SKA Overview

World’s Largest Radio Telescope

SKA Phase 1 comprised of:

**Mid-Frequency Dishes**

Located in South Africa

- 64 x 13.5m MeerKAT Dishes
- 133 x 15m SKA Dishes
- 350 MHz – 13.8GHz Freq. Range
- Core diameter ~1km
- 3 x spiral arms radius ~100km
- Offset-Gregorian design
SKA Overview

World’s Largest Radio Telescope

SKA Phase 1 comprised of:

**Low-Frequency Aperture Array**

Located in Australia

- ~131,000 Antenna Elements
- Dual-polarised, log-periodic
- 50 MHz – ~350MHz Freq. Range
- Core diameter ~1km
- 512 stations 35m diameter each
- Stations spread over 40km radius
SKA Elements
TM Consortium

Self Funded Partners

- Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia
- Engage SKA Consortium, Portugal
- GTD GmbH, Germany
- National Centre for Radio Astrophysics (NCRA), India
- National Institute for Astrophysics (INAF), Italy
- National Research Council of Canada (NRC), Canada
- Science and Technologies Facilities Council (STFC), UK
- SKA South Africa (SKA SA), South Africa

Industry Partners

- Persistent Systems Limited (PSL), India
- SCISYS UK Ltd, UK
- Tata Consultancy Services (TCS), India
TM Primary Responsibilities

Management of Astronomical Observations

Management of Telescope Hardware & Software Subsystems

Management of the Data to Support Operations and all Stakeholders
TM Development Plan

Pre-Construction

CoDR  
Consortia  
PDR  
Delta PDR  
CDR  
Construction

2011  
2013 (Nov)  
2015 (Jan)  
2015 (Oct)  
2017 (Mar)  
2018

Construction

Construction  
Verification  
Early Science  
Full Science  
Utilisation

2018  
2023

CDR – Critical Design Review  
PDR – Preliminary Design Review  
CoDR – Concept Design Review
TM Development Plan

Pre-Construction

CoDR 2011
Consortia 2013 (Nov)
PDR 2015 (Jan)
Delta PDR 2015 (Oct)
CDR 2017 (Mar)
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Utilisation 2023

CDR – Critical Design Review
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CoDR – Concept Design Review
• Responsive, collaborative...deep understanding of key design issues;

• High quality PDR data pack;

• Technology choices were outstanding;

• Telescope level operations concept was immature;

• ‘Rebaselining’ needed to be considered;

• Graphical user interface (GUI) design and scripting approach was immature;
TM PDR Outcome

- Responsive, collaborative...deep understanding of key design issues;
- High quality PDR data pack;
- Technology choices were outstanding;
- Telescope level operations concept was immature;
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Construction 2018

Construction

Construction Verification Early Science Full Science Utilisation

2018 2018 2018 2018 2023

CDR – Critical Design Review  PDR – Preliminary Design Review  CoDR – Concept Design Review
TM Development Plan

CoDR (Concept Design Review) – 2011
Consortia – 2013 (Nov)
PDR (Preliminary Design Review) – 2015 (Jan)
Delta PDR – 2015 (Oct)
CDR (Critical Design Review) – 2017 (Mar)
Construction – 2018

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## Future Milestones

- Development Baseline Formed: **4th Qrt 15**
- Rebaselining changes implemented: **4th Qrt 15**
- Element Level RBL / DBL: **2nd Qrt 16**
- Prototyping Report: **2nd Qrt 16**
- Sub Element Level RBL / DBL: **3rd Qrt 16**
- Application Level RBL / DBL: **1st Qrt 17**
- CDR Submission: **1st Qrt 17**
- CDR Closure: **3rd Qrt 17**

**CDR** – Critical Design Review  
**RBL** – Requirements Baseline  
**DBL** – Design Baseline
RISKS

• Dependency on Operations Concept Documents
• Dependency on Telescope Level Architecture Pack
• Scope and boundaries regarding Enterprise functionality unclear
• Uncertainty in ability to align with the construction assembly, integration and verification (AIV) schedule
• Assumptions made in the interim to continue development
• Next 6-9 months critical
Telescope Manager Tools

- **JIRA**
- **Alfresco**
- **eB**
- **Google Drive**
- **CAMEO Systems Modeler**

**Abbreviations:**
- **CDR** – Critical Design Review
- **RBL** – Requirements Baseline
- **DBL** – Design Baseline
Conclusion

• Telescope Manager is an integral part of the SKA Observatory.
• Telescope Manager is responsible for observation, telescope and data management.
• Significant progress has been made in developing the TM since project kick-off in Nov 13.
• Most notably, the Delta PDR has been PASSED in the last week.
• Detailed Design and Prototyping are current focus areas.
• Risks still expose the Telescope Manager, next 6-9 months are critical
Questions