Commentary on

“Probabilistic reasoning for robust plan execution”

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The paper well identifies the problems commonly encountered in the production of robust plans/timelines in the light of real world uncertainties in level and duration of resource usage by the various activities. The analysis of the solutions using either full or limited probabilistic techniques clearly points out the advantages that may be had, especially in case of large size problems for which a high degree of risk averseness is desired.

For an operations “end-user” of a planning system that has to deal with severe resource over-subscriptions (e.g. for multi-user/-instrument observatories), it would be of interest if the analysis were to go beyond the measurement of execution errors per run for each method, and take into account the overall results of the scheduling and execution process. For instance by also scoring the number of requests that ultimately made it through the system, weighted with their associated schedule priority (or similar measure of importance of the request).

Given the continuous increase of computing power on ground, it appears to be well worthwhile pursuing these more processing-intensive scheduling techniques when they indeed give rise to more robust operations timelines and as such decrease the human effort needed to adjust these schedules to real world events and/or increase the overall mission return.

Therefore, it would seem that the subject technique could be useful for a number of space application domains, such as:

• Crew activity planning in the manned space environment, where in particular the duration of crew-assisted activities is known to have large uncertainties.

• Utilization planning of orbiting observatories (both space and earth oriented) that are equipped with multiple competing instruments and serve different user communities. This would obviate the need for an early, fairly rigid, global partitioning of observation time, as is commonly the case, and allow for a more efficient use of the available resources (as demonstrated during the limited 1 year lifetime of the IRAS mission).

• Planning of “single-shot” activities, for which no optional repeats are feasible, such as in deep-space missions.

As such it merits further prototyping for an actual ongoing, or planned, mission.