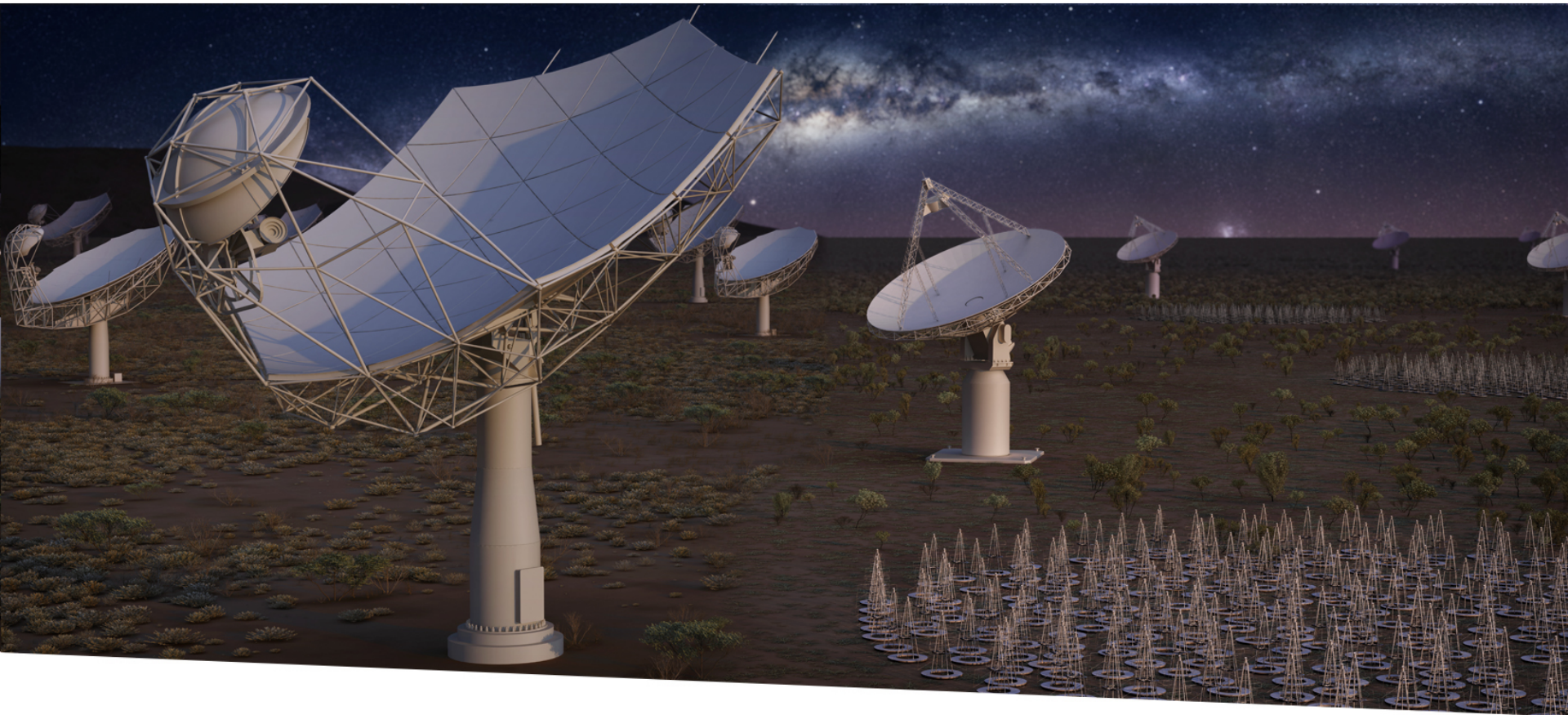


Operations Planning

SKA Engineering Meeting 2017



SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Prof. Gary Davis

12th June 2017

Outline

1. Introduction
2. Science Operations
3. Engineering Operations
4. Operations Management
5. Miscellany

Introduction

- The objective of this project is not to build two telescopes
- It is to do transformational science with the telescopes we will build
 - over a 50-year operational lifetime
 - design & construction is only the first step

What Is Operations Planning?

- How we will operate the telescopes to do science

- proposal and time allocation process
- submission and execution of observations
- generation of science data products
- provision of data to users

Science
Operations

- How we will maintain the telescopes

- preventive and corrective maintenance
- inventory of working spare parts
- managing and responding to faults

Engineering
Operations

- How we will run the organisation

- globally-distributed project

Operations
Management

The Operations Planning Team

- Gary Davis, Director ✓
- Antonio Chrysostomou
 - Rosie Bolton (50%) – SRC Project Scientist ✓
 - Cristina García Miró – VLBI (starting 1st Aug)
- Corrie Taljaard ✓
 - recruiting RAM/Logistics Engineer

Operations
Management

Science
Operations

Engineering
Operations

Operational Concept Document







- Key planning document
 - Describes operational model
 - Defines operational requirements
- Focus is on requirements, not on implementation
 - implementation will be in the Operations Plan →



SKA1 OPERATIONAL CONCEPT DOCUMENT

Document Number..... SKA-TEL-SKO-0000307
Document Type..... RSP
Revision 02
Author G.R. Davis, A. Chrysostomou, C. Taljaard
Date 2016-12-21
Document Classification..... UNRESTRICTED
Status..... Released

GRD

Name	Designation	Affiliation	Signature	
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G.R. Davis et al.	Operations Planning Group	SKAO		
			Date:	Dec 31, 2016
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G.R. Davis	Director of Operations Planning	SKAO		
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			Date:	Jan 1, 2017
Released by:				
P.J. Diamond	Director General	SKAO		
			Date:	Jan 3, 2017

Operational Concept Document



**obsessive
compulsive
disorder
symptoms**



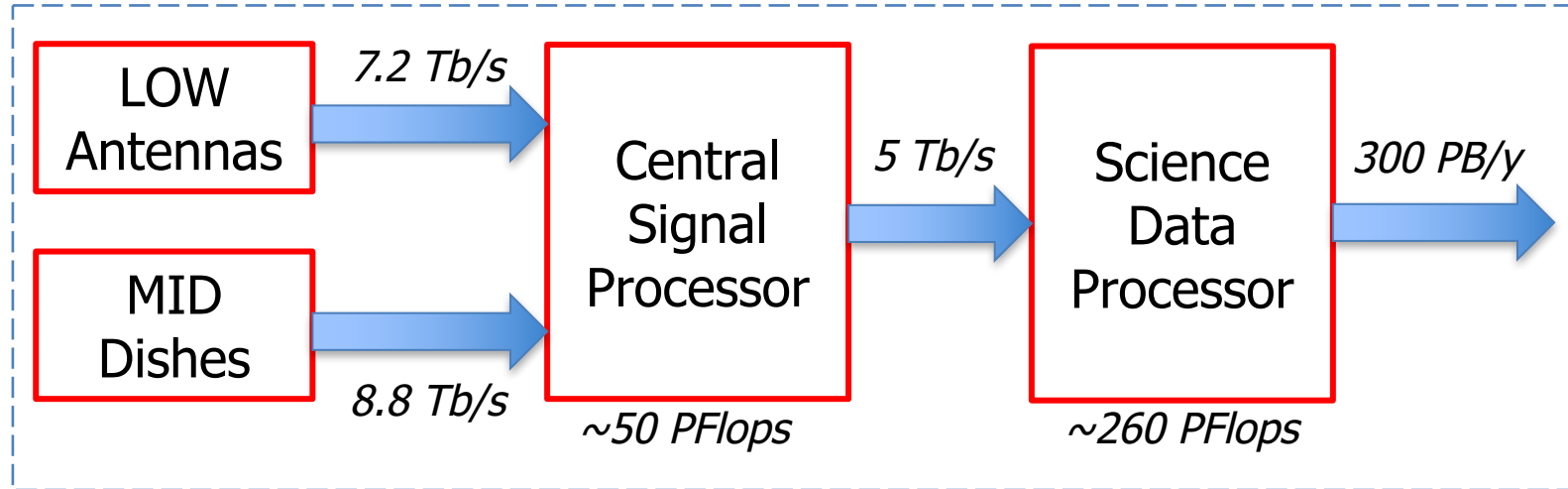
Outline

1. Introduction
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5. Other Topics

Science Operations

- Science observing:
 - flexible scheduling
 - observing modes, scheduling blocks, scan types
 - time-domain observing: ToO, triggers, overrides
 - commensal observing
 - VLBI observing
- Operational processes:
 - proposal submission & time allocation
 - observation design, planning & execution
 - science data products – calibration and quality assessment
 - data flow →
 - time accounting
 - performance monitoring

Observatory Data Flow



SKA Observatory (supported by INFRA, SaDT, TM)

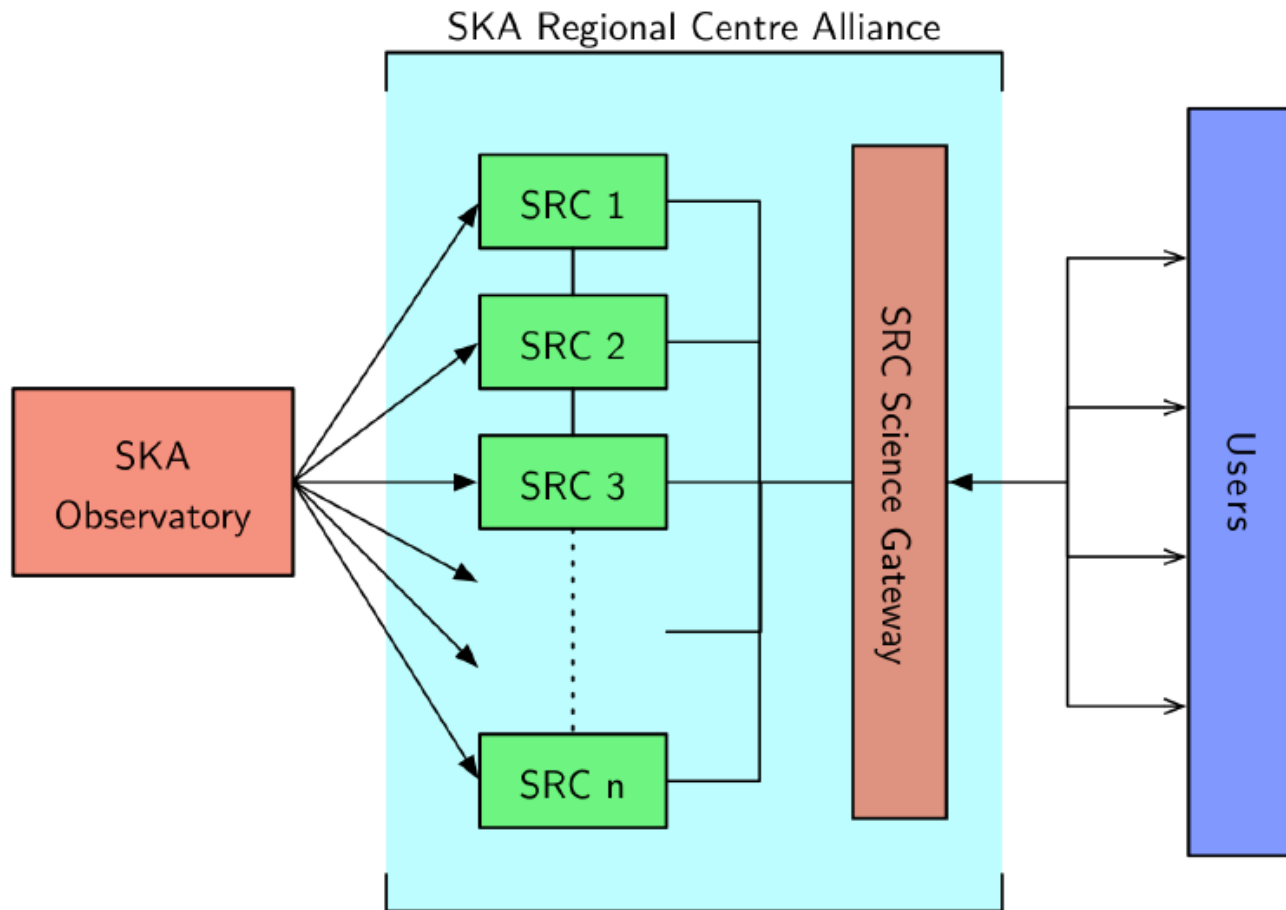
How to ensure large data volumes are turned into high science productivity?

SKA Regional Centres



- SRCs will:
 - be independently funded by the regions
 - provide users with access to SKA data in accordance with Access Policy
 - provide computational resources for post-processing
 - form a collaborative alliance to facilitate data transfer, common analysis tools and interoperability
 - collectively host the SKA science archive
 - use new and/or existing computational facilities, which may be shared with other computational projects
 - sign an MoU with the SKA Observatory
 - be formally accredited as meeting Observatory requirements

Collaborative Alliance of SRCs



Science Gateway:
a transparent and
location-agnostic
interface for
users

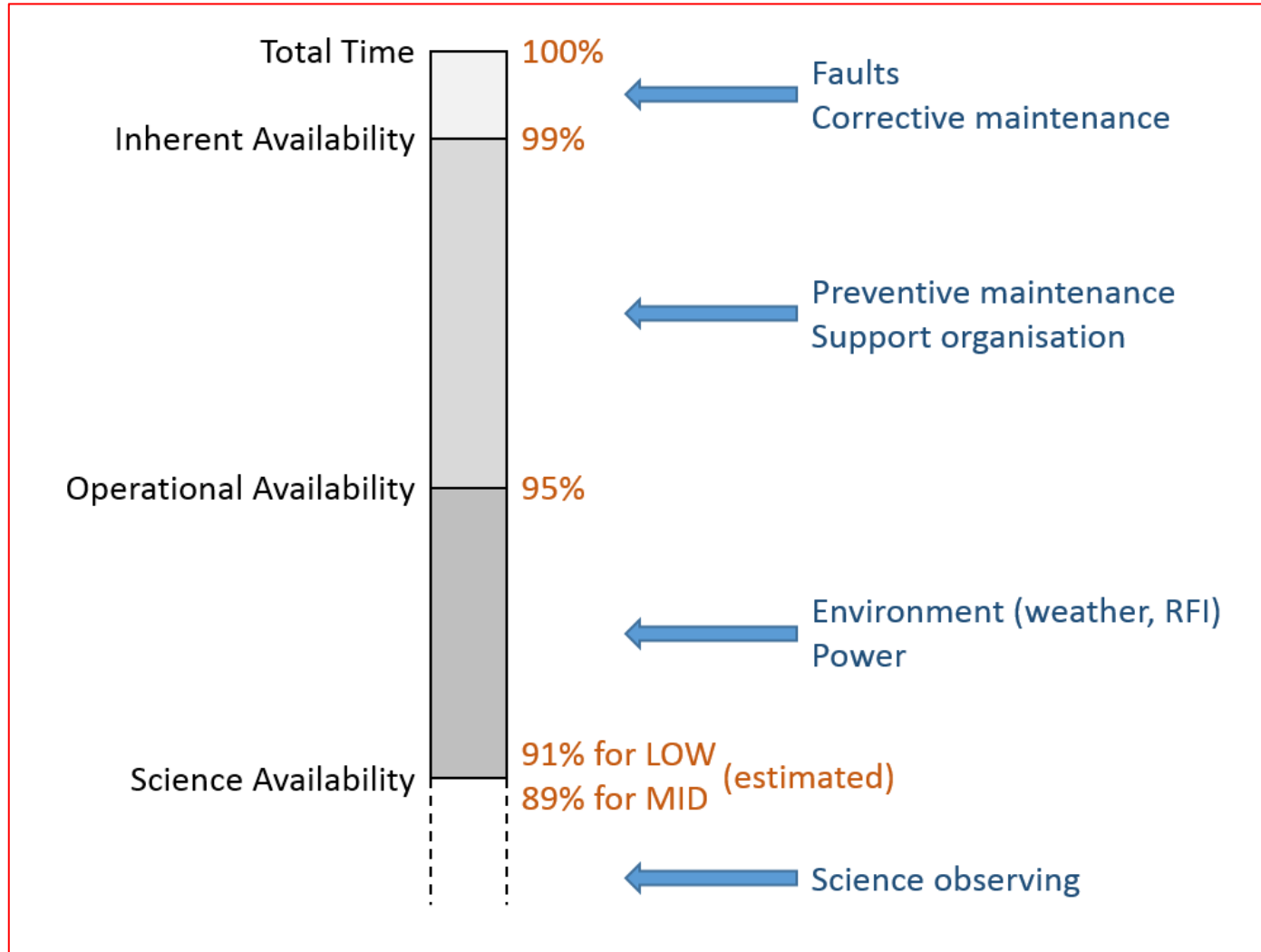
SRC Coordination Group

- Membership:
 - SKA Org: Bolton, Chrysostomou (chair), Deegan, Rees
 - Members: Gaudet, Horrell, Quinn, Wadadekar, Wise, Yu
 - External: Bird, Connolly, Verdes-Montenegro
- Work plan:
 - Framework document (Rev 02 imminent)
 - requirements document (soon)
 - international networking
 - MoU & accreditation process
 - science archive requirements
 - data challenges
- Joint projects with CERN

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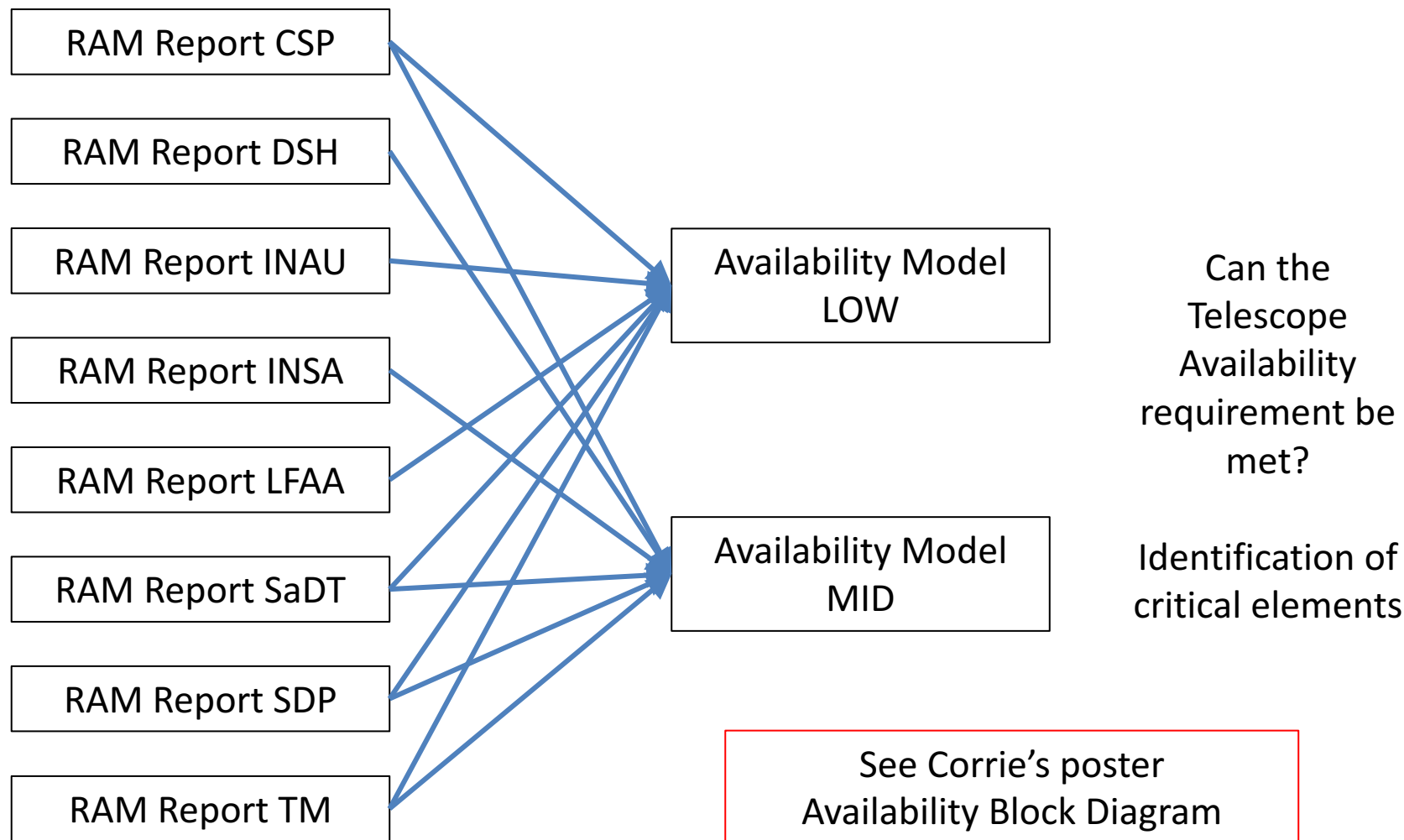
Availability



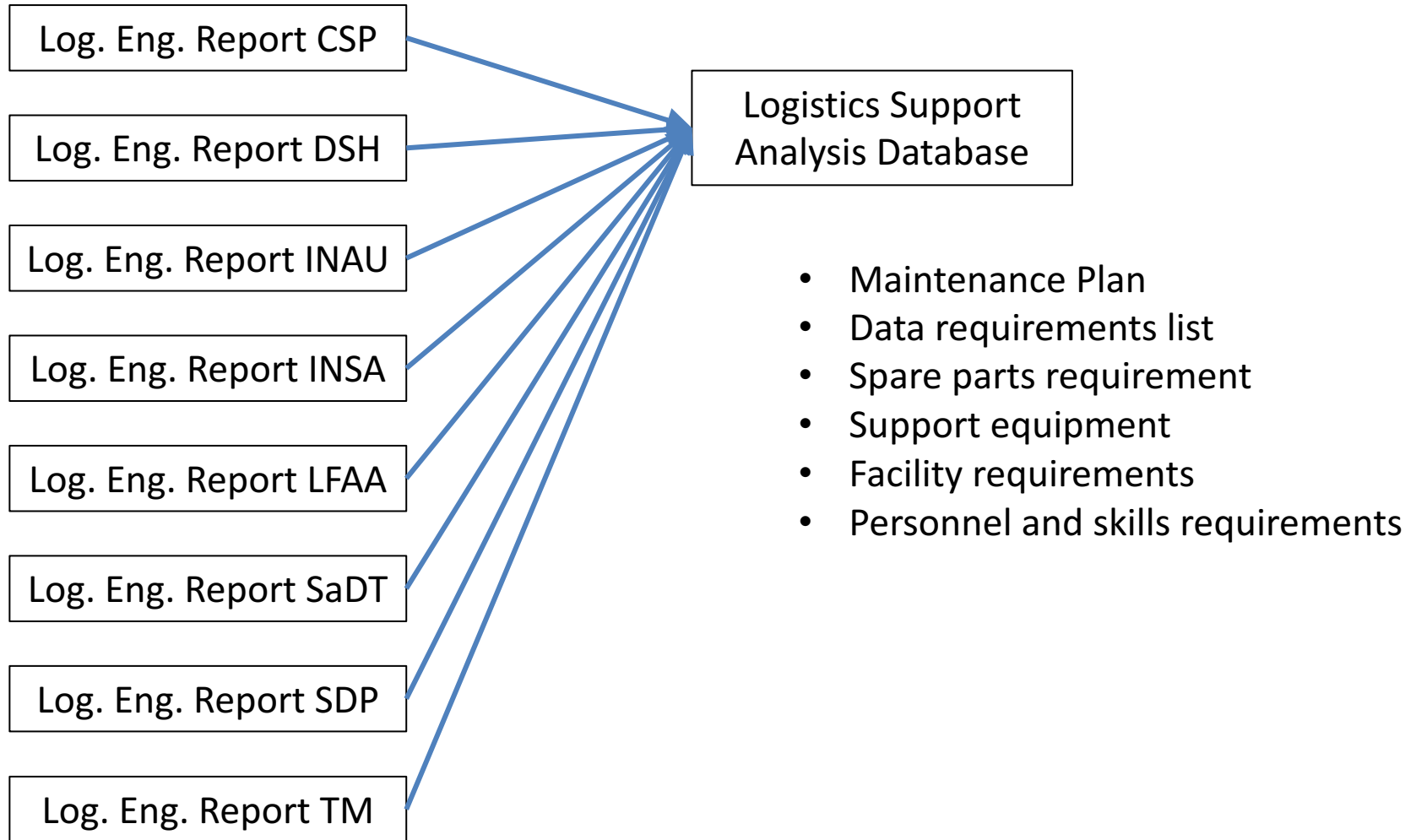
Availability

- RAM Allocation document
 - Rev 02 issued in May
- Is this ambitious?
 - we think not, with good design/fabrication/installation
 - Cost Control: 6 of 8 consortia have informed us that the availability requirement does not drive the operational cost
 - but we need to see FMECAs to be sure – iterative process
- CDR deliverables
 - RAM report
 - Logistics Engineering report

Availability Modelling



Logistics and Maintenance Planning



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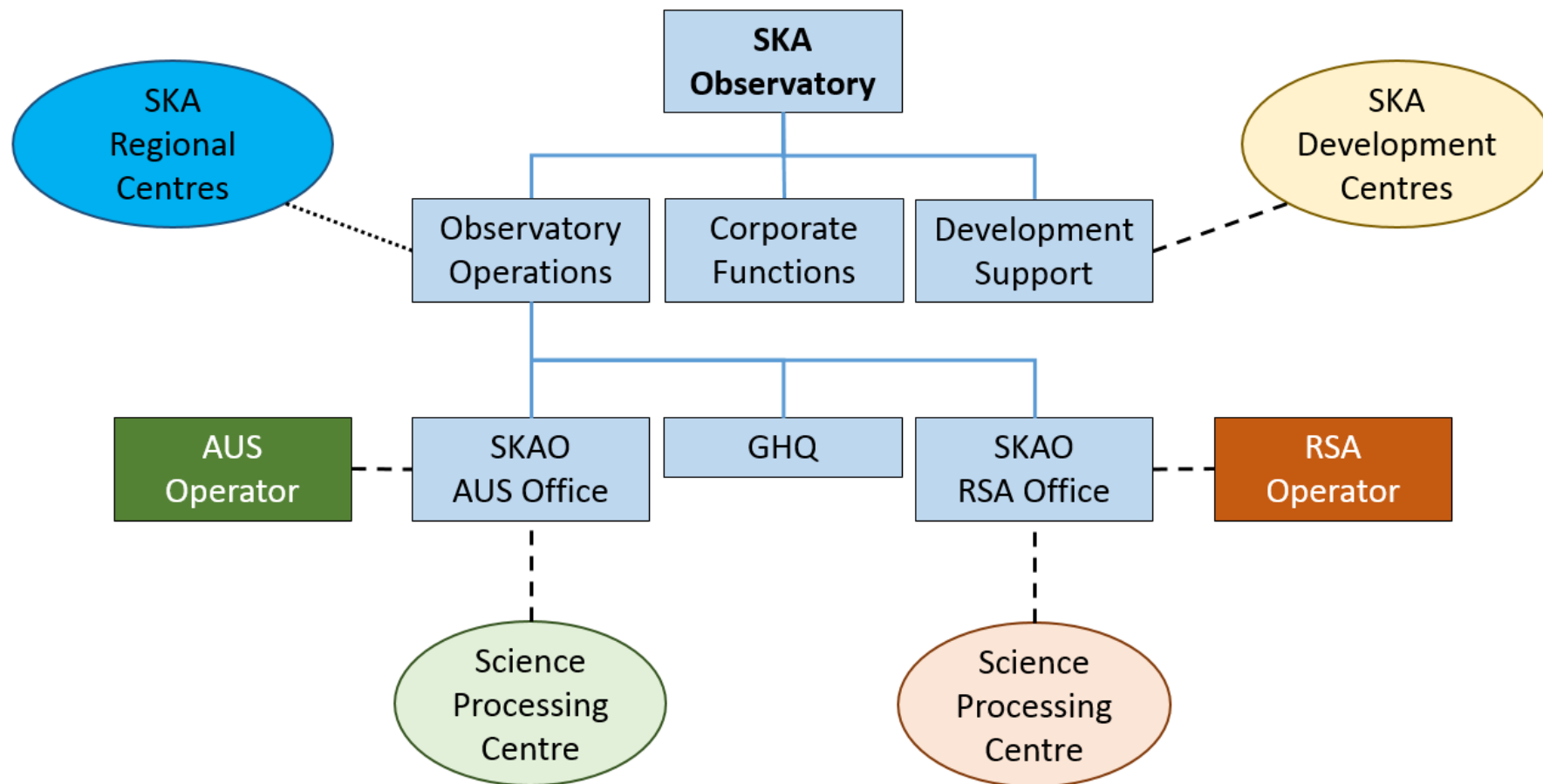
The Observatory Organisation



One Observatory

- Rationale:
 - Two quite different telescopes
 - Up to 50% of the telescope time will be spent on science projects that require data from both telescopes

The Observatory Organisation



----- Service Level Agreements

..... Memorandum of Understanding

LOW Operations



Engineering Operations Centre (EOC) Geraldton

- base for site & engineering operations
- Telescope Operators
- adjacent to existing MSF

Science Operations Centre (SOC) Perth

- science operations

LOW site

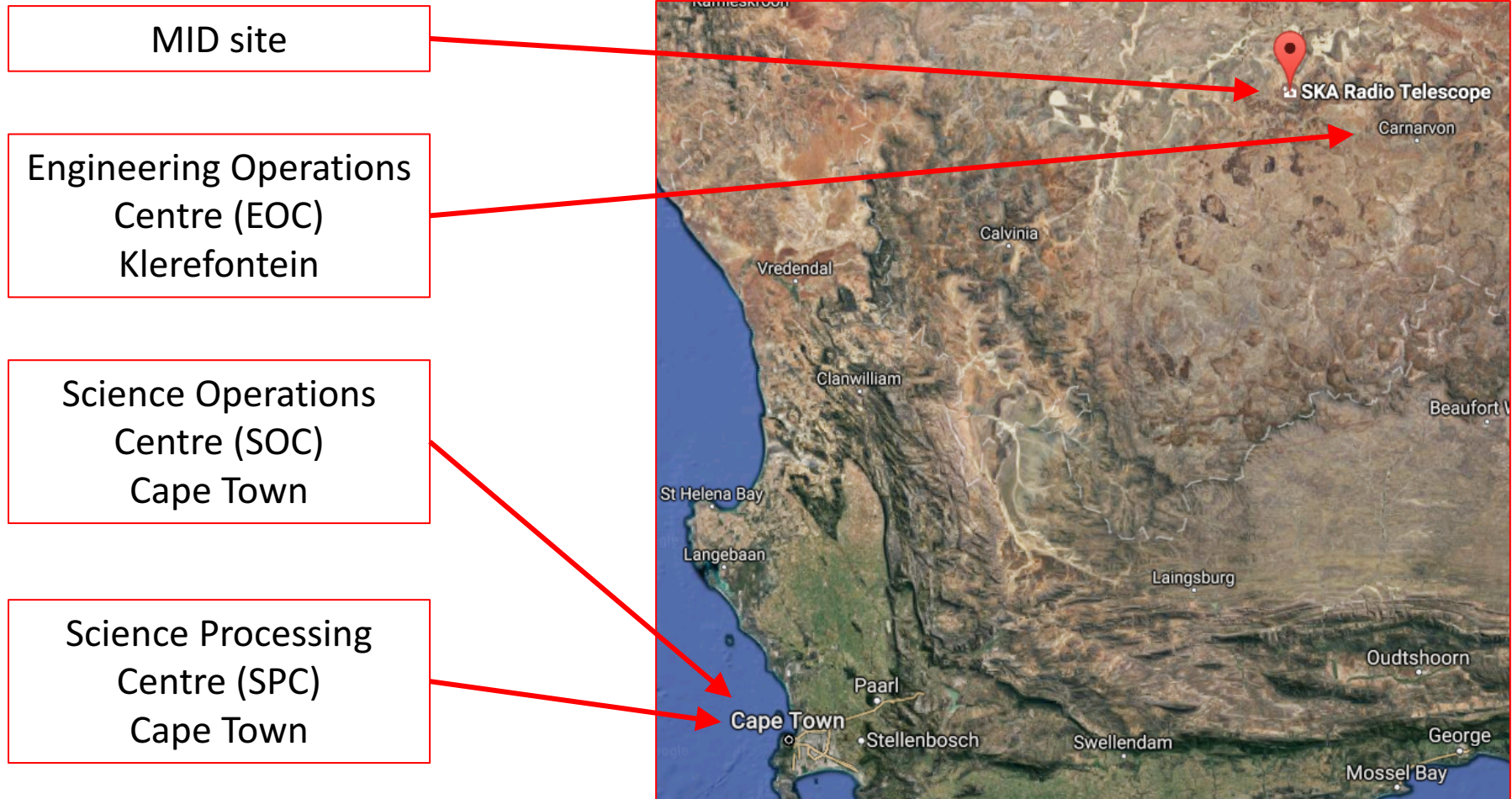
Science Processing Centre (SPC) Perth

- Pawsey Centre

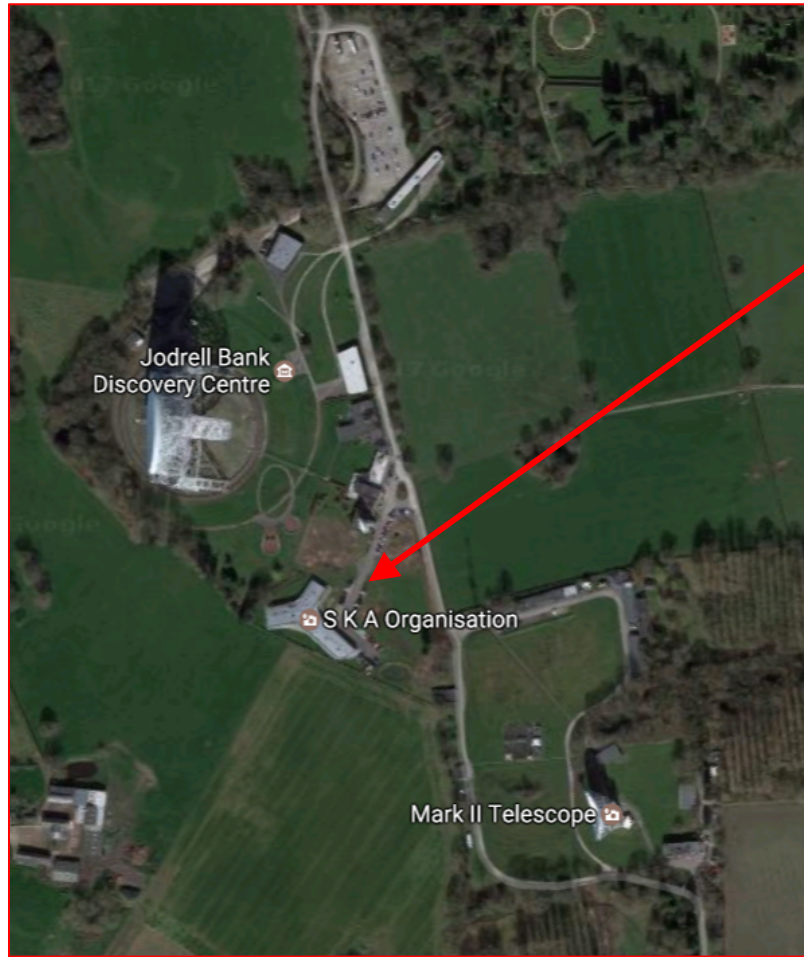


Relationships are key to making this work!

MID Operations



COMMON Operations



SKAO GHQ
Jodrell Bank

- science operations that are common to both telescopes
- computing & software
- engineering & development
- corporate functions

Opex Estimation

	€M/yr
Operations	72
Reserve Fund	6
Contingency	15
CURRENT ESTIMATE	93

Note, this is just a
snapshot of current
estimate – much work
still to be done

Notes:

- baseline design, routine operations
- as presented to Board in March
- based on February cost estimates from consortia
- excludes development →
- target: €85M/yr
- cost control: reducing capex to cost cap saves €10M/yr in opex

Future Work:

- continual development and review as design matures towards CDR
- integrated maintenance & logistics plans
- harmonisation for computational elements
- benchmarking against comparable projects
- full, external review

Operations Plan



- For approval by SKA Observatory Council, at same time as Construction Proposal
- Contents:
 - Operational model
 - Organisational structure
 - Staffing plan
 - Operational budget
 - ...



Atacama
Large
Millimeter /
submillimeter
Array

ALMA Operations Plan

Operations Plan v.D (approved October 2007).doc

Version: D

Status: Approved by the ALMA Board

October 29, 2007

ALMA-00.00.00-002-D-PLA.A

Prepared By:		
Name(s) and Signature(s)	Organization	Date
Russell Smeback Operations Working Group	Joint ALMA Observatory	2007-10-08
Approved By:		
Name and Signature	Organization	Date
	ALMA Board	2007-10-29
Released By:		
Name and Signature	Organization	Date
Massimo Tarenghi, Director	Joint ALMA Observatory	

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Three Flavours of “Upgrade”

- Refresh
 - replacement of systems to maintain capability
 - system support, reduced power consumption
 - provided for within operations budget
- Small-Scale Upgrade
 - replacement of systems to improve efficiency
 - provided for within operations budget
- Large-Scale Upgrade
 - replacement of systems, or integration of new systems, to enhance capability
 - SKA Observatory Development Programme (SODP)

SKA Observatory Development Programme (SODP)

- Distinct budget line
 - not within operations budget
 - will start at commencement of construction, and ramp up to constant value of c.€20M/yr (TBC)
- Initially for continuation of AIP activities
 - MFAA, PAF, WBSPF
- Then open to competition
 - possibly guided by observatory development roadmap
- SKA Development Centres
 - institutes that receive development contracts under the SODP
 - development costs to be shared

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