RE-BASELINING SUBMISSION: FURTHER ANALYSIS AND DEVELOPMENT OF OPTIONS PLAN

Document number .............................................. SKA-TEL-SKO-0000132
Context ................................................................. PMT-DIR-PL
Revision ................................................................. 01
Author ................................................................. A. McPherson
Date ................................................................. 2014-10-15
Document Classification ..................................... UNRESTRICTED
Status ................................................................. Released

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<td><a href="http://www.skatelescope.org">www.skatelescope.org</a></td>
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LIST OF ABBREVIATIONS

SKA .................................. Square Kilometre Array
SKAO ................................. SKA Project Office
1 Introduction

1.1 Purpose of the document

This document describes the process for the development of options for re-baselining and the procedure to reduce these options and create a recommended way forward to the SKAO DG to allow him to make a recommendation to the Board.

At the beginning of this process, the state of knowledge is as follows:

- The EPMs carried out the initial investigation and clarification process and are authoritative on the scope and content of the Element RBS submissions.
- The EPMs are authoritative on the costings breakdown, assumptions and clarification.

2 References

2.1 Applicable documents

The following documents are applicable to the extent stated herein. In the event of conflict between the contents of the applicable documents and this document, the applicable documents shall take precedence.

2.2 Reference documents

The following documents are referenced in this document. In the event of conflict between the contents of the referenced documents and this document, this document shall take precedence.

[RD1] SKA-TEL-SKO-000030 Re-baselining Documents Requirements
3 Timetable

- Friday 17th October – closing date for clarifications for initial clarification Phase
- Monday 20th October – AG assumes lead of RB process
- Monday 24th November - Present Options and scoring to Exec
- 10-11 December - Present Options to Ad-Hoc Science Review Panel
- 22-23 January 2015 Present Options to SEAC
- 3-5 March 2015 – Present Options to SKA Board

4 Initial Analysis Process

4.1 Principles

The RBS packages are required to contain:
- A design description, of designs conforming to the Baseline Design as amended and meeting the L1 requirements as amended.
- A cost for the designs
- A cost model, as a minimum the cost broken down to show the relative contributions of major sub elements, their unit cost and the apportionment of NRE to recurring cost where relevant.
- Options, not yet explored, for cost reduction in the Element and elsewhere, with an estimate of the (cost) benefits.

The Consortia have been asked to conform to the TMT costing approach, unless they can argue for a different approach.

The initial clarification and analysis process focused on the structure and completeness of the costs and cost models. The architecture and constituent technologies were not examined at this stage. This means that costs offered was taken at face value, and a later, deeper Office analysis will inform the risk that will be attached to those costs. This risk analysis will be used to calculate contingency which will then be built into the final (cost cap compliant) cost.

This phase will create options to allow the re-baselining to be carried out in a structured and disciplined manner. This will demonstrate that the principles agreed with the Board of Transparency, Credibility and Timeliness.

4.2 Roles and Responsibilities

The members of the Architecture Group will be responsible for this task under the direction of the Project Architect. The other groups, Science, PM, and SE will support the effort. In particular, the Science Group will work closely with the AG to ensure that the Science Priorities are applied consistently and coherently. The PMs will work with the AG to ensure that the Options are costed correctly and will be responsible for this aspect. Furthermore, a joint (AG, PM & SE) effort will be made to assess risks and attach contingency to each risk.

4.3 Scope of Development Options

The development and analysis of Options must consider both cost, based on the information provided from the Initial Clarification Phase under the responsibility of the EPMs, and science priorities.
process must be traceable and open to future audit. We must be able to demonstrate traceability to stakeholders such as the Ad-hoc SRP, SEAC and the Board.

The scope will include all three telescopes and as many options as sensible to be raised. There should be no unnecessary limitations set.

Provenance of options must be noted and traced. Due reference should be made of the submissions from the consortia as well as noting outputs of the Re-baselining Workshop at the Engineering Meeting.

Options shall be identified with a three level approach.

Id(number:1+).variant(number:0+).revision(letter:A-Z)

In addition a descriptive name should be attached. Once assigned an identity, each option shall be tracked via a JIRA ticket.

5 Process

5.1 Phase 1 – Initial Development of Options (approximately 2 weeks)

In this phase the AG will coordinate the generation of a series of options that will be investigated. They will generate these options from:

- Within SKAO Office
- RBS from Elements
- Outputs from the Engineering Meeting Workshop
- Any other suggestions arising during external review

They will carry out an initial analysis using tools that they will develop to give an initial ranking of the suggestions. The analysis will take both cost, risk and science Priority into account, but these will not be deep investigations.

The output of this phase will be a reduced list of options that can be investigated in more detail. The cut will be made on multiple criteria:

- A clear step function in the scoring
- An appropriate number of options for Phase 2

Any possible issues requiring further investigation shall be noted. Variants of the same basic concept should be unified.

The AG is not acting just as an evaluator of options but is expected to submit original options, merge options, add variants, and make revisions.

5.2 Phase 2 – Further Development (approximately 3 weeks)

The purpose of Phase 2 is to:

- Investigate and validate (or not) all options passed from Phase 1. The investigations will go deeper, according to possible issues raised in Phase 1, and time available.
- Explicate options as required.
• Test against Science Priorities
• Select a manageable set of options to be presented as the output of the process.

In this phase the output of Phase 1 will be further developed to ensure that the initial investigation was carried out well and that any further development of the option is realised before further development.

The phase will include:
• Review of options
• Any further development of options
• In depth review of option

The initial step will be to confirm the output from Phase 1 and ensure a full understanding has been obtained of all options carried forward. Some options may be discarded without deep cost or scientific evaluation. These will be noted.

This will lead to the opportunity to develop the options further, perhaps taking advantage of some options that were or were not taken from Phase 1 to Phase 2.

Once the short list of options are developed, they will be fully tested against the Science Priorities and costed by the EPMs as accurately as possible.

If, at the end of this process the options are no longer viable, either through cost or Science Loss, then it is possible for the options either to be amended or further options taken from Phase 1 into Phase 2. If that is necessary, then the same procedure described above will be carried out on the options.

The output of Phase 2 will be a short set of options, fully assessed for technical feasibility, scored on Science Priorities, and costed by the EPMs with one, or more, preferred option. The report shall assess and note the significance of differences in scoring.

6 Tools

The AG will have to develop some tools to assist in carrying out both Phase 1 and Phase 2. The tools for Phase 1 will be, by nature, less complex than those required for Phase 2. These tools will probably be based in spreadsheets. The tools will ensure:
• Processes are clearly defined
• Items have clear definitions
• Scoring systems are clearly defined
• Assumptions are listed
• Calculations and conclusions are clearly defined and auditable
• Risk can be reflected in a qualitative way, initially.

7 Clarification and Assistance

It is important that we maintain linkages with the community during this process to ensure engagement as well as ensuring that the information being used is correct and accurate. The communications should be disciplined and limited in scope to that strictly necessary.
Requests for Clarification will be sent, via the Element Project Managers, to the Consortia as required. The clarifications will be maintained on the relevant Confluence pages.

RfCs communicated to the Consortia will be individually treated as JIRA Issues, using the linking system and a linked space in JIRA.

The responses to the RfCs was discussed, in priority order, at the Perth Engineering Meetings.

Open issues will be addressed by the Consortia on the timetable given above, and closed out using JIRA.

8 Process Change

Proposals for process changes are not unlikely given the difficulty, novelty, and importance of this process. Accordingly written proposals for change should be submitted to the Head of the Architecture Group, who will evaluate and if appropriate submit to the Head of Project.

9 Timing

- Cost clarifications complete by EPMs 17/10/14
- 1st broad set of options by AG 31/10/14
- 2nd set of options by AG 21/11/14
- Presentation of options and scoring to Exec 24/11/14
- Set of costed options with risk profiles by AG/EPMs 9/12/14
- Presentation of options to Ad-hoc Science Review Panel 10-11-12/14
- Material ready for external cost review 19/12/14
- External cost review 12-13/1/15
- Material ready for SEAC 16/1/15
- Presentation of options to SEAC 22-23/1/15
- Reworking of options based on SEAC input 13/2/15
- Board submission 17/2/15
- Board meeting 3-5/3/15
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