any) and their functional and physical attributes compared to design and requirements. Configuration Management includes change management, tracking deviations, and establishing and coordinating CIDLs.

~~*4. SKA.TEL.SE.INTERF Interface management*~~

Interface Management contains development and management of interface (hardware and software) requirements, supporting and coordinating their definition. This includes outlining the content of high level Interface Control Documents. Interface Management supports Project Management in setting interface boundaries.

~~*4. SKA.TEL.SE.MODEL Performance modeling and analysis*~~

Performance modeling and analysis contains support to Systems Engineering in evaluating the overall performance of the telescope and establishing high level error budgets.

~~*4. SKA.TEL.SE. COMMISSIONING*~~

TBD

3. SKA.TEL.DSH Dish

Dish includes all activities necessary to prepare the procurement of the SKA dishes, including local monitoring & control of the individual dish in pointing and other functionality, their feeds, necessary electronics and local infrastructure. Dish includes the manufacturing of all components, the shipment and installation on site of each dish (including feeds and other components) and the acceptance testing. Dish does not include the incorporation of existing dishes into the SKA.

4. SKA.TEL.DSH.MGT Dish engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.DSH.SE Dish system engineering

Dish System engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the dish design.

4. SKA.TEL.DSH.STRUC Dish structure

The Dish structure includes all the mechanical, electrical and fluid systems necessary to provide the steerable collecting area of the dish (e.g. pedestal, rotation axes, collecting surface, sub-reflector, mounting surfaces etc.). Dish structure includes the optical design of the dish. Dish structure includes the provision of suitable interfaces for the hosting of either of single pixel feeds or phased array feeds.

4. SKA.TEL.DSH.SPF Dish Single Pixel Feeds and LNAs

Single pixel feeds and Low Noise Amplifiers includes all hardware and software/firmware necessary to provide electromagnetic coupling to the dish optics in both polarisations over a well defined frequency band, and to amplify the signal with minimal addition to system noise. Multiple feed/LNAs may be required to cover the entire frequency range. Single pixel feed includes provision of all the feeds necessary to cover the frequency band. Single pixel feed includes the exchange mechanism to locate the appropriate feed at the focus of the dish.

4. SKA.TEL.DSH.PAF Dish Phased Array Feeds and LNAs

Phase array feed is a closed-packed array of antennae whose outputs are ultimately summed to develop multiple, close-packed feed-beams surrounding the optical axis in both polarizations over a well defined frequency band. Phased array feeds includes the low noise amplifier required for the amplification of the observed signal.

4. SKA.TEL.DSH.RCVR Dish Receivers

Dish receiver takes as RF inout one or more outputs from the feeds/LNAs, amplifies, conditions and digitizes the signals and outputs them in digital format.

4. SKA.TEL.DSH.PROT Dish Prototypes

Prototypes include all activities necessary to design, procure, assemble, integrate prototype systems for the purpose of verification of particular design solutions. Prototypes includes the verification and testing of prototypes. Dish prototypes includes the verification of the integrated dish (including feeds) to demonstrate performance. Prototyping is supported in the field by SKA.OPS.PROT if it is required.

4. SKA.TEL.DSH.LMC Dish Local monitor & control

Dish local monitor and control includes the generation and usage of all signals necessary for the operation of a Dish. Local monitor and control provides standalone capabilities in operating a dish during commissioning and verification. Local monitor and control provides with all information necessary to diagnose problems and the undertake performance based maintenance. Local monitor and control includes all software and hardware necessary to interface with the telescope manager and to permit remote system management.

4. SKA.TEL.DSH.LINFRA Dish local infrastructure

Dish local infrastructure includes all elements that are required by a single dish to operate, e.g. cabling, ducting, local power distribution, cooling units, access control and other installation contained within the dish element. Local infrastructure includes all safety systems necessary to assure the safety of the personnel and hardware involved throughout the lifetime and all operational scenarios.

3. SKA.TEL.LFAA Low Frequency array

Low Frequency Aperture Array is the set of antennae, on board amplifiers and local processing required for the Aperture Array telescope of the SKA. LFAA includes the local station signal processing and hardware required to combine the antennas and the transport of antenna data to the station processing. The local monitoring & control including the software of the aperture array are included. LFAA includes the different types of stations necessary as defined by the baseline reference design.

4. SKA.TEL.LFAA.MGT Low Frequency array engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.LFAA.SE Low Frequency array system engineering Low Frequency aperture array system engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the LFAA design.

4. SKA.TEL.LFAA.AL Low frequency array antenna and low noise amplifier

The LFAA antenna is one element of a station antenna array, whose elements will be used to form one or more dual polarisation beams that define the field-of-view of a station over a well-defined frequency band. The LFAA antenna will be equipped with a low-noise amplifier to amplify the signal with minimal addition to system noise.

4. SKA.TEL.LFAA.SP Low frequency array signal processing

Low frequency array signal processing consists of all the signal processing that takes place inside enclosures in which signals from nearby array antennas are gathered. Processing includes amplification, signal conditioning, digitisation, and one or more levels of beamforming. (The order of these operations is not necessarily specified in the previous statement). Output signals will be transmitted to the signal processing centre via the SADT network.

4. SKA.TEL.LFAA.PROT Low frequency array prototypes

Prototypes include all activities necessary to design, procure, assemble, integrate prototype systems for the purpose of verification of particular design solutions. Prototypes includes the verification and testing of prototypes. Prototyping is supported in the field by SKA.OPS.PROT if it is required.

4. SKA.TEL.LFAA.LINFRA Low frequency array local infrastructure

LFAA local infrastructure includes power and signal distribution within a node. Local infrastructure includes all installations (e.g. surface preparation) needs to support the antennae.

4. SKA.TEL.LFAA.LMC Low frequency array Local monitor and control

LFAA local monitor and control includes the generation and usage of all signals necessary for the operation of an LFAA station and LFAA unit. Local monitor and control provides with all information necessary to diagnose problems and the undertake performance based maintenance. Local monitor and control includes all software and hardware necessary to interface with the telescope manager and to permit remote system management.

3. SKA.TEL.SADT Signal and data transport

SADT includes all hardware and software necessary for the transmission of data and information between the Elements of the SKA. SADT includes the provision of timing. SADT does **not** include local communication between Sub-Elements within a level 3 Element of the SKA.

4. SKA.TEL.SADT.MGT Signal and data transport engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.SADT.SE Signal and data transport system engineering

Signal and data transport system engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the SADT design.

4. SKA.TEL.SADT.SAT Signal and data transport synchronization and timing

The SKA synchronization and timing system will generate and distribute all those signals required to maintain coherence across the array and provide the necessary time stamps and tick interrupts to label data as it flows through the signal chain of the telescope.

4. SKA.TEL.SADT.NWA Signal and data transport network architecture

The signal and data transport network architecture will define and design a physical layer fibre network capable of carrying all the network services required by the telescope. This will include the network services as required by the synchronization and timing, telescope manager, digital data backhaul, central signal processing and science data processing transmission systems.

4. SKA.TEL.SADT.NMGR Signal and data transport network manager

The signal and data transport network manager will provide supervisory functions in order to manage the operation of the physical layer network of the telescope and the all the transmission systems that run over it. The network manager will interface with the telescope manager system for monitoring and control purposes.

4. SKA.TEL.SADT.DDBH Signal and data transport digital data back haul

The signal and data transport digital data back haul system will deliver digital data from the output of a digitizing stage (e.g. a beam-former) in the antenna arrays to the central signal processor.

4. SKA.TEL.SADT.TM Signal and data transport telescope manager

The signal and data transport telescope manager system will provide connectivity between nodes of the telescope and carry telescope manager data between these nodes. It will also provide the means to distribute identified safety critical data as required (e.g. interlocks). SADT telescope manager does not include the workstations and other equipment necessary for control.

4. SKA.TEL.SADT.CSP Signal and data transport central signal processor

The signal and data transport central signal processor network will provide connectivity and transmit data between the central signal processor and the science data processor.

4. SKA.TEL.SADT.SDP Signal and data transport science data processor

The signal and data transport science data processor network will provide the interface at the SDP site for external distribution of the data. SADT science data processor does **not** include transmission of data beyond the SDP site.

4. SKA.TEL.SADT.PROT Signal and data transport prototypes

Prototypes include all activities necessary to design, procure, assemble and integrate prototype systems for the purpose of verification of particular design solutions. Prototypes includes the verification and testing of prototypes. Prototyping is supported in the field by SKA.OPS.PROT if it is required.

4. SKA.TEL.SADT.LINFRA Signal and data transport local infrastructure

The signal and data transport local infrastructure includes all infrastructure that is specific to the signal and data transport Element, such as cable trenching, cabinets and amplifier housings at all facilities and locations of the SKA system. Local infrastructure includes all safety systems necessary to assure the safety of the personnel and hardware involved throughout the lifetime and all operational scenarios.

3. SKA.TEL.CSP Central signal processor

Central signal processor includes the hardware and associated firmware/software necessary for the generation of visibilities, pulsar survey candidates and pulsar timing from the telescope arrays. Central signal processor does not include the buildings, cooling, shielding or power supply to the building. Central signal processor does include the distribution of data within the processor, diagnostic tools etc necessary for the maintenance and operation of the system.

4. SKA.TEL.CSP.MGT central signal processor engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.CSP.SE central signal processor system engineering

CSP System engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the CSP design.

4. SKA.TEL.CSP.CBF central signal processor correlator and central beam former

The Correlator provides auto and cross correlation across the receivers and within each of the components of the SKA to provide integrated full Stokes visibilities for subsequent processing by the Science Data processor. The correlator, for SKA-mid, includes the capability to provide pulsar gating in the form of phase binning in support of astrometry science. The correlator may be instantiated in more than one solution and location depending on the design of the system.

The central beam former provides coherent tied array beams from an array of dishes formed from the central 1-km diameter core of SKA-mid. This functionality is provided in support of the pulsar and timing implemented within the Non-Imaging processing chain.

4. SKA.TEL.CSP.NIP central signal processor non imaging processor

Non-imaging processing provides the signal processing capabilities required for all sky survey principally for the detection of pulsars and subsequent timing of spin-stable and binary pulsars.

4. SKA.TEL.CSP.CLK central signal processor clock and timing

Clock and timing provides and distributes the timing signals required by CSP to operate. Clock and timing receives time from SADT. Clock and timing does not include the generation of the clock signal.

4. SKA.TEL.CSP.PROT central signal processor prototypes

Prototypes include all activities necessary to design, procure, assemble and integrate prototype systems for the purpose of verification of particular design solutions. Prototypes includes the verification and testing of prototypes. Prototyping is supported in the field by SKA.OPS.PROT if it is required.

4. SKA.TEL.CSP.LMC central signal processor local monitoring and control

Local monitoring and control includes all software and hardware that are required to support the operation of the central signal processor system. This includes dedicated software that monitors the performance of the system and ensures that remote diagnostics can be performed.

4. SKA.TEL.CSP.LINFA central signal processor local infrastructure

Local infrastructure includes all necessary equipment and installations required by the central signal processor to operate (e.g. cable ducts, internal networks etc.). CSP local infrastructure does **not** include the provision of buildings and air-conditioning units. Local infrastructure includes all safety systems necessary to assure the safety of the personnel and hardware involved throughout the lifetime and all operational scenarios.

3. SKA.TEL.SDP science data processor

Science Data Processor includes hardware platforms, software, and algorithms needed to process science data from the correlator or non-imaging processor (visibility data or time series data) into science data products.

4. SKA.TEL.SDP.MGT science data processor engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.SDP.SE science data processor system engineering

SDP System engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the SDP design.

4. SKA.TEL.SDP.COMP science and data processor computing platform

The SDP computing platform hosts the processing pipelines and data layer. The platform includes hardware, operating system, SKA-originated software, and third party software. There may be multiple configurations tuned to the different telescopes.

4. SKA.TEL.SDP.DATA science and data processor data layer

The SDP data layer includes all access to data within the SDP Element, responsibility for persistence of data objects.

4. SKA.TEL.SDP.PIP science and data processor pipelines

The processing pipelines include all software for ingesting, calibrating, editing, imaging, cataloguing, and searching to produce science data products. The processing pipelines execute on the SDP computing platform or platforms.

4. SKA.TEL.SDP.PROT science and data processor prototypes

Prototypes include all activities necessary to design, procure, assemble, integrate prototype systems for the purpose of verification of particular design solutions. Prototypes includes the verification and testing of prototypes. Prototyping is supported in the field by SKA.OPS.PROT if it is required.

4. SKA.TEL.SDP.LMC science and data processor local monitoring and control

Local monitoring and control includes all software and hardware that are required to support the operation of the science and data processor system. This includes dedicated software that monitors the performance of the system and ensures that remote diagnostics can be performed.

4. SKA.TEL.SDP.LINFA science and data processor local infrastructure

Local infrastructure includes all necessary equipment and installations required by the science and data processor to operate (e.g. cable ducts, internal networks etc). SDP local infrastructure does **not** include the provision of buildings and air-conditioning units. Local infrastructure includes all safety systems necessary to assure the safety of the personnel and hardware involved throughout the lifetime and all operational scenarios.

3. SKA.TEL.MGR telescope manager

Telescope manager includes all hardware and software necessary to control the telescope and associated infrastructure. Telescope manager includes the co-ordination of the systems at observatory level and the software necessary for scheduling the telescope operations. Telescope manager includes the central monitoring of key performance metrics. Telescope manager includes the provision of central co-ordination of safety signals generated by Elements of the SKA. Telescope manager provides physical and software access to, and at, remote locations for transmission of diagnostic data and local control.

Telescope manager does **not** include local control, whether hardware or embedded software, of units (e.g. individual dishes, beam formers, building control systems). Telescope manager does **not** include the generation of local metrics (e.g. tracking stability of dish, power consumption of LFAA).

4. SKA.TEL.MGR.MGT telescope manager engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.MGR.SE telescope manager system engineering

MGR System engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the MGR design.

4. SKA.TEL.MGR.TELMGR telescope manager telescope management

Telescope management includes all activities for observing with a telescope that are described in terms of the underlying hardware and software subsystems. It includes all aspects of traditional control and monitor of all relevant subsystems.

4. SKA.TEL.MGR.OBSMGT telescope manager observation management

Telescope observation management includes all activities for observing with the telescope that are associated with an astronomically motivated and described observation. Inputs include scheduling block descriptions of observations, and outputs include high data rate products such as visibility data and time series data.

4. SKA.TEL.MGR.PROT telescope manager prototypes

Prototypes include all activities necessary to design, procure, assemble and integrate prototype systems for the purpose of verification of particular design solutions. Prototypes includes the verification and testing of prototypes. Prototyping is supported in the field by SKA.OPS.PROT if it is required.

4. SKA.TEL.MGR.LMC telescope manager local monitoring and control

Local monitoring and control includes all software and hardware that are required to support the operation of the telescope manager system. This includes dedicated software that monitors the performance of the system and ensures that remote diagnostics can be performed.

4. SKA.TEL.MGR.LINFRA telescope manager local infrastructure

Local infrastructure includes all necessary equipment and installations required by the telescope manager to operate (e.g. cable ducts, internal networks etc). MGR local infrastructure does **not** include the provision of buildings and air-conditioning units. Local infrastructure includes all safety systems necessary to assure the safety of the personnel and hardware involved throughout the lifetime and all operational scenarios.

3. SKA.TEL.INFRA Infrastructure

Infrastructure includes all work undertaken to deploy and be able to operate the SKA in South Africa and Australia. Infrastructure includes roads, buildings, power generation and distribution, reticulation, vehicles, cranes and specialist equipment needed for maintenance that are not included in the supply of the other Elements.

Infrastructure does not include access rights to the land, environmental protection or monitoring. Infrastructure does not include protection from external sources of interference.

Infrastructure includes the provision of any site wide safety systems necessary for personnel and equipment safety.

4. SKA.TEL.INFRA.MGT Infrastructure engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.INFRA.SE Infrastructure system engineering

Infrastructure System engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the Infrastructure design.

4. SKA.TEL.INFRA.SITEMON Infrastructure site monitoring

Infrastructure site monitoring includes all activities that design the monitors, analysis and reporting of the relevant parameters of the site (e.g. RFI, tropospheric stability, weather parameters such as wind, temperature, humidity). Site monitoring includes the construction, if necessary, of dedicated prototypes of monitoring stations.

Site monitoring does **not** include the characterisation of the existing sites. Site monitoring does not include the current operations at the remote sites. For the purposes of prototyping site monitoring may be supported by SKA.OPS.PROT.

4. SKA.TEL.INFRA.POW Infrastructure power

Infrastructure power includes the provision of all power needs of the observatory at all the SKA facilities and locations.. Power includes the supply, if required, of uninterruptible power supplies, smoothing of power and the capacity to deal with surges. It also includes the design of the reticulation networks, power conversion and filtering, back-up power, and the full analysis of the entire power SKA system (grid to chip) to ensure highly effective power delivery and consumption. At the remote stations it may include the design of power generation, the design of conversion and filtering, reticulation networks, back-up, uninterrupted supply (if required), and optimisation. It does not include the design of the delivery of the power to the SKA sites and facilities, but will include the collaboration with the suppliers to ensure adherence to RFI requirements (such as buried cable vs overhead). Include the definition and design of the monitoring and control of the power network, and the requirements for infrastructure (such as generator rooms and foundations for transformers)

4. SKA.TEL.INFRA.ACC Infrastructure access

Infrastructure access includes roads, airstrips and all necessary equipment (e.g. signage and control) for the movement of equipment during the construction and operation of the SKA.

4. SKA.TEL.INFRA.WAS Infrastructure water & sanitation

Infrastructure water & sanitation includes all necessary provisions for supply of water and sanitation services for the construction and operation of the SKA and at all the sites and facilities of the SKA. This includes water for fire-fighting, cooling units, bathrooms etc. It does not include provision for drinking water.

4. SKA.TEL.INFRA.BLDS Infrastructure buildings

Infrastructure buildings include all constructions that are necessary to house equipment or personnel of the SKA at all the locations of the SKA. Buildings include the construction and equipment for a first aid station, warehouses, offices, dormitories, canteens. Buildings includes if necessary, the provision of a fuel station for vehicles and garage/maintenance facility. Infrastructure buildings does include the buildings that house computers and power components. Buildings includes the air-conditioning for the buildings as well as the generation of cooling supply for the buildings.

4. SKA.TEL.INFRA.FOUND Infrastructure telescope foundations

Infrastructure foundations includes the ground preparation and foundations necessary to support LFAA and Dish. Infrastructure foundations does **not** include foundations for buildings provided under INFRA.BLDS.

4. SKA.TEL.INFRA.COMMS Infrastructure communications

Infrastructure communications includes the provision of non-science related communications within the SKA site and to the outside world (e.g. telephony, radio or other communications).

4. SKA.TEL.INFRA.VEH Infrastructure vehicles

Infrastructure vehicles includes all dedicated SKA on site vehicles that may be necessary during construction and for maintenance and support of the facility. Infrastructure vehicles does **not** include the provision of fuel for the vehicles.

3. SKA.TEL.AIV Assembly Integration and Verification

Assembly Integration and Verification includes all activities at the remote sites that are necessary to incorporate the elements of the SKA into existing infrastructures whether these be precursors or new components of the SKA. AIV does **not** include design of new components of the SKA.

4. SKA.TEL.AIV.MGT AIV management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.AIV.SE AIV system engineering

AIV system engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance associated with the assembly, integration and verification of the SKA.

4. SKA.TEL.AIV.PRECAUS AIV precursor Australia

AIV precursor Australia includes the creation of the local interfaces with the as built ASKAP telescope and the creation of plans and requirements that will enable SKA to deploy with a minimal distribution to ASKAP operations. AIV precursor Australia includes the provision for support for the design of the infrastructure as well as processing and communications facilities that will interface with the existing equipment.

4. SKA.TEL.AIV.PRECSA AIV precursor South Africa

AIV precursor South Africa includes the creation of the local interfaces with the as built MeerKAT telescope and the creation of plans and requirements that will enable SKA to deploy with a minimal distribution to MeerKAT operations. AIV precursor South Africa includes the provision for support for the design of the infrastructure as well as processing and communications facilities that will interface with the existing equipment.

3. SKA.TEL.MFAA Mid frequency Aperture Array

Mid Frequency Aperture Array includes the activities necessary for the development of a set of antennae, on board amplifiers and local processing required for the Aperture Array telescope of the SKA. MFAA includes the development of local station signal processing and hardware required to combine the antennas and the transport of antenna data to the station processing.

4. SKA.TEL.MFAA.MGT Mid frequency Aperture Array engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.MFAA.SE Mid frequency Aperture Array system engineering

Mid Frequency aperture array system engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the MFAA design.

4. SKA.TEL.MFAA.R&D Mid frequency Aperture Array Research & development

MFAA R&D includes all activities necessary to develop the MFAA concept for inclusion into the SKA telescope. MFAA R&D includes design, analysis, prototyping and associated testing.

3. SKA.TEL.WBSPF Wideband single pixel feeds

Wideband single pixel feeds includes the activities necessary to develop a broad spectrum single pixel feed for the SKA.

4. SKA.TEL.WBSPF.MGT Wide band single pixel feeds engineering management

Management includes all activities necessary to co-ordinate the technical and programmatic work of the consortium according to the statement of work. Management includes the generation and follow-up/updating, of the planning, risk register, financial and manpower resource allocation, reporting at all levels required by the consortium and the statement of work. Management includes the co-ordination of all activities within the consortium. Management, reports to the consortium leader.

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4. SKA.TEL.WBSPF.SE Wide band single pixel feeds system engineering

Wide band single pixel feed system engineering includes the requirements engineering, functional analysis, architecture, allocation, performance budgets, interface management, configuration control, integration, verification, RAM, hazard analysis, logistics, Product Assurance and modeling of the WBSPF design.

4. SKA.TEL.WBSPF.R&D Wide band single pixel feeds Research & Development

Wide band single pixel feed R&D includes all activities necessary to develop the WBSPF concept for inclusion into the SKA telescope. WBSPF R&D includes design, analysis, prototyping and associated testing.