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# SKA2010

## Closing remarks

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# SKA is a telescope of superlatives

- **Transformational science**
- **Breathtaking engineering**
- **Global collaboration**
- **Major role for industry**

# Aim of this meeting

**To bring the astronomical and engineering community together to discuss:**

- **the latest astronomical results in SKA-relevant areas**
- **the status of engineering studies for the SKA systems and sub-systems, and**
- **design/science trade-off issues for the SKA.**

**We did this!**

## Is really exciting! KSPs still highly relevant

### ■ EoR

Full SKA-lo will tell us how the EoR occurred, Phase 1 will start off along that road

### ■ Strong gravity and pulsars

SKA can probe the entire range of space time curvatures  
Detect gravitational waves

### ■ The billion galaxy spectroscopic survey out to $z \sim 2$

HI evolution, dark energy ( $w < \sim 1\%$ )

### ■ Micro-Jy and nano-Jy sources

Most objects found in all-sky surveys at other wavelengths will have an SKA counterpart

### ■ Pebbles in the sky

Unique probe of a critical phase of planetary formation

- **Recognise that we are building an observatory not an experiment**
  - must be capable of responding to the wide science case already articulated as well as to completely new directions
- **Prioritisation is difficult to do**
  - SWG: Some enthusiasm for establishing scientific priorities, but perhaps not at the level of specificity adopted by ALMA.
- **Transient case needs sharpening**

- Challenge is to build a **highly performing** radio telescope covering a **very wide parameter space** of frequency, sensitivity, survey speed and baseline for a **very small amount of money per m<sup>2</sup>**
- **Pathfinders, precursors, Design Studies**
  - Great progress in developing real technology. We learn most by building things and finding out whether they work.
  - Dynamic range: WSRT 1.6 million, EVLA 500000, LOFAR 10000 dynamic range
  - ASKAP and MeerKAT large proposals

**The challenge for the SKA is to capture the full benefit of the global R&D in a systematic way.**

- **Costed system design for Phase 1 by end-2012**
  - Impressive amount of work on the way in the 20 institutes around the world
  - ~70 FTE/year going directly into WP2 tasks
  - Software architecture and power issues need additional attention
    - Software is moving from custom to domain generic building blocks
  - Costing and costing methodology under development
  
- **Robust discussion on the Verification Programs!**

- **The transition from R&D to Detailed Design takes longer than one would hope**
- **Target Based Teams/ Busy Weeks**
- **Commissioning and verification teams will be large**
- **Operations should be involved early on**
- **Procurement on initial stations crucial for accurate costing**

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## ■ Site Configurations

Dish configuration from core out to 180 km will be aggregations of antennas not “beads”

Number of remote stations beyond 180 km will be 25 for the purpose of site selection

Configurations will be input to external consultants looking at infrastructure costs

## ■ Operations

Paper on Science and Technical Operations completed

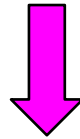
Issues identified for Operations Plan but concept design is required to progress this further

## ■ Power

Paper in preparation setting out issues that need to be addressed; will serve as input to cost consultants

 **Strong message**

**Make decisions now on science priorities  
and on concept design, formalise  
requirements**

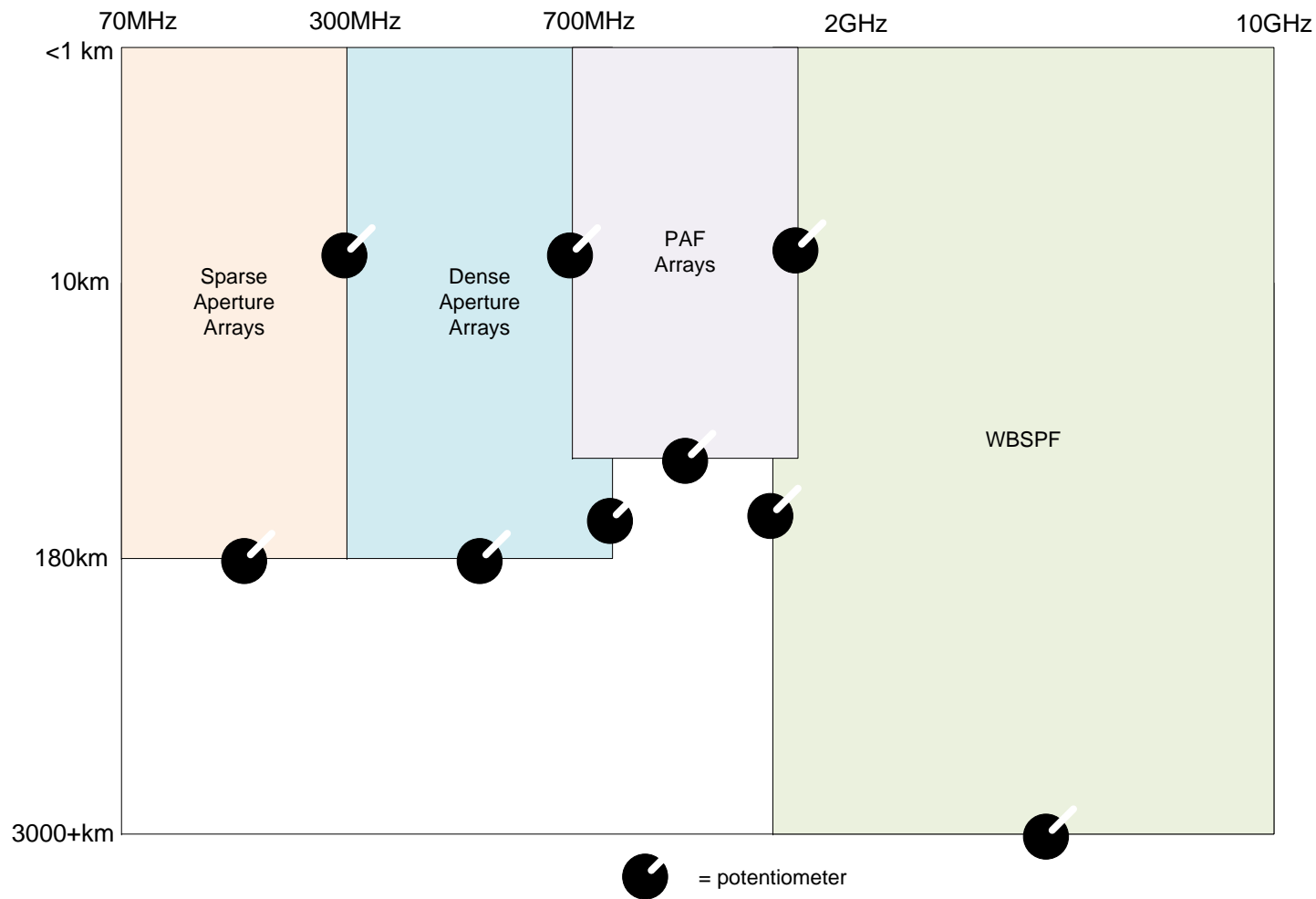


**The SSEC makes the science and engineering  
decisions for the SSEC**

## Some headline science options

- 1) Epoch of re-ionisation
- 2) HI cosmology at redshift 0.4
- 3) Fundamental physics – pulsars, strong gravity, gravitational waves
- 4) Fundamental physics – magnetic fields in the universe
- 5) Radio transient telescope
- 6) CO cosmology at redshift 10

# Phase 1 Technology



# Phase 1 (~10%) technology

## Some alternatives

- 1) dish array with multiple narrow-band SPF for 1-10 GHz on baselines out to 150km
- 2) sparse AA array with A/T 10xLOFAR
- 3) dish array with multiple SPF for 1-10 GHz plus a dense AA (10000 m<sup>2</sup>)
- 4) dish array with PAFs for 500 MHz–1.5 GHz and multiple SPF for 1-10 GHz + dense AA
- 5) dish array with multiple SPF for 1-10 GHz plus a sparse AA with an A/T of 500
- 6) all dense-AA telescope

# SKA meetings coming up

- **SKA and ELT – Crete, May**
- **International SKA Forum + Golden Age of Radio Astronomy + LOFAR opening, NL, June**
- **JENAM 2010, Lisbon, September**
- **PrepSKA WP2 Annual Meeting, Manchester, Oct**
- **SKA2011, Banff (Canada), July 2011**

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This has been a very  
successful meeting thanks to  
some key people....