Considerations on the AIP/SODP

Tony Brown (University of Manchester),

Wim van Cappellen (ASTRON), John Conway (Chalmers),

Michiel van Haarlem (ASTRON) and Sarah Pearce (CSIRO).

Considerations

- Upgrades and expansions, enabling new capabilities driven by scientific needs, essential for the future of the SKA. The SKA science case and an analysis of the AIP consortia show that there is a large scientific interest in science that can *only* be done with an SKA that includes advanced technologies (in terms of both hardware and software). Hence, continued technology development feeding into the SKA is essential.

- The interest of the SKAO in advanced technologies is perceived as marginal
  - Absence of a clear budget, guidance and initiatives to support innovation.

Considerations: Timeline

- The current timeline of SKA2 construction is extremely unrealistic.

- When the AIP consortia started in 2013, the start of SKA2 construction was anticipated in the 2023-timeframe. Driven by this timeline, MFAA and WBSPF planned a series of design reviews to reach PDR by mid-2016. The above SKA2 timeline is now completely unrealistic. SKA2 construction will not start until SKA1 is complete. While SKA1 construction may formally end in 2024/25, recovery of functionality/performance lost in the 2014/15 rebaselining and the current cost-reduction process is certain to take priority over SKA2. It therefore seems likely that SKA2 construction will not start until after 2030.

Considerations: Commitments

- Increasing SKA1 delays:
  - R&D towards SKA2 becomes less urgent and parties that are involved in both SKA1 and the AIP need to invest more than anticipated in SKA1 and are prioritising the SKA1 work.
  - Organisations reconsider the investments in the AIP. Commitments to the AIP are therefore being reduced.
  - A.o. MFAA and PAF research programs that organisations perform for their own stakes and at their own pace still continue and they would like to share the outcomes with the SKA, with minimal overhead.

Considerations: Scope

- The AIP is currently focused on frontend technology (MFAA, PAF, WBSPF).
- Innovation in other parts of the signal chain is also needed. For example, new calibration and imaging algorithms, processing platforms and correlator upgrades. Relevant research is happening at various organisations and in industry, but there are insufficient links to the SKA.

Considerations: Process

- Given limited funds, at some point a selection will need to be made between competing proposals. There is no insight as to this selection process nor the return to those who have (and have not) invested into the cost of these developments.

Recommendations

- Clarify the return to those who have (and have not) invested into the cost of these developments.
- Establish a realistic timeline.
- For now: Organise as collaborative R&D partnerships.
  - Actively and significantly pursue a certain technology,
  - establish/maintain a community of scientists and engineers on the subject
  - define working specifications
- Annual R&D progress reviews (instead of design reviews).
- The partnerships will maintain working links to SKA and will be ready to insert itself into the SODP timeline when this is better defined.

Recommendations

- The SKAO should firmly anchor the SODP in its organization and demonstrate a strong commitment towards observatory development.
- Dedicating a budget to observatory development is an essential part of this commitment.
- Such visible and genuine commitment of the SKAO is a necessary condition for partners to successfully acquire R&D funding.
- The definition of a CTO (technology development ‘visionary’) role to monitor and guide observatory development would be a very valuable addition to the SKAO. A single responsible person would be the best way to make sure it does not get forgotten.

Recommendations

- The SKAO should perform high-level technology roadmapping, in consultation (or together) with the teams active in SKA technology development, to signal opportunities and, if needed, stimulate/support new R&D partnerships. Regular (annual?) reviews of technology progress by an expert panel from industry is a recommended practice.