9252(F)/SM/FORS2					
60.A-9252(G)/SM/UVES					
group 1					
concatenate					
science					
calibrator					
monitoring OBs					
epoch1					
epoch2					
epoch3					
epoch4					
epoch5					
group 2					
OB1					
OB2					
OB3					
OB4					
OB5					
60.A-9252(H)/SM/NACO					
60.A-9252(I)/SM/FLAMES					
60.A-9252(J)/SM/VIMOS					
60.A-9252(K)/SM/WFI					
60.A-9253(A)/SM/CES3.6					
60.A-9253(B)/SM/EFOSC2					
60.A-9253(C)/SM/TIMM12					
60.A-9253(D)/SM/EMMI					

p2pp server is reachable

Time links

003d 00:00 005d 00:00
014d 00:00 030d 00:00
014d 00:00 030d 00:00
014d 00:00 030d 00:00

Group contributions

20
50
10
10
10

priorities

9
4
1
5

Meaningful time links

- The first OB in a sequence may have absolute time window
Don't choose it too narrow, there must be a chance to meet your constraints (see **ESO Observation Schedule Query Form!**)
- All subsequent OBs have lower and upper time limit for execution
As soon as the first OB in a sequence gets completed, the next OB gets an absolute time window. Make sure that those windows make sense with respect to the absolute time window of the previous OB (i.e. next OB could fall in full moon period, etc.).

Always keep in mind that OBs with absolute (and relative) time windows may **EXPIRE!** They get status “F” (failed).

In general: monitoring of a target that needs exact dates is difficult in service mode! In this case one might prefer to give each OB an absolute time window.

User priorities

- Individual OBs have a user priority. OBs in a container inherit the user priority of the container. In groups they can have different group contributions.
- Use the full range of priorities (1-10, with 1 the highest priority) to influence the completion of preferred containers or OBs.
- Use group contributions to prefer individual OBs within groups over others
- Note that it might happen that a container or individual OB is completed before the a container/OB with higher priority, because:
 - the target is setting soon
 - the constraints are more relaxed
 - other higher ranked programs prohibit the execution of your high priority OB

Relative contribution in group containers

- Start with two identical groups (G1 and G2)
- Both have group score 0% and the same user priority

OB Name	Group Name	Group Score	Group Contribution
OB_A	G1	0%	50%
OB_B	G1	0%	20%
OB_C	G1	0%	30%

OB Name	Group Name	Group Score	Group Contribution
OB_D	G2	0%	50%
OB_E	G2	0%	20%
OB_F	G2	0%	30%

Relative contribution in group containers

- OB_A executed → G1 increases its group score to 50%
- This now favors (raises priority) G1 OBs with respect to G2

OB Name	Group Name	Group Score	Group Contribution
OB_B	G1	50%	20%
OB_C	G1	50%	30%

OB Name	Group Name	Group Score	Group Contribution
OB_D	G2	0%	50%
OB_E	G2	0%	20%
OB_F	G2	0%	30%

Relative contribution in group containers

- If possible continue observation with G1 and execute OB_C (highest Group Contribution) → this execution raises group score of G1 to 80%

OB Name	Group Name	Group Score	Group Contribution
OB_B	G1	80%	20%

OB Name	Group Name	Group Score	Group Contribution
OB_D	G2	0%	50%
OB_E	G2	0%	20%
OB_F	G2	0%	30%

Relative contribution in group containers

- G1 OBs not observable
- G2 observation starts with OB with highest Group contribution (OB_D) & its execution raises G2 Group Score to 50%

Not-observable

OB Name	Group Name	Group Score	Group Contribution
OB_B	G1	80%	20%

OB Name	Group Name	Group Score	Group Contribution
OB_E	G2	50%	20%
OB_F	G2	50%	30%

Relative contribution in group containers

- G1 & G2 OBs observable and both have the same user priority – continue observing group with highest Group Score → G1 is completed

OB Name	Group Name	Group Score	Group Contribution
OB_B	G1	80%	20%

OB Name	Group Name	Group Score	Group Contribution
OB_E	G2	50%	20%
OB_F	G2	50%	30%

Choose constraints wisely: do not over/under-constrain

- Transparency

- Are photometric conditions really necessary?

They cause a lot of extra calibrations. For spectroscopy, clear/thin (CLR/THN) conditions are mostly sufficient.

- Thin conditions often go along with good seeing

- Too relaxed transparency (THK) might cause guide or reference stars to fail the sensitivity limits (use bright stars in this case).

Choose constraints wisely: do not over/under-constrain

• Seeing

The seeing is evaluated on the image/spectrum taken if possible.

Don't ask for unrealistic values (i.e. 0.4" seeing in U-band)
but don't relax it too much (i.e. decreases the flux within a slit of point sources).

For ranking purposes the seeing of Phase-2 is converted to the equivalent value at zenith and at 600nm:

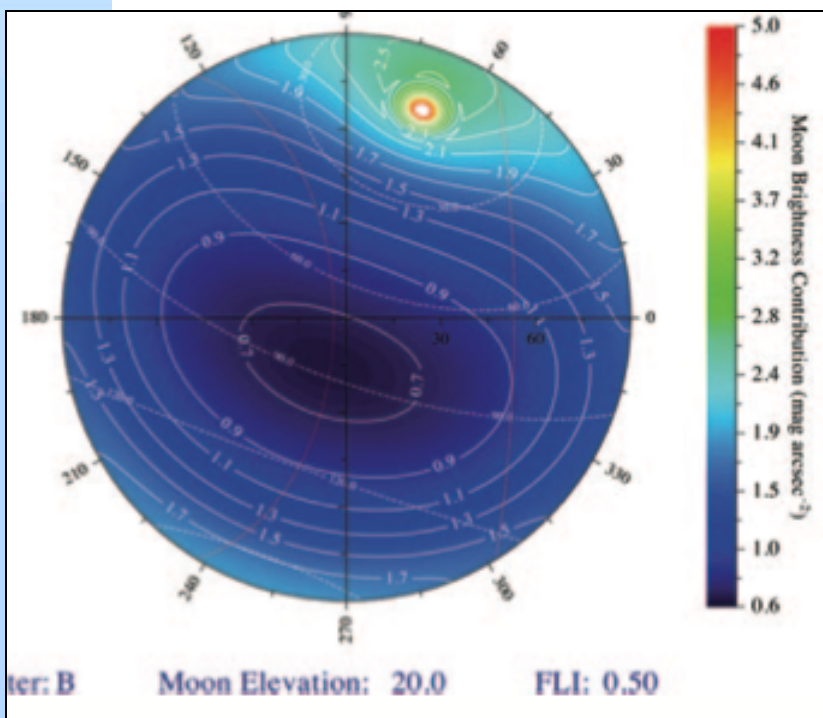
$$s_{\text{req,norm}}(z=1, \lambda=600\text{nm}) = s_{\text{req}}(z, \lambda) * [1/\cos(\text{lat}-\delta)]^{-0.4} * (\lambda/600\text{nm})^{+0.2}$$

Choose constraints wisely: do not over/under-constrain

- Moon illumination and distance
 - Consider whether $FLI < 0.2$ (dark time) is really needed.
This narrows the window when your OBs are observable.
 - The sky is often darker 50-70 deg away from the Moon rather than > 90 deg away. Moon distances of > 120 deg in general make no sense, see article by F. Patat

OBSERVING DURING BRIGHT TIME: TIPS AND TRICKS

IN THIS PAPER WE PRESENT AND DISCUSS THE EFFECTS OF SCATTERED MOONLIGHT ON OPTICAL OBSERVATIONS, THE CURRENT STATUS OF THE MOONLIT NIGHT SKY MODELLING AND THE IMPLICATIONS THIS HAS ON THE SERVICE MODE OBSERVATIONS AND THE MAXIMISATION OF SCIENTIFIC OUTCOME.



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USER SUPPORT DEPT. - ESO, DMD

