

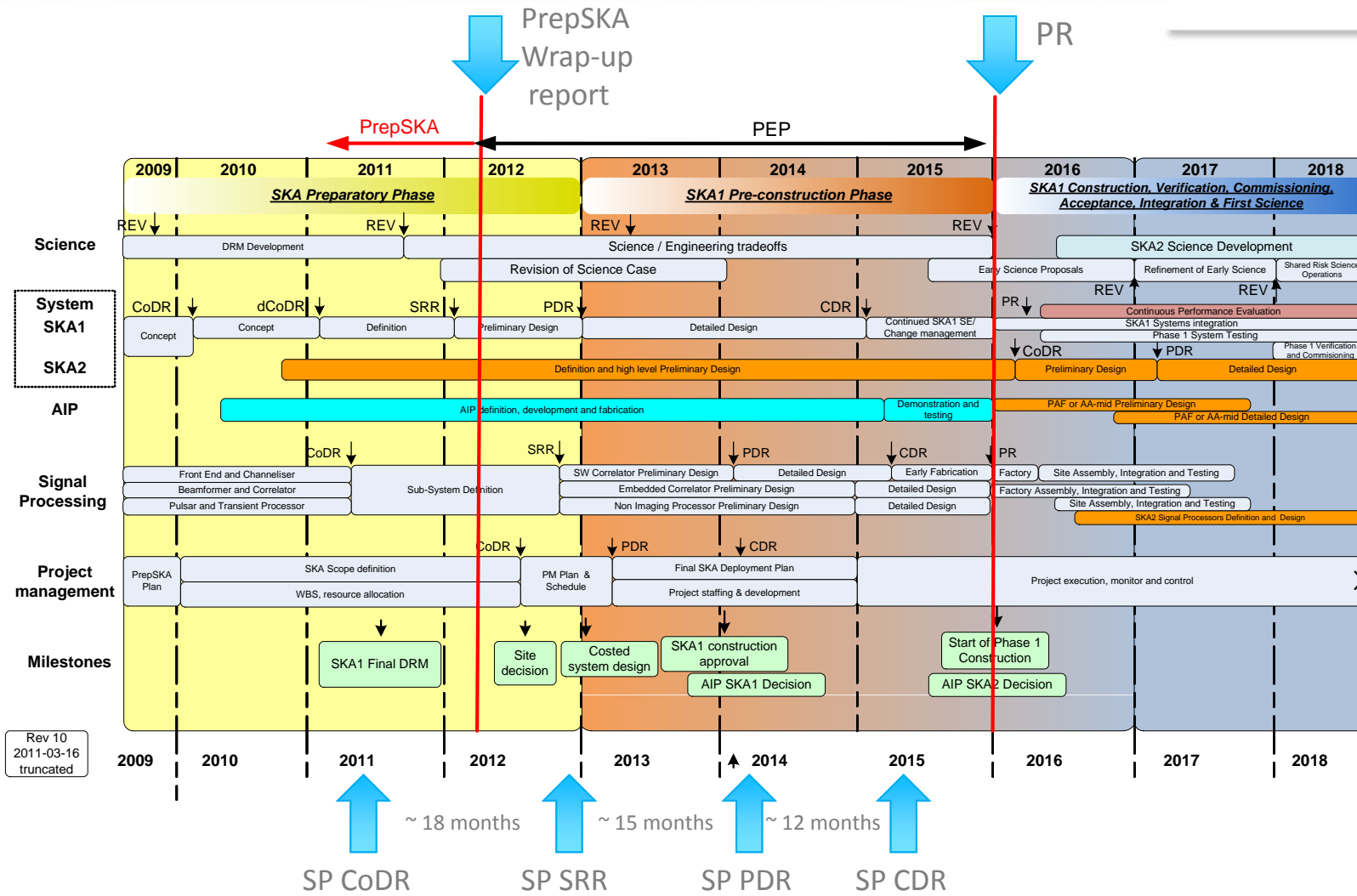


2011 Signal Processing CoDR: Strategy to Proceed

W. Turner SPDO

14th April 2011

SP Time Line



Gaps at the CoDR



- Remote Station Beamforming
 - Need system definition of a remote station
 - Can read across from other beamformer concepts
 - Specifications and ICDs will be produced for SRR
- Software Development & Costing Strategy
 - Leverage Software and Computing Domain
 - PrepSKA WP2.6 Strategy for Development of – and Cost Estimation for – Software and Computing Architectures Rev B (Draft)
- Reliability & Maintainability
 - Need a top down approach to Reliability, Availability, Maintainability and Safety (i.e. At System Level)
 - Should avoid a focus on Reliability data bases such as Mil Hndbk 217 and Telcordia SR-332

Reliability, Availability, Maintainability & Safety Plan(RAMS)



Suggested contents for RAMS Plan at the System Level: will inform Design & Production Programme. Development from LEMP

bdd [block] system [Reliability, Maintainability & Safety Plan document model]

«block»
Reliability,
Maintainability (&
Safety) Plan

«block»
1. RAMS Overview

1.1 Introduction
1.2 RAMS Requirements
1.3 RAMS Tasks

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3. Safety Engineering Tasks

3.1 Preliminary Hazard Analysis
3.2 System & Subsystem Hazard Analysis
HAZOPS, FMECA, FTA, ETA
3.3 Hazard Tracking (Hazard Log)

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Appendix 1 RAMS Work Plans

RAMS Requirements:
•Not more than TBD failures per TBD hours causing TBD
•Repairs to be performed in not more than TBD minutes for TBD % of failures
•Safety

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2. Reliability & Maintainability Engineering Tasks

2.1 Reliability Modelling
2.2 Reliability Prediction & Apportionment
2.3 Failure Modes, Effects & Criticality Analysis
FMECA software
CAD Models
2.4 Fault Tree Analysis
2.5 Reliability Testing
HALT
Taguchi
2.6 Failure Reporting & RAMS Monitoring
FRACAS
2.7 Production Reliability Activities
FMECA
Statistical Process Control
Production Stress Screening
Failure Reporting & Corrective Action System
2.8 Maintainability Analysis & Demonstration
Reliability Centred Maintenance RCM
2.9 In Service RAMS Monitoring

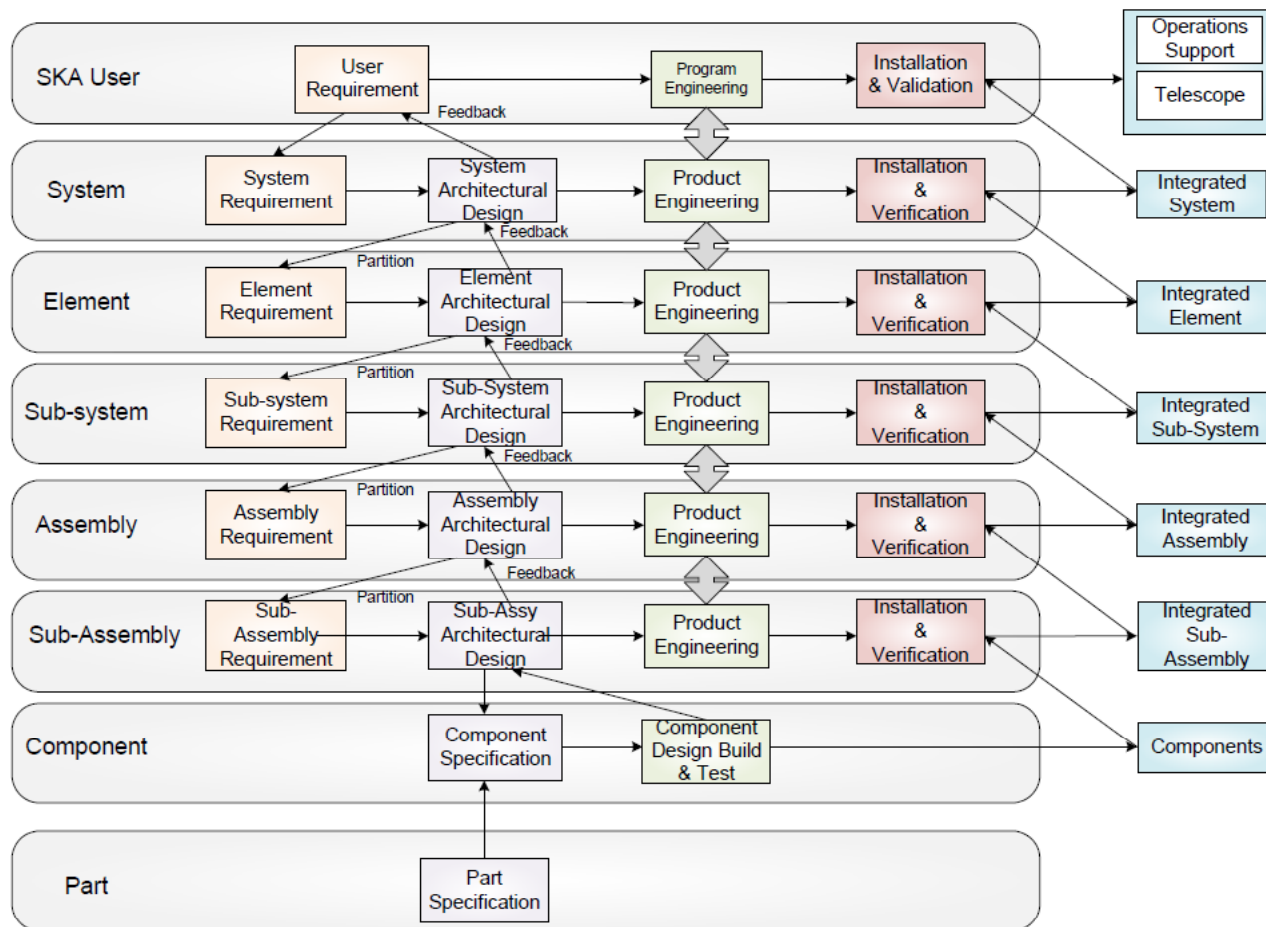
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4. Project RAMS Management & Reporting

3.1 Responsibilities
3.2 RAMS Views

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Appendix 2 RAMS Deliverables

CAD: Computer Aided Design
ETA: Event Tree Analysis
FMECA: Failure Mode, Effects & Critical Analysis
FRACAS: Failure Reporting & Corrective Action
FTA: Fault Tree Analysis
HALT: Highly Accelerated Life Test
HAZOPS: Hazard & Operability Study
RCM: Reliability Centred Maintenance

Hierarchical Development



Bottom up & Top Down

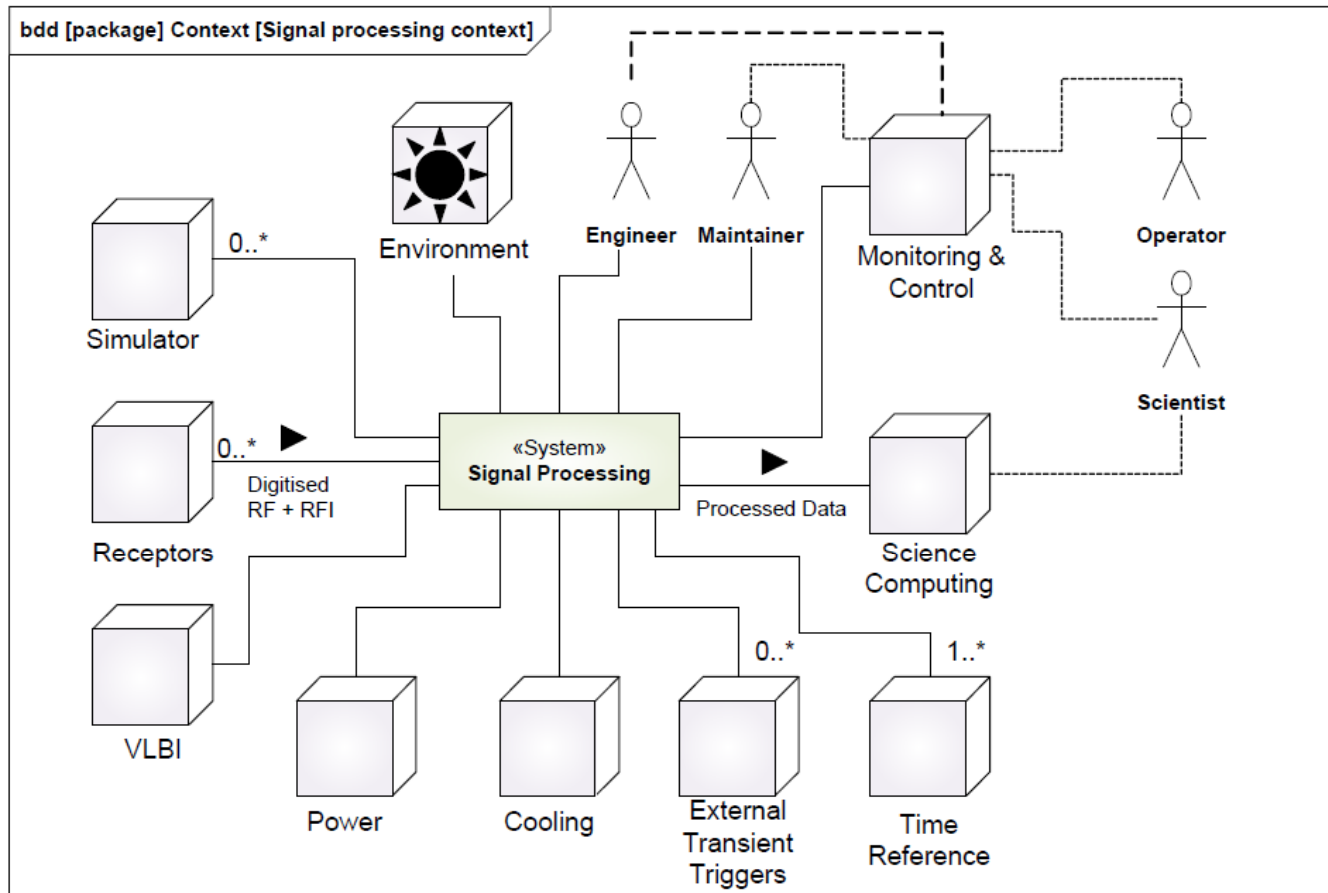
CoDR: First pass at requirements for the element level only

SRR: Element level requirements baselined

SRR: First pass at requirements for Sub-System, Assembly and Sub-Assembly required

SRR: First Pass at ICDs

Interface

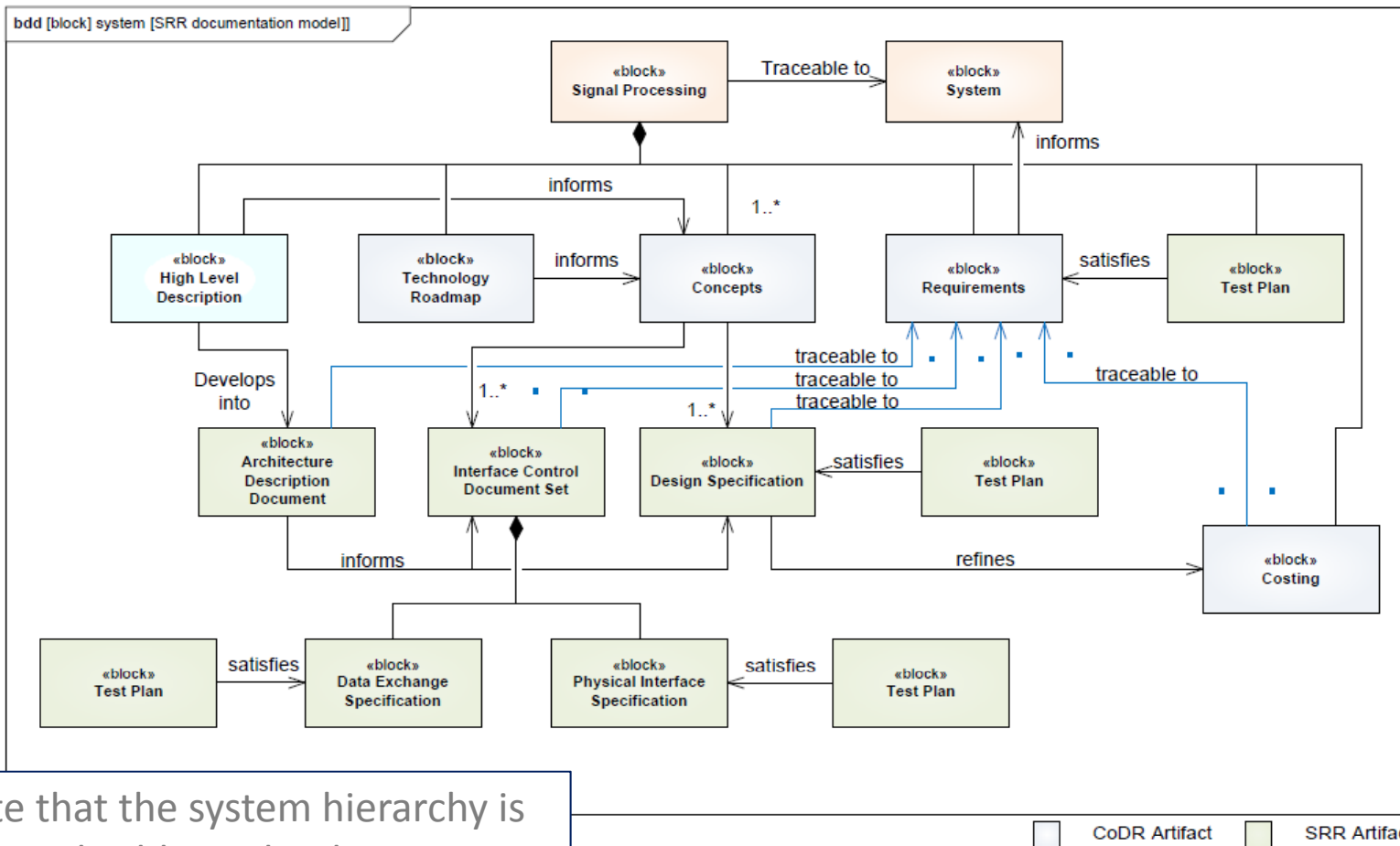


Interface Control Documents, ICDs

For SRR:

- Need to identify interface boundaries and ownership of interfaces.
- Ensure all interfaces have been identified for SKA1 & SKA2
- First pass at ICDs:
 - Physical interface requirements
 - Data exchange requirements

SP SRR Document Tree



Note that the system hierarchy is still applicable to the document tree

Concept development activities

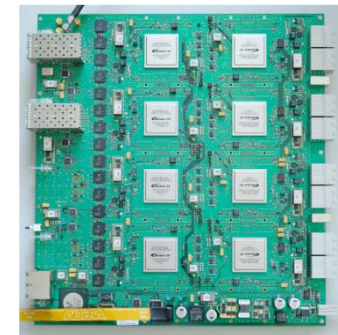


- Proposed activities for Concepts listed in Strategy to Proceed Document including (but not limited) to:
 - Modelling & Benchmarking
 - Affect of truncation of word length on S/N
 - Benchmarking of Non Imaging algorithms
 - Benchmarking of Communications Infrastructure
 - In Feed to the SRR document set
 - Provide in feed to the Cost model tool.
- Development of next generation for:
 - Roach board (CASPER)
 - UNIBOARD
 - Red Back (ASKAP)
- Need detailed plans from contributing institutions for post CoDR to SRR activities

ROACH 2



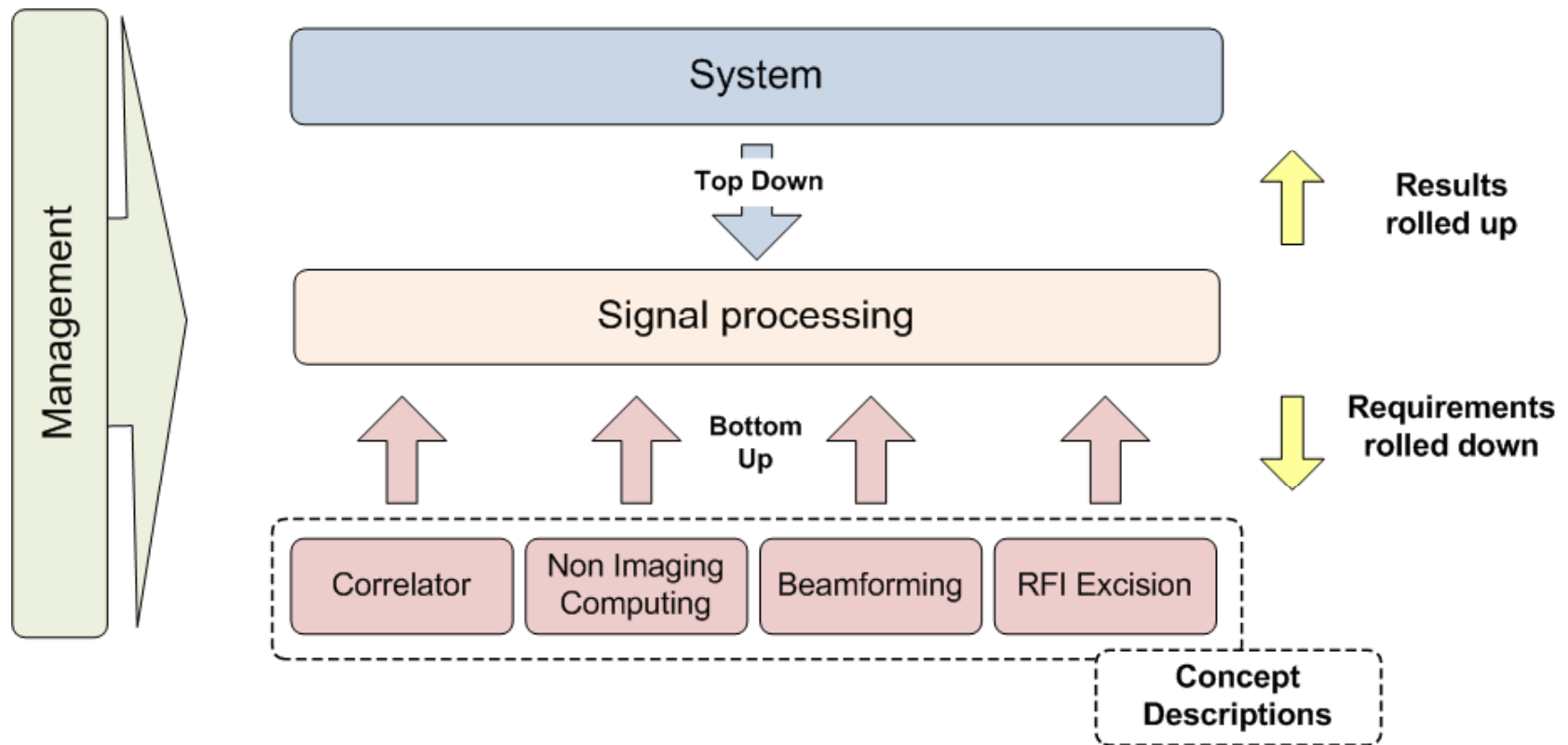
UNIBOARD



Red Back 2



Way Forward



SP PrepSKA Resources (1)



Table of resources for each Work-package

Work Package	WP number	Task	Lead Institutes	Task Leader	Participating Institutes	Resources
SPDO Domain Specialist						
WP2.5 Digital Signal Processing W. Turner	2.5.1	Correlator and central beamformer	DRAO	B. Carlson	JIVE	A. Szomoru
					KASI	J. Kim
					NCRA	Y. Gupta
					CSIRO	J. Bunton
					NRF	F. Kapp
	2.5.2	Digital Beamformers				
	2.5.2.1	PAFs	CSIRO	J Bunton	ASTRON	W. van Cappellen
					DRAO	B. Veidt
					UCAL	L. Bruton

SP PrepSKA Resources (2)



2.5.2.2	AAs	AAVP			
2.5.2.3	Station Beamforming	UK	M.Jones C.Shenton	MPIfR	R. Keller
				ASTRON	A.Gunst
				DRAO	B.Carlson
				INAF	S. Montebugnoli
2.5.3	Non-Imaging	UK	B.Stappers	ASTRON	J.G. Bij de Vaate
				CSIRO	J.Bunton
				MPIfR	R. Keller
				NRF	F. Kapp
				OBSPAR	C. Viou
				UORL	R. Weber
2.5.4	Software Correlators			KASI	J. Kim
				NCRA	Y. Gupta
				UK	P.Alexander

In addition to this list, other institutions are providing support including:

ICRAR: T. Colegate and N. Clarke for Non Imaging processing including transients and dedispersion.

JPL: L. Daddario, R.Navarro, K. Wagstaff, W.Majid for Correaltion and Non Imaging processing including dedispersion and auto detection