

SEVENTH FRAMEWORK



PROGRAMME

## GO-SKA

Coordinating & supporting policy development of  
the global organisation of the Square Kilometre Array

### *FP7-CAPACITIES*

Coordination and Support Actions  
(Coordinating Action)

**Type of funding scheme:** Coordination and Support Actions

**Work programme topic addressed:** FP7-INFRASTRUCTURES-2011-1

**Call Topic:** INFRA-2011-3.2: Coordinating actions, conferences, and studies supporting policy development, including international cooperation, for research infrastructures in all fields of S&T.

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**List of participants**

<b>Participant no.</b>	<b>Participant organisation name</b>	<b>Part. short name</b>	<b>Country</b>
1 (coordinator)	Netherlands Organisation for Scientific Research	NWO	NL
2	Science and Technology Facilities Council	STFC	UK
3	Istituto Nazionale di Astrofisica	INAF	IT
4	Max Planck Gesellschaft	MPG	DE

**Estimated budget**

<b>Participant number</b>	<b>Short name</b>	<b>Organisation country</b>	<b>RTD</b>	<b>DEMO</b>	<b>SUPPORT</b>	<b>COORD</b>	<b>MNGMNT</b>	<b>OTHER</b>	<b>TOTAL</b>	<b>TOTAL RECEIPTS</b>	<b>REQUESTED CONTRIBUTION</b>	<b>EC</b>
1	NWO	NL	0	0	0	291.640	122.565	0	414.205	0	390.194	
2	STFC	UK	0	0	0	245.060	11.724	0	256.784	0	177.558	
3	INAF	IT	0	0	0	300.720	0	0	300.720	0	217.669	
4	MPG	DE	0	0	0	331.700	0	0	331.700	0	214.482	
<b>Total</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>1.169.120</b>	<b>134.289</b>	<b>0</b>	<b>1.303.409</b>	<b>0</b>	<b>999.902</b>	

**Abstract**

The Square Kilometre Array (SKA) is a revolutionary telescope programme that will address a broad range of key science areas in astronomy and fundamental physics. For the past 2.5 years, radio astronomers and funding agencies have joined forces to explore the legal, policy, and technical framework required for the SKA in a Preparatory Phase study called PrepSKA. The principal deliverable of the PrepSKA project is an implementation plan that forms the basis of a funding proposal to governments to start the construction of the SKA.

The end of PrepSKA is now approaching, and a number of major decisions need to be made so that the international SKA project can progress to the Pre-Construction Phase (2012-15). These decisions include approval of funding for the Pre-Construction activities, the establishment of a legal entity for the SKA Organisation, and the selection of the SKA site.

The decisions and the ensuing developments will have significant impact on the organisation of the SKA project and raise new topics to be investigated, in order to narrow down and implement the governance, funding and procurement options delivered by the PrepSKA policy work packages. The purpose of this proposal, called GO-SKA, is to investigate and provide guidance at policy-level to the global SKA, so that it can prepare the international SKA organisation for construction and operation of the SKA in 2016. Whereas PrepSKA has assembled the best options for SKA, GO-SKA will focus on the further development and implementation during the next stage of development of the SKA.

**GO-SKA will:**

1. broaden and strengthen the involvement of funding agencies and governments around the globe
2. establish world-wide partnerships between industry and SKA
3. prepare the establishment of global governance for the SKA organisation
4. develop strategies to further define the conditions by which non-scientific benefits from large scale research infrastructures can best be integrated into investment decision-making

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# 1. Scientific and technical excellence

## 1.1 Concept and objectives

### ***Building the largest radio telescope in the world***

The aim of this proposal, GO-SKA, is to create a programme of work that supports the policy development, matures the global organisation, and broadens the linkages of the European and global collaboration of an innovative large research infrastructure, the Square Kilometre Array (SKA). Once it becomes operational, the SKA will be the world's largest multi-purpose radio telescope. It will play a major role in answering key questions in modern astrophysics and cosmology. The SKA global research infrastructure is estimated as a 1.5 B€ project. The SKA will be an international and innovative mega science project that aims to realise a radio interferometer with a collecting area of 1 million square metres, approximately two orders of magnitude larger than any currently existing radio telescope (see [www.skatelescope.org](http://www.skatelescope.org) for more details). It will provide astrophysicists and cosmologists with a transformational view of the Universe. For the location of the SKA telescope South Africa and Australia are selected as candidate sites. The final site selection will take place in 2012.

The SKA is one of the research infrastructures on the ESFRI roadmap and has been marked as a truly global project. The SKA is also a priority on the European ASTRONET roadmap and in several national research infrastructure roadmaps and science plans. In a recent (May 2010) update of the implementation of the ESFRI roadmap, the SKA was acknowledged as a project that has made sufficient progress and has clear commitment from several EU Member States.



**Figure 1: artist impressions of the core of the SKA (credit: Swinburn Astronomy Productions)**

A preparatory study for the SKA, called PrepSKA (“A Preparatory Phase proposal for the Square Kilometre Array”) has already been funded by the European Commission under the FP7 programme. This study started in April 2008 with the aim of integrating the R&D work from around the globe in order to develop the fully-costed design for Phase I of the SKA, and a deployment plan for the full instrument. The other aim of PrepSKA was to investigate, with active collaboration between funding agencies and scientists, all policy-related questions. The principal deliverable of the PrepSKA project is an implementation plan that forms the basis of a funding proposal to governments to start the construction of the SKA. The three PrepSKA policy

work packages investigate the legal framework and governance, the procurement and industrial involvement, and the funding model for the SKA.

The end of the PrepSKA project is nearing, and within the next few months a number of major decisions for the SKA project need to be taken to ensure that at the end of 2011 the international SKA project can progress into the Pre-Construction Phase (2012-2015). These decisions include:

- the approval of funding for the completion of the Preparatory Phase and for the execution of the Project Plan (PEP)
- the establishment of a legal entity for the SKA Organisation during the pre-construction phase
- location of the SKA Project Office

The decisions and the ensuing developments will have a significant impact on the organisation of the SKA project and raise new topics to be investigated and agreed upon, in order to allow the narrowing down and the implementation of the governance, funding and procurement options delivered by the PrepSKA policy work packages.

### ***The next step: GO-SKA***

This proposal, called GO-SKA, is being put forward by four national funding and research agencies, which are keen to take the next essential supporting step in the creation of a fully functional SKA. GO-SKA, with a duration of 36 months, will build on PrepSKA deliverables. The work of the PrepSKA policy work packages has advanced the realisation of the Agencies SKA Group (ASG) and has been having a positive impact on the involvement of funding agencies in the SKA project. The policy work packages have provided guidance to many discussions on policy topics in the ASG and input to several work streams initiated by the ASG. Whereas PrepSKA has assembled the best options for SKA, GO-SKA will focus on the further development and implementation during the next stage of development of the SKA: the pre-construction phase.

GO-SKA's primary aim is to investigate and provide guidance at policy-level to the global SKA, so that it can prepare the international SKA organisation for the construction and operation of the SKA in 2016.

GO-SKA will:

5. broaden and strengthen the involvement of funding agencies and governments around the globe
6. prepare the establishment of global governance for the SKA organisation after the site has been selected. This process needs to be aligned with the requirements of (new) funding parties, industrial partnerships, and the further development of the project.
7. establish world-wide partnerships between industry and the SKA
8. develop strategies to further define the conditions by which non-scientific benefits from large scale research infrastructures can best be integrated into investment decision-making and communicate the advancement of knowledge for the benefit of mankind

GO SKA will achieve this by:

1. building a globally coordinated collaboration for the construction and operation of the SKA telescope
2. the development and implementation of the global governance for the construction and operation of the SKA telescope
3. the development and implementation of a global approach to industry engagement for the construction and operation of the SKA telescope

4. the development of the SKA project as a tool to address global challenges

The main deliverables of the GO SKA project will be:

1. Establishing new states as potential members in SKA Organization.
2. A Draft Implementation Agreement for the Construction and Operation of the SKA telescope.
3. A Draft Collaboration Agreement for a global SKA Industrial Consortium.
4. An up to date Business Plan related to the opportunities for the emerged themes and lessons learned from other large scale projects.

## 1.2 Progress beyond State-of-the-Art

### *Development status of the Square Kilometre Array*

The SKA is a major driver for science and innovation and should be considered an iconic project for global cooperation in many frontier domains of the 21<sup>st</sup> century. The SKA offers an enormous potential not only in terms of increasing our understanding of the universe, but also for exploring technologies of communication and innovation (like e-science, testing of viable green energy supply and science-industry-government linkages and human capital development (attract and educate people) which will be further explained in the chapter on 'Impact'. The implementation of the SKA will be phased. The phasing of SKA has recently been defined in more detail, with SKA Phase 1 (SKA<sub>1</sub>) as the initial (10%) deployment of the array at low and mid-band frequencies, costing 350 M€ (in 2007 currency units) and SKA Phase 2 (SKA<sub>2</sub>) as the full collecting area at low and mid-band frequencies (~70 <Hz to 10 GHz). Phase 3 (SKA<sub>3</sub>) will see the implementation at higher frequencies, of up to 25 GHz or more.

Over the past decade, funding organisations and research institutes in and beyond Europe committed large investments in the development of pathfinder projects for the SKA. The two selected candidates for hosting the SKA telescope, South Africa and Australia, have invested greatly in the development of the precursor telescopes Meerkat (South Africa) and ASKAP (Australia), which are currently under construction at the proposed core sites. Scientists from around the globe have been joining forces to collaborate on the development of the SKA project for many years. The global radio astronomy community has been engaged in the development of the system design for the SKA as a major part of the Preparatory Phase of the project, which included the EC funded PrepSKA project (start: 2008). The next phase - starting in 2012- is called the Pre-Construction Phase and will:

- 1) progress SKA design to the point that Production Readiness Reviews have been successfully completed and contracts for construction of major sub-systems have been let
- 2) advance the infrastructure roll-out on the selected site to the point where sub-systems can be deployed
- 3) mature the SKA legal entity into an organisation capable of carrying out the construction, verification, and operation of the telescope.

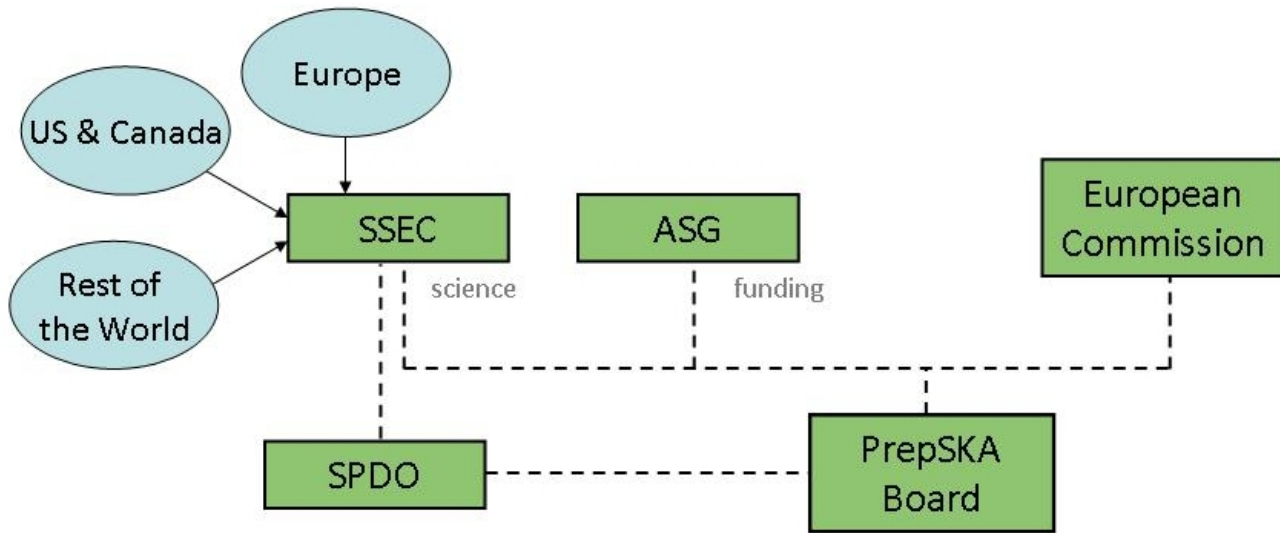


Figure 3: Overview of the current SKA organisation. The SSEC consists of three consortia.

### ***Restructuring the organisation of the SKA for the next phase***

The SKA is a global bottom-up science project with strong commitment from the science community, with Europe and the US leading the collaboration as equal one-third partners and with strong involvement of both candidate countries for hosting the SKA, Australia and South Africa. The European and global partners collaborate on a variety of technical, R&D and policy issues. Since the preparatory phase of SKA started in 2008, much effort was given to strengthen and broaden the international cooperation of interested parties in the SKA project. Currently, the main overseeing body is the SKA Science and Engineering Committee (SSEC), comprising 24 members with equal numbers of members from the US, the European and the Rest of the World Consortia. SSEC members jointly funded the SKA Project Development Office (SPDO) hosted by the University of Manchester (UK).

The existing organisational agreements for the SKA are limited in scope and duration, and will expire by the end of 2011. At the same time, there is a strong desire to expand the collaboration and establish more formal links and relationships beyond those which currently exist, moving to the point of formal negotiation on possible routes to progress. These types of relationships have been highlighted as a critical area for concentrated effort by the PrepSKA work package examining possible funding strategies, as they offer a route to new sources of funding. These in turn may be critical if the full scope of the SKA is to be realised. One been identified as the highest priority target for the establishment of new partnerships, and has been highlighted as a critical area for concentrated effort by the PrepSKA work package examining possible funding strategies.

Other areas for examination focus on the establishment of the international and legally constituted collaboration, including the initial governance and legal entity for the SKA during its pre-construction phase and the evolution of the global governance for SKA as it moves on to the decisions for construction of SKA<sub>1</sub> and SKA<sub>2</sub>. This includes the organisational aspects of the e-infrastructure character of the SKA facility, the entrance of new parties in the SKA organisation, possible formal links between a future SKA governance and the EU, and how a European 'bloc' might be coordinated (including links with other global governance

initiatives). Other areas for study in this project include the organisation of global SKA industry parties and the development of a plan that maximises the potential for wider socio-economic benefits from the project in addressing the major challenges faced by our world.

***Overall ‘beyond-state-of-the-art’ GO-SKA objective***

It is therefore clear that a new governance structure is needed. An initial legal entity for the SKA organisation during the pre-construction phase is expected to be in place before the end of 2011. The overall objective of this GO-SKA proposal is to provide support to the further evolution of the global SKA Organisation in close collaboration with the ASG (or its successor, the board of the initial legal entity for the SKA) and the SKA project management (currently the SSEC and the SPDO). Because of the global character of the work in GO-SKA and the aim to support the further policy development of the SKA project, these linkages and this collaboration are crucial and they will be ensured by the management of the GO-SKA project. It is important to note that the GO-SKA proposal has already been endorsed by the SSEC and ASG<sup>1</sup>. The representatives of funding agencies and governments represented in the ASG will be invited to become an associate partner (non-beneficiaries) in the GO-SKA project and to participate in all the activities of the GO-SKA work packages.

***Responding to European research infrastructure needs***

As already mentioned, only through continued international scientific, political, financial and legal cooperation will it be possible to build this unique research infrastructure. The nature of the facility and the international cooperation during its creation, will allow European researchers to access and make full use of the radio telescope’s capabilities. It will also by default encourage European researchers to participate in future joint research activities (within Europe and also with institutes outside Europe) related to the use of the SKA and foster more international networking opportunities. A more detailed explanation of how this project is building on other national and international research activities, the contribution of this project to European policy ambitions and the need for European funding for GO-SKA, can be found in chapter 3 (‘Impact’).

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<sup>1</sup> The GO-SKA proposal is endorsed by the Agencies SKA Group (ASG) (Annex @ Letter of support from the ASG chair, Prof. John Womersley) and the SKA Science & Engineering Committee (SSEC) (Annex @ Letter of support from the SSEC chair, Prof. Michael Garrett).

## **1.3 Work plan**

### ***1.3.1 Overall strategy of the work plan***

The GO-SKA project comprises five work packages, each with distinctive tasks and measurable deliverables. Each partner will manage one of the work packages. The project coordinator will ensure the smooth exchange of information and project results between partners/work packages. The GANTT chart provides a clear overview of the timing of each task. The coordinator will closely monitor progress of tasks and the timely completion of the deliverables. Any gaps or delays will be discussed on a monthly basis between the coordinator and the work package leaders (as further explained in chapter 2) with the aim of ensuring that no delays occur as a result of a delay in any given task.

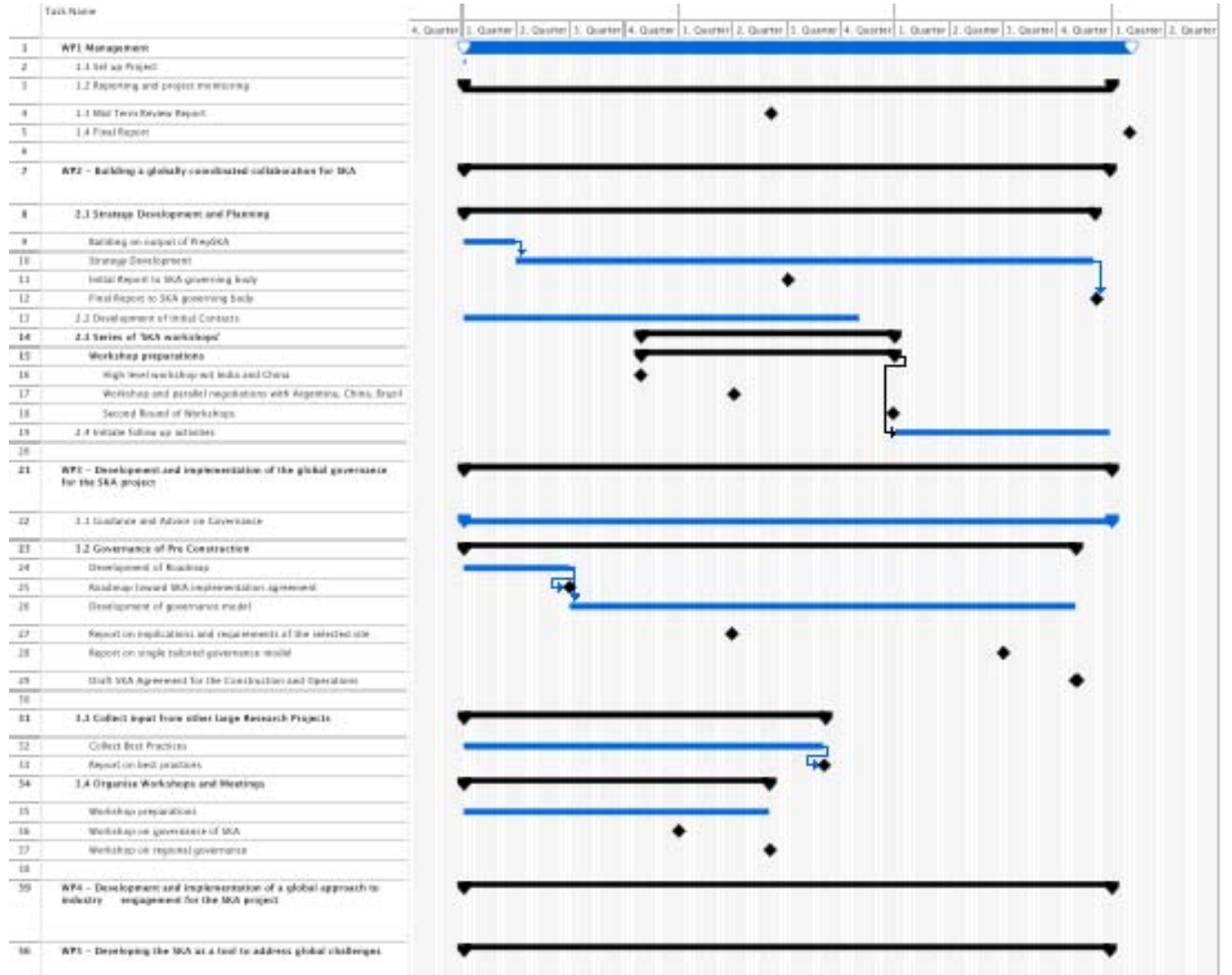
### ***1.3.2 Structure of the work packages and interdependence***

Work Package 2 focuses on identifying new funding agencies and government bodies to extend the European and global SKA-partnership. It will also establish synergies with other Research Infrastructures for joint activities and knowledge exchange. Work Package 3 is aimed at reaching the much needed SKA implementation agreement between stake-holders so that the strategic governance for SKA can be put in place. Work Package 4 will establish the much desired European industrial involvement in the construction of the SKA and the formation of regional industrial consortia which will provide input to the project as well as receive valuable research input for their commercial activities. Finally, Work Package 5 focuses on establishing a strategic forum in order to better disseminate SKA technology transfer opportunities in topics like energy supply, electronic hardware, information & communication technology and computing.

All GO-SKA work packages tie in closely with the Project Execution Plan of the SKA. The work packages will all start at the same time, but will also depend on each other's progress, most likely requiring multiple iterations between them. For example: if WP2 does not succeed in gaining interest from new funders, industrial interest may not be very forthcoming. This could have consequences on the progress made in establishing the implementation agreement and also reduce SKAs potential to develop technological spin-out opportunities outside of astrophysics and cosmology. A further risk analysis is provided at the end of the work package descriptions.

Finally, all work packages have a responsibility with respect to outreach and disseminating, which is further described in Table 1.3d and Chapter 3.

### 1.3.3 Gantt charts



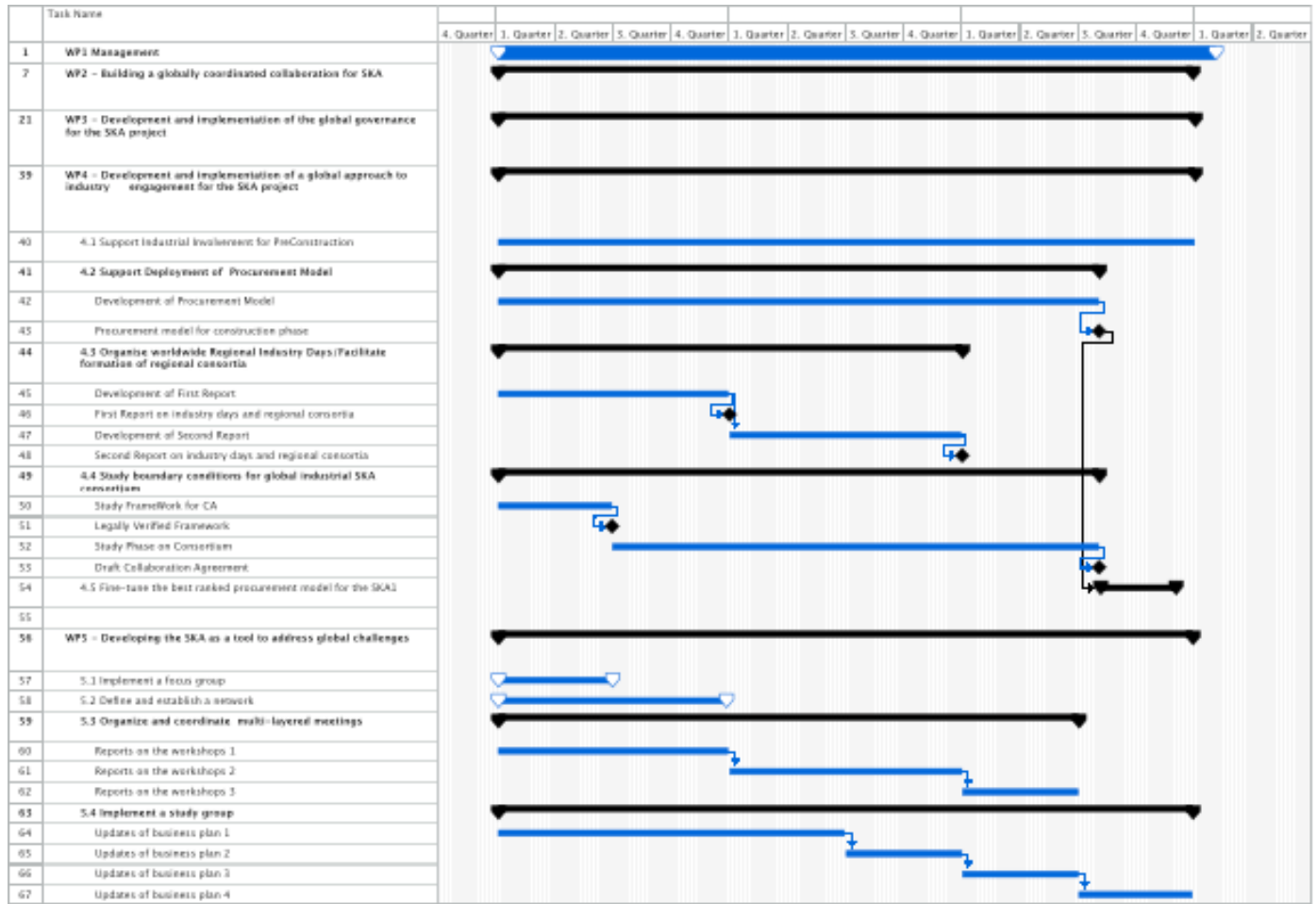


Figure 2: GO-SKA Gantt charts

Table 1.3a: Work package list

Work package No	Work package title	Type of activity	Lead participant No	Lead participant short name	Person months	Start month	End month
1	Project management	<b>MGT</b>	1	<b>NWO</b>	12	<b>M1</b>	<b>M36</b>
2	Building a globally coordinated collaboration for SKA	<b>COORD</b>	2	<b>STFC</b>	15	<b>M1</b>	<b>M34</b>
3	Global governance: development and implementation	<b>COORD</b>	1	<b>NWO</b>	15	<b>M1</b>	<b>M34</b>
4	A global approach to industry engagement: development and implementation	<b>COORD</b>	3	<b>INAF</b>	15	<b>M1</b>	<b>M34</b>
5	SKA as a tool to address global challenges	<b>COORD</b>	4	<b>MPG</b>	15	<b>M1</b>	<b>M34</b>
<b>TOTAL</b>					<b>72</b>		

Table 1.3b: Deliverables list

Del. No.	Del. Name	WP no.	Nature	Dissemination level	Delivery date
D1.1	Project Management Plan	1	R	PP	M1
D1.2	Launch of the GO-SKA website	1	O	PU	M3
D2.1	Building on the emerging outputs of the PrepSKA project and discussions with ASG and SSEC (or successors), a detailed report and options analysis on opportunities for engagement with potential stakeholders, identifying potential contact points, how they might participate in the evolving SKA pre-construction phase and downstream	2	R	CO	M3

	construction activities, and detailing specific methods of contact				
D3.1	a detailed roadmap towards a draft SKA <sub>1</sub> Implementation Agreement, identifying the relevant questions and timeline to address	3	R	CO	M6
D4.1	Legally verified framework for Collaboration Agreements enabling the involvement of industrial partners in pre-construction consortia and review of the procurement model of the pre-construction phase.	4	R	RE	M6
D4.2	First Report on organised industry days and regional consortia formed	4	R	PP	M12
D5.1	Establishment of focus groups of project stakeholders to coordinate national and international work and to develop a business plan from input of workshops, as well as the establishment of a network of economic and sociological leaders with local contact point in each individual country	5	O	RE	M12
D2.2	Report on the development and outcomes from high level workshops and parallel negotiation meetings in the selected international target countries to establish policy contacts with key research administration/government stakeholders	2	O	RE	M15

D3.2	Report on the implications and requirements of the selected site for the governance of the Global SKA Organization	3	R	RE	M15
D1.3	Mid-term Review Report	1	R	PU	M18
D2.3	Initial report to the SKA governing body on options and strategies for introducing new stakeholders/members to the developing SKA organisation, based on first round of workshops	2	R	RE	M18
D3.3	Report on best practices and examples for regional governance of international coordinated large research infrastructures and a resulting preferred model for structuring the European participation in the global SKA project.	3	R	PP	M20
D2.4	Second round of workshop/bilateral discussions on establishing new states as potential members in SKA Organisation	2	O	RE	M24
D4.3	Second Report on organised industry days and regional consortia formed	4	R	PP	M24
D3.4	Report on a single tailored governance model for the full SKA Organization during construction and operation with the focus on SKA <sub>1</sub>	3	R	PP	M30
D5.2	Reports on the various organized national and international workshops and the assimilation of	5	R	PP	M30

	results (public involvement, industry, politics) in regular intervals				
D4.4	Draft Collaboration Agreement for a global SKA Industrial Consortium	4	O	CO	M32
D2.5	Final report on engagement activities, outcomes and plans for further work	2	R	PP	M34
D3.5	Draft SKA Agreement for the Construction and Operations with the focus on the SKA, including signature ready documents	3	O	CO	M34
D4.5	Updated report on the final SKA procurement model for the construction phase	4	R	RE	M34
D5.3	Initial delivery and constant updates of business plan (M18, M24, M30, and M36) and a related external study that explores the opportunities for the emerged themes and addresses lessons learnt from other large-scale projects	5	R	RE	M34
D1.4	Final Report	1	R	PU	M36

**Table 1.3c: List of milestones**

<b>Milestone number</b>	<b>Milestone name</b>	<b>Work package(s) involved</b>	<b>Expected date</b>	<b>Means of verification</b>
<b>Work Package 1</b>				
1.1	Kick Off meeting with WP-leaders and with Gobal Policy Working Group	WP1, D1.1	M2	presentation on-line
1.2	Mid-term review	WP1, D1.3	M18	Report
1.3	Project Closure	WP1, D1.4	M36	Report
<b>Work Package 2</b>				
2.1	Strategy development and planning, liaising with SKA project bodies (SSEC and ASG) and interaction with other ESFRI projects to identify prioritised approach to contact building. Analysis of opportunities for expansion of collaboration;	WP2	M3	Report
2.2	Development of initial contacts and bilateral discussions on SKA through the international liaison offices of the national agencies of the SKA project (for example through STFC and NWO) the SKA Project Office, and the existing technical links with those countries. For European interests, plan a series of 'Roadshow' briefings to key delegations;	WP2	M15	Report
2.3	To run a series of targeted SKA 'workshops' and high level briefings on the SKA project for appropriate government officials, facilitating engagement with the SKA Organisation;	WP2	M24	Report
2.4	Together with GO-SKA work packages 3 and 4, initiate follow-up activities as appropriate to each potential partner, including: surveying and undertaking preliminary negotiations on policy issues such as governance and the development of an agreed Joint Implementation Agreement (with Work Package 3), funding approaches, constraints and levels, and the development of a global industry consortium (with Work	WPs2, 3, 4	M35	Report

	Package 4)			
Work Package 3				
3.1	overview of the implications of the objectives of WP2 and WP4 for the roadmap of D3.1	WP3, D3.1	M3	Report
3.2	Specification of the favoured governance model(s) to the conditions of the host country of the selected site.	WP3, D3.2	M10	Report
3.3	Workshop on the governance aspects of SKA as an global e-infrastructure	WP3	M12	Report and presentations on-line
3.4	Workshop on regional governance of international coordinated large research infrastructures	WP3, D3.3	M17	report and presentations on-line
3.5	Report on the forthcoming implications of developing global collaboration For the SKA governance model	WP3, D3.4-D3.5	M24	report
Work Package 4				
4.1	Support industrial involvement in the pre-construction phase and establishment of guidelines and formal agreements for inclusion of industrial partners in the pre-construction phase.	D4.1	M6	Plan/presentation on-line
4.2	Support the deployment of the procurement model adopted for the pre-construction phase.	D4.2	M12	Plan/presentation on-line
4.3	Organise worldwide regional industry days and facilitate the formation of regional consortia. In particular the formation of a European Industrial SKA Consortium will be stimulated in the European area.	D4.3	M24	Report/presentation on-line
4.4	Study the boundary conditions for a global industrial SKA consortium	D4.4	M32	report
4.5	Fine-tuning of the best-ranked procurement model for the SKA construction phase issued from PrepSKA.	D4.5	M34	report
Work Package 5				
5.1	Implement a focus group	WP5	M12	Report

5.2	Define and establish a network of economic and sociological leaders	WP5	M12	Report
5.3	Organize and coordinate multi-layered (local and global) meetings	WP5	M12 M18 M24 M30	Report & Presentations on-line
5.4	Implement a study group consisting of the focus group and selected experts	WP5	M18, M24, M30, M34	Business plan
5.5	Compilation of an external study that explores the opportunities for the emerged themes and addresses lessons learnt from other large-scale projects		M34	Study

**Work Package 1: Management**

Work Package 1 provides the management for GO-SKA. It is described in detail in Section 2.1

<b>Work package number</b>	1	<b>Start date:</b>					<b>M1</b>
<b>Work package title</b>	Project Management						
<b>Activity type</b>	MGT						
<b>Participant number</b>	1						
<b>Participant short name</b>	NWO						
<b>Person-months per participant</b>	<b>11</b>						

**Objectives**

Ensuring the successful achievement of the stated project deliverables and to manage relationships between the GO-SKA project and the wider SKA collaboration. Please see section 2.1 for further details.

**Description of work**

- Implement the appropriate management structure is in place;
- Ensure that there is excellent communication and interaction between all relevant parties and work packages, and particularly the various funding agencies;
- Ensure that reporting to the European Commission is completed on time and according to an established procedure and schedule;
- Ensure that the appropriate mechanisms for monitoring progress within work packages are in place and that milestones and deadlines are achieved;
- Distribute the EC financing in a timely manner, including the central administration of travel funds associated with all work packages;
- Liaise with the SKA Project Office and the ASG (or its successor: the board and director of the initial legal entity are expected to be in place mid 2011); and
- Coordinate the dissemination of the GO-SKA results and the outreach activities

**Milestones**

- WP1.1 – Kick Off meeting with WP-leaders and the Global Policy Working Group (M2)
- WP1.2 – Mid-term review
- WP1.3 – Project Closure (M36)

**Participant’s role**

*Work Package 1 will be led by the GO-SKA Coordinator (NWO). The WP-2 leader (STFC) will act as the vice coordinator.*

**Deliverables**

D1.1 – Project Management Plan (M1)

D1.2 – launch of the GO-SKA website (M3)  
D1.3 – Mid-term Review Report (M18)  
D1.4 – Final Report (M36)

## Work Package 2: Building a globally coordinated collaboration for SKA

As the Preparatory Phase ends and the SKA project moves into the pre-construction period, the development of a coherent, truly global collaboration will be of critical importance. During 2011, it is expected that a dedicated legal entity will be established to provide the governance framework for SKA, succeeding the parallel structures of the current Agencies SKA Group and the SKA Science and Engineering Committee. At present, at the agency/governmental level, in addition to the two candidate site countries, there is a strong European-North American emphasis in the current arrangements. However, in the technical engineering sphere, there is a wider collaboration with active interaction between a wider range of nationalities than is present at the Agency level. As the new SKA legal entity starts work and the pre-construction phase begins, the project will need to address a range of challenges, from site selection (expected 2012) through the preparation of compelling cases for supporting construction (2013) to governments and agencies deciding to participate in the construction of SKA (2014).

The ASG and SSEC have agreed that a broadening of the current collaboration is essential in order to secure the position of the project in terms of available resources, available technical knowledge and resulting scientific and societal impact. The SKA has the potential to become an astronomy Research Infrastructure with an unprecedented global reach, albeit with a strong European core. In addition to developing the European interests beyond the current core nations, the aim of this work package is to facilitate this 'globalisation' with a range of key potential future partners with the ultimate aim of these partners becoming members of the SKA collaboration in time to contribute to the start of construction of the facility.

<b>Work package number</b>	2	<b>Start date:</b>					<b>M1</b>
<b>Work package title</b>	Building a globally coordinated collaboration for SKA						
<b>Activity type</b>	<b>COORD</b>						
<b>Participant number</b>	2						
<b>Participant short name</b>	STFC						
<b>Person-months per participant</b>	15						

### Objectives

The objectives of this work package are:

- to build on the outcomes of the PrepSKA project and through discussion with the SSEC (or its successor body) thus increasing our understanding of the scope for potential new government/agency partnerships of potential strategic importance to the SKA;
- to expand, through our contacts established during the Preparatory Phase, existing synergies with the other ESFRI and global RI projects to develop potential closer inter-agency interactions as the basis for contact on SKA;
- to development strategic relationships with various national (European and wider global) government and funding bodies, linking together established R&D or

technical interest in SKA with possibilities for engagement in the project. The aim would be to:

- proactively seek greater awareness at the funding agency level in the SKA project, leading to their participation in the ASG (or its successor body) and its associated policy activities;
- understand their respective positions to the project on issues of funding, governance and procurement, as initially explored in the PrepSKA project;
- map a pathway to their potential formal engagement as contributors to the formal SKA organisation and construction phase; and
- ultimately enable additional resources, technical expertise, innovation, industrial relationships and outreach in a broader SKA collaboration

### **Description of work**

This work package will build a series of strategic agency-level relationships with potential future partners in the SKA project. It has the overall aim of developing a genuinely global consortium with shared aims on funding and governance and a vision of realising the project as it moves towards the construction phase. It will work closely with the other GO-SKA work packages, the SKA Project Office and steering bodies to ensure the approaches are optimally aligned with the needs of the project. Potential targets for detailed discussions include Portugal, Spain, Sweden and Poland in Europe, and in the wider global context, Chile, Argentina, Russia and various East Asian countries, all of whom are currently involved in SKA R&D activities. In addition, this Work Package will take care of dissemination and outreach related to the deliverables listed below. This is done by organising workshops, contributing to the website and publishing reports.

### **Activities and milestones:**

- WP2.1 – Strategy development and planning, liaising with SKA project bodies (SSEC and ASG) and interaction with other ESFRI projects to identify prioritised approach to contact building. Analysis of opportunities for expansion of collaboration;
- WP2.2 – Development of initial contacts and bilateral discussions on SKA through the international liaison offices of the national agencies of the SKA project (for example through STFC and NWO) the SKA Project Office, and the existing technical links with those countries. For European interests, plan a series of ‘Roadshow’ briefings to key delegations;
- WP2.3 – To run a series of targeted SKA ‘workshops’ and high level briefings on the SKA project for appropriate government officials, facilitating engagement with the SKA Organisation;
- WP2.4 – Together with GO-SKA work packages 3 and 4, initiate follow-up activities as appropriate to each potential partner, including: surveying and undertaking preliminary negotiations on policy issues such as governance and the development of an agreed Joint Implementation Agreement (with Work Package

3), funding approaches, constraints and levels, and the development of a global industry consortium (with Work Package 4)

The tasks will be undertaken in a consultative way with the other stakeholders and the work package staff will take make use of the Global SKA Policy Working Group to steer its progress.

***Participant's role***

*Work Package 2 will be led by an STFC policy officer (Dr S Berry) with expertise in large project financial planning and in particular, the SKA programme. It will work closely with the other GO-SKA work packages, the SKA Project Office and steering bodies to ensure the approaches are optimally aligned with the needs of the project. Contributors to this work package will meet on a regular basis by telecon. The activities and reports of the core Working Group will be reported to contract participants via a protected website.*

**Deliverables**

D2.1 – Building on the emerging outputs of the PrepSKA project and discussions with ASG and SSEC (or successors), a detailed report and options analysis on opportunities for engagement with potential stakeholders, identifying potential contact points, how they might participate in the evolving SKA pre-construction phase and downstream construction activities, and detailing specific methods of contact (M3).

D2.2 – Report on the development and outcomes from high level workshops and parallel negotiation meetings in the selected international target countries to establish policy contacts with key research administration/government stakeholders (M15).

D2.3 – Initial report to the SKA governing body on options and strategies for introducing new stakeholders/members to the developing SKA organisation, based on first round of workshops (M18).

D2.4 – Second round of workshop/bilateral discussions on establishing new states as potential members in SKA Organisation (M24).

D2.5 – Final report on engagement activities, outcomes and plans for further work (M34).

### Work Package 3: Development and implementation of the global governance for the SKA project

This work package builds on the output of the PrepSKA policy Work Package on the Governance and Legal Framework of the SKA. It will deliver a white paper with viable options for the long term global governance of SKA in mid 2011. During 2010, exploratory discussions have taken place within the current Agencies SKA Group (ASG) to consider how an Implementation Agreement to realise the SKA project might be achieved. This work is based on the analysis of the possible governance frameworks and principles for the global SKA organisation in the construction and operational phase of the SKA project and will follow the establishment of an initial legal entity that will be established in 2011 to govern the SKA project for the duration of the pre-construction phase (2012-2016). The legal environment of the project will be developing, especially with the site selection in 2012, and the evolving 'globalisation' of the overall consortium (Work Package 2). This GO-SKA work package will closely monitor these developments and further detail and optimize the governance of the project in the pre-construction phase. It will analyse how a wider global governance structure can be implemented in time for the expected 2014 decision point on construction of the SKA. The governance and legal issues will require further research and guidance of experts as well as stimulation of the dialogue between the (potential) partners in the SKA project

<b>Work package number</b>	3	<b>Start date:</b>					<b>M1</b>
<b>Work package title</b>	Development and implementation of the global governance for the SKA project						
<b>Activity type</b>	COORD						
<b>Participant number</b>	1						
<b>Participant short name</b>	NWO						
<b>Person-months per participant</b>	15						

#### Objectives

This work package has the following aims:

- To develop an agreed roadmap for producing a n SKA<sub>1</sub> Implementation Agreement, in conjunction with the work to negotiate an expanded collaboration of global SKA funders and following investigation of tools, establishing the requirements of all potential funders and prepare signature-ready documentation on the required timescale for progress. The further development of the SKA governance will take into account the requirements for the long-term governance for construction and operation of the full SKA project (beyond SKA<sub>1</sub>).
- Work with the OECD GSF and other global research oversight organisations to ensure that this implementation agreement is aligned with other processes and large intergovernmental projects.
- Investigate common decision-making tools for managing the range of strategic governance and organisational issues to be addressed as the global SKA project evolves towards construction of SKA<sub>1</sub>. This includes the specific organisational conditions for building and operating the SKA-infrastructure at site, the

headquarters of the global SKA organisation, and the relations with de-central (regional) centres of activity. As the SKA facility is going to produce and disseminate a revolutionary amount of data it should be considered as a global e-infrastructure. This has implications for the governance model (special conditions and challenges for the organisation), which this work package shall take into account

- Develop/profile the European role in SKA, building on the PrepSKA governance output; consider how the European role in SKA might be best coordinated. This consideration includes the option of collaboration with existing European research organisations. Investigate and advice on the implementation of sustainable arrangements for joint collaboration and representation in large scale global research projects.
- In conjunction with Work Package 2 and, where appropriate also Work Packages 4 and 5, investigate from a governance and legal perspective how to facilitate the broader participation in SKA (by funding agencies, industry and other parties) beyond as well as within Europe.
- Produce implementation recommendations for the global SKA collaboration and guide the implementation process

#### **Description of work**

- Provide guidance and advice on establishing the governance and legal framework of the global SKA, as it evolves during the pre-construction phase towards construction and operation of SKA<sub>1</sub>
- define the further governance options and advising on suitable legal arrangements for the global SKA governance when the selected site is known
- collect and prepare documents relevant for the evolvement of the governance from preconstruction to the next stage (SKA<sub>1</sub>) of the project
- study and organise input from other large (research) projects and organisations for the development and implementation of the global governance
- take care of dissemination and outreach related to the deliverables listed below. This is done by organising workshops, contributing to the website and publishing reports.

#### **Milestones**

- WP3.1 – overview of the implications of the objectives of WP2 and WP4 for the roadmap of D3.1 (M3)
- WP3.2 – Specification of the favoured governance model(s) to the conditions of the host country of the selected site. (M10)
- WP3.3 – Workshop on the governance aspects of SKA as an global e-infrastructure (M12)
- WP3.4 – Workshop on regional governance of international coordinated large

research infrastructures (M17)

- WP3.5 – Report on the forthcoming implications of developing global collaboration for the SKA governance model (M24)

***Participant's role***

*Work Package 3 will be led by an NWO policy officer with expertise in project governance leading specialist Working Groups. It will work closely with the other GO-SKA work packages, the SKA Project Office and steering bodies to ensure the approaches are optimally aligned with the needs of the SKA project. Contributors to this work package will meet on a regular basis by telecon. The activities and reports of the Working Group will be reported to contract participants via a protected website.*

*The Working Group will seek legal and business advice as appropriate to carry out its tasks.*

**Deliverables**

D3.1 – a detailed roadmap towards a draft SKA<sub>1</sub> Implementation Agreement, identifying the relevant questions and timeline to address (M6)

D3.2 – Report on the implications and requirements of the selected site for the governance of the global SKA Organization (M15)

D3.3 – Report on best practices and examples for regional governance of international coordinated large research infrastructures and a resulting preferred model for structuring the European participation in the global SKA project. (M20)

D3.4 – Report on a single tailored governance model for the full SKA Organization during construction and operation with the focus on SKA1 (M30)

D3.5 - Draft SKA Agreement for the Construction and Operations with the focus on the SKA, including signature ready documents (M34)

## Work Package 4: Development and implementation of a global approach to industry engagement for the SKA project

This work package will build on the SKA procurement model established in the PrepSKA, and extend this. It will create the boundary conditions for the deployment of the procurement strategy in the construction phase.

The Construction of the SKA will rely on close engagement of (high-technology) industries who have been involved in the project from an early stage. Industrial involvement is considered crucial to the success of the SKA in two ways. The project needs the expertise and experience available in industry to build the best possible system. On the other hand, industrial partners will benefit from involvement in the SKA directly and indirectly. The SKA is a technological challenge, pressing generic technical capabilities to their extreme in many fields, thus having relevance much broader than the project itself

In the SKA Preparatory Phase, top-level models for industrial involvement have been developed that are now being applied to the forthcoming SKA pre-construction phase. Industrial consortia have been formed in several partner countries, and regional groups are being considered, in particular in Europe. The formation of these regional groups needs to be facilitated. Work Package 4 will support this in organising regional industry events, providing advice to the International project on collaboration agreements.

In the forthcoming SKA pre-construction phase, technical work packages will be contracted to consortia of scientific (institutional) and industrial parties. These consortia will be span multiple regions and close attention will have to be paid to the regional differences in procurement regulations. Work Package 4 will provide boundary conditions for the collaboration agreements in these consortia and develop a global procurement industry.

These activities will result in a global strategy for industrial collaboration in the Construction Phase that goes beyond mere contracting, but enables involvement of industrial partners that maximised both the scientific performance of the SKA and the growth of global industrial potential. A specific area of concern is industrial collaboration towards sustainable production and green computing, where the SKA can serve as a large scale demonstration.

<b>Work package number</b>	4	<b>Start date:</b>						<b>M1</b>
<b>Work package title</b>	Development and implementation of a global approach to industry engagement for the SKA project							
<b>Activity type</b>	COORD							
<b>Participant number</b>	3							
<b>Participant short name</b>	INAF							
<b>Person-months per participant</b>	15							

### Objectives

This objectives of this work package are:

- to support the industrial involvement in the pre-construction phase consortia, building on the models developed in the PrepSKA program;

- to examine the requirements for industrial engagement in the Construction Phase of SKA<sub>1</sub> and then SKA<sub>2</sub> construction, and derive adequate global models;
- to facilitate the formation/creation of regional industrial consortia, in particular a European SKA Industrial consortium;
- to establish the boundary conditions for a global industry consortium, building on the regional models

### **Description of work**

Activities are organised in four tasks, each with a clear deliverable. Task 4.1 and 4.2 start immediately. Task 4.3 and 4.4 start when the pre-construction phase is well underway. In addition, this Work Package will take care of dissemination and outreach related to the deliverables listed below. This is done by organising workshops, contributing to the website and publishing reports.

### **Activities and milestones**

- WP4.1 – Support industrial involvement in the pre-construction phase and establishment of guidelines and formal agreements for inclusion of industrial partners in the pre-construction phase.
- WP4.2 – Support the deployment of the procurement model adopted for the pre-construction phase.
- WP4.3 – Organise worldwide regional industry days and facilitate the formation of regional consortia. In particular the formation of a European Industrial SKA Consortium will be stimulated in the European area.
- WP4.4 – Study the boundary conditions for a global industrial SKA consortium
- WP4.5 – Fine-tuning of the best-ranked procurement model for the SKA construction phase issued from PrepSKA.

### **Participant's role**

*This Working Package will be led by an INAF policy officer with expertise in procurement policy. It will work closely with the other GO-SKA work packages, the SKA Project Office and steering bodies to ensure the approaches are optimally aligned with the needs of the project. Contributors to this work package will meet on a regular basis by telecon. The activities and reports of the Working Group will be reported to contract participants via a protected website.*

### **Deliverables**

D4.1 – Legally verified framework for Collaboration Agreements enabling the involvement of industrial partners in pre-construction consortia and review of the procurement model of the pre-construction phase. [M6]

D4.2 – First Report on organised industry days and regional consortia formed [M12]

D4.3 – Second Report on organised industry days and regional consortia formed [M24]

D4.4 – Draft Collaboration Agreement for a global SKA Industrial Consortium [M32]

D4.5 – Updated report on the final SKA procurement model for the construction phase [M34]

**Work Package 5: Developing SKA as a tool to address global challenges**

The SKA will create a unique Research Infrastructure that has the potential to drive innovation in a range of areas that will impact on common global challenges such as security and environmental change. Two broad categories where the SKA will make an impact are the unique opportunities for talent development, and the innovations and technological challenges involved in the design and the realisation of the facilities.

An analysis of the societal impact of the SKA was made by experts in a broad range of fields in the EC COST Strategic Workshop “Benefits of Research Infrastructures beyond Science – The Example of the Square Kilometre Array (SKA)”, held on 30 and 31 March 2010 in Rome, Italy. The conclusions of this workshop confirmed that the performance demanded by the SKA will require technical advances and new collaborations in areas such as energy supply, electronic hardware, information and communication technology and computing.

As important as these technological advances is that the realisation of the project will impact massively on the prospects for training and education of a next generation of engineers and scientists, creating a large impact and opportunity for the corresponding economies. In addition, the inherently global nature of the project offers opportunity for benefits and impact in less developed countries.

<b>Work package number</b>	5	<b>Start date:</b>					M1
<b>Work package title</b>	Developing SKA as a tool to address global challenges						
<b>Activity type</b>	COORD						
<b>Participant number</b>	4						
<b>Participant short name</b>	MPG						
<b>Person-months per participant</b>	15						

**Objectives**

The two main objectives of this work package are

- (1) To build a core group of science, industry and government stakeholders representing the four main innovation drivers of the SKA as a strategic forum to identify the global challenges and to define conditions by which non-scientific benefits from large scale research infrastructure can best be integrated into investment decision-making.
- (2) To enhance global and transcultural collaboration by demonstrating such collaboration in the SKA, stimulating such collaboration within the project and effectively communicating the results and experiences.

**Description of work**

This work package will create a strategic forum in which this crucial question can be more widely debated and the various implications properly considered. The deliverables and milestones take the form of face-to-face meetings, plus a final position paper that can be

used by the SKA consortium and its individual partners as input to the dialogue between the community, national funding agencies, government ministries, industry and the European Commission itself. In addition, this Work Package will take care of dissemination and outreach related to the deliverables listed below. This is done by organising workshops, contributing to the website and publishing reports.

Specific and primary activities will lead to the generation of a coherent and forward-looking guideline that maximises the potential for wider socio-economic benefits from the project in addressing the major challenges faced by our world.

This work package will:

- Examine themes around global challenges like environmental and security changes in the world, where the SKA has potential to have high impact;
- Broaden the global consortium for the SKA project with partners that are experts on these high-impact fields;
- Identify specific actions to be taken to maximise the wider socio-economic benefits from the SKA in these fields and strengthen the cases that will be required to secure the investment needed to realise the project;
- Investigate business plans from other countries and distil one model for the SKA;
- Establish routes and enable transfer of knowledge and experience to and from other global scale research projects.

Activities in this work package fall into different categories, each of which will produce a well-defined deliverables.

#### **Activities and milestones**

- Task 5.1: *Implement a focus group* that looks at the experience of other large-scale research projects and hereby create a route of knowledge transfer from these projects to the SKA on a national and international stage. This group of project stakeholders will coordinate the work of the tasks described in 5.2 and 5.3 and will ensure the assimilation of the results to the broader community and the general public in close coordination with the work of Work Packages 2 and 3. The leader of WP4 will be a member of this focus group to ensure close collaboration.
- WP5.2 – *Define and establish a network* of economic and sociological experts who share and discuss their views on global challenges and offer insight in possible technology solutions to overcome them. The network is aimed for European and global business, government and stakeholder officials and will have a local contact point in each individual country that liaises with the Work Package 4 leader to enable global cross-links and communications.
- WP5.3 – *Organize and coordinate multi-layered (local and global) meetings* that discuss the global challenges and present solutions that can be envisioned by the network established in WP5.2. These meetings of project stakeholders should also involve local and national politicians to raise the awareness of industrial and socio-

economical opportunities. Activities here will be closely coordinated with Work Package 4. This report to be coordinated by the focus group established in WP 5.1 will serve as the basis to broaden the SKA community by approaching decision makers in industry and politics to establish funding based on the social-economic benefits of the SKA.

- WP5.4 – *Implement a study group* consisting of the focus group of WP 5.1 and selected experts emerging from the work in tasks 5.2 and 5.3 to review and compare the required investments with the cost impact of solutions discussed and proposed as the outcome of the meetings in 5.2 and 5.3. The result will be a constantly updated business plan that is derived from contributions from different countries to lead to a final and realistically sound model for the SKA.

### **Deliverables**

D5.1 – Establishment of focus groups of project stakeholders to coordinate national and international work and to develop a business plan from input of workshops, as well as the establishment of a network of economic and sociological leaders with local contact point in each individual country (M12)

D5.2 – Reports on the various organized national and international workshops and the assimilation of results (public involvement, industry, politics) in regular intervals (M12, M18, M24, and M30).

D5.3– Initial delivery and constant updates of business plan (M18, M24, M30, and M34) and a related external study that explores the opportunities for the emerged themes and addresses lessons learnt from other large-scale projects (M34).

## Summary of staff effort

Table 1.3e: Requested funding in person months

Participant no./short name	WP1	WP2	WP3	WP4	WP5	Total person months
1. NOW	10	0	15	0	0	25
2. STFC	1	15	0	0	0	16
3. INAF	0	0	0	15	0	15
4. MPG	0	0	0	0	15	15
<b>Total funded</b>	11	15	15	15	15	71

Table 1.3f: Additional contributed effort per participant per work package (not auditable)

Participant no./short name	WP1	WP2	WP3	WP4	WP5	Total person months
1. NWO	8	2	2	2	2	16
2. STFC	1	2	2	2	2	9
3. INAF	2	2	2	2	2	10
4. MPG	2	2	2	2	2	10
<b>Total contributed</b>	13	8	8	8	8	45

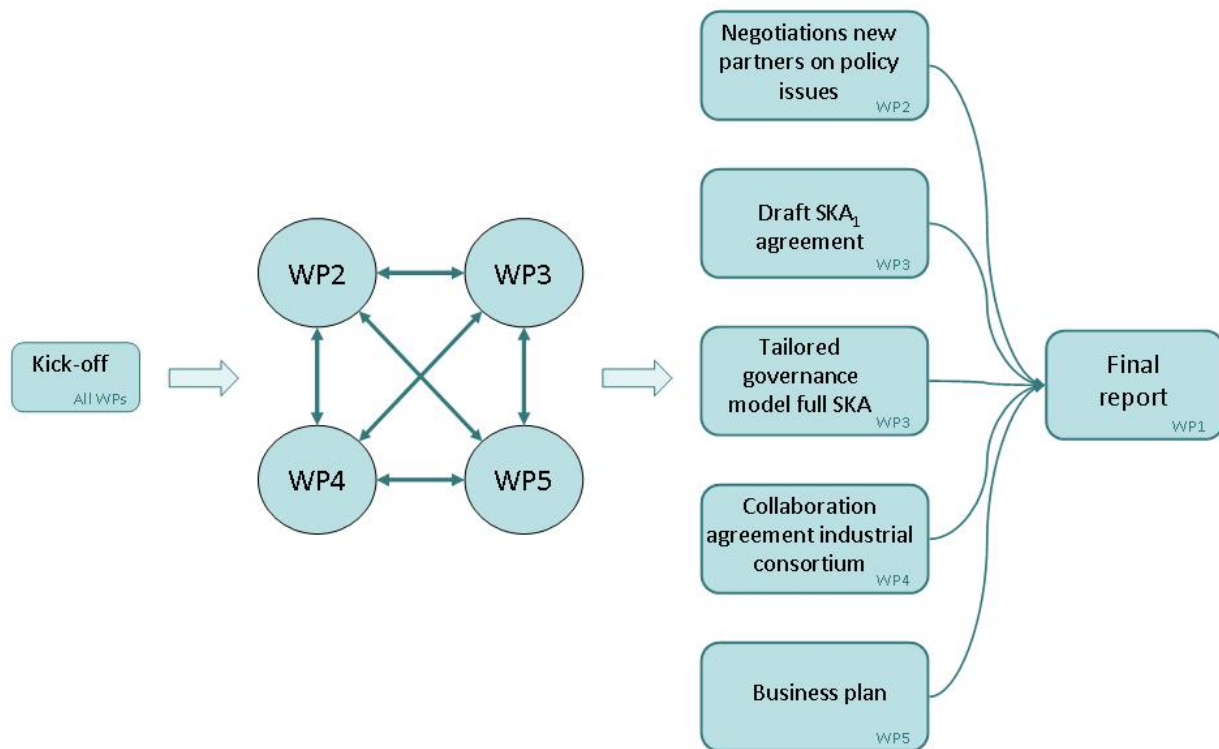


Figure 3: GO-SKA Pert diagram

### 1.3.5 Risks and associated contingency plans

The GO-SKA project is relatively small with four participants. The Work Package Leaders will meet on a monthly basis, to ensure alignment between the work packages. The risks identified with this project are on two levels:

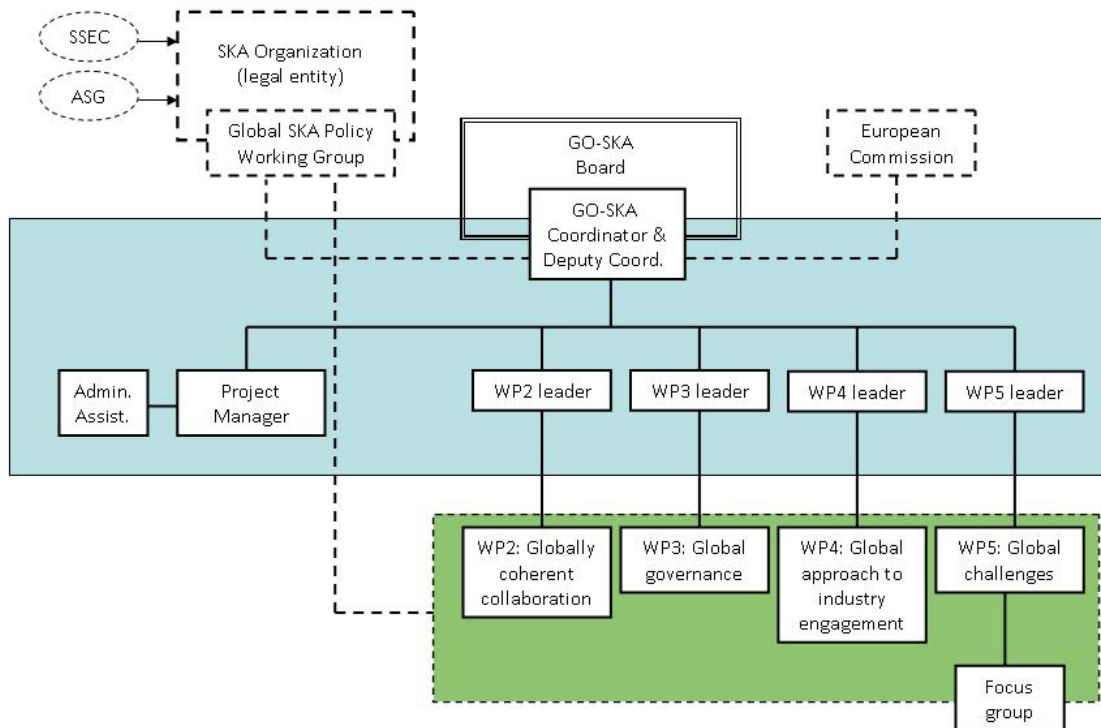
1. As GO-SKA builds on the results of PrepSKA, it is very useful for the planning and timely implementation of GO-SKA that the consortium partners are all active partners in PrepSKA. Any delaying issues arising out of PrepSKA which might have impact on GO-SKA deliverables can thus be quickly identified and mitigated.
2. If for some reason the activities described in the SKA Project Execution Plan are seriously delayed, this would have its effect on Work Packages 2, 3, and 4. For Work Package 2, a delay in the project could cause potential funders to act hesitantly in joining the project. Work Package 3 would lack the necessary information to detail the governance model. For Work Package 4 it could be difficult to chart the industrial partners, since the requirements for the contracts would remain uncertain. To mitigate the effects of such a delay, the GO-SKA Work Package Leaders will identify the cause of any such delay and move specific tasks either forward or backward. If this would lead to significant changes in the implementation of the project or cause work packages to move beyond their

expected end-date, then, the project coordinator will notify the Commission Project Officer immediately and provide him/her with different scenario’s leading to a minimisation of the delay. Mitigation, for example on policy issues, may also occur by asking associate partners (i.e., other funding agencies or government representatives) for support. A related risk could be delay in the SKA site selection. This would mainly affect Work Package 3, since the choice of host country is a crucial ingredient in the governance model. In case of such a delay, the GO-SKA project may need to temporarily change the order of the deliverables and shift the focus. This would, of course only, be done in close cooperation with (and agreement from) the European Commission. It is not likely that the choice of the site would be delayed beyond the scope of GO-SKA. Work Package 5 would not suffer much from delays in the project or site selection, since it operates relatively independent from the activities in the Project Execution Plan.

**2. Implementation**

**2.1 Management structure and procedures**

The management of GO-SKA will be light and well-matched to the nature of the project and aligned with the current and future steering bodies of the SKA.



**Figure 4: Management structure of GO-SKA: Solid lines show reporting structure; dashed lines show information flow. The large blue box delineates the GO-SKA Management Team, the green box denotes the global SKA Policy Working Group.**

### 2.1.1 GO-SKA Board

The formal governing body will be the GO-SKA Board. The GO-SKA Board will consist of representatives of the organisations that sign the GO-SKA contract. A representative of the coordinating organisation shall chair all meetings of the Board, unless decided otherwise in a meeting of the Board. The Board will meet at least once a year and will hold telecons as necessary. Decisions will be made by consensus. In the event of a deadlock, the chair will have a casting vote.

The Board will:

- oversee all GO-SKA activities defined in the work programme
- receive regular reports on all GO-SKA activities
- confirm the appointment of the leaders of each work package
- approve the allocation and distribution of resources
- maintain the control of the project contingency funds
- monitor the execution of the project
- approve the annual, midterm and final reports to the EC before submission
- ensure compliance with the EC contract and the GO-SKA Consortium Agreement

Participating Organisations which do not sign the GO-SKA contract, but who are participating in GO-SKA activities (e.g., the Associate Partners), will be granted Observer status on the GO-SKA Board. Observers may attend Board meetings and may have their voice heard, but will not be entitled to vote. Work Packages Leaders will usually be invited to the Board meetings, at the discretion of the Chairman.

### 2.1.2 The GO-SKA coordinator

NWO has agreed to act as the coordinator for GO-SKA. The coordinating person will be Ms Patricia Vogel (MSc) from NWO, senior policy expert and coordinator research institutes at NWO. She will be supported by the Deputy Coordinator Dr Simon Berry (STFC) in activities and the preparation of reports and documents when and where appropriate. The coordinator will be member of the GO-SKA board and chair of the GO-SKA management team and be the primary contact person with the European Commission.

The principal responsibilities of the Coordinator are as follows:

- to monitor all activities and ensure that each is following the plan laid down by the Work Package Leaders and approved by the Board
- to ensure that the project website is kept up-to-date and that all documents emerging from project activities are available under version control
- to ensure that the Work Package Leaders provide all reports and documentation on a timely basis to the board and that periodic reports are prepared and delivered to the European Commission on time

- to be responsible for and monitor all financial matters pertaining the project
- to act as the representative on GO-SKA activities to the funding agencies and national governments
- to act as the point-of-contact vis-a-vis the European Commission on behalf of the consortium

The GO-SKA coordinator will be Ms Patricia Vogel (MSc), senior policy expert and coordinator research institutes at NWO. She will be supported by the Deputy Coordinator in activities when and where appropriate. The Deputy Coordinator will be Dr Simon Berry (STFC). He will stand in at events and meetings for the Coordinator if the latter is absent; he will assist the Coordinator in preparing reports and documents if required.

### **2.1.3 The GO-SKA management team**

The coordinator will be supported by the GO-SKA management team (blue area of Figure 1). The project management team will be chaired by the Project Coordinator and further consist of the Project Manager and Work Package Leaders. The Management Team will meet, generally by teleconferencing, on a monthly basis to coordinate and integrate the activities.

The responsibilities of the Project Manager are as follows (0.1 FTE):

On an administrative level:

- to support the coordinator in monitoring the day-to-day activities of GO-SKA and in monitoring and coordinating the project as a whole
- to monitor the timeliness and quality of the project deliverables
- to be responsible for coordinating the generation of reports, both technical and financial and assist in providing management reports to the Board and the EC
- to organise monthly GO-SKA management team meetings and telecons.
- to set up and run the project website
- to organise meetings of the board
- to be the primary contact person for technical details regarding contractual issues.

On a financial level:

- to be responsible for the detailed management of all financial aspects of GO-SKA
- to receive financial reports and progress updates for all GO-SKA activities

Administrative staff (0.2 FTE) will provide secretarial and administrative support to the Coordinator and NWO in all aspects of project management.

### **2.1.4 Work Package Leaders**

The leaders of the individual work packages will be approved by the GO-SKA Board. The Work Package Leaders can establish task groups for the activities of their work packages.

Each Work Package Leader will have the following responsibilities:

- to ensure that the agreed work programme is followed and that the dates of the milestones and deliverables are adhered to

- to monitor the work package cash-flow and to provide quarterly financial reports to the Coordinator
- to provide quarterly reports on an exception basis; to deliver half-yearly progress reports, a comprehensive annual report, including financial statements, a midterm report and final report in a timely fashion to the Coordinator

### **2.1.5 The Global SKA Policy Working Group**

A Global SKA Policy Working Group shall be established to guide the work of the Project (encompassing all work packages of the Project). It shall consist of representatives from funding agencies and governments who are represented in the ASG (or its successor, the board of the SKA organisation of the legal entity to be established mid 2011), the SKA project director, participating research organisations, and invited experts. The Global SKA Policy Working Group can, with the understanding of the Work Package Leaders, take up some of the activities of the GO-SKA work packages. It can also serve as an Advisory Panel to the Work Package Leaders.

### **2.1.6 Management of funds**

EC funds for GO-SKA will be received by the Coordinator at NWO and will be distributed as agreed by the GO-SKA Board in accordance with the plan agreed with the EU. Funds for the work of individual work packages will be distributed to the organisation that employs the work-package leader. Once distributed, all financial dealings will be in accordance with the internal financial policies and procedures of the beneficiary. NWO will be required to conduct a periodic audit of costs following its usual policy.

A small contingency fund will be held in a central, non-interest bearing, contingency account of NWO. These funds may be used at the discretion of the Board to support activities whose scope has expanded or to support new activities identified during the project.

### **Consortium Agreement**

A draft Consortium Agreement between the partners is currently being drawn up according to the guidelines in the "Checklist for a Consortium Agreement for FP7 projects" (Version 28/06/2007) based on Regulation EC No 1906/2006. . The associate participants that join the project as a non-beneficiary party will also sign the Consortium Agreement. This agreement will be refined as appropriate and signed by the formal contract participants before contract negotiations between the Coordinator and the EU are finalised.

## **2.2 Individual participants**

The overview below describes the relevant experience and knowledge of the participants

### **NWO**

NWO is the *Netherlands Organisation for Scientific Research*. It funds thousands of top researchers at Dutch Universities and institutes, and steers the course of the national science programme by means of subsidies and research programmes. NWO mediates for the Dutch scientific community in the use of research facilities elsewhere in the world and in itself

finances large-scale facilities in the Netherlands (such as the WSRT and LOFAR radio telescopes). NWO is the mother organisation for several internationally renowned institutes, including ASTRON. ASTRON is the Netherlands Institute for Radio Astronomy, with a strong technology development programme, encompassing both innovative instrumentation for existing and future telescopes, and leading pathfinder projects for the SKA. NWO is also committed to ensure that the results of scientific research quickly gain presence and exposure in society, either as new expertise or practical applications. NWO is playing an increasingly pivotal role between industry, society and research, facilitating cooperation, and also disseminating the application of fundamental research results. The NWO staff will be responsible for the high-level coordination of the GO-SKA project in general, and Work Package 3 in particular.

**Key Personnel:**

**Ms Patricia Vogel**, senior policy manager is coordinator research institutes and senior policy manager of NWO's Policy Development Department in NWO. She will act as the coordinator of the GO-SKA project and will be leading the Work packages 1 (Management of the Project) and 3 (Global Governance Development and Implementation). Ms Vogel is member of the Agencies SKA Group (ASG), member of the SKA Site Selection Group (SSG), member of several ASG-working groups and leading one. is leading the PrepSKA policy work package on governance. She is NWO's representative in the PrepSKA Board and coordinator of the PrepSKA Work package 4 on Governance and Legal Framework, leading the NWO WP4 team. She has a broad experience in governance and coordinating projects. **Ms Miriam Roelofs** is NWO's senior policy officer and legal expert of the PrepSKA WP4 team of NWO. She advises the general NWO-management on legal and governance aspects of the SKA and other large research infrastructures and is NWO's contact person for legal advice on the implementation of the ERIC (European Research Infrastructure Consortium). **Dr. Maaike Damen**, has a PhD in astronomy and is a policy officer based in the Policy Development Department and in the Physics Department of NWO. She is a project officer in the PrepSKA WP4 team of NWO.

**Mr. André van Es** is project officer based at ASTRON. He will assist the GO-SKA coordinator in the project management and act as GO-SKA project manager. Mr. Van Es has experience with the management of other projects, such as the ISKAF 2010 in the Netherlands

**Science and Technology Facilities Council (STFC), UK**

The STFC performs its role by funding researchers in universities directly through grants particularly in astronomy, particle physics, space science and nuclear physics, providing access to a range of world-class facilities in the UK. In addition, the Council provides access to world-class facilities overseas, including through CERN, the European Space Agency (ESA), the European Southern Observatory (ESO), the European Synchrotron Radiation Facility (ESRF), the Institut Laue-Langevin (ILL) and telescope facilities in Chile, Hawaii, La Palma, Australia and the MERLIN/VLBI National Facility. STFC operates a range of laboratories and observatories, including the Rutherford Appleton Laboratory, which is part of the Harwell Science and Innovation campus in Oxfordshire: the Daresbury Laboratory, the Chilbolton Observatory in Hampshire, the UK Astronomy Technology Centre in Edinburgh, the Isaac Newton Group of Telescopes on La Palma in the Canary Islands; and the Joint Astronomy Centre in Hawaii. Through STFC, the UK is a leading member of the ASPERA, OPTICON, RADIONET and ILIAS I3

programmes as well as several design studies and/or Preparatory Programs under FP7, including the ELT and SKA. In particular, STFC is the coordinator of PrepSKA.

**Key Personnel:**

Dr Simon Berry is Head of Ground-Based Astronomy Facilities and manages STFC's operation of the Agencies SKA Group and leads several of the policy working groups under the ASG. In addition, he is a work package leader in the PrepSKA project and oversees the UK's Coordinator role in that project.

Ms Sherrie-Lee Samuel-Neill is the STFC Project Officer for the PrepSKA project. In addition to leading STFC's work in PrepSKA work package 6, she is part of the UK's ASG delegation and is a member of the ASG's site selection group.

**Istituto Nazionale di Astrofisica (INAF)**

The Istituto Nazionale di Astrofisica (National Institute for Astrophysics) is the Italian leading body for basic research in the fields of astronomy and astrophysics. It is in charge to develop the national policy in astronomy and to fund research programs. Founded in 1999 as merging of the 12 astronomical observatories and expanded in 2003 by the acquisition of 3 national institute from the National Research Council, (CNR), INAF has currently 19 research centres distributed all over the country and performs researches in all the frontrunner topics of current astronomy. INAF owns 25% of the Large Binocular Telescope and the National Telescope TNG at Canarians Islands.

**Key Personnel:**

Dr Corrado Perna is Head of the National Industrial Policy and manages the INAF's operations to promote the involvement of the industry in the most relevant projects. He is also deputy representative in the ASG. In addition, he is a work package leader in the PrepSKA.

**Max-Planck-Gesellschaft (MPG)**

The Max-Planck-Institut für Radioastronomie (MPIfR) is one of 80 independent research institutes of the Max Planck Society (Max-Planck-Gesellschaft, MPG) that performs basic research in the areas of radio and far-infrared astronomy. The MPIfR is the leading radio astronomical institute in Germany and operates the 100-m radio telescope in Effelsberg at centimetre and millimetre wavelengths, one of the world's most important facilities in radio astronomy. The MPIfR also leads the operations and further development of the Atacama Pathfinder Experiment (APEX), a 12-m telescope in the Chilean Atacama Desert built in 2005. Since 2007 the institute is operating the international LOFAR station DE-1 at the Effelsberg site.

In terms of future observational and development activities, the institute takes part in a number of emerging facilities, such as the further upgrade of the 100-m radio telescope in Effelsberg, the planning of the Square Kilometre Array (SKA), optical interferometry facilities (VLTI and LBT), the German-American airborne observatory SOFIA, the Atacama Large Millimeter Array (ALMA), and the further development of VLBI at high resolutions (millimetre wavelengths and

space VLBI). MPIfR is engaged in national, European and international scientific cooperation. The MPIfR is coordinating the COST Action *MP0905* and the ERC-Advanced Grant *GLOSTAR*, has been and is participating actively in a number of EU-funded collaborations, e.g. RadioNet, SKADS and EXPReS (all FP6); RadioNet-FP7, NEXPReS, PrepSKA, E-SQUID (all FP7).

The MPIfR will lead the Work Package 5 Global Challenges and will be involved as partner in all the other work packages.

### **Key Personnel**

**Prof. Michael Kramer**, director of the fundamental physics research group and head of the Effelsberg department operating the 100-m telescope and the LOFAR DE-1 station. He is member of the SKA Science & Engineering Committee (SSEC) and also is PI of one of five Key Science Projects. He will be overall responsible for the MPIfR participation in GO-SKA.

**Prof. J. Anton Zensus**, director of the VLBI group, is board member of PrepSKA. He is vice-Chair of the European SKA Consortium (ESKAC) and is member of the SSEC. He will be closely involved in the development of policies and procedures to handle the interests of the various project stakeholders.

**Dr. Reinhard Keller**, head of the Electronics Division. He will be responsible for the coordination of activities with industrial links and the application of third-party technology.

**Ms Viola Tegethoff**, European liaison officer of the Max-Planck-Society posted at the institute. She will coordinate the workshop activities and lead the activities to create the networks, study and focus groups.

### **2.3 Consortium as a whole**

As was listed in Section 2.2, there are 4 formal participants of GO-SKA: NWO, STFC, INAF and MPG. All these organisations have extensive expertise in the field of science policy, radio-astronomy, governance of large research infrastructures, policy development and the involvement of industry in science projects and the wider impact of science for society. Each participant will lead a work package and there will be close collaboration between the work packages. Not only will the work package leaders and coordinator meet every month (primarily by telecon), but all participants also agreed to make an in kind contribution to the other work packages. This will ensure that the work packages benefit from all GO-SKA activities and experiences and that the work is carried out efficiently.

Agencies and other government bodies from within and outside the EU will play a major role in the pre-construction phase of SKA and are invited and expected to become an associate participant in the GO-SKA proposal. Some delegations already have expressed their interest, (Canada, Australia & New Zealand and South Africa, see also the letters of support from both candidate host countries for the SKA in Annex B) For a global project such as the SKA, this involvement is regarded as essential. For the formal agreement and commitments funding agencies and governments will need assurances attention. This is best achieved by their active participation in discussion and dialogue with the interested parties.

The associate participants will be invited as observers in the GO-SKA board and to join the Global Policy Working Group for the GO-SKA project. The GO-SKA proposal is endorsed by the Agencies SKA Group (ASG) (see Annex B for Letters of support from the ASG chair, Prof. John Womersley and Mike Garrett, chair of the SKA Science & Engineering Committee (SSEC)

## 2.4 Resources to be committed

A detailed overview of the GO-SKA resources is shown in Table 2.4.1

Beneficiary	Personnel costs	Consulting	Equipment	Direct costs	Indirect costs	Total	EC contribution
<b>WP1 Management</b>							
NWO	80.268	5.000	0	120.268	24.054	149.322	149.322
STFC	5.719	0	0	5.719	6.005	11.724	11.724
INAF	0	0	0	0	0	0	0
MPG	0	0	0	0	0	0	0
<b>WP2 Building a global coordinated collaboration for the SKA</b>							
NWO	0	0	0	0	0	0	0
STFC	85.785	0	0	150.535	90.075	240.610	161.072
INAF	0	0	0	0	0	0	0
MPG	0	0	0	0	0	0	0
<b>WP3 Global governance: development and implementation</b>							
NWO	115.500	70.000	0	173.000	34.600	277.600	255.110
STFC	0	0	0	0	0	0	0
INAF	0	0	0	0	0	0	0
MPG	0	0	0	0	0	0	0
<b>WP4 A global approach to industry engagement</b>							
NWO	0	0	0	0	0	0	0
STFC	0	0	0	0	0	0	0
INAF	87.500	50.000	0	152.250	91.350	293.600	212.908
MPG	0	0	0	0	0	0	0
<b>WP5 The SKA as a tool to address global challenges</b>							
NWO	0	0	0	0	0	0	0
STFC	0	0	0	0	0	0	0
INAF	0	0	0	0	0	0	0
MPG	93.750	0	0	196.000	131.250	327.250	209.720
Total NA	382.535	120.000	0	671.785	347.275	1.139.060	838.810
Total Project	468.522	125.000	0	797.772	377.334	1.300.106	999.855

As can be seen from the table about 50 % of the requested EC contribution is spent on manpower. Next to the funded manpower all parties will contribute considerable resources

beyond the level requested and required by the EC-models. Table 1.3f gives an overview of this effort.

The primary goals of this proposal all require involvement of participants on a global scale, this in accordance with SKA as a global research infrastructure, result in the fact a significant part of the financial resources will be allocated to the renting of meeting venues and travel, subsistence associated with these meetings.

Preparing and implementing industrial collaborations and governance structures requires specialized consultancy for legal and strategic business advice as explained in section 2.3.1.

All work packages require a budget for outreach activities in order to interest parties to cooperate or to communicate to a broader audience the status and the result of the SKA organization. This outreach will consist of , for example, contributions to the website, brochures, DVD and press releases.

The partners in the GO-SKA project (NWO, STFC, INAF and the MPG/MPiFR) are all interested in realising the SKA project. Their strong commitment is also shown by the fact that they will invest own staff-time in carrying out parts of the work described in the GO-SKA work packages which they will lead. In addition, they will participate (~2PM per WP) in each of the other work packages. NWO, STFC, MPiFR and INAF are also all partners in PrepSKA and actively involved in SKA activities. NWO, STFC and INAF are each leading one of the PrepSKA policy work packages and are all represented in the ASG. This guarantees a strong interaction and linkage with the ASG (or its successor). The MPiFR is represented in the SSEC.

#### *Subcontracting costs:*

In WP3, €70.000 is budgeted to external consultancy on the legal framework and governance model to be adopted for the SKA. Legal and strategic business advice will be obtained the development and implementation of appropriate legal framework and governance arrangements for the SKA. The contractor will be selected from legal companies or other organisations with experience in the governance of large scientific projects in their construction and operational phase by the WP-leader and agreed by the Project Management team.

In WP4, INAF has budgeted €50.000 to structure and organise the SKA Industry Days around the world. In addition, external advice will be required for the deployment of the procurement model.

#### *Equipment costs:*

The GO-SKA project will not claim funding for equipment costs, as these costs are not deemed relevant in this project. In case any equipment is needed, the respective partner will provide it.

#### *Dissemination costs:*

Each work package includes dissemination and outreach activities in order to maximise SKA's reputation as an open access Research Infrastructure and an exciting chance for young researchers and other interested parties to work in the fields of astrophysics and cosmology.

Dissemination activities are also targeted at attracting interest from industry, both as suppliers of technology to the SKA as well as receivers of research results following from the construction and operation of the SKA. The results of GO-SKA will be shared with other Research Infrastructures initiatives and projects, especially facilities that are in the ESFRI-roadmap and with the OECD Global Science Forum for their activities on Establishing Large International Research Infrastructures.

Total estimated costs for dissemination and outreach activities are: €103,000.

Project management costs:

Project management costs are estimated at €129,289 for the duration of the project. This equals 9.9% of the total requested funding for this project. This may seem as a high fraction of the overall budget. However, GO-SKA is not a regular R&D project.

Indirect costs:

The partners are using the following cost models to calculate their indirect costs:

NWO: Standard Flat Rate

STFC: Actual Indirect Cost

INAF: Standard Transitional Flat Rate

MPG: Actual Indirect Cost

### **3. Impact**

#### **3.1 Impact GO-SKA on the SKA programme**

The SKA programme will benefit from all the activities of the work packages within GO-SKA. The activities are strongly connected and the final results will be reflected in the implementation of a global SKA governance model. The GO-SKA project will enable the SKA to strengthen the global collaboration and by building comfort and trust, develop relationships on intergovernmental levels. The construction and operation of the SKA telescope will show that a global collaboration in a science project can drive societal benefits and provide solutions in a much wider area than just science.

#### **3.2 Expected impacts listed in the work programme**

##### *Flagship Initiative on Innovation Union*

From a policy perspective, the active participation in the SKA should be seen as a clear example of what the European Commission has in mind when promoting the new Europe 2020 Flagship Initiative on the Innovation Union. The Commission has publicly stated<sup>2</sup> that it is its policy to “make Europe into a world-class science performer”. By supporting the PrepSKA and GO-SKA projects, the EU contributes to this scientific aim, whilst at the same time signalling to young researchers that Europe is willing to invest in large Research Infrastructures so they can start building and expanding their academic careers. The open access to this RI will mean exciting opportunities to engage in new research paths and build up networks in a joint research

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<sup>2</sup> European Commission MEMO 10/473 - 6 October 2010

environment. The creation of an appealing research environment will attract and keep highly skilled human capital from different disciplines working in Europe. Furthermore, the continued European support (EU and individual member States) for SKA clearly illustrates that SKA is considered of strategic importance to Europe's own research-driven innovation agenda. GO-SKA is intended as a vehicle for the European science community and European policy makers to ensure that the European Union has a strong position in the further management and roll-out of the SKA. A second key-driver for GO-SKA in relation to meeting Europe's strategic scientific, industrial and competitive needs is the fact that the project will actively start to build industry interest for the construction phase of SKA. As SKA is a project of very high complexity and advanced technology, participation by European industry will increase knowledge-levels inside these companies and increase their international competitiveness. For example: engineers for the SKA will challenge Europe's ICT industry to innovate for efficiency and cost savings in high performance networks, power and capital investment. New software and hardware that will drive the SKA and make it smart will be developed, potentially setting global standards for ICT engineering and construction. The anticipated benefits involve not only signal processing, storage and computation, but also reliability and maintainability for remote SKA use, providing a backbone for development of remotely distributed ICT commercial services. Research<sup>3</sup> has shown that industry is also likely to gain valuable knowledge from SKA. For example: the SKA will have considerable energy needs in the order of 50-100 MW, with much of the demand concentrated in remote areas. The use of renewable energy for the SKA would pioneer remote power generation with low running costs that would be unaffected by fluctuations in global fuel prices. Such a renewable strategy would accelerate technology development in the areas of scalable energy generation and storage, distribution, efficiency and demand reduction and provide a launch pad for commercialisation of innovative green energy technologies.

#### *ESFRI and other research activities*

The ESFRI Roadmap explicitly acknowledges the importance of international collaboration and names the SKA as one of the prime examples where a single country – or even continent – alone cannot undertake this type of investment in Research Infrastructures, especially not in the current economic climate. With regard to SKA, the recent ESFRI update<sup>4</sup> states: “(...) discussions on legal, governance and financial issues are underway. Because of the substantial international participation, these projects need in general more effort to understand and align widely different legal structures and funding cycles.” This is precisely the aim of GO-SKA! As already stated in chapter 1, it is important to also note that SKA is a priority on the European ASTRONET roadmap and in several national research infrastructure roadmaps and science plans.

### **3.3 Need for EU FP7 funding for GO-SKA**

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<sup>3</sup> COST strategic workshop into non-science benefits of SKA; Compiled & edited by Phil Crosby & Jo Bowler, SKA Program Development Office

<sup>4</sup> ESFRI Implementation report 2009, page 10.

The project consortium requests FP7 financial support in order to implement GO-SKA, as it is clear that this project's aims are clearly beyond the normal remit of national funding agencies. GO-SKA will build and extend international financial and political support for the project as well as build interest from industry in the construction of the SKA. The partners have – from their own national research agenda's – an interest in seeing the SKA become reality and are willing to invest staff-time on building an integrated international stake-holder community, but working with so many (still increasing) partners across all continents does require support from a European level.

### **3.4 Spreading excellence, exploiting results, disseminating knowledge**

Each work package will include specific dissemination and outreach activities (listed in the work package descriptions). The output of the GO-SKA work packages will be presented to and discussed with the Board and management of the SKA organisation, presented at the yearly International SKA Forum and other relevant national and international forums and conferences, such as the ESFRI meetings. The project consortium expects to also be able to provide a contribution concerning its experience in working on global project development during upcoming ECRI Conferences (organised by ESFRI and the European Commission), so that stakeholders, policy makers and researchers can discuss how to jointly approach the realisation and operation of research infrastructures of global relevance. The progress and results of GO-SKA will also be published to a broader public. A dedicated website will be created early in the project. In addition Work Package 5 focuses on outreach. An important ingredient for the successful completion of WP5 is the constant engagement of the general public in all involved countries to demonstrate the sociological-economic benefits of the SKA project. This will be demonstrated by focussing on key areas such as energy and computing. The planned workshops will be organized together with public exhibitions that are aimed to the general public and industrial partners. Brochures and leaflets will be produced in corresponding languages, targeting country-specific interests and opportunities. We will also organize road-shows that will visit schools to excite young people about science and technology using astronomy as a vehicle. Targeting decision and policy makers, we will present specific cases where astronomy has already demonstrated a huge non-scientific impact (e.g. WiFi, GPS) and make the case that SKA developments promise to follow the same paths."

The exploitation of results is not specifically relevant for this project, as by itself it will not generate results that are of interest to external parties. Instead, the Governance Structure set in place by GO-SKA will enable the structured participation by industry in the development of SKA and organise exploitation opportunities coming out of SKA.

### **3.5 IPR**

This project is not expected to generate any new intellectual property and therefore IPR arrangements are not really required. Still, the consortium agreement will contain a section on how to deal with IPR-issues in case such issues arise.<sup>5</sup>

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<sup>5</sup> The unique global character of the SKA project could generate new standards for IPR for technological collaboration

## 4. Ethics Issues

**ETHICS ISSUES TABLE**

<b>Research on Human Embryo/ Foetus</b>		<b>YES</b>	<b>Page</b>
*	Does the proposed research involve human Embryos?		
*	Does the proposed research involve human Foetal Tissues/ Cells?		
*	Does the proposed research involve human Embryonic Stem Cells (hESCs)?		
*	Does the proposed research on human Embryonic Stem Cells involve cells in culture?		
*	Does the proposed research on Human Embryonic Stem Cells involve the derivation of cells from Embryos?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	Confirmed P. Vogel	

<b>Research on Humans</b>		<b>YES</b>	<b>Page</b>
*	Does the proposed research involve children?		
*	Does the proposed research involve patients?		
*	Does the proposed research involve persons not able to give consent?		
*	Does the proposed research involve adult healthy volunteers?		
	Does the proposed research involve Human genetic material?		
	Does the proposed research involve Human biological samples?		
	Does the proposed research involve Human data collection?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	Confirmed P. Vogel	

<b>Privacy</b>		<b>YES</b>	<b>Page</b>
	Does the proposed research involve processing of genetic information or personal data (e.g. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?		
	Does the proposed research involve tracking the location or observation of people?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	Confirmed P. Vogel	

<b>Research on Animals</b>		<b>YES</b>	<b>Page</b>
	Does the proposed research involve research on animals?		
	Are those animals transgenic small laboratory animals?		
	Are those animals transgenic farm animals?		
*	Are those animals non-human primates?		
	Are those animals cloned farm animals?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	Confirmed P. Vogel	

<b>Research Involving ICP Countries<sup>6</sup></b>		<b>YES</b>	<b>Page</b>
	Is the proposed research (or parts of it) going to take place in one or more of the ICP Countries?		
	Is any material used in the research (e.g. personal data, animal and/or human tissue samples, genetic material, live animals, etc):		
	a) Collected in any of the ICP countries?		
	b) Exported to any other country (including ICPC and EU Member States)?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	Confirmed P. Vogel	

<b>Dual Use</b>		<b>YES</b>	<b>Page</b>
	Research having direct military use		
	Research having the potential for terrorist abuse		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	Confirmed P. Vogel	

<sup>6</sup> In accordance with Article 12(1) of the Rules for Participation in FP7, 'International Cooperation Partner Country (ICPC) means a third country which the Commission classifies as a low-income (L), lower-middle-income (LM) or upper-middle-income (UM) country. The list of countries is given in annex 1 of the work programme. Countries associated to the Seventh EC Framework Programme do not qualify as ICP Countries and therefore do not appear in this list.

**Annex A: List of ASG Members****A.1 – Regular Attending Delegations**

<b>Delegation</b>	<b>Organisation</b>
<b>Australia</b>	Commonwealth Scientific and Industrial Research Organisation (CSIRO) Department of Innovation, Industry, Science and research (DIISR)
<b>Canada</b>	National Research Council (NRC)
<b>EC</b>	European Commission
<b>ESO</b>	European Southern Observatory (ESO)
<b>France</b>	Centre National de la Recherche Scientifique (CNRS)
<b>Germany</b>	Projekträger DESY (PT - DESY) Max-Planck-Society
<b>Italy</b>	Istituto Nazionale di Astrofisica (INAF)
<b>Japan</b>	National Astronomical Observatory (NAO)
<b>Netherlands</b>	Ministry of Education, Culture and Science Netherlands Organisation for Scientific Research (NWO)
<b>New Zealand</b>	Ministry of Research, Science and Technology (MoRST) New Zealand Ministry of Research, Science and Technology, NZ Mission to the EU, Brussels
<b>Spain</b>	Ministry of Science and Innovation
<b>South Africa</b>	South African SKA Project Office National Research Foundation Dept of Science and Technology
<b>UK</b>	Science and Technology Facilities Council (STFC)
<b>USA</b>	National Science Foundation (NSF)

**A.2 – Other Invited Delegations**

<b>Delegation</b>	<b>Organisation</b>
<b>Argentina</b>	National Research Ministry
<b>Chile</b>	CONICYT Astronomy Programme
<b>China</b>	National Astronomical Observatories
<b>India</b>	National Centre for Radio Astronomy
<b>Portugal</b>	Fundação para a Ciência e a Tecnologia (FCT)
<b>Russia</b>	Kurchatov Institute Ministry for Education and Science of Russia
<b>South Korea</b>	Korea Astronomy and Space Science Institute (KASI)

Annex B - Letters of support



**Australian Government**

**Department of Innovation  
Industry, Science and Research**

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Dr Patricia Vogel  
Netherlands Organisation for Scientific Research (NWO)  
PO Box 93138  
NL2509 AC Den Haag

Dear Dr Vogel

I am writing to express the support of the Australian-New Zealand SKA Coordination Committee (ANZSCC) for the Square Kilometre Array (SKA) related proposal (GO-SKA) currently being coordinated by the Netherlands Organisation for Scientific Research (NWO) on behalf of a consortium of European institutions. I understand that NWO is planning to submit the proposal to the European Commission.

As you are aware, the Australian and New Zealand governments are active partners in the international SKA program. This region has been identified as one of two candidate sites for the SKA and the governments intend to submit a proposal for hosting the SKA as part of the SKA site selection process.

The governments have also made in-principle commitments to be major scientific, technical and funding partners in the SKA project, through the relevant agencies and institutions in our countries. To date, governments involved in the Australia-New Zealand SKA project, including the State Government of Western Australia, have committed around \$330 million to SKA related infrastructure and activities. The Australian Government is in the process of formally considering its position in providing funding for the next stage of the international SKA program – the pre-construction phase project.

In this context I would like to indicate the ANZSCC's support for this proposal and willingness to become an active associate partner in the GO-SKA project. We look forward to having further discussions with the project partners on how Australia and New Zealand can contribute, should the application be successful.

In relation to the proposed industry engagement work package, you might like to note that this activity is of particular interest. The ANZSCC would be pleased to discuss with the partners how it could make available, from our well engaged industry stakeholders, advice and expertise to assist the work.

Yours sincerely

Patricia Kelly  
Chair

Australia-New Zealand Square Kilometre Array Coordination Committee  
24 November 2010

DEPARTMENT OF  
SCIENCE AND TECHNOLOGY  
(SOUTH AFRICA)

Office of the Senior Science and Technology  
Representative to the European Union

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25 November 2010

Ms Patricia Vogel  
Senior Policy Manager  
Netherlands Organisation for Scientific Research (NWO)  
PO Box 93138  
NL-2509 AC The Hague

**Statement of support for the FP7 GO-SKA proposal and commitment of South Africa to participate as an associate partner**

In my capacity as the South African Department of Science and Technology's Senior Science and Technology Representative to the European Union, I would like to confirm the Department's strong support for the GO-SKA (Coordinating and supporting policy development of the global organisation of the SKA) Seventh Framework Programme proposal being coordinated by the NWO.

Should the GO-SKA proposal be approved, it will be an invaluable instrument to enable the further progress of the global SKA project. Addressing strategic objectives, such as the broadening of international participation in the project, the further development of appropriate governance frameworks, the strengthening of engagement with industry and exploring the SKA's role in addressing global challenges, GO-SKA is aligned with and ideally positioned to support the global project work plan as envisioned by SKA bodies such as the Agencies SKA Group and the SKA Science and Engineering Committee.

South Africa, through the Department of Science and Technology, our National Research Foundation and the SKA South Africa Project Office, stand ready to, where appropriate, actively contribute to GO-SKA and would be honoured to participate in the project as an Associate Partner.

Please accept our best wishes for this important initiative. I can provide further clarification or information as may be required.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Daan du Toit'.

Daan du Toit  
Minister Counsellor (Science and Technology)  
South African Mission to the European Union



Dr P Vogel  
Netherlands Organisation for Scientific Research  
PO Box 93138  
NI-2509 AC The Hague  
The Netherlands

Dear Patricia,

**Support for Proposal in response to INFRA-2010-3.2 Call: GO-SKA**

As you know, I currently act as Chair of the Agencies SKA Group, which brings together funding agencies and governments with an interest in the SKA Programme. Since 2009, the ASG has built on the earlier work of the SKA Informal Funding Agencies Group to coordinate discussions on a range of policy, technical and strategic issues. In this, we have benefited in particular from the resources made available through the European Union's PrepSKA project in examining the issues of governance, funding and procurement. The emerging results from this work have been essential as we have started the move towards planning the next, detailed design phase of the project and the potential move to a new governing SKA legal entity.

The challenges that the SKA project faces in the coming period are many and varied. I am therefore pleased to note the development of a response to the current FP7 call: INFRA-2010-3.2 which will address a range of the issues identified by the ASG as critical to making progress in the various policy aspects of the ASG project. I believe that each of the proposed workpackages, ranging from developing a broader global collaboration (necessary to identify the full scope of resources needed to deliver the SKA) the development of a global governance structure (essential to enable an implementation of the SKA to proceed in the future, if resources are to be committed) the development of a stronger industry collaboration, and the exploration of the broader economic impact of the project in addressing global challenges, will serve to enhance the preparation of the project in the pre-construction phase as we move towards potential approval.

With this background, it is my pleasure to endorse the submission of this proposal as a critical tool in achieving our collective aims on the ASG. I look forward to working with you as Coordinator and the other participants, in the event of a favourable assessment of the proposal, and would be pleased to provide any other supporting information to the assessors that might be helpful.

Yours sincerely

Professor John Womersley  
Director, Science Programmes



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25 November 2010

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The Netherlands

### **Letter of Support for INFRA-2010-3.2 Call GO-SKA**

Dear Patricia,

I am writing to you in my capacity as chairman of the Square Kilometre Array (SKA) Science & Engineering Committee (SSEC). The SSEC is the international oversight body for all SKA scientific and technical matters, and via its executive is ultimately responsible for all financial and personnel matters associated with the SKA Program Development Office (SPDO). As you are well aware, the SKA is identified as a major global research infrastructure project in the ESFRI list of opportunities. In addition, it has emerged from the ASTRONET ground-based astronomical infrastructure roadmapping process as the top priority of the European community, together with the E-ELT.

I understand that NWO, together with several other funding agencies, will respond to an EC FP7 call for proposals, INFRA-2010-3.2, with a proposal *Go-SKA* that aims to further develop various policy developments that are crucial to the future success of the SKA project. This will include the development of an appropriate governance model for the SKA – a significant challenge given the large and complex nature of the global collaboration involved. The proposal will also be important in further engaging industrial interest and will continue to push forward the SKA as a prime example of the very positive role large research infrastructure programmes can play as vehicles to tackle large global challenges. This includes not only direct economic benefits expected from the SKA but also many indirect societal impacts, such as advanced technology development, attracting young people into science and engineering schools and capacity building in general.

*GO-SKA* builds on FP7 PrepSKA and continues the trend towards greater engagement and involvement of the major funding agencies in the SKA project. Today, the SKA finds itself an important crossroads with many key decisions to be made over the coming months and years. The direct involvement of the funding agencies and national ministries and indeed governments is now essential. I believe *GO-SKA* represents a very necessary, major step forward for the SKA project, and I support it whole-heartedly and without reservation.

Yours sincerely,

Professor Michael A. Garrett  
Chair, SKA Science and Engineering Committee.