

Guide for writing sections of Baseline Design/Design Description
P. Dewdney 2018dec05
V1 – draft

This guide is directed at those parts of the BD/DD that describe components of the telescopes (e.g. transient capture system) or functions (e.g. pre-correlation flagging), which, when assembled, represent an entire telescope description. Overview sections of the telescope will be written separately.

The subject matter in these sections has been selected so that they can be described in a target length of ~5 pages text + diagrams + tables. They are not meant to describe entire major sub-systems.

In principle, these sections will be describing the ‘reference designs’ (i.e., designs contained in the CDR documents). In most cases they will also be the delivered designs, unless the delivered designs are based on significantly different design philosophies from the reference designs. The target level here is intermediate between detailed and overview. For this reason, it would be a major change for a delivered design to be implemented in a way that changes this document significantly.

The overall document is directed at diverse readership: informed agency persons, SKA Board members, potential science users, engineering staff in consortia, and potential organisations looking to join the SKA. These sections will contain a significant level of design detail. Nevertheless, they should assume that the reader is familiar with but not an expert in a specific area. Plain language is the norm. It is expected that submitted text will be edited for style and conciseness.

This should apply equally to hardware and software components of the system – in fact from the perspective of this document, these aspects are just how things are implemented and delivered, and no more.

Diagrams should conform to the BD/DD Diagram Style Guidelines. Originals should be submitted separately from the text.

The following sub-sections should be included:

1. How does it fit into the telescope system description?
 - a. This need not be a stand-alone description and need not be long, since this topic will be covered in more depth in a system overview section.
 - b. Likely part of a major sub-system (e.g. Dish structure).
 - c. This part of the description may be extracted from this section and also used in a more general overview.
2. Design justification/motivation/choice (summary).
 - a. Design philosophy.
 - b. Functional description (diagrams may be needed).
 - c. A summary of possible choices that could have been made.
 - d. Motivation for choice.
3. Diagrams illustrating concepts and key details.
 - a. Context diagram.
 - b. High level diagram.
4. Technical Description (How does it work?).

- a. Description of the sub-system that covers significant detail (not trivial detail).
 - b. Other diagrams as needed.
5. Non-trivial inputs, outputs and controls (interfaces).
 - a. Diagram showing these interfaces.
 - b. Emphasis on any interfaces that have user/observer/operations aspects.
 - c. Description of interface flows.
6. Tables of parameters of interest to users and observers.
 - a. Consolidated lists of parameters that are either built into the system (and are design parameters); their names and values.
 - b. Consolidated list of user-settable parameters, their names and values (default max, min, delta).
 - c. The goal is to have this type of reference material in one place, and in the context of the design.
7. Performance characteristics.
 - a. Description of key performance attributes (What does performance actually mean for this area?).
 - b. Tables of performance parameters, where not already contained in item 6 above.
 - c. In some cases, a few sentences on what it cannot do, if that is important.
8. References
 - a. Primary references: references such as ADD, DDD, top-level science, etc.
 - b. Secondary references: key details.
 - c. Often there are only incomplete primary references. In those cases, a large number of secondary references may be needed.
9. Table of relevant requirements
 - a. This will not be in line with the text, but will serve as a cross-check for gaps and issues. These tables may appear in an extended appendix or separate volume.

BD/DD Diagram Style Guidelines
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Diagrams for the SKA Baseline Design document are a key component and lasting artefact of this work. It is very important that they be drawn in according to a standardised style. This is no meant to constrain the work, but to ensure that they maximise content and clarity, and hence will have lasting value.

- Line thicknesses should always be defined and not left as default.
- Text size should be scaled to utilise all the available space, at least to a size that is easily readable.
- Maximum use of space but not over crowded.
- Limited use of ‘crossing paths’ in flow diagrams.
- Simplest possible display of concepts, designs or results (No unnecessary embellishment or decoration).
- Maximise use of colours to convey clarity or content – otherwise not used.
- Standard SKA terminology only.
- Scalable over a wide range, but definitely clear on an A4 portrait format (or at most on an A4 landscape format). (Decide in advance which format is to be used and draw for that format.)
- Drawn in Visio (SKA standard for a long time).
- Axes on graphs labelled with large enough font to be readable when scaled to A4.
- If possible, graphs should not depend on captions to be understood.
- Special symbols (e.g. SysML) should be avoided unless necessary to convey the concept. In such cases the symbols should be explained on the diagram.