



AA System Requirements

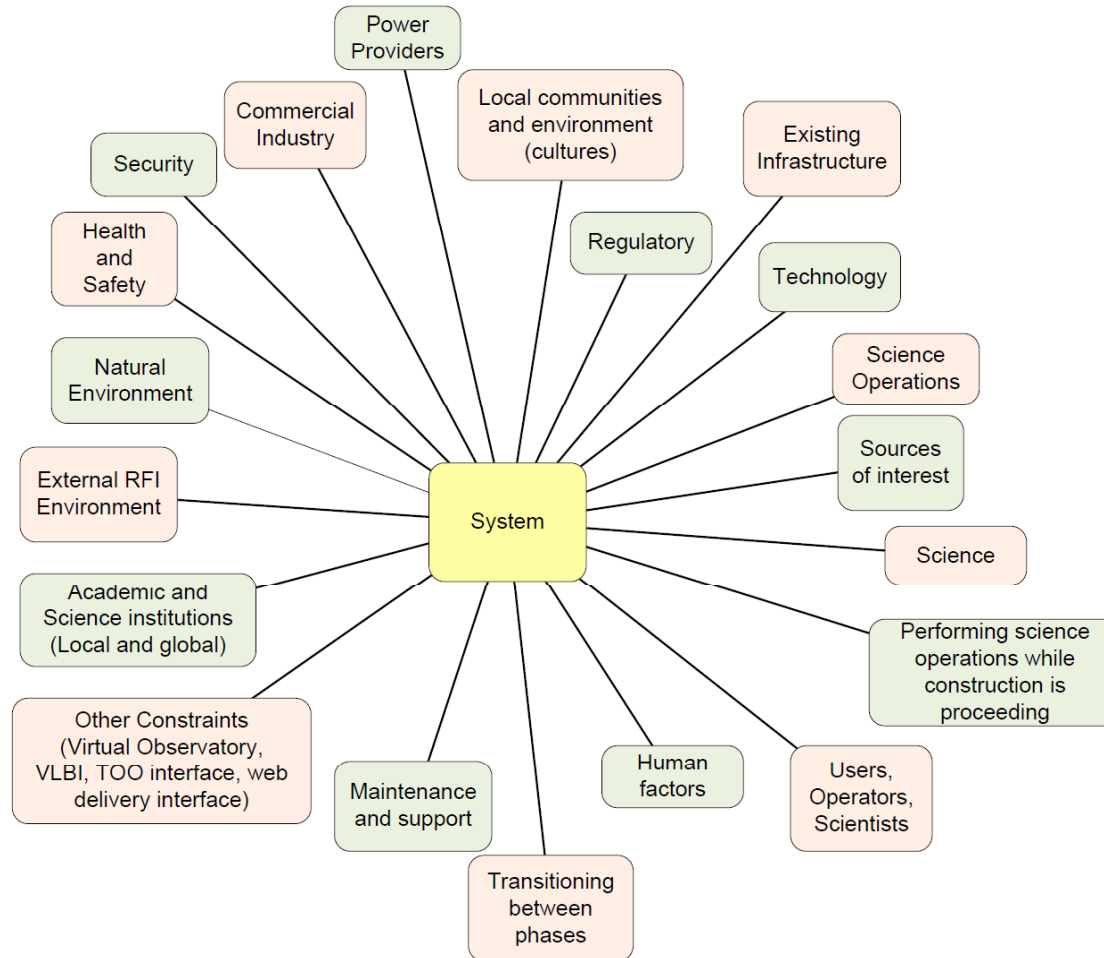
André W. Gunst (SPDO)

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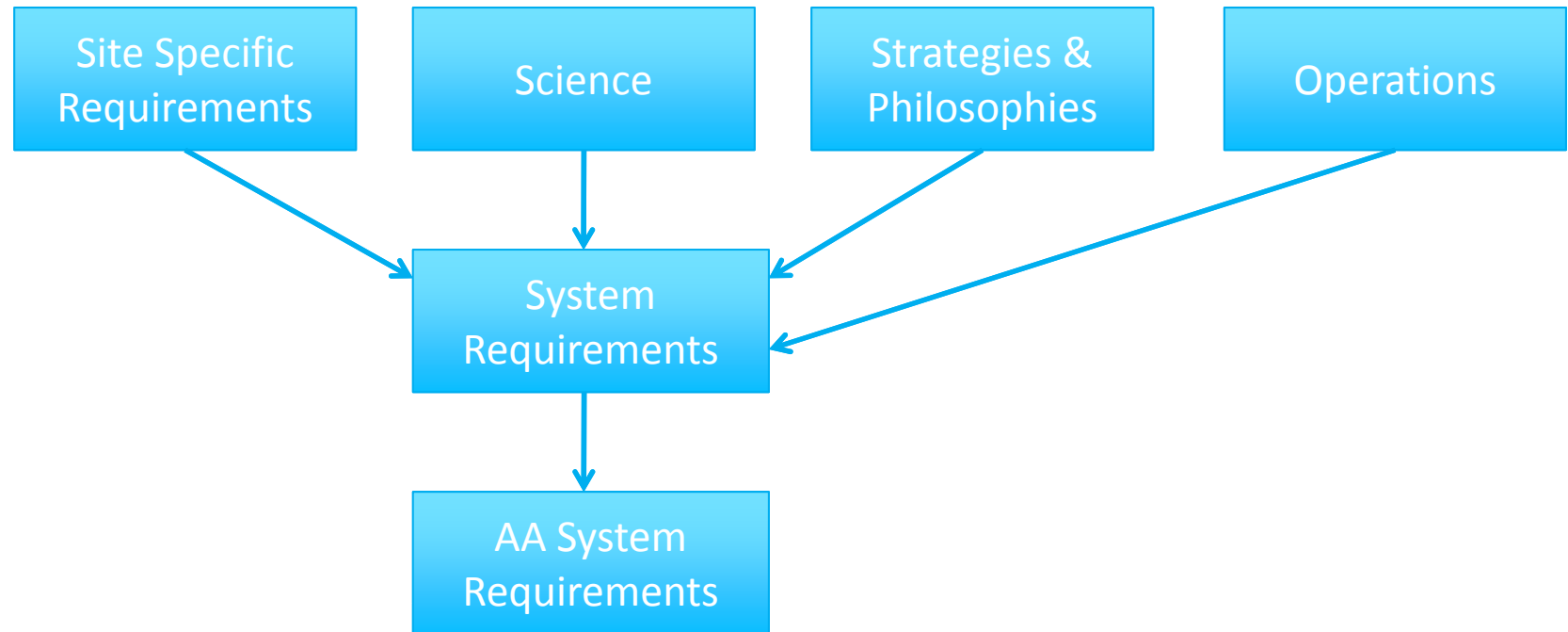


- Process
- Context Diagram & Interfaces
- Functional Requirements
- Non-functional Requirements
- Principal Drivers
- Route to SRR
- Summary

SKA User System Context Diagram



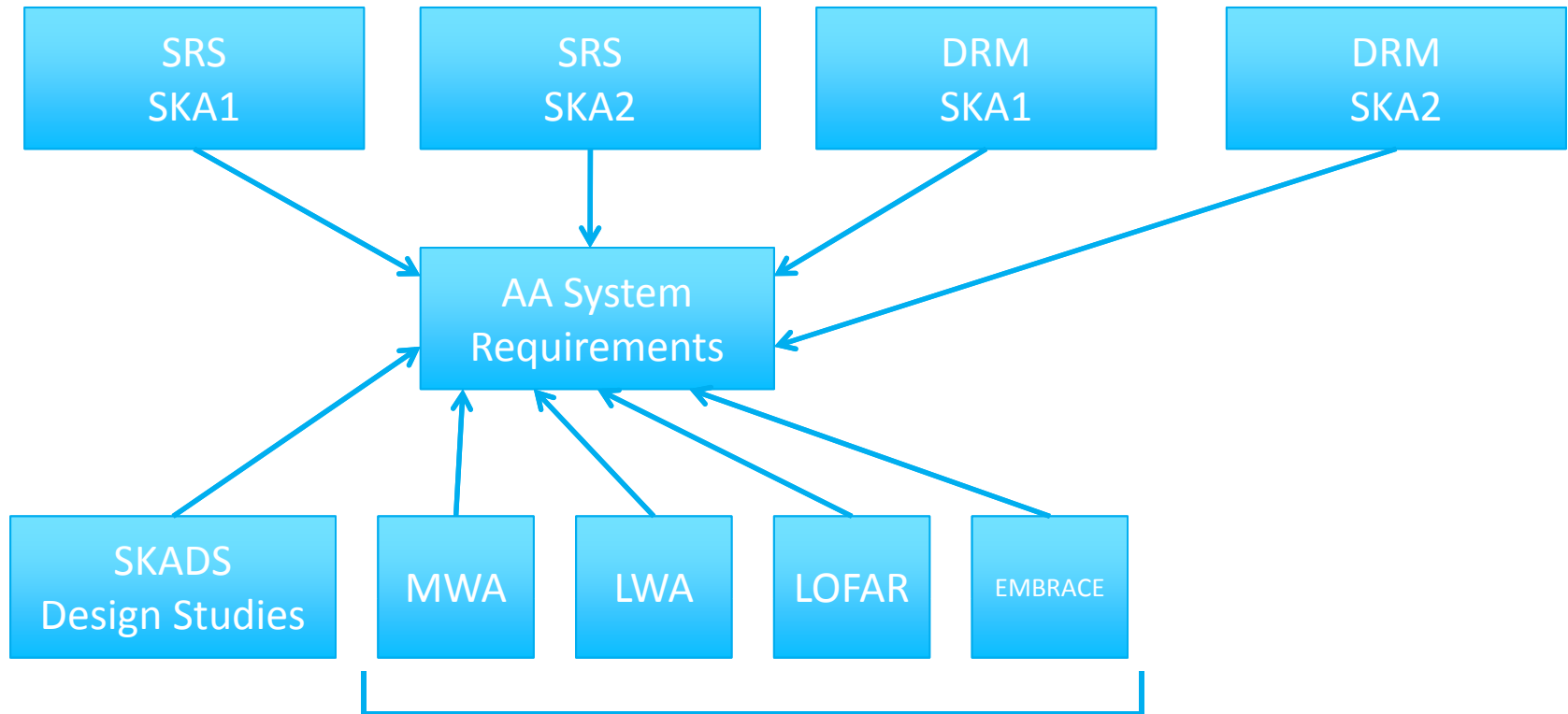
Ideal Top Down Flow



Top Down & Bottom Up

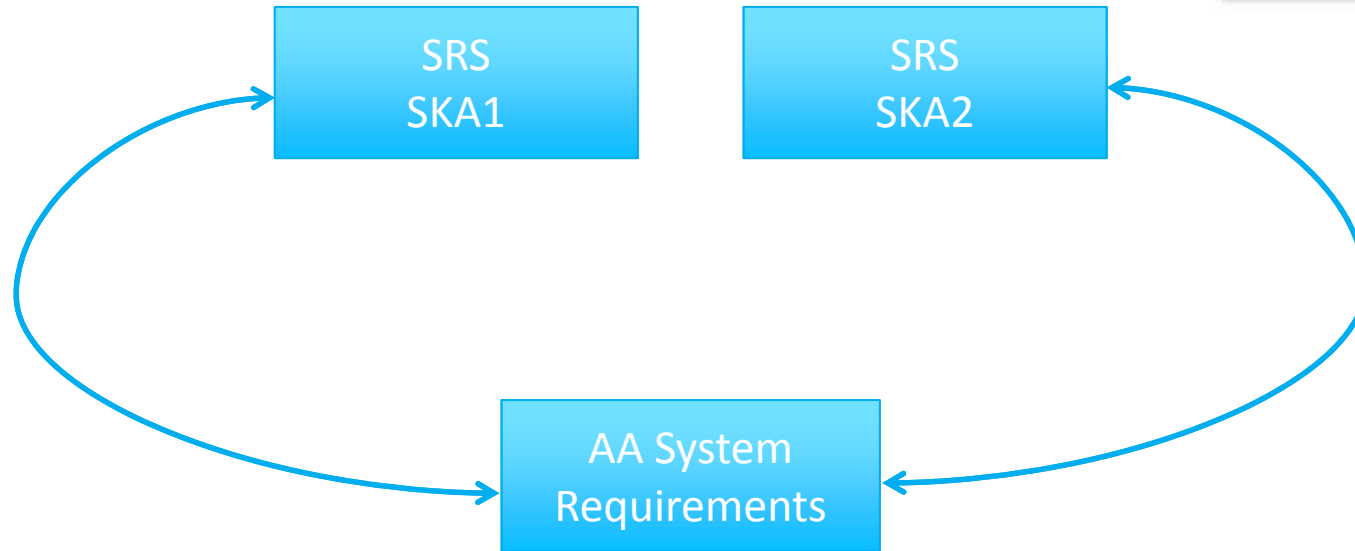


Current way of working



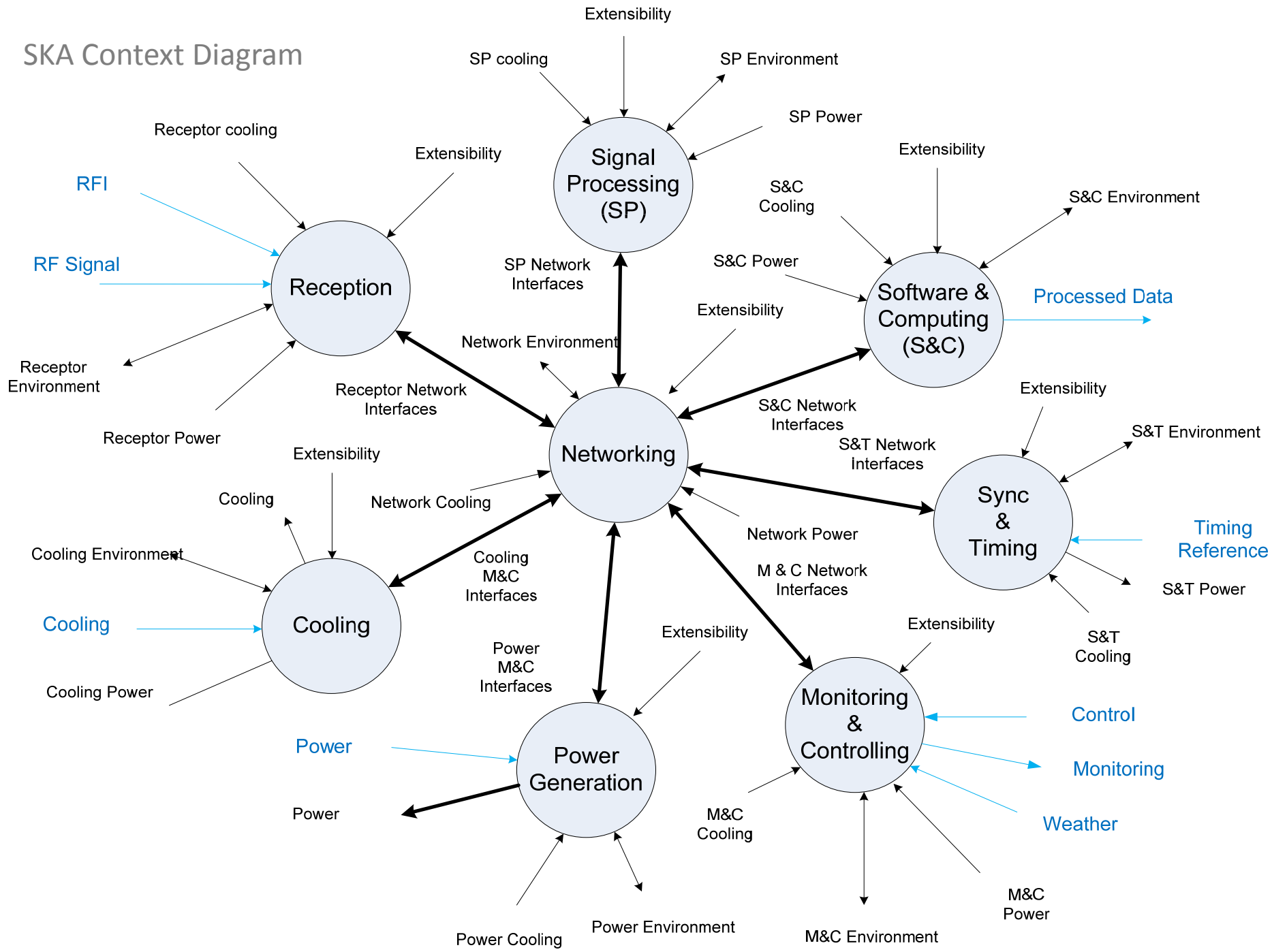
SKA Pathfinder/Precursors

SRS = System Requirements Specification
DRM = Design Reference Mission

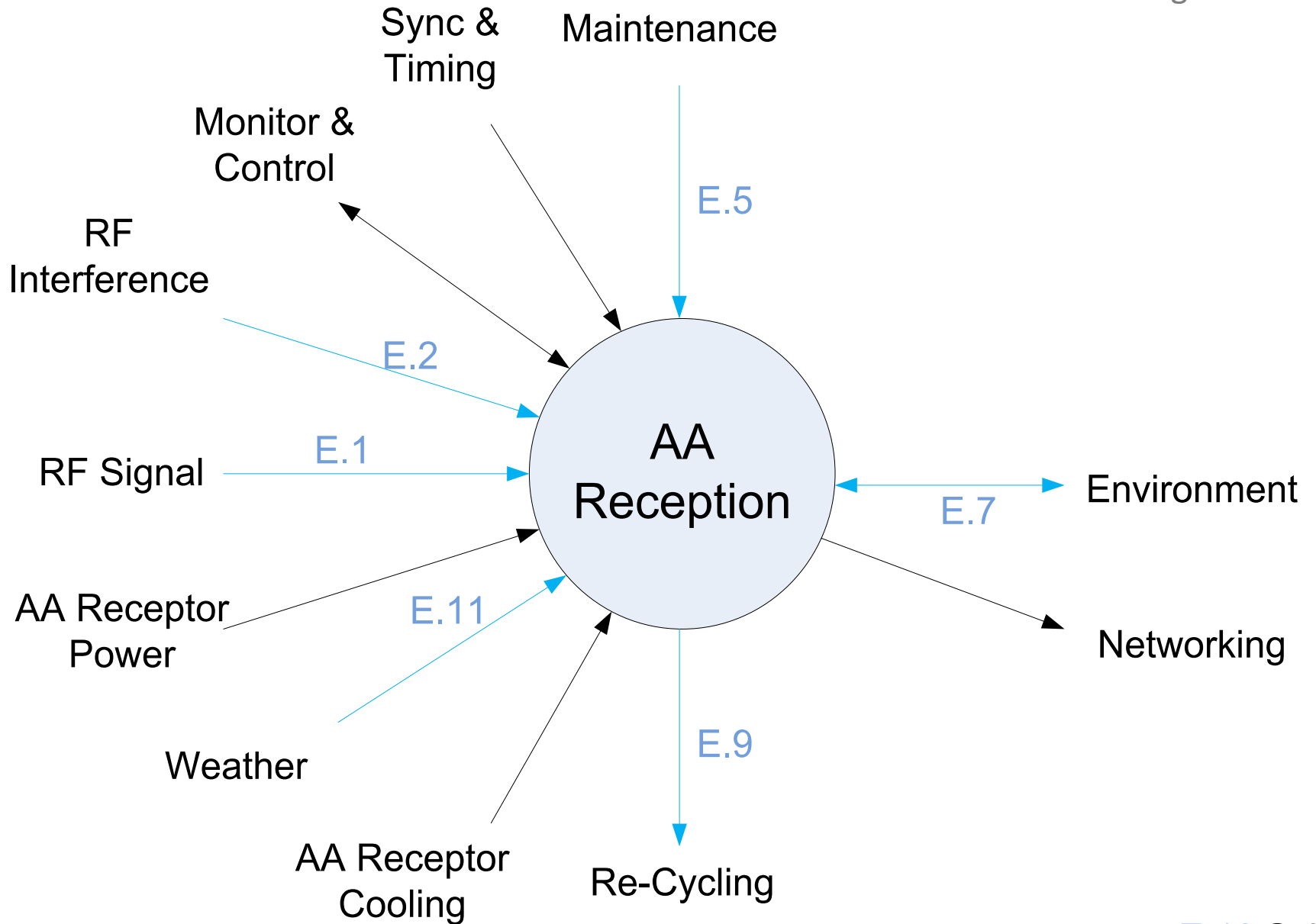


- Iteration between SRS and AA SRS
 - Gaps are filled
 - TBDs will be Ds
 - SRSs will be extended and completed

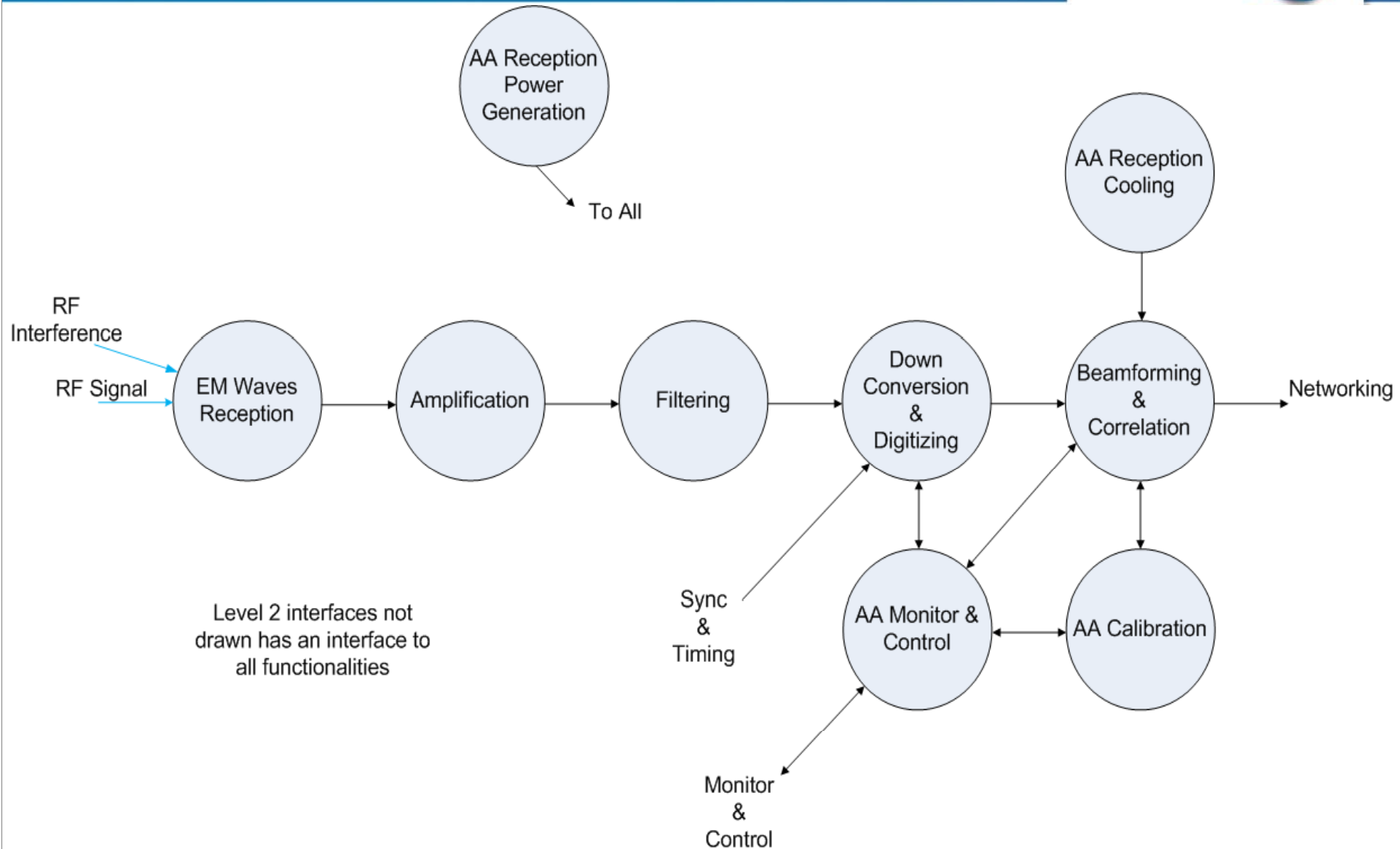
SKA Context Diagram



AA Reception Top Level
Context Diagram



AA Context Diagram



Functional Requirements



3.2.1 Operating Frequency

Ident	Requirement	Applicability	Parent	Verification
AA_REQ_1110	Electromagnetic frequency range. The AAs in SKA shall be able to measure electromagnetic radiation in a frequency range from:	Mandatory		By design
	70 MHz to 450 MHz for SKA1 and SKA2, further referred to as AA-low		[1] SYS_REQ_1110	
	400 MHz to 1450 MHz for SKA2 only, further referred to as AA-mid		[4] Section 18, Table 18.2. To cover science cases 7, 11, 15	

Connected Requirements (SKA1)



- Sensitivity
 - 70-240 MHz: $10^3 \text{ m}^2\text{K}^{-1}$
 - 240-450 MHz: TBD
- FOV
 - 70-240 MHz: 20 degrees²
 - 240-450 MHz: TBD
- Survey speed
 - 70-200 MHz: TBD
 - 200-450 MHz: $10^7 \text{ m}^4 \text{ K}^{-2} \text{ deg}^2$

Survey Speed



- Implicit survey speed:
 - 70-240 MHz: $2 \cdot 10^7 \text{ m}^4 \text{ K}^{-2} \text{ deg}^2$
- Keeping sensitivity & FOV constant over whole 70-450 MHz

Connected Requirements (SKA2)



- Sensitivity
 - 70-1450 MHz: $10^4 \text{ m}^2\text{K}^{-1}$
- FOV
 - 70-1450 MHz: 200 degrees²
- Survey speed
 - 70-150 MHz: TBD
 - 150-300 MHz: 10^8
 - 300-460 MHz: $6 \cdot 10^8$
 - 460-1450 MHz: $10^{10} \text{ m}^4 \text{ K}^{-2} \text{ deg}^2$

Survey Speed (SKA2)



- Implicit survey speed:
 - 70-1450 MHz: $2 \cdot 10^{10} \text{ m}^4 \text{ K}^{-2} \text{ deg}^2$

Functional Requirements



- Spectral characteristics
- Sensitivity, FOV, survey speed
- Spatial characteristics
- Systematic errors
- Temporal characteristics
- Polarisation characteristics
- Imaging characteristics
- Monitoring and control
- Observational modes
- Data products

Non-functional Requirements



- Operational requirements
- Engineering design constraints
- Interface requirements

Operational Requirements



- Start up & shut down
- Failure management
- Maintenance
- Disposal Phase

Engineering Design Constraints



- Materials & processes
- Marking
- Power & other utilities
- Accessibility & testability
- Transportability & storage

Principal Science Design Drivers



- Required instantaneous UV coverage
- Frequency profile of
 - Sensitivity
 - FOV
 - Survey speed

Route to SRR



- System SRS needs to be fully aligned with science requirements
- AA SRS will then refer “only” to system requirements as a parent
- Deriving detailed requirements for AA subsystems
- Reduce the 84 TBD/C/V’s to 40
- Fill in verification column
- Fill in gaps

The End

