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THOUGHTS ON USE CASES

SCIENCE OPERATIONS PLAN

- OBS TDR contains some elements of SOP, but is lacking details, to be augmented in suitable form
- SOP includes use cases, explicitly or implicitly
- Use ALMA SOP,... as examples

OBSERVATORY-RELEVANT USE CASES



Currently discussed in

- OBS
- ACTL
- DATA
- ...

not always fully consistent,
including much low-level detail

OBSERVATORY-RELEVANT USE CASES



In my view, should aim for

- Hierarchy of use cases (in analogy to requirements)
- Upper levels managed by PO (“ ”)
- Review and formal approval of (top-level) use cases

then review, adapt, extend requirements if needed

- Try to “factorize” use cases and keep use cases as simple as possible

EXAMPLE

TOOs for transients:

We'll get 1000s of alerts, need to filter out the relevant ones, and react in an appropriate fashion; reaction could range from

- without any human interaction, reposition telescopes and start taking data while homing in on target
- have a scientist look at TOO and associated MWL data next day and decide what to do

Filtering TOOs and selecting valid ones and type of reaction is a science problem (“science use case”)

Enabling appropriate response to selected TOO is an observatory problem (“observatory use case”)

USER VIEW (“USER USE CASE”)

What does the user wants to do?

- **Definition of observations, including TOO**
- Data analysis, possibly with RT feedback

plus proposal preparation, submission

Following: example of definition of observations to be carried out for a user project

Question (to PHYS): Are there missing elements in the definition? Are there unnecessary elements?

DESCRIBING OBSERVATIONS: SCHEDULING BLOCK



Atomic unit of scheduling. A SB may include several Runs as well as calibration sequences. Observations are scheduled such that always complete SBs are executed.

Examples of SBs are

- a single Run
- a sequence of Runs corresponding to different wobble positions around a target
- an ON-target / OFF-target combination of Runs
- a sequence of short runs to survey a certain field, e.g. in response to a TOO (could be a script with parameters depending on TOO info)

Observation project: A set of SBs, to be executed as part of an approved proposal.

RUN DEFINITION EXAMPLE

- **Run_Duration:** usually a (TBD) default value
- **Pointing_Type:** Ra-Dec, Alt-Az
- **Nominal_Pointing:** pointing coordinates
- **Pointing_Mode:** parallel (=0) / convergent (<0) / divergent (>0) {a few selectable options}
- **Requested_Telescopes[3]:** number of LST / MST / SST telescopes requested for the run {a few selectable options}
- **Minimal_Telescopes[3]:** minimum number of LST / MST / SST telescopes required for the run; the run will not be executed unless these telescopes can be provided

RUN DEFINITION CONT'D

- **Minimal_Sky_Quality:** specifying atmospheric quality (transmission), suggest three options (perfect, good, marginal); the run will not be executed unless these conditions are met.
- **Maximal_NSB:** specifying maximal allowed NSB, mainly due to the moon, suggest three options (minimal, up to 5 x minimal ($\sim 1/2$ moon), any); the run will not be executed unless these conditions are met
- **Maximal_Zenith:** maximal allowable zenith angle during the run; the run will not be executed unless this condition is met.

RUN DEFINITION

- **Precision_Pointing:** conditions enabling highest pointing precision (low wind, low temperature gradient); the run will not be executed unless these conditions are met.
- **Run_Priority:** value between 1 (low) and high (5) relevant for TOO's; TOO will take precedence over run if TOO has a higher priority. Assigned/confirmed by TAC.
- **Timing_Requirement:** not before ... / not after ... / at.
- ...
- ...
- ...

TOO: ADDITIONAL PARAMETERS

- **Trigger_Condition:** definition of alert messages and message parameters under which the TOO is triggered
- **Confirmation_Level:** indicated if some kind of confirmation is required; options are: automatically execute follow up, without any confirmation; confirmation by telescope operator/by CTAO TOO coordinator/by PI.
- **Interrupt_Level:** interrupt ongoing run (if TOO Run_Priority > Run_Priority of ongoing run); schedule as next run (if TOO Run_Priority > Run_Priority of next run); schedule at any time below Maximum_Delay; assigned/conformed by TAC.
- **Maximum_Delay:** maximum delay after TOOs for which follow-up should be started.

TOO HANDLING

Convert to standard format, in case not already standard;

Parse message and check against list of approved TOOs;

If in list of approved TOOs

 Check if/when visible;

 If visible within **Maximum_Delay**

 Get **Confirmation_Level** and, if req., confirm

 Once confirmed

 Proceed according to **Interrupt_Level &**

Scheduling_Priority; when ready

 Check if **Minimal_Telescopes** met

 Check if **Minimal_Sky_Quality** met

 Check if **Maximal_NSB** met

 Execute TOO **Pointing_Pattern**