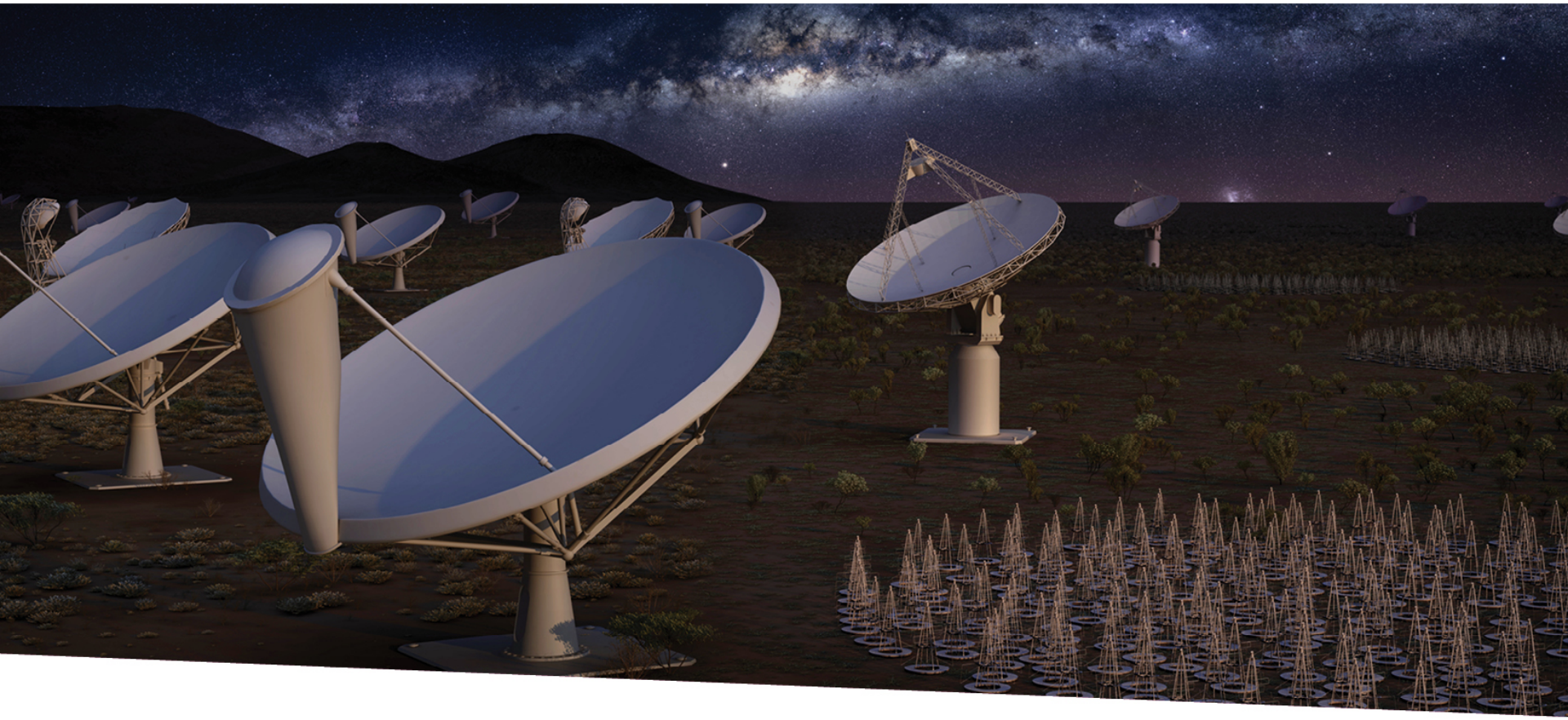
Guidelines CDR Deliverable – Element Construction Schedule



SQUARE KILOMETRE ARRAY

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Rotterdam Engineering Meeting

15 June 2017

Goal of Meeting

1- Get inputs from Consortia on Schedule Guidance

- Share the current draft of guidelines to consortia for the development of the CDR deliverable – Construction Schedule
- Obtain inputs from consortia
- Identify areas where more clarification is needed.

2- Discussing how to achieve best construction milestone dates for 2 October 2017 cost estimates

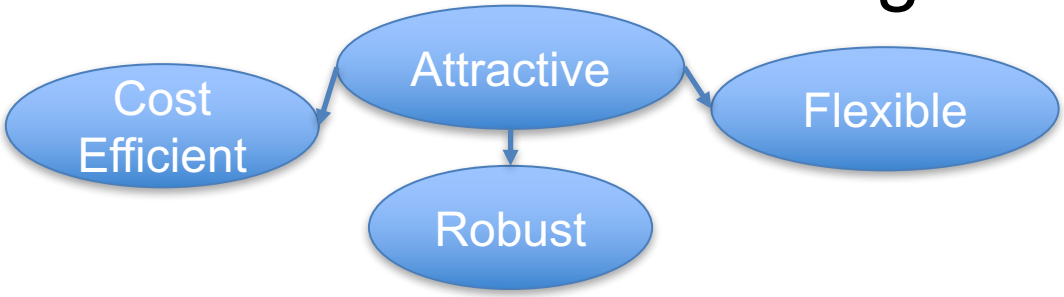
"The client kept changing the requirements on a daily basis, so we decided to freeze them until the next release."

Goal 1 of Meeting –

Get inputs from Consortia on Schedule Guidance

Primary Goal of the Element construction schedules in the Pre-Construction phase of SKA1

1. Provide input to the construction proposal to the SKA IGO to seek construction funding approval –



2. Provide important input to the Procurement Document Package (Call for Tender) as a schedule requirement.

High level Requirements of the Element construction schedules

1. Aid in optimising construction cost for the SKA1 project (Cost Efficient)
2. Show that construction planning takes Telescope and Observatory level constraints into account- dependencies (Robust) (Flexible)
3. Demonstrate robust planning and consideration for construction has been included in the CDR Deliverables. (Robust)
4. Confirm that man-hours and other time factors are consistent with cost estimates. (Robust)
5. Allow easy integration into system level construction schedule (Flexible)

Terminology and Definitions (1)

- ***T0***: start of construction for the SKA1 project: The date at which the IGO Council states that SKA1 is ready for construction and funding is approved.
- ***Contractor***: An entity carrying out a construction work package during the Construction Phase of SKA1. e.g. commercial companies, national or academic institutions etc.

Terminology and Definitions (2)

- ***C0***: This is the day of the Kick-Off meeting after the contract has been awarded for work packages. For the purpose of the element schedule, this day is assumed to be **31/3/20** and is the start day for the first work package/s for which the element is responsible for estimating construction schedule.

NOTE

This date needs to be flexible in the schedule i.e. all other dates should be linked directly or indirectly to this date

Terminology and Definitions (3)

- ***Construction activities in the element schedule***: Includes all activities required from C0, to handover of verified facilities (at L1 of the requirements) to the SKA Observatory, including adoption and integration of MeerKAT.

- ***Contract Overlay***: A proposed grouping of WBS items into contracts that will make technical sense (provided by SKA Office with inputs from consortia)

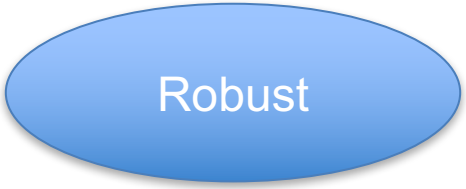
Requirements for all Elements (1)

The Element Construction Schedule shall:

Cost Efficient

- Be cost optimised within the milestone constraints provided by SKAO
- Indicate cost drivers w.r.t schedule in the Construction Plan
- Be aligned with the CDR submission construction cost estimates

Requirements for all Elements (2)



- Be consistent with the Element Construction Plan at CDR
- Be aligned with the CDR submission construction cost estimates
- Be aligned, as far as possible, with the latest AIV Roll-out plans. Any deviation from compliance needs to be clearly identified.
- Practical aspects e.g. travel to site, mobilisation shown, shipping

Requirements for all Elements (3)

- Reflect the latest construction SKAO WBS
- Must clearly reflect dependencies between activities. Dependencies on activates not part of the Element scope or part of construction must be listed in the Element Construction Plan.
- Realistic duration estimates should be included, float/contingency should be added as separate line items in the schedule.
- All expected long lead items shall be indicated clearly
- Critical path must be identified

Requirements for all Elements (4)

Flexible

- All activities following after C0 should be relative to C0
- Other than C0, the schedule dates should derive from duration rather than specific dates. Duration, contingency and slack for activities should be clearly visible.
- Indicate cost drivers w.r.t schedule in the Construction Plan
- Must clearly reflect dependencies between activities. Dependencies on activates not part of the Element scope or part of construction must be listed in the Element Construction Plan.

Software-Specific Guidelines for Element Construction Schedules (1)

1. Software must abide by the SKA Software standards. Particular attention should be given to §5.2 Construction, §5.3 Acceptance and Handover, and §6 Support Infrastructure.

2. The support infrastructure mentioned in §6 of the SKA Software standards should be assumed to exist. It is planned that full documentation and a version of this infrastructure will be available before construction, but it will also evolve to meet construction, integration and test needs.

3. A set of Python base classes for LMC interfaces implemented according to the guidelines in the SKA Tango Developers Guidelines should be assumed to exist before construction.

Software-Specific Guidelines for Element Construction Schedules (2)

4. It should be assumed that there will be regular milestones consisting of system-level integration challenges, nominally every 6 months, commencing 6 months after C0. These integration challenges will be approximately one week in duration and be hosted in a cloud based infrastructure. They will also provide an opportunity for a critical review of system-level progress, and may result in changing delivery priorities for the next period.

Software-Specific Guidelines for Element Construction Schedules (3)

5. The construction plan should include proposed deliverables for each six-month integration milestone. These deliverables should demonstrate a gradual build-up of functionality and should not be biased towards the end of the construction periods.
6. We anticipate that many of the software construction plans will make use of agile development techniques. The construction plan should describe what is recommended, and how this is aligned with the 6-month integration milestones as well as the latest AIV roll-out plans.
7. The construction plan should include explicitly when specific simulators, emulators, stubs, drivers, and mocks will be delivered, and also include assumptions about when similar deliveries are required from other elements of the project.

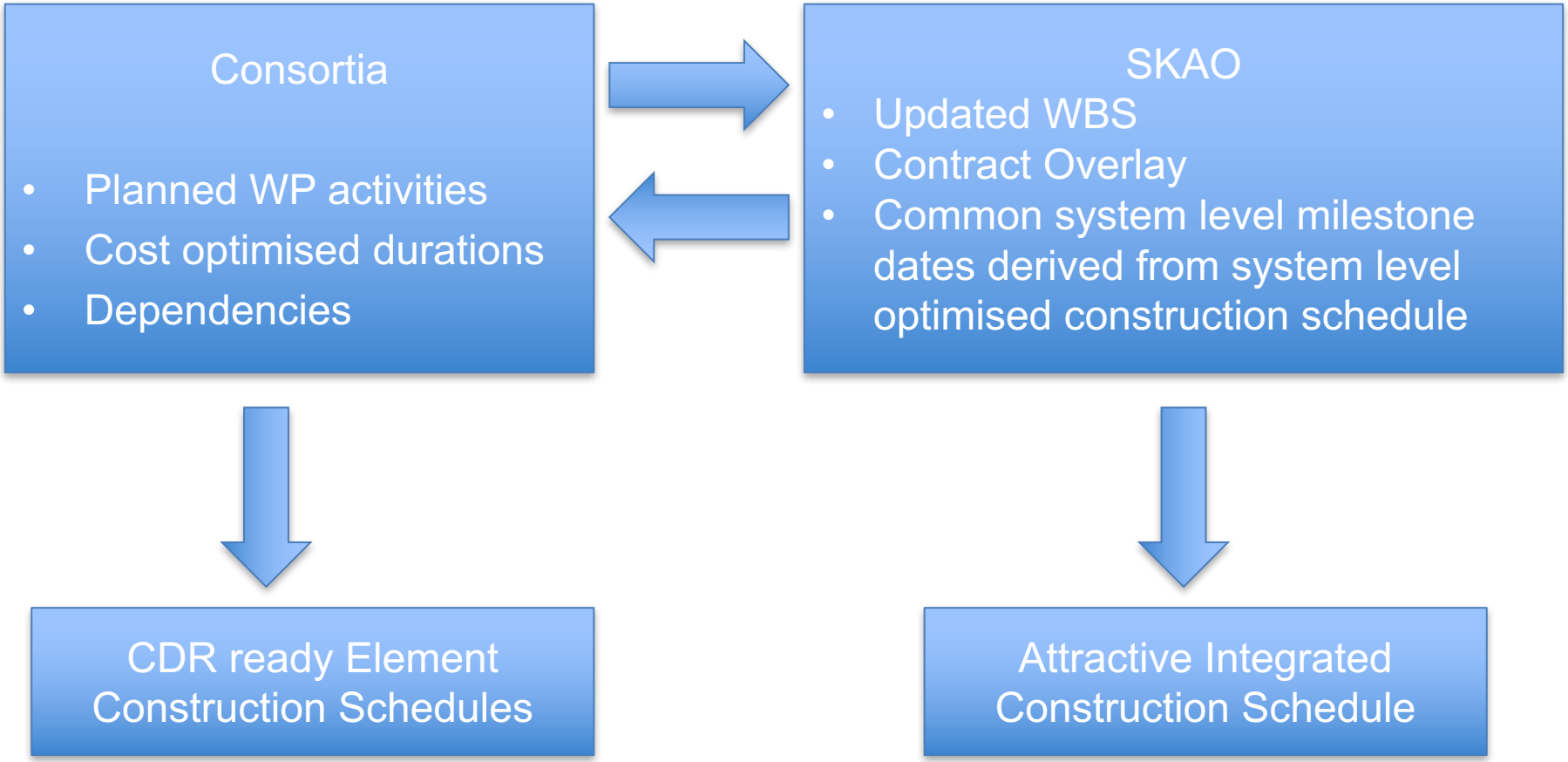
Process to get to Attractive Integrated Construction Schedule

Iterative process between Consortia and SKAO

Constraints:

- 9 Consortia developing schedules – SKAO needs to integrate schedules
- Unlikely that optimal schedule for all elements be achieved
- Need to get overall optimal schedule

What schedule inputs needed from SKA Office and Consortia?



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- Comments and Questions

Goal 2 of Meeting – Discussing how to achieve best milestone dates for 2 October 2017 cost estimates

Proposed Plan

Interim goal: provide dates for 2 October 2017 cost submission

- System level cost optimised milestone dates
  - SKAO Confirm with consortia schedule related cost drivers for each element
  - SKAO develop with input from consortia high level optimised integrated schedule
  - SKAO Provide array assembly dates based on input for cost update