

# Descriptions of SKA Concepts – Suggested Form

Peter Hall, 27 March 2002.

Concept title

Name, title and affiliation of submitter

List of authors

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Executive summary (2 pages maximum)

- Include cost summary (\$US 2002)

Introduction/Overview

- Explain guiding assumptions and overall design philosophies
- Explain implications for cost and performance of critical design decisions (e.g. number of antennas, multi-beaming, adoption of extensible architecture)

Science Drivers

- Explain principal links between identified science priorities and the chosen concept

Preferred Array Configuration

- Summarize characteristics and outline link with science goals

Antenna solution

- Basic attributes of chosen aperture (FOV, raw sidelobe level, ...)
- Description of optics
- Feed options and preferred solution (2010)
- Sky coverage, efficiency and other performance projections
- Overview of any required mechanical systems (e.g. dish mounts, feed translators, etc.)
- Practical manufacturing techniques for the SKA application
- Cost equations (incorporating parameters such as diameter, number of beams, ...)
- Commentary on relevant previous EMT remarks

RF Systems

- Nature of proposed solution (e.g. integrated receiver, modular MMIC, ...)
- Performance projections (e.g. bandwidth, gain, noise temperature, intercept points, ...)
- Overview of any associated systems (e.g. cryogenics)

Beamforming Arrangements

- May be covered partially in other sections (e.g. RF, signal processing) but a clear outline the beamforming hierarchy (RF, digital) and scale will be valuable

### Signal encoding/transport

- Nature of intra and inter-station connection
- Location in system of analog – digital interface (2010)

### Signal processing

- Include proposed correlator architecture
- Interference mitigation strategies

### Data Management

- Commentary on issues such as data rate, volume, on-line processing, visualization etc. is encouraged

### Array Control, Diagnostics and Monitoring

- General commentary is encouraged
- Does the chosen concept and configuration impose special demands or confer special advantages?

### Pivotal technologies

- Outline critical development needs, experiments in progress, initial results

### Proposed SKA location

- Note any specific links between the proposed concept and suggested location
- Note likely RFI environment and infrastructure (power, communications, ...) access

### Representative system performance and cost estimates (\$US 2002, for 2010 construction)

- Summarize telescope (system) performance over defined band(s) (e.g. sensitivity, FOV, total sky coverage, ...)
- What would a telescope with the described performance cost?
- What performance/price evolution curves are assumed for major components? (e.g. Moore's Law for DSP)
- Include a brief commentary on operational costs

### Concept demonstrators

- Outline demonstrators completed, in progress, or planned
- Note scale, astronomical functionality and project duration
- Indicate feasibility of demonstrator evaluation by 2005

### Synergies with other SKA concepts

- Note previous, existing or planned links between development groups

### Appendices

- Any detailed supporting material (e.g. technical reports, published papers, historical perspectives) may be incorporated

- Expert industry (or other) commentary on, for example, critical technology or pricing is welcome