PRE-CONSTRUCTION PHASE, STAGE 1
WORK BREAKDOWN STRUCTURE
AND
STATEMENT OF WORK
GLOSSARY

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LIST OF ABBREVIATIONS

ADD .....Architectural Design Document

AIP .....Advanced instrumentation Programme

BO&E .....Build-out and Evolution

CDR.....Critical Design Review

COAR .....Consolidated Observation Action Register

CoDR.....Concept Design Review

CSP .....Central Signal Processor

DDBH.....Digital Data Back Haul

EMC.....Electromagnetic Compatibility

ICD.....Interface Control Document

ITT.....Integrated Task Team

LEMP .....Logistic Engineering Management Plan

OAR .....Observation Action Register

PDR.....Preliminary Design Review

PEP .....Project Execution Plan

PM.....Project Management

PMP.....Project management Plan

PrepSKA.....Preparatory Phase of the SKA

QA .....Quality Assurance

Rev .....Revision

SaDT .....Signal and Data Transport

SaT.....Synchronisation and Timing

SE.....System Engineering

SEMP .....System Engineering Management Plan

SKA .....Square Kilometre Array

SOW .....Statement of Work

SPDO .....SKA Program Development Office

SRR .....(Sub)System Requirements Review

TBD.....To be determined

UML.....Unified Modelling Language

WBS.....Work Breakdown Structure

WP.....Work Package

WPC.....Work Package Consortium/Consortia

1 Introduction

1.1 Purpose of the document

This document is to define terms used only in a narrow context (see section 1.2 below). The use of a Glossary minimises the repetition of explanatory and clarifying text.

1.2 Scope of the document

This Glossary applies only to the terms used in the SKA Project Execution Plan Phase 1 Work Breakdown Structure and Statement of Work MGT-001.005.010-WBS-001.

2 References

2.1 Applicable documents

The following documents are applicable to the extent stated herein. In the event of conflict between the contents of the applicable documents and this document, **the applicable documents** shall take precedence.

[1] PREPSKA Documentation Standards: MGT-040.010.010-MP-001

2.2 Reference documents

The following documents are referenced in this document. In the event of conflict between the contents of the referenced documents and this document, **this document** shall take precedence.

[2] T. Stevenson, et. al. *SKA Phase 1 System Requirement Specification (SRS)*', –document number WP2-005.030.000-SRS-002
[3] T. Stevenson, '*System Engineering Management Plan*', document number WP2-005.010.030-MP-001, Rev F.
[4] Glinz, Martin. 'On Non-Functional Requirements' Proc. 15th IEEE International Requirements Eng. Conf.
[5] Alexander Kossiakoff, William N. Sweet (2003). Systems Engineering: Principles and Practices p. 413

3 Glossary

When utilised in this document the following terms will take on the meaning as reflected in the table below. These definitions may differ significantly from natural language definitions.

Table 1 Glossary definitions

Term	Meaning in this document and the WBS
Acceptance Plan	A document providing detail of a complete and traceable set of verification and integration activities for determining the compliance against all requirements allocated to a deliverable to the SKA. Similar to a Verification Plan.
Actor	In UML/SysML, a natural person, organisation or other system, outside the subject system, that interacts with it.
Application Programming Interface	Middleware layer components: shared mechanisms used for interaction between multiple software processes.

Architectural Design Document	A document providing a description of the complete logical model of what the system or subsystem must do in order to satisfy applicable requirements with as little as possible (and ideally nothing) said about how the system or subsystem will be implemented.
	Documents the following:
	• External interfaces
	  ○ Unique identifier for each interface
	  ○ Definitions of initial and final conditions
	  ○ Sequence diagrams for all transactions
	  ○ Identification of exceptions
	  ○ Usage restrictions
	  ○ Assumptions including range of variability of parameters associated with each interface. Assumptions are to be replaced by requirements when baselined.
	  ○ Quality aspects of interfaces
	• Structural definitions
	  ○ Structural block diagram (q.v.) identifying the static process blocks at the next level of breakdown (subsystem) including their steady state relationships and flows
	  ○ Identification of process options at subsystem level
	  ○ A rationale for the partitioning
	  ○ A description of verification cases for the proposed structures
	  ○ Assumptions including range of variability of parameters associated with each process block. Assumptions are to be replaced by requirements when baselined.
	  ○ Quality aspects of structures
	• Behavioural aspects
	  ○ Document the expected behaviour of the Architecture via Use Cases
	  ○ Modes and mode transitions
	  ○ Sequence diagrams for all transactions
	  ○ Rationale and analysis of behaviour
	  ○ Test cases
	  ○ Assumptions including range of variability of parameters associated with behaviour. Assumptions are to be replaced by requirements when baselined.

Term	Meaning in this document and the WBS

	• Build-out and Evolution (BO&E) aspects
	  ○ Document interfaces proposed to accommodate BO&E extensions
	  ○ Document proposed structural features proposed to accommodate BO&E extensions
	  ○ Document changes to behaviour features proposed to accommodate BO&E extensions

Architecture	Architecture is the logical arrangement of functional and physical partitions, which for systems of more than modest complexity, is hierarchical. Architecture is a simplified model amenable to visualisation, simulation & analysis. Partitions are often suggested by clear boundaries in Requirements.
Assembly (of the SKA)	Entities of the SKA as contained on the Assembly Level of the SKA hierarchy as defined in the SEMP.
Assumption	A controlled supposition and associated rationale made in the absence of an appropriate parent requirement. Intended to be replaced by a traceable requirement in due course.
Back Projection (a.k.a. Science Case assessment)	A process whereby an SKA design (arrived at by a rigorous requirements driven approach) is assessed in terms of the scope, depth and quality of the science that may be carried out by it, over and above that which set the requirements. The assessment is followed up by postulating small affordable increments in performance and/or functionality which can provide large increments in science return.
Behavioural Model	A model that describes the behaviour of a system or subsystem with sufficient internal detail to interact as required with the external environment. Q.v. environmental model
Boilerplate	Noun or adjective; a document or part of a document which is intended to be widely applicable and perhaps duplicated everywhere it applies. It forms the basis for tailoring (q.v.) where necessary.
Build-out and Evolution (BO&E) extensions	Possible and proposed additions or enhancements to a basic SKA Phase 1, of the following classes: • An increase of receptor area (number of receptors) to that of SKA Phase 2, nominally 1 square kilometre • Any Advanced Instrumentation Programme technology on a scale driven by requirements • The introduction of improved technology whose advent is predicted by agreed roadmaps • The introduction of disruptive technologies not predicted by roadmaps • Others TBD
Calibration	The process whereby the output of a measurement is related back to the value of the measure and, in order that absolute measurements are possible.
Central Signal Processor	The Signal Processing equipment located at the Central Processing Facility including the Correlator, Central Beamformer and Non-Imaging Processor
Combined Network	The SKA network carrying Digital Data Back Haul (DDBH), Synchronization & Timing (SaT) & Telescope Manager (TM) network services
Component (of the SKA)	Entities of the SKA as contained on the Component Level of the SKA hierarchy as defined in the SEMP. The Component level is the second lowest level in the hierarchy immediately above Part.
Commissioning	The process which establishes routine operations of the Observatory. It runs concurrently with the latter part of Verification (q.v.) and includes Acceptance. It allows the refinement of procedures, software etc primarily to maximise performance and perhaps functionality over and above requirements.

Term	Meaning in this document and the WBS
Concept of Operations (ConOps) Document	A user-oriented document that describes a system's operational characteristics from the end user's viewpoint
Configuration	Dependent upon context: 1 The geometrical arrangement of receptors in an interferometric array 2 A list of entities in a system and a description of their relationships, together with their key attributes, such as design status, build status, maintenance status and operating status The use of qualifiers – 'Array Configuration', 'System Configuration' – is recommended. C. F. 'Topology'.
Context Diagram	System Context Diagrams are diagrams used in systems design to represent all external factors and actors that interact with the system at hand. This type of diagram[1] pictures the system at the centre, with no details of its interior structure, surrounded by all its interacting systems, environment and activities. The objective of a system context diagram is to focus attention on external factors and events that should be considered in developing a complete set of system requirements and constraints".
Control Activities	Project Management, System Engineering and Quality Engineering (subsumed into SE)
Constraint Requirement	Constraints are global requirements on the project or design and are expressed in the same way as any other requirement.
Costing Strategy	A document, baselined at System CoDR, which provides the framework for all costing activity in the SKA Project. To be found at http://wiki.skatelescope.org/pub/SKACosting/WebHome/SKACosting_strategy_MGT-040.070.000-MP-001C.pdf
Cost Model	A model of either an aggregate of or an individual of: • Project Cost – the cost of developing SKA • Capital Cost – the cost of manufacture, assembly and verification of SKA • Operating Cost – the cost of operating and sustaining SKA once delivered to the users
Customer	The SKA Project Office or a higher tier contractor
Design	(Noun) A specific implementation which combines technologies into a Product. A Design is the last stage of development of a Product or prototype prior to the preparation of a production data set. Architecture is expressly excluded in the context of this WBS. Designs reflect not only requirements, but other constraints and conditioning factors such as cost, availability of materials and tools and engineering culture. (Verb) To create a Design or (sometimes) an Architecture. The latter usage is to be discouraged unless qualified.
Design Specification	A document providing complete definition of an item such that the item can be designed against the document. Primarily based on the derived requirements for the item including traceability and supportive text and diagrams.
Derived Requirement	A requirement that is created as the result of architecture being established, and one or more higher requirements being levied upon an entity in that architecture.

[1] Alexander Kossiakoff, William N. Sweet (2003). Systems Engineering: Principles and Practices p. 413

Term	Meaning in this document and the WBS
Development System	(q. v. Verification System) In general, a Development System is a combination of hardware and software built to develop or to demonstrate certain technologies, their integration and environmental design for the purposes of reducing technical risk. Where the programme is incremental, successive systems approach the final design for SKA but do not necessarily constitute it completely. Development systems are key to the process of technology maturation, and play a central role in the creation of evidence in support of Technology Readiness Assessment (see Technology Readiness Report).
Disposition	Verb – to finalise a decision making process, by weighing up evidence and deeming a proposal as accepted or denied. Noun – the final status of a proposal, ie accepted or denied
Domain	Management groupings of work, technologies and disciplines which allow oversight by SPO staff of defined technical expertise. Not synonymous with Element or any other Architectural, Product or Functional entity.
Domain Group	A group, convened and led by the SKA Organisation, assembled to provide a discussion or problem-solving forum for situations in which technology, system engineering, or management approaches are deployed in different parts of the project. The members provide mutual advice to the participants within the Domain Group, further communication and domain expertise learning, provides recommendations to the project in cases where specific advice is needed and/or sought by the project, and can identify tasks to be executed within ITTs or within the Elements themselves.
Element (of the SKA)	Entities of the SKA as contained on the Element Level of the SKA hierarchy.
Engineering Network	A Network – specifically for the purposes of testing and commissioning equipment or in-service development trials.
Engineering Resource	A resource managed at System and/or subsystem level whose utilisation in quantity during operations has design and operating cost impacts. Examples are: • Electrical power • Water • Processor cycles
Environment	1. Aspects of the physical surroundings including but not limited to temperature, humidity, EMC etc. 2. That which is external to the boundary defining a system or subsystem. C.f. Environmental Model. 3. The set of items required to support a software application including but not limited to operating system, middleware, development tools, libraries and compiler
Environment Model	A model that represents the boundary between a system or subsystem and that which is external to it, to include a context diagram, an event list and a description of purpose.
Ergonomics	A design discipline concerned with human interfaces.
Exception	Special conditions that change the normal flow of executions.
Executor	A software product that provides real time control and monitoring of a collection of software/hardware entities with an interaction interval of no shorter than a few seconds. In the context of SKA, the collection of entities will constitute the telescope.
Exposed (environment)	An uncontrolled operating environment. The definition of the environment must be given with respect to the possible values of design driver parameters to allow analysis, test, review or demonstration.

Term	Meaning in this document and the WBS
Extensibility	A system design principle where the implementation takes into consideration future growth of the system. It is a systemic measure of the ability to extend a system and the level of effort required to implement the extension.
Extra-SKA	External to the SKA.
First Draft	Complete in structure, with less than 20% undefined, undetermined or unconfirmed text.
Functional Requirement	A requirement that dictates the functionality or performance that must be provided in direct support of the functional objective of the system without considering physical constraints[2]
Housed (environment)	A fully controlled operating environment, with regard to temperature, humidity, contaminants, power quality, RFI, security, etc. The definition of the environment must be given with respect to the permissible values of the controlled parameters to allow analysis, test, review or demonstration.
Interface Control Document (ICD)	Interface control documents are a key element of systems engineering that define and control the interface(s) of a system, and thereby bound its requirements. An ICD provides a complete definition of a physical interface to some external potential or actual user of that item such that the interface can be designed against the document. The document is primarily based on the derived requirements for the interface including traceability and supportive text and diagrams.
Integrated Task Team (ITT)	A Team, led by the SKA Organisation, but with members drawn from two or more Consortia, tasked with guiding the implementation of development areas which span two or more Elements and are more complex than simple engineering interfaces.

Integrated Logistics Support Plan (ILSP)	A plan which outlines the detailed approach to be taken to provide supply and re-supply to the SKA throughout the project lifecycle. It includes, but is not limited to, the following:
	• Staff-effort requirements and personnel
	• Supply support
	• Test equipment and support
	• Training and training equipment
	• Technical data input requirements
	• Computer resource support, incl. both hardware and software
	• Logistics
	  ○ Packaging, incl. requirements, supply of and use
	  ○ Handling, incl. loading/unloading equipment
	  ○ Storage, incl. capacity and environment requirements
	  ○ Transportation
	  ○ Consignment tracking and inventory management
	• Facilities
	• Standardisation and interoperability requirements

Integration	The process, whether analytical or actual, of assembling entities. Analytical integration provides the means by which the entities can be made to work correctly and optimally together by necessitating changes to design. Physical integration is the process of building up a system, implicitly in the optimum way, usually hierarchically.
Inter-Element	Between Elements
Intra-Element	Internal to an Element
Middleware	Middleware is computer software that provides services to software applications beyond those available from the operating system. It provides a level of abstraction

[2] Using the Glinz concern based taxonomy, this is a combination of Functional & Performance Requirements.

Term	Meaning in this document and the WBS
	from the operation system for the software application and as such facilitates portability.
Model	A conceptual, mathematical, or sometimes physical representation of a Product that is amenable to visualisation, analysis, simulation or test. Models exist whereby the development and testing of architectures and designs may be carried out in short order and at low cost compared with the construction and test of full Products. Models invariably embody a subset of the features, scale, behaviour, functionality or other attributes of a fully built Product; that is to say that they are of limited fidelity.
Network Topology	The physical location of items in the observatory and the interconnectivity between them.
Non Functional Requirement	A requirement other than a Functional Requirement[3]
Part (of the SKA)	Entities of the SKA as contained on the Part Level of the SKA hierarchy as defined in the SEMP. The Part level is the lowest level in the hierarchy
Physical Interface	The physical manifestation of the region in which entities interact. The term encompasses such mechanical considerations as connector types, electrical considerations such as impedances, thermal considerations such as cold finger temperatures, optical considerations such as f-number, etc.
Physical (Parametric) Model	A model of a system or subsystem which represents the variation of functional and performance characteristics with design or technology choices and constrained by a (possibly variable) set of non-functional requirements.
Physical Model	See Physical (Parametric) Model
Portability	The portability of an item is its ability for reuse within different environments
Procurement Specification	A document providing complete definition of an item such that the item can be procured against the document. Primarily based on the derived requirements for the item including traceability and supportive text and diagrams.
Product	An item of hardware or software, or a service which constitutes a part of the as-delivered SKA and its operation. Interim products of development, such as engineering models or test fixtures, can be included, but they are not members of the Product breakdown of the SKA.
Product Assurance	A discipline which is intended to provide sustained and sustainable conformity to requirements in a product or service. A subset of Quality Assurance (q.v.)
Production Network	A network specifically for the purposes of regular operational use in telescope observations and their preparation.
Promulgate	To raise awareness of something (a document) by publication, distribution, presentation and explanation.
Quality Assurance	A discipline which is intended to provide consistency of performance, functionality and behaviour in an organisation.
Scenario	A step-by-step description of a series of events and Use Cases that may occur concurrently or sequentially
Receiver (in the context of dishes)	From a functional perspective, a dish receiver (sub-system) is that part of the RF chain that begins at the output of the Feed/Low Noise Amplifier sub-system and ends at the digital output of the Analogue to Digital Converter.
Requirements Allocation	The process whereby a Requirement levied at a certain level in a Product or Functional Breakdown is made applicable to the next level of breakdown. This may be by simple repetition, unchanged, or may be by a complex process (analytical or arbitrary). Where the satisfaction of a higher level requirement will be achieved by

[3] Translating to Glinz, these are Specific Quality Requirements, Constraints & Attributes

Term	Meaning in this document and the WBS
	the satisfactory performance and functionality of several lower level entities, new requirements must be established on each by allocation.
Roll-out	Broadly, the managed and progressive deployment/release of hardware, software and procedures with little or no open development work remaining. Suggestive of a series of multiple deployments with the same modification state.
Sequence Diagram	An interaction diagram that shows how processes operate with one another and in what order. Standardised within UML and SysML.
Simulated Environment	In the context of Technology Readiness Level (q.v.) assessment, simulation or emulation is required where the environment in which the technology is intended to operate (either natural or system or both) is not available.
Stakeholder	A person or organisation that interacts with an item and is positively or negatively affected by its existence or operation.
Standardisation	The process whereby a common solution is proposed for a common problem.
State machine	A state machine is an abstract machine that can be in one of a finite number of states at any one time. It can change from one state to another when initiated by a triggering event or condition.
Statement of Work (SOW)	A pro-forma document providing details relating to each 'leaf' of the WBS. The details provided are an identification, a long description, a list of inputs, a list of tasks and a list of outputs or deliverables.
Structure	Structure defines the things that must be present in a system and the relationship between them. It is closely allied to architecture but has specific meaning within the UML and SysML standards
Structural Block Diagram	Structure diagrams emphasise the things that must be present in the system being modelled. Whilst their use is not mandatory for SKA, the SysML and UML languages define a set of diagrams for system and software modelling respectively that can be used to represent structure: <u>SysML</u> • Block Definition diagram: represents structural elements called blocks and their composition and classification and is a modification of UML class diagram • Internal Block Diagram: represents interconnection and interfaces between the parts of a block and is a modification of UML composite structure diagram • Parametric Diagram: represents constraints on property values, such as F=m*a used to support engineering analysis (not in UML) • Package Diagram: represents the organisation of a model in terms of packages that contain model elements same as UML package diagram <u>UML</u> • Class diagram: describes the structure of a system by showing the system's classes, their attributes, and the relationships among the classes. • Component diagram: describes how a software system is split up into components and shows the dependencies among these components. • Composite structure diagram: describes the internal structure of a class and the collaborations that this structure makes possible. • Deployment diagram: describes the hardware used in system implementations and the execution environments and artifacts deployed on the hardware. • Object diagram: shows a complete or partial view of the structure of an example modelled system at a specific time.

Term	Meaning in this document and the WBS
	• Package diagram: describes how a system is split up into logical groupings by showing the dependencies among these groupings.
Structural Model	An abstracted conceptual, representation describing the processes and their relationships that combined form the definition of a static aspect of a system or subsystem.
Sub-Assembly (of the SKA)	Entities of the SKA as contained on the Sub-Assembly Tier of the SKA hierarchy as defined in the SEMP.
Sub-System (of the SKA)	Entities of the SKA as contained on the Sub-System Tier of the SKA hierarchy as defined in the SEMP.
subsystem (no capitals)	General term - a partition of any high level entity.
Supplier	A Work Package Contractor (includes subcontractor).
Sustaining Engineering	Maintenance and logistics. In this context, this includes the logistics necessary for initial deployment.
System Modelling Language (SysML)	A general purpose modelling language for systems engineering applications, specified as a profile (dialect) of UML, see, for instance, http://www.sysml.org/
Task	The lowest level of work breakdown in this particular WBS; also work package.
Tailoring	Verb or noun; a process whereby a document, procedure, plan or policy is amended to suit particular circumstances. Tailoring is allowed only if justification exists. C.F. boilerplate.
Technology Readiness Level (TRL)	A formal way of describing the maturity of a technology (as opposed to a system or subsystem) which results from demonstrating its functionality and performance in a series of increasingly realistic 'real-world' contexts ranging from analysable concept, through laboratory experimentation, simulated environments (q.v.) to fully representative operation as a component of a product designed for the intended end use. The formal process of signifying transition from one level to the next is called Technology Readiness Assessment.
Technology Readiness Report	A document used in the formal process of Technology Readiness Assessment (see Technology Readiness Level). It contains the following information (for Technology Readiness Level 5): A. A clear description of the new technology, including the design of demonstrations performed and explanation of how the testing environment is relevant to the expected operational environment. B. Documentation presenting customer-focused applications functionality and resulting performance metrics that were used to drive the selection of technology demonstrations, including definition of appropriate concepts of operations and operational environments for the prospective applications. C. Identification and detailed descriptions of any or all demonstrations and/or analytical studies that have been performed, upon which the feasibility of the technology depends. Delineation of any and all references documenting the results of analysis and modelling, performed demonstrations, as well as any experimentation or demonstrations performed by others that establish the technical and/or economic feasibility of new technology. D. Compelling arguments that indicate likely connections between the component and/or breadboard demonstrations performed in a relevant environment and yet-to-be-performed demonstrations at higher levels of integration (e.g., systems-level), in relevant and/or operational environments. An evaluation of the

Term	Meaning in this document and the WBS
	technical risk (Low, Medium, High), and required effort (Low, Medium, High) to advance to the next TRL level.
Technology Roadmap	A controlled document or data base at system level collating, in a consistent manner, the projected evolution of technology types being proposed by candidate implementations.
Telescope Manager (TM)	The telescope manager integrates operationally all the engineering entities in the system to form the telescope device, with a set of capabilities and behaviours. Its core functionality is coordination, monitoring, control and engineering lifecycle support for the entities to work together as a single instrument that can conduct observations.
Template	The structure of a document, providing the section headings and (sometimes) guidelines as to content.
Tier (of the SKA)	Individual layer of the SKA product hierarchy as defined in the SEMP.
Topology	The spatial arrangement of entities described in such a way as to emphasise the connections between them rather than their geometrical relationships or locations. C. f. 'Configuration'.
Touchpoint document	A semi-formal document which sets out the relationship amongst organisations and stakeholders; in this case between a developer of services and a user of services. When formalised, it leads to requirements and perhaps Interface Control Documents.
Traceability	The degree to which a relationship can be established between two or more products of the development process, especially products having a predecessor-successor or master-subordinate relationship to one another.
Traceable	Having characteristics whose origin can be objectively determined
Trade Study or Tradeoff	A process whereby architectural or design solutions are compared with a view to ranking and selection. It uses as inputs a set of key attributes, the values of these attributes for the candidate options and a weighting scheme. The process produces a set of scores which may be used as a figure of merit to aid selection. A process applied at Element level is more fully described in WP2-005.010.030-MP-004-1.2 SKA Science-Technology Trade-Off Process
Transportability	Requirements associated with the transportation of SKA items.
Unified Modelling Language (UML)	A graphical language for visualising, specifying, constructing, and documenting a system's artifacts, developed by the Object Management Group (OMG): see for instance http://www.omg.org/spec/UML/2.4.1/
Use Case	In UML, a complete task of a system that provides a measurable result of value for an actor
Validation	The process whereby Requirements are shown to lead to the expected functionality and performance.
Variability	Providing the range of values a parameter might be within when the precise value is not known
Verification	1 The process whereby the design or the manufacture/construction of a Product is shown to be compliant with Requirements Alternatively: 2 A programme of progressively specifying, developing and demonstrating aspects of a design deemed to be high risk and therefore worthy of early development effort. The process involves the rational selection of design and technology options. The overall design is initiated against assumptions which are progressively replaced by traceable requirements.
Verification Plan	1 A document providing detail of a complete set of verification and integration activities for determining the compliance against all

Term	Meaning in this document and the WBS
	requirements allocated to a deliverable to the SKA. It emphasises: • The comprehensiveness of verification, showing that every requirement applicable at the relevant level will be verified by test, inspection, review or analysis • The order of verification, so that the carrying forward of risk is minimised, and the level of integration needed for verification of each requirement • The early identification and specification of extra hardware/software ('simulators') and facilities required for verification Alternatively: 2 A plan outlining the objectives and success criteria for a developmental verification (q.v. Verification 2) programme: a. A definition of the Requirements for which the necessary design features/technologies are being developed, including any initial assumptions. b. A description of the design options that are being examined/demonstrated c. A description of the verification systems, including those parts which are not being verified and those design features that must be incorporated in order that two or more design options may be demonstrated/verified at minimum cost d. A description of the models to be validated by the programme and the tests and measurements that will be carried out to accomplish this. e. A description of the limitations and constraints that exist solely for this development activity which will not apply for SKA f. A description of the approach to be taken in quantifying and eliminating the effects of the non representivity of the verification programme designs, environments and tests. g. A schedule showing the milestones by which designs will be verified as being compliant with requirements. Examples of such milestones are the SKA PDR or CDR.
Verification System	In the context of the SKA, a Verification System is a combination of hardware and software built to develop or to demonstrate certain technologies, their integration and environmental design for the purposes of reducing technical risk. Where the programme is incremental, successive systems approach the final design for SKA but do not necessarily constitute it completely. For this reason, Verification Systems do not provide Verification in the classical sense, except in limited areas of design which must remain unchanged along with their integration environment. As early developments, the design of Verification Systems is driven initially by assumptions. Progressively, these assumptions are replaced by flowed down and allocated SKA requirements, and design changes become necessary.
WBS element or Work Element	A member of the hierarchy of the WBS, irrespective of level.
Weighting	A multiplicative factor combined with a key attribute score in a Trade Study, in order to provide priority or emphasis to that key attribute over others.
Workpackage	A grouping of Tasks, subject to a single contract/agreement between the SPO and a Work Package Contractor.