



**UPDATED SUMMARY OF THE RESULTS OF THE
PRECONSTRUCTION PHASE STAGE 1 EXPRESSION OF
INTEREST (EOI)**

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 Author K Cloete
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Name	Designation	Affiliation	Date	Signature
Submitted by:				
K. Cloete	Project Manager	SKA Organisation	2012-07-09	
Approved for release by:				
M. van Haarlem	Interim Director General	SKA Organisation	2012-07-09	

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ORGANISATION DETAILS

Name	SKA Organisation
Registered Address	Jodrell Bank Centre for Astrophysics Room 3.116 Alan Turing Building The University of Manchester Oxford Road Manchester, UK M13 9PL Registered in England & Wales Company Number: 07881918
Fax.	+44 (0)161 275 4049
Website	www.skatelescope.org

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LIST OF ABBREVIATIONS

AI.....	Advance Instrumentation	PAF	Phased Array Feed
CSP	Central Signal Processor	PWR.....	Power
DSH.....	Dishes	RFP	Request for proposal
Eoi	Expression of Interest	SADT.....	Signal and Data Transport
INFRA.....	Site and Infrastructure	SAT	Synchronisation and Timing
LFAA	Low Frequency Aperture Array	SDP	Science Data Processor
MFAA	Mid Frequency Aperture Array	SKA	Square Kilometre Array
MGR	Telescope Manager	WBSPF	Wide Band Single Pixel Feed

1 Introduction

The purpose of this document is to present the results of the SKA Preconstruction Phase Stage 1 Expression of Interest (Eol) process to all the respondents that took part in the process.

This document has been updated to accommodate the request from various consortia to make their membership publically available. In addition nine Eols, received shortly after the closing date, were added to the tables and lists.

2 Background

The work to be executed during the pre-construction phase will be structured and managed as described in the SKA Project Execution Plan (PEP) for this phase. During this phase the SKA Organisation intends to enter into agreements with a small number of consortia who will be responsible for executing large portions of the work, especially at the Element level of the SKA. The process of allocating the work will be formal and consortia will be invited to bid during a formal Request for Proposal (RFP) process against work packages described in a detailed Work Breakdown Structure (WBS)/Statement of Work (SOW). The Office of the SKA Organisation, supported by organisations and groups around the world, has recently finalised the Stage 1 WBS/SOW.

In preparation for the formal process the Office of the SKA Organisation decided to issue an Expression of Interest (Eol). The aims of the Eol process were to:

- 1) Establish a snapshot of the coverage of the interest to participate/execute the work as defined for the SKA Preconstruction Stage 1 WBS, and
- 2) Facilitate consortia formation by the gathering and utilisation of the information provided as part of the Eol process.

The Eol process was initiated on 1 May 2012 with the distribution of the Eol document (MGT-001.005.015-EOI-001, Rev 1, dated 1 May 2012) per e-mail as well as on the SKA website. The document provided an overview of the process, guidance on participating and completion of the expression of interest, general important information as well as rules (see [Appendix A](#) for SKA website announcement).

Following the release of the documents a number of questions with regards to the participation of industry arose. A number of questions and answers were developed and published via the SKA website (see [Appendix B](#)). The closing date for the process was set as Monday 14 May 2012, at 16:00 UT.

3 Results

All the tables and lists as published in Revision 1 of this document have been updated with the information as indicated in paragraph 1 above. The updated results of the Eol are presented in **Appendices C to G** as follows:

- [Appendix C](#): Complete list of respondents
- [Appendix D](#): Respondents arranged per SKA Element
- [Appendix E](#): Consortia information
- [Appendix F](#): Detailed tables per SKA Element

The contact information as supplied by the respondents is not included in this report and is available on request. Please contact Kobus Cloete (cloete@skatelescope.org) to request a copy.

4 Next Steps

Due to the recent agreement on a dual site implementation for the SKA, the Stage 1 WBS/SOW will, amongst other, be revisited. A plan, setting out the way forward for the next few months, has been drafted by the Office of the SKA Organisation and has been presented to the SKA Board at the end of June 2012. In general the plan has been approved but a few minor details have to be sorted out before it will be made publically available.

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Appendix A: Announcement on SKA Website

Request for expressions of interest:

Stage one of the SKA preconstruction phase

Background

Following the completion of the preparatory phase of the Square Kilometre Array (SKA) in December 2011, the SKA project has progressed into the preconstruction phase. During this phase the SKA Organisation intends to enter into agreements with a small number of consortia who will be responsible for executing large portions of the work, especially at the element level of the SKA.

The preconstruction phase is subdivided into two stages. The Office of the SKA Organisation, supported by organisations and groups around the world, is in the process of finalising the work breakdown structure (WBS) and statement of work (SOW) for the first stage (stage one) and the aim is to issue formal a request for proposals (RFP) for this stage towards the end of June 2012.

In preparation for the formal RFP process, the Office of the SKA Organisation has decided to issue an expression of interest (EoI) to firstly establish a snapshot of the interest to participate/execute the work for the stage one, and secondly to facilitate consortia formation by gathering and utilising the information provided as part of the EoI process.

The SKA Organisation would like to invite organisations to participate in the expression of interest process for stage one of the SKA preconstruction phase.

How to participate?

Please download the documents provided at the bottom of this page. These documents provide all the background and guidance on how to complete and submit the EoI to the SKA office.

Who can participate?

SKA consortia, organisations and members of industry who are considering participation by resourcing and executing the work for stage one of the SKA preconstruction phase are welcome to participate.

Timeline

Expressions of interest must be sent to the SKA Organisation by no later than **no later than 16:00 UT on 14 May 2012**.

Industry involvement

Information on industry involvement in the expression of interest (EoI) process for stage one of the SKA preconstruction phase can be found [here](#).

Queries

Any queries or questions on aspects that might still be unclear after reading the expression of interest documentation can be sent to Kobus Cloete (cloete@skatelescope.org).

Documents

Expression of Interest [MS Word](#) and [pdf](#).

Please complete and return the MS Word version.

Glossary containing terms and definitions [pdf](#).

Appendix B: Q+A for Industry Participation in the Eol

Industry participation in the Eol

The SKA Organisation welcomes interest from potential industry partners. Please see below for responses to frequently asked questions regarding industry involvement in the request for expressions of interest (Eol) in stage one of the SKA preconstruction phase.

Q: How can industry get paid for their role in a work package consortium (WPC)?

A: The work package consortia will not be funded by the SKA Organisation. Money will come from the funding agencies and other sources identified by the members of the SKA Organisation. Industry can be paid as a subcontractor of a university or research organisation. A second possibility is for industry to be paid directly from these funds, but that may not be allowed in all cases (e.g. if it is seen as state support). The third option is self-funding by industry, although care must be taken that potential future procurements are not affected. Indeed, the threat of “lock-out” in the procurement process should be avoided wherever possible. Organisations (including industry) based in countries that are not members of the SKA Organisation may, in all likelihood, have to self-fund or look to their own funding agencies for support. The value of any such work will not be entered into the SKA Organisation’s contribution register.

Q: Can industry lead a work package consortium?

A: The Eol does not exclude this possibility. Whether the funding model of stage one work allows it is not clear, that may differ from country to country.

Certainly, if there are no research organisations or universities able to lead a WPC, then this may be an attractive option. The board of directors could still decide that industry cannot lead WPCs, this should be clear in time for the request for proposals (RfP).

Q: When will information on the SKA intellectual property (IP) policy and procurement strategy be ready?

A: The outline of both will be available when the RfP is issued. Both these documents require approval by the Board of Directors of the SKA Organisation. The full IP policy and the procurement strategy will be completed thereafter. Exactly how long this takes depends on the approaches advocated in the member countries and whether principles of juste-retour will be applied.

Q: What further documents will form part of the RfP?

A: It is currently foreseen that with the RfP the following documents will be released in addition to the full stage one work breakdown structure (WBS) and statement of work (SOW) (and the documents referenced therein):

- Template agreement for consortia;
 - The criteria to be used to evaluate the bids;
 - Updated system engineering management plan;
 - SKA stage one draft project management plan;
 - Templates for major technical documents such as requirement specifications (SRS), architectural design documents (ADD), procurement specifications and development specifications.
-

Appendix C: List of Respondents

	Organisation	Country
1	AARNet	Australia
2	ABB Australia	Australia
3	ACAL Bfi	United Kingdom
4	Adaptive Array Systems Limited	United Kingdom
5	AECOM Australia	Australia
6	Agilent Technologies UK	United Kingdom
7	Alberta Centre for Advanced Micro&Nanotech Products	Canada
8	Alcatel-Lucent Australia Limited	Australia
9	Altera	United States
10	ANSYS Limited	South Africa
11	APCO Technologies SA	Switzerland
12	ARC Centre of Excellence for All-sky Astrophysics	Australia
13	ARIYA Project Managers	South Africa
14	Arup	United Kingdom/Australia/South Africa
15	ASTRON	Netherlands
16	<p>ASTRON led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • International Centre for Radio Astronomy Research (ICRAR, Australia) • Istituto Nazionale di Astrofisica Istituto di Radio Astronomia (INAF-IRA, Italy) • Joint Institute for VLBI in Europe (JIVE, The Netherlands) • Netherlands Institute for Radio Astronomy (ASTRON, The Netherlands) • Observatoire de Paris (France) • Raman Research Institute (RRI, India) • Université de Bordeaux 1 (UB1, France) • University of Cambridge (UK) • University of Malta (Malta) • University of Manchester (UK) University of Oxford (UK) 	Netherlands
17	Aurecon	Australia/South Africa
18	Aveng (Africa) Limited	South Africa
19	BAE Systems Australia	Australia
20	BAE Systems Land Systems South Africa	South Africa
21	BCF Solutions	France
22	Bigen Africa Services	South Africa
23	Callisto Limited/Callisto France	United Kingdom/France
24	Caltech Eng	United States
25	Cambridge Consultants Ltd	United Kingdom
26	<p>Canadian SKA Industry Consortium (NRC led) currently consisting out of:</p> <ul style="list-style-type: none"> • IBM Canada Limited • Calgary Scientific Inc • MDA Corporation • NovAtel Inc. • DA-Integrated • Dynamic Structures Ltd • TeraXion Inc. • COM DEV Ltd • Nanowave Technologies Inc. 	Canada

	Organisation	Country
	<ul style="list-style-type: none"> • Sanmina-SCI • PowerOn Ltd. • Platinum Engineering Ltd • e-VANS Corp. • Murandi Communications Ltd. • MuAnalysis Inc. • Sysacom R&D plus • Motive Industries Inc. • Lyrtech RD, Inc. • Arrow Electronics • National Research Council of Canada (NRC) • University of Alberta + TRILabs • University of Calgary 	
27	CCD Design & Ergonomics	United Kingdom
28	CETC54	China
29	Ciena	United Kingdom
30	Circadian Solar	United Kingdom
31	Cisco International Limited	United Kingdom
32	Clearspeed Technology Limited	United Kingdom
33	Cobham Technical Services	United Kingdom
34	CommAgility Limited	United Kingdom
35	COMMUNICATIONS AUDIT UK	United Kingdom
36	CSIRO	Australia
37	<p>CSIRO led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • CSIRO - Astronomy and Space Science & the CSIRO ICT Centre, Australia • Astronomy Technology Program – Penticton, National Research Council, Herzberg Institute of Astrophysics Dominion Radio Astrophysical Observatory & University of Calgary, Canada • National Astronomical Observatory China (NAOC) & Joint Laboratory for Radio Astronomy Technologies (JLRAT), China • ASTRON, Netherlands • SKA SA, South Africa • INAF, Italy • Chalmers University & Onsala Observatory, Sweden • University of Manchester, UK • And in preliminary discussions: <ul style="list-style-type: none"> • EMSS (South Africa) • MMS (South Africa) • BAE Systems SA (South Africa) • CETC54 (JLRAT, China) • Airborne Composites (ASTRON, NL) • Finmeccanica (INAF, Italy) • Université de Bordeaux 1 (UB1, France) • Observatoire de Paris (France) • Low Noise Factory (Chalmers/Onsala, Sweden) • Omnisys Instruments AB (Chalmers/Onsala, Sweden) • Lockheed Martin Australia (CSIRO, Australia) • BAE Systems Australia (CSIRO, Australia) • GE Australia (CSIRO, Australia) • Selex-Galileo (UMan, UK) 	Australia
38	<p>CTAER and IAA-CSIC led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • ASTRON (The Netherlands) 	Spain

	Organisation	Country
	<ul style="list-style-type: none"> • Centro Tecnológico Avanzado de Energías Renovables (CTAER; Spain) • Fraunhofer-Institut für Solare Energiesysteme (FhG-ISE; Germany) • Instituto de Astrofísica de Andalucía-CSIC (IAA-CSIC; Spain) • Instituto de Telecomunicações de Aveiro (IT; Portugal) • Max-Planck Institut für Radioastronomie (MPIfR; Germany) 	
39	DA-Integrated	Canada
40	Daniels Electronics Ltd.	Canada
41	DBM Marketing – DRIE-D BEARINGS SOUTH AFRICA	South Africa
42	Denel Aerostructures a Division of Denel Group	South Africa
43	Dihlase Consulting Engineers	South Africa
44	e2v SAS	France
45	EMSS Antennas	South Africa
46	EnSilica	United Kingdom
47	ESP Central Ltd	United Kingdom
48	Filtronic Broadband Limited	United Kingdom
49	Fluor Ltd	United Kingdom
50	FormaShape	Canada
51	Fujitsu Semiconductor Europe GmbH	United Kingdom
52	GE Intelligent Platforms	Australia
53	General Dynamics SatCom Technologies	United States/United Kingdom
54	GHD	Australia
55	GHD Pty Ltd	Australia
56	Glyndwr Innovations Ltd	United Kingdom
57	Goonhilly Earth Station Ltd	United Kingdom
58	Hatch Associates	Australia
59	High Gain Antenna	Korea
60	Hitachi Data Systems	Australia
61	HUBER+SUHNER	Australia
62	IBM	United States
63	IBM United Kingdom Limited	United Kingdom
64	INAF - Istituto Nazionale di Astrofisica led consortium	Italy
65	Institute for Radio Astronomy & Space Research	New Zealand
66	Instituto de Física de Cantabria (IFCA, CSIC-UC)	Spain
67	Japan SKA consortium	Japan
68	Jet Propulsion Laboratory	United States
69	JLRAT/NAOC	China
70	Jülich Supercomputing Centre (JSC), Forschungszentrum Jülich GmbH	Germany
71	KEPCO KDN	Korea
72	Korea Astronomy and Space Science Institute	Korea
73	Lockheed Martin Australia	Australia
74	Low Noise Factory	Sweden
75	MARAND PRECISION ENGINEERING	Australia
76	Materia, Inc	United States
77	Max-Planck-Institut fuer Radioastronomie (MPIfR)	Germany
78	METHODE ELECTRONICS	United Kingdom
79	Micreo Limited	Australia
80	Minex Engineering Corp.	United States
81	Mott MacDonald Ltd	United Kingdom
82	NAOC	China
83	National Institute of Aerospace Technique	Spain
84	National Instruments	United Kingdom
85	National Measurement Institute	Australia

	Organisation	Country
86	National Physical Laboratory	United Kingdom
87	National Research Council of Canada led consortium	Canada
88	National Time and Frequency Network (NTFN) led consortium	Australia
89	NCRA-TIFR led consortium	India
90	Nexeya Systems	France
91	Nokia Siemens Networks	Germany/South Africa
92	Norsat International Inc	Canada
93	Nova Systems	Australia
94	NTE-SENER S.A.	Spain
95	NXP Semiconductors	Netherlands
96	Observatory Sciences Ltd	United Kingdom
97	Omnisys Instruments AB	Sweden
98	P3-Group	South Africa/Germany
99	Parsons Brinckerhoff	United Kingdom
100	Persistent Systems Limited	India
101	Prudent Energy Corporation	United States
102	Quartzlock (UK) Limited	United Kingdom
103	Rapallo Consulting & Contracting Engineers	Australia
104	Reutech Radar Systems	South Africa
105	RF Module & Optical Design Limited [RFMOD]	United Kingdom
106	RFEL Ltd	United Kingdom
107	Roke Manor Research	United Kingdom
108	ROXTEC AUSTRALIA	Australia
109	Sanyati Holdings	South Africa
110	SCISYS	United Kingdom
111	SELEX Galileo	United Kingdom
112	SELEX Sistemi Integrati S.p.A.	Italy
113	Siemens Industry	United Kingdom
114	Siemens Nederland	Netherlands
115	SKA South Africa (Telescope manager)	South Africa
116	SKA South Africa (Infrastructure)	South Africa
117	SKA South Africa (Central signal processor)	South Africa
118	SKA South Africa led consortium currently consisting out of: <ul style="list-style-type: none"> • INAF • EIE* • EMSS • GDSatcom* • BAE* • RRS* • CETC54 • Astron** • Chalmers** • CSIRO** <p>* Depends on the MeerKAT Dish tender. ** Will be useful as it will fill gaps SKA SA cannot at this stage.</p>	South Africa
119	SSI Engineers and Environmental consultants	South Africa
120	STFC – Technology Department	United Kingdom
121	STFC RAL Space Department	United Kingdom
122	Surface Generation Ltd	United Kingdom
123	Systems Engineering & Assessment	United Kingdom
124	Tata Consultancy Services led consortium	India
125	TEK Microsystems	United Kingdom
126	Teledyne Defence Limited	United Kingdom

	Organisation	Country
127	Telespazio VEGA UK Ltd	United Kingdom
128	The Boeing Company	Australia
129	Tronicon Industries Inc.	Canada
130	UNIVERSIDAD CARLOS III DE MADRID (UC3M)	Spain
131	Universidad de Cantabria. Dept of Communications Engineering	Spain
132	University of Cambridge (LFAA)	United Kingdom
133	University of Cambridge (Central signal processor)	United Kingdom
134	University of Cambridge led consortium currently consisting out of: <ul style="list-style-type: none"> • University of Cambridge (Lead) • Astronomy & Space Science CSIRO • ASTRON • SKA SA • ICRAR • SDP-NZ • STFC • University of Manchester • MPIfR Bonn • Instituto de Astrofísica de Andalucía-CSIC • International Center for Computational Science, Lawrence Berkeley National Laboratory • University of Melbourne • CADC/cyberSKA • The Chancellor, Masters and Scholars of the University of Oxford. 	United Kingdom
135	University of Malta	Malta
136	University of Manchester (Non imaging processor)	United Kingdom
137	University of Manchester led consortium currently consisting out of: <ul style="list-style-type: none"> • CSIRO Astronomy and Space Science (CASS, Australia) • Instituto de Telecomunicações (IT, Portugal) • Joint Institute for VLBI in Europe (JIVE, The Netherlands) • Netherlands Institute for Radio Astronomy (ASTRON, The Netherlands) • SKA South Africa • University of Manchester (UK) • University of Granada (Spain) 	United Kingdom
138	University of Oulu	Finland
139	University of Oxford	United Kingdom
140	WESTRALIAN ENGINEERING	Australia
141	WorleyParsons Europe Limited	United Kingdom
142	Stratosat Datacom (Pty) Ltd	South Africa

Appendix D: Respondents arranged per SKA Element

Dishes (80 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ACAL Bfi
- Alberta Centre for Advanced Micro&Nanotech Products
- Altera
- APCO Technologies SA
- ARiYA Project Managers
- Arup
- Aurecon (Lead: P; Full: N; Cons: N)*
- BAE Systems Land Systems South Africa (Lead: Y; Full: N; Cons: N)*
- BCF Solutions
- Callisto Limited/Callisto France
- Caltech Eng
- Canadian SKA Industry Consortium (NRC led) (Lead: Y; Full: N; Cons: Y)*
- CCD Design & Ergonomics
- CETC54
- Cobham Technical Services
- COMMUNICATIONS AUDIT UK
- CSIRO led consortium (Lead: Y; Full: Y; Cons: Y)*
- DA-Integrated
- Daniels Electronics Ltd.
- Denel Aerostructures a Division of Denel Group
- EMSS Antennas
- Fluor Ltd
- FormaShape
- GE Intelligent Platforms
- General Dynamics SatCom Technologies (Lead: Y; Full: Y; Cons: N)*
- GHD Pty Ltd
- Glyndwr Innovations Ltd
- Goonhilly Earth Station Ltd
- High Gain Antenna
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium (Lead: Y; Full: N; Cons: Y)*
- Institute for Radio Astronomy & Space Research
- Instituto de Física de Cantabria (IFCA, CSIC-UC)
- Jet Propulsion Laboratory
- JLRAT/NAOC
- Lockheed Martin Australia (Lead: Y; Full: N; Cons: N)*
- Low Noise Factory
- MARAND PRECISION ENGINEERING
- Materia, Inc
- METHODE ELECTRONICS
- Micro Limited
- Minex Engineering Corp.
- Mott MacDonald Ltd
- NAOC
- National Physical Laboratory
- National Research Council of Canada led consortium
- NCRA-TIFR
- Nexeya Systems
- Norsat International Inc
- NTE-SENER S.A.
- NXP Semiconductors
- Observatory Sciences Ltd
- Omnisys Instruments AB (Lead: P; Full: N; Cons: N)*
- P3-Group
- Prudent Energy Corporation
- Reutech Radar Systems
- RFEL Ltd
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SCISYS
- SELEX Galileo
- SELEX Sistemi Integrati S.p.A.
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SKA South Africa led consortium (Dishes) (Lead: Y; Full: N; Cons: Y)*
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Stratosat Datacom (Pty) Ltd (Lead: Y; Full: N; Cons: N)*
- Surface Generation Ltd
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- The Boeing Company
- Tronicon Industries Inc.
- Universidad de Cantabria. Dept of Communications Engineering
- University of Oxford
- WorleyParsons Europe Limited (Lead: Y; Full: N; Cons: N)*

Low Frequency Aperture Array (LFAA) (83 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ACAL Bfi
- Adaptive Array Systems Limited
- Agilent Technologies UK
- Alberta Centre for Advanced Micro&Nanotech Products
- Altera
- ARiYA Project Managers
- Arup
- **ASTRON led consortium (Lead: Y; Full: Y; Cons: Y)***
- **Aurecon (Lead: P; Full: N; Cons: N)***
- BCF Solutions
- Bigen Africa Services
- Callisto Limited/Callisto France
- Cambridge Consultants Ltd
- Canadian SKA Industry Consortium (NRC led)
- CCD Design & Ergonomics
- Cisco International Limited
- Clearspeed Technology Limited
- Cobham Technical Services
- CommAgility Limited
- COMMUNICATIONS AUDIT UK
- DA-Integrated
- Daniels Electronics Ltd.
- Denel Aerostructures a Division of Denel Group
- e2v SAS
- EnSilica
- Filtronic Broadband Limited
- Fluor Ltd
- FormaShape
- Fujitsu Semiconductor Europe GmbH
- GE Intelligent Platforms
- General Dynamics SatCom Technologies
- GHD Pty Ltd
- Hatch Associates
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium
- Institute for Radio Astronomy & Space Research
- Instituto de Física de Cantabria (IFCA, CSIC-UC)
- Jet Propulsion Laboratory
- Lockheed Martin Australia
- MARAND PRECISION ENGINEERING
- METHODE ELECTRONICS
- Micreo Limited
- Minex Engineering Corp.
- Mott MacDonald Ltd
- National Institute of Aerospace Technique
- National Instruments
- National Physical Laboratory
- National Research Council of Canada led consortium
- NCRA-TIFR led consortium
- Nexeya Systems
- Norsat International Inc
- NXP Semiconductors
- Observatory Sciences Ltd
- Omnisys Instruments AB
- P3-Group
- Parsons Brinckerhoff
- Prudent Energy Corporation
- Reutech Radar Systems
- RFEL Ltd
- Roke Manor Research
- **Sanyati Holdings (Lead: Y; Full: N; Cons: N)***
- SCISYS
- SELEX Galileo
- SELEX Sistemi Integrati S.p.A.
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- TEK Microsystems
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- The Boeing Company
- Tronicon Industries Inc.
- UNIVERSIDAD CARLOS III DE MADRID (UC3M)
- Universidad de Cantabria. Dept of Communications Engineering
- University of Cambridge
- University of Malta
- **WorleyParsons Europe Limited (Lead: Y; Full: N; Cons: N)***

Signal and Data Transport (SADT) (55 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- AARNet
- ACAL Bfi
- Alcatel-Lucent Australia Limited
- Altera
- ARiYA Project Managers
- Arup
- Aurecon (Lead: P; Full: N; Cons: N)*
- BAE Systems Australia
- BCF Solutions
- Canadian SKA Industry Consortium (NRC led)
- CCD Design & Ergonomics
- Ciena (Lead: P; Full: N; Cons: N)*
- Cisco International Limited
- DA-Integrated
- Fluor Ltd (Lead: Y; Full: Y; Cons: N)*
- Fujitsu Semiconductor Europe GmbH
- GE Intelligent Platforms
- General Dynamics SatCom Technologies
- GHD Pty Ltd
- Hatch Associates (Lead: Y; Full: N; Cons: N)*
- HUBER+SUHNER
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium
- Institute for Radio Astronomy & Space Research
- Lockheed Martin Australia
- METHODE ELECTRONICS
- Micro Limited
- Mott MacDonald Ltd
- National Physical Laboratory
- National Research Council of Canada led consortium
- NCRA-TIFR led consortium
- Nokia Siemens Networks (Lead: Y; Full: Y; Cons: N)*
- Norsat International Inc
- P3-Group
- Prudent Energy Corporation
- Reutech Radar Systems
- RFEL Ltd
- Roke Manor Research
- ROXTEC AUSTRALIA
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SELEX Sistemi Integrati S.p.A.
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Stratosat Datacom (Pty) Ltd
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- The Boeing Company
- University of Manchester led consortium (Lead: Y; Full: Y; Cons: Y)*
- WESTRALIAN ENGINEERING

Central Signal Processor (CSP) (68 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ACAL Bfi
- Alberta Centre for Advanced Micro&Nanotech Products
- Altera
- ARC Centre of Excellence for All-sky Astrophysics
- ARiYA Project Managers
- Arup
- ASTRON
- Aurecon (Lead: P; Full: N; Cons: N)*
- BCF Solutions
- Cambridge Consultants Ltd
- Canadian SKA Industry Consortium (NRC led) (Lead: Y; Full: Y; Cons: Y)*
- Clearspeed Technology Limited
- CommAgility Limited
- COMMUNICATIONS AUDIT UK
- DA-Integrated
- EnSilica
- Fluor Ltd
- Fujitsu Semiconductor Europe GmbH
- GE Intelligent Platforms
- GHD Pty Ltd
- HUBER+SUHNER
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium
- Institute for Radio Astronomy & Space Research
- Japan SKA consortium
- Jet Propulsion Laboratory (Lead: Y; Full: Y; Cons: N)*
- JLRAT/NAOC
- Korea Astronomy and Space Science Institute
- Lockheed Martin Australia
- METHODE ELECTRONICS
- Mott MacDonald Ltd
- NAOC
- National Instruments
- National Physical Laboratory
- National Research Council of Canada led consortium (Lead: Y; Full: N; Cons: Y)*
- NCRA-TIFR led consortium
- Nexeya Systems
- Norsat International Inc
- Observatory Sciences Ltd
- Omnisys Instruments AB
- P3-Group
- Prudent Energy Corporation
- Reutech Radar Systems
- RFEL Ltd
- Roke Manor Research
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SCISYS
- SELEX Galileo
- SELEX Sistemi Integrati S.p.A.
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SKA South Africa (Central signal processor) (Lead: Y; Full: Y; Cons: N)*
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- TEK Microsystems
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- The Boeing Company
- Tronicon Industries Inc.
- University of Cambridge (Central signal processor)
- University of Malta
- University of Manchester (Central signal processor)
- University of Oxford

Science Data Processor (SDP) (55 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- Alberta Centre for Advanced Micro&Nanotech Products
- ARC Centre of Excellence for All-sky Astrophysics
- ARiYA Project Managers
- Arup
- Aurecon (Lead: Y; Full: N; Cons: N)*
- BCF Solutions
- Canadian SKA Industry Consortium (NRC led) (Lead: Y; Full: N; Cons: Y)*
- CCD Design & Ergonomics
- Cisco International Limited
- Fluor Ltd
- Jülich Supercomputing Centre (JSC), Forschungszentrum Jülich GmbH
- GE Intelligent Platforms
- General Dynamics SatCom Technologies
- GHD Pty Ltd
- Hitachi Data Systems
- IBM (Lead: Y; Full: Y; Cons: N)*
- IBM United Kingdom Limited (Lead: Y; Full: Y; Cons: N)*
- INAF - Istituto Nazionale di Astrofisica led consortium
- Institute for Radio Astronomy & Space Research
- Instituto de Física de Cantabria (IFCA, CSIC-UC)
- Japan SKA consortium
- Jet Propulsion Laboratory
- JLRAT/NAOC
- Lockheed Martin Australia
- METHODE ELECTRONICS
- Mott MacDonald Ltd
- NAOC
- National Instruments
- National Physical Laboratory
- National Research Council of Canada led consortium
- NCRA-TIFR led consortium
- Nexeya Systems
- Norsat International Inc
- Observatory Sciences Ltd
- P3-Group
- Persistent Systems Limited
- Prudent Energy Corporation
- Reutech Radar Systems
- RFEL Ltd
- Roke Manor Research
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SCISYS
- SELEX Sistemi Integrati S.p.A.
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- The Boeing Company
- University of Cambridge led consortium (Science data processor) (Lead: Y; Full: Y; Cons: Y)*

Telescope Manager (MGR) (45 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ARiYA Project Managers
- Arup
- Aurecon (Lead: P; Full: N; Cons: N)*
- BAE Systems Australia
- BCF Solutions
- Canadian SKA Industry Consortium (NRC led)
- CCD Design & Ergonomics
- Cisco International Limited
- Fluor Ltd
- GE Intelligent Platforms
- General Dynamics SatCom Technologies
- GHD Pty Ltd
- Goonhilly Earth Station Ltd
- Hatch Associates
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium (Lead: Y; Full: N; Cons: Y)*
- Institute for Radio Astronomy & Space Research
- Lockheed Martin Australia
- Max-Planck-Institut fuer Radioastronomie (MPIfR)
- METHODE ELECTRONICS
- Mott MacDonald Ltd
- National Instruments
- National Physical Laboratory
- National Research Council of Canada
- NCRA-TIFR led consortium (Lead: Y; Full: Y; Cons: Y)*
- Nexeya Systems
- Persistent Systems Limited
- Observatory Sciences Ltd
- P3-Group
- Prudent Energy Corporation
- Reutech Radar Systems
- SCISYS
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Stratosat Datacom (Pty) Ltd (Lead: Y; Full: Y; Cons: N)*
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Telespazio VEGA UK Ltd
- The Boeing Company
- Tronicon Industries Inc.

Synchronisation and Timing (SAT) (44 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ARC Centre of Excellence for All-sky Astrophysics
- ARiYA Project Managers
- Arup
- Aurecon (Lead: P; Full: N; Cons: N)*
- BCF Solutions
- Canadian SKA Industry Consortium (NRC led)
- Cisco International Limited
- COMMUNICATIONS AUDIT UK
- Fluor Ltd
- GHD Pty Ltd
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium
- Lockheed Martin Australia (Lead: Y; Full: N; Cons: N)*
- METHODE ELECTRONICS
- Mott MacDonald Ltd
- National Instruments
- National Measurement Institute
- National Physical Laboratory (Lead: Y; Full: N; Cons: N)*
- National Time and Frequency Network (NTFN) led consortium
- NCRA-TIFR led consortium
- Nexeya Systems
- Nokia Siemens Networks (Lead: Y; Full: Y; Cons: N)*
- NXP Semiconductors
- Observatory Sciences Ltd
- Omnisys Instruments AB
- P3-Group
- Prudent Energy Corporation
- Quartzlock (UK) Limited
- Reutech Radar Systems
- Roke Manor Research
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SCISYS
- SELEX Sistemi Integrati S.p.A.
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SSI Engineers and Environmental consultants
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- Tronicon Industries Inc.
- University of Manchester led consortium (Lead: Y; Full: Y; Cons: Y)*

Power (PWR) (55 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ABB Australia (Lead: Y; Full: N; Cons: N)*
- ACAL Bfi
- Alberta Centre for Advanced Micro&Nanotech Products
- ANSYS Limited (Lead: Y; Full: N; Cons: N)*
- ARC Centre of Excellence for All-sky Astrophysics
- ARiYA Project Managers
- Arup (Lead: Y; Full: Y; Cons: N)*
- Aurecon (Lead: Y; Full: N; Cons: N)*
- BCF Solutions
- Bigen Africa Services
- Canadian SKA Industry Consortium (NRC led) (Lead: Y; Full: Y; Cons: Y)*
- CCD Design & Ergonomics
- Circadian Solar
- Cisco International Limited
- Cobham Technical Services
- CTAER and IAA-CSIC (Lead: Y; Full: N; Cons: Y)*
- Dihlase Consulting Engineers
- Fluor Ltd (Lead: Y; Full: Y; Cons: N)*
- GE Intelligent Platforms (Lead: Y; Full: Y; Cons: N)*
- General Dynamics SatCom Technologies
- GHD (Lead: Y; Full: Y; Cons: N)*
- GHD Pty Ltd
- Hatch Associates (Lead: Y; Full: N; Cons: N)*
- Hitachi Data Systems
- INAF - Istituto Nazionale di Astrofisica led consortium
- KEPCO KDN
- Lockheed Martin Australia
- METHODE ELECTRONICS
- Mott MacDonald Ltd (Lead: Y; Full: N; Cons: N)*
- National Instruments
- National Physical Laboratory
- National Research Council of Canada led consortium
- NCRA-TIFR led consortium
- Nexeya Systems
- Norsat International Inc
- Nova Systems
- Omnisys Instruments AB
- P3-Group
- Parsons Brinckerhoff (Lead: Y; Full: Y; Cons: N)*
- Prudent Energy Corporation
- Rapallo Consulting & Contracting Engineers (Lead: Y; Full: Y; Cons: N)*
- Reutech Radar Systems
- ROXTEC AUSTRALIA
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- Siemens Industry
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SKA South Africa (Power, Site and Infrastructure) (Lead: Y; Full: N; Cons: N)*
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- Tata Consultancy Services led consortium
- Telespazio VEGA UK Ltd
- The Boeing Company
- Tronicon Industries Inc.
- WorleyParsons Europe Limited (Lead: Y; Full: Y; Cons: N)*

Site and Infrastructure (INFRA) (49 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ACAL Bfi
- AECOM Australia (Lead: Y; Full: Y; Cons: N)*
- ARiYA Project Managers
- Arup (Lead: Y; Full: N; Cons: N)*
- Aurecon (Lead: Y; Full: N; Cons: N)*
- Aveng (Africa) Limited
- BCF Solutions
- Bigen Africa Services (Lead: Y; Full: N; Cons: N)*
- Canadian SKA Industry Consortium (NRC led)
- CCD Design & Ergonomics
- Circadian Solar
- Cisco International Limited
- Cobham Technical Services
- COMMUNICATIONS AUDIT UK
- CSIRO (Lead: P; Full: N; Cons: N)*
- Denel Aerostructures a Division of Denel Group
- Fluor Ltd (Lead: Y; Full: Y; Cons: N)*
- GE Intelligent Platforms
- General Dynamics SatCom Technologies
- GHD Pty Ltd (Lead: Y; Full: N; Cons: N)*
- Hatch Associates
- Hitachi Data Systems
- INAF - Istituto Nazionale di Astrofisica led consortium
- Lockheed Martin Australia
- MARAND PRECISION ENGINEERING
- Materia, Inc
- METHODE ELECTRONICS
- Mott MacDonald Ltd (Lead: Y; Full: N; Cons: N)*
- National Instruments
- National Physical Laboratory
- National Research Council of Canada led consortium
- Omnisys Instruments AB
- P3-Group
- Parsons Brinckerhoff (Lead: Y; Full: Y; Cons: N)*
- Prudent Energy Corporation
- Reutech Radar Systems
- ROXTEC AUSTRALIA
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SCISYS
- SELEX Sistemi Integrati S.p.A.
- Siemens Nederland
- SKA South Africa (Telescope manager)
- SKA South Africa (Power, Site and Infrastructure) (Lead: Y; Full: N; Cons: N)*
- SSI Engineers and Environmental consultants
- Stratosat Datacom (Pty) Ltd (Lead: Y; Full: Y; Cons: N)*
- Tata Consultancy Services led consortium
- The Boeing Company
- Tronicon Industries Inc.
- WorleyParsons Europe Limited (Lead: Y; Full: N; Cons: N)*

Mid Frequency Aperture Array (MFAA) (53 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- ACAL Bfi
- Adaptive Array Systems Limited
- Agilent Technologies UK
- Alberta Centre for Advanced Micro&Nanotech Products
- ARiYA Project Managers
- Arup
- [ASTRON led consortium \(Lead: Y; Full: Y; Cons: Y\)*](#)
- BCF Solutions
- Callisto Limited/Callisto France
- Cambridge Consultants Ltd
- Canadian SKA Industry Consortium (NRC led)
- Cobham Technical Services
- COMMUNICATIONS AUDIT UK
- DA-Integrated
- Daniels Electronics Ltd.
- Filtronic Broadband Limited
- Fluor Ltd
- FormaShape
- General Dynamics SatCom Technologies
- GHD Pty Ltd
- IBM
- IBM United Kingdom Limited
- INAF - Istituto Nazionale di Astrofisica led consortium
- Instituto de Física de Cantabria (IFCA, CSIC-UC)
- MARAND PRECISION ENGINEERING
- Micro Limited
- Mott MacDonald Ltd
- National Institute of Aerospace Technique
- National Physical Laboratory
- Nexeya Systems
- Norsat International Inc
- NXP Semiconductors
- Omnisys Instruments AB
- P3-Group
- Reutech Radar Systems
- RF Module & Optical Design Limited [RFMOD]
- RFEL Ltd
- Roke Manor Research
- [Sanyati Holdings \(Lead: Y; Full: N; Cons: N\)*](#)
- SELEX Galileo
- SELEX Sistemi Integrati S.p.A.
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- UNIVERSIDAD CARLOS III DE MADRID (UC3M)
- Universidad de Cantabria. Dept of Communications Engineering
- University of Cambridge
- University of Malta
- WESTRALIAN ENGINEERING

Phased Array Feeds (PAF) (41 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- Adaptive Array Systems Limited
- Alberta Centre for Advanced Micro&Nanotech Products
- ARiYA Project Managers
- Arup
- BCF Solutions
- Callisto Limited/Callisto France
- Canadian SKA Industry Consortium (NRC led) (Lead: Y; Full: Y; Cons: Y)*
- Cobham Technical Services
- CSIRO led consortium (Lead: Y; Full: Y; Cons: Y)*
- Fluor Ltd
- General Dynamics SatCom Technologies
- GHD Pty Ltd
- INAF - Istituto Nazionale di Astrofisica led consortium (Lead: Y; Full: N; Cons: Y)*
- Instituto de Física de Cantabria (IFCA, CSIC-UC)
- Japan SKA consortium
- JLRAT/NAOC
- MARAND PRECISION ENGINEERING
- Micro Limited
- Mott MacDonald Ltd
- NAOC
- National Institute of Aerospace Technique
- National Physical Laboratory
- National Research Council of Canada led consortium (Lead: Y; Full: Y; Cons: Y)*
- Nexeya Systems
- Norsat International Inc
- P3-Group
- Reutech Radar Systems
- RF Module & Optical Design Limited [RFMOD]
- Roke Manor Research
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SELEX Galileo
- SELEX Sistemi Integrati S.p.A.
- SSI Engineers and Environmental consultants
- STFC – Technology Department
- STFC RAL Space Department
- Systems Engineering & Assessment
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- Universidad de Cantabria. Dept of Communications Engineering
- University of Cambridge

Wide Band Single Pixel Feeds (WBSPF) (39 Respondents)

(* Lead = Expression of interest to lead Element; Full = full coverage of the work within the Element; Cons = Consortium; Y = Yes; N = No; P = Participate)

- Alberta Centre for Advanced Micro&Nanotech Products
- ARiYA Project Managers
- Arup
- BCF Solutions
- Callisto Limited/Callisto France
- Caltech Eng
- Canadian SKA Industry Consortium (NRC led)
- CETC54
- Cobham Technical Services
- CSIRO led consortium (Lead: Y; Full: Y; Cons: Y)*
- EMSS Antennas (Lead: Y; Full: N; Cons: N)*
- Fluor Ltd
- General Dynamics SatCom Technologies
- INAF - Istituto Nazionale di Astrofisica led consortium
- Instituto de Física de Cantabria (IFCA, CSIC-UC)
- Japan SKA consortium
- JLRAT/NAOC
- Low Noise Factory
- Materia, Inc
- Minex Engineering Corp.
- Mott MacDonald Ltd
- NAOC
- National Physical Laboratory
- National Research Council of Canada
- Norsat International Inc
- Omnisys Instruments AB
- P3-Group
- Reutech Radar Systems
- Sanyati Holdings (Lead: Y; Full: N; Cons: N)*
- SELEX Galileo
- SELEX Sistemi Integrati S.p.A.
- SKA South Africa led consortium (Lead: Y; Full: N; Cons: Y)*
- STFC – Technology Department
- STFC RAL Space Department
- Tata Consultancy Services led consortium
- Teledyne Defence Limited
- Telespazio VEGA UK Ltd
- Universidad de Cantabria. Dept of Communications Engineering
- University of Cambridge

Appendix E: SKA Consortia and Membership Details

The following consortia submitted Expressions of Interest to lead and participate in various SKA Elements. Contact details of the majority of the members of the consortia are included in the list of contact details.

	Lead Organisation	Interest Expressed to Lead:	Interest Expressed to also Participate in:
1	ASTRON led consortium currently consisting out of: <ul style="list-style-type: none"> • International Centre for Radio Astronomy Research (ICRAR, Australia) • Istituto Nazionale di Astrofisica Istituto di Radio Astronomia (INAF-IRA, Italy) • Joint Institute for VLBI in Europe (JIVE, The Netherlands) • Netherlands Institute for Radio Astronomy (ASTRON, The Netherlands) • Observatoire de Paris (France) • Raman Research Institute (RRI, India) • Université de Bordeaux 1 (UB1, France) • University of Cambridge (UK) • University of Malta (Malta) • University of Manchester (UK) • University of Oxford (UK) 	<ul style="list-style-type: none"> • Low Frequency Aperture Array, • Mid Frequency Aperture Array. 	-
2	Canadian SKA Industry Consortium (NRC led) currently consisting out of: <ul style="list-style-type: none"> • IBM Canada Limited • Calgary Scientific Inc • MDA Corporation • NovAtel Inc. • DA-Integrated • Dynamic Structures Ltd • TeraXion Inc. • COM DEV Ltd • Nanowave Technologies Inc. • Sanmina-SCI • PowerOn Ltd. • Platinum Engineering Ltd • e-VANS Corp. • Murandi Communications Ltd. • MuAnalysis Inc. • Sysacom R&D plus • Motive Industries Inc. • Lyrtech RD, Inc. • Arrow Electronics • National Research Council of Canada (NRC) • University of Alberta + TRILabs University of Calgary 	<ul style="list-style-type: none"> • Dishes, • Central Signal Processor, • Science Data Processor, • Power, • Phased Array Feeds. 	<ul style="list-style-type: none"> • Low Frequency Aperture Arrays, • Signal and Data Transport, • Telescope Manager, • Synchronisation and Timing, • Site and Infrastructure, • Mid Frequency Aperture Arrays, • Wide Band Single Pixel Feeds.

	Lead Organisation	Interest Expressed to Lead:	Interest Expressed to also Participate in:
3	<p>CSIRO led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • CSIRO - Astronomy and Space Science & the CSIRO ICT Centre, Australia • Astronomy Technology Program – Penticton, National Research Council, Herzberg Institute of Astrophysics Dominion Radio Astrophysical Observatory & University of Calgary, Canada • National Astronomical Observatory China (NAOC) & Joint Laboratory for Radio Astronomy Technologies (JLRAT), China • ASTRON, Netherlands • SKA SA, South Africa • INAF, Italy • Chalmers University & Onsala Observatory, Sweden • University of Manchester, UK • And in preliminary discussions: <ul style="list-style-type: none"> • EMSS (South Africa) • MMS (South Africa) • BAE Systems SA (South Africa) • CETC54 (JLRAT, China) • Airborne Composites (ASTRON, NL) • Finmeccanica (INAF, Italy) • Université de Bordeaux 1 (UB1, France) • Observatoire de Paris (France) • Low Noise Factory (Chalmers/Onsala, Sweden) • Omnisys Instruments AB (Chalmers/Onsala, Sweden) • Lockheed Martin Australia (CSIRO, Australia) • BAE Systems Australia (CSIRO, Australia) • GE Australia (CSIRO, Australia) <p>Selex-Galileo (UMan, UK)</p>	<ul style="list-style-type: none"> • Dishes, • Phased Array Feeds, • Wide Band Single Pixel Feeds. 	-
4	<p>Centro Tecnológico Avanzado de Energías Renovables (CTAER); Instituto de Astrofísica de Andalucía-CSIC (IAA-CSIC) led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • ASTRON (The Netherlands) • Centro Tecnológico Avanzado de Energías Renovables (CTAER; Spain) • Fraunhofer-Institut für Solare Energiesysteme (FhG-ISE; Germany) • Instituto de Astrofísica de Andalucía-CSIC (IAA-CSIC; Spain) • Instituto de Telecomunicações de Aveiro (IT; Portugal) • Max-Planck Institut für Radioastronomie (MPIfR; Germany) 	<ul style="list-style-type: none"> • Power 	-

	Lead Organisation	Interest Expressed to Lead:	Interest Expressed to also Participate in:
5	INAF - Istituto Nazionale di Astrofisica led consortium	<ul style="list-style-type: none"> • Dishes, • Telescope Manager, • Phased Array Feeds. 	<ul style="list-style-type: none"> • Low Frequency Aperture Arrays, • Signal and Data Transport, • Central Signal Processor, • Science Data Processor, • Synchronisation and Timing, • Power, • Site and Infrastructure, • Mid Frequency Aperture Arrays, • Wide Band Single Pixel Feeds.
6	Japan SKA consortium	-	<ul style="list-style-type: none"> • Central Signal Processor, • Science Data Processor, • Phased Array Feeds, • Wide Band Single Pixel Feeds.
7	National Research Council of Canada led consortium	<ul style="list-style-type: none"> • Central Signal Processor, • Phased Array Feeds 	<ul style="list-style-type: none"> • Dishes, • Low Frequency Aperture Arrays, • Signal and Data Transport, • Science Data Processor, • Telescope Manager, • Power, • Site and Infrastructure, • Wide Band Single Pixel Feeds.
8	National Time and Frequency Network (NTFN) led consortium	-	<ul style="list-style-type: none"> • Synchronisation and Timing.
9	National Centre for Radio Astrophysics - Tata Institute of Fundamental Research (NCRA-TIFR) led consortium	<ul style="list-style-type: none"> • Telescope Manager 	<ul style="list-style-type: none"> • Dishes, • Low Frequency Aperture Arrays, • Signal and Data Transport, • Central Signal processor, • Science Data Processor, • Synchronisation and Timing, • Power.

	Lead Organisation	Interest Expressed to Lead:	Interest Expressed to also Participate in:
10	<p>SKA South Africa led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • INAF • EIE* • EMSS • GDSatcom* • BAE* • RRS* • CETC54 • Astron** • Chalmers** • CSIRO** <p>* Depends on the MeerKAT Dish tender. ** Will be useful as it will fill gaps SKA SA cannot at this stage.</p>	<ul style="list-style-type: none"> • Dishes, • Wide Band Single Pixel Feeds. 	-
11	Tata Consultancy Services (TCS) led consortium	-	<ul style="list-style-type: none"> • Dishes, • Low Frequency Aperture Arrays, • Signal and Data Transport, • Central Signal processor, • Science Data Processor, • Telescope Manager, • Synchronisation and Timing, • Power, • Site and Infrastructure, • Mid Frequency Aperture Arrays, • Phased Array Feeds, • Wide Band Single Pixel Feeds.
12	<p>University of Cambridge led consortium currently consisting out of:</p> <ul style="list-style-type: none"> • University of Cambridge (Lead) • Astronomy & Space Science CSIRO • ASTRON • SKA SA • ICRAR • SDP-NZ • STFC • University of Manchester • MPIFR Bonn • Instituto de Astrofísica de Andalucía-CSIC • International Center for Computational Science, Lawrence Berkeley National Laboratory • University of Melbourne • CADC/cyberSKA • The Chancellor, Masters and Scholars of the University of Oxford. 	<ul style="list-style-type: none"> • Science Data Processor 	-

	Lead Organisation	Interest Expressed to Lead:	Interest Expressed to also Participate in:
13	University of Manchester led consortium currently consisting out of: <ul style="list-style-type: none"> • CSIRO Astronomy and Space Science (CASS, Australia) • Instituto de Telecomunicações (IT, Portugal) • Joint Institute for VLBI in Europe (JIVE, The Netherlands) • Netherlands Institute for Radio Astronomy (ASTRON, The Netherlands) • SKA South Africa • University of Manchester (UK) University of Granada (Spain)	<ul style="list-style-type: none"> • Signal and Data Transport, • Synchronisation and Timing 	-
14	University of Oulu led consortium	-	Filter banks, inverse problems, digital signal transport and beam forming.

Appendix F: Detailed Tables per SKA Element

Please note these tables are presented on A3 pages due to the size of some of them.

The details within the tables have also been sorted slightly differently from those published in Revision 1.

SKA.TEL.LFAA
Low Frequency Aperture Array

Table with columns for Organisation, Consortium, and various project tasks. Includes a list of organisations like ASTRON led consortium, WorleyParsons Europe Limited, etc., and a detailed list of tasks such as LEAD, Full Coverage, and various system engineering and production tasks.

SKA.TEL.SAT Synchronisation and Timing

Organisation	University of Manchester led consortium	Nokia Siemens Networks	Lockheed Martin Australia	National Physical Laboratory	Sanyati Holdings	Aurecon	INAF - Istituto Nazionale di Astrofisica led consortium	Roke Manor Research	SELEX Sistemi Integrati S.p.A.	National Time and Frequency Network (NTFN) led consortium	Cisco International Limited	National Measurement Institute	Quartzlock (UK) Limited	Arup	Canadian SKA Industry Consortium (NRC led)	Mott MacDonald Ltd	Omnisys Instruments AB	Fluor Ltd	Siemens Nederland	Tata Consultancy Services led consortium	BCF Solutions	Reutech Radar Systems	SSI Engineers and Environmental consultants	ARIYA Project Managers	GHD Pty Ltd	Systems Engineering & Assessment	Telespazio VEGA UK Ltd	NCRA-TIFR led consortium	ARC Centre of Excellence for All-sky Astrophysics	COMMUNICATIONS AUDIT UK	IBM	IBM United Kingdom Limited	METHODE ELECTRONICS	National Instruments	Nexeya Systems	NXP Semiconductors	Observatory Sciences Ltd	P3-Group	Prudent Energy Corporation	SCISYS	Siemens Industry	SKA South Africa	Teledyne Defence Limited	Tricon Industries Inc.		
Consortium	Y	N	N	N	N	N	Y	N	N	Y	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
3 SKA.TEL.SAT - Synchronisation and Timing (SaT)																																														
LEAD:																																														
Full Coverage:																																														
4 SKA.TEL.SAT.MGT - SAT Project Management	Y	Y	Y	Y	Y	P		P	Y	P	P			Y				Y		P	P	P	P	Y	Y																					
4 SKA.TEL.SAT.SE-SRR - SAT SE to Requirements Review	Y	Y	Y	Y			P	Y	P	P		P		P	Y	P				P	P	P	P			P																		P		
4 SKA.TEL.SAT.SE-VSYS - System Engineering for Verification Systems	Y	Y	Y	Y			P	Y	P	P			P	Y	P					P	P	P			P	Y																				
4 SKA.TEL.SAT.UTCR - Central Timing and Frequency Reference	Y	Y	Y	Y			P	Y	P	P		P	Y	P			Y																													
5 SKA.TEL.SAT.UTCR.SCI - Central Timing Science Requirements	Y	Y	Y	P			P	Y	P																			Y																		
5 SKA.TEL.SAT.UTCR.CLKS - Clock	Y	Y	Y	Y			P	Y	P	Y	P	Y	P			Y																														
5 SKA.TEL.SAT.UTCR.ENSB - Central clock ensemble	Y	Y	Y	P			P	Y	P	Y	P	Y	Y																																	
4 SKA.TEL.SAT.STFR - Station Frequency Reference	Y	Y	Y	P			P	Y	P	P	P	P			Y																															
5 SKA.TEL.SAT.STFR.SCI - Frequency Reference Science Requirements	Y	Y	Y	P			P	Y	P																																					
5 SKA.TEL.SAT.STFR.PERF - Performance Models	Y	Y		Y			P	Y	P	Y	P																																			
5 SKA.TEL.SAT.STFR.DD - Direct distribution of frequency standards	Y	Y	Y	Y			P	Y	P	Y	P	P	Y		P		Y																													
5 SKA.TEL.SAT.STFR.RL - Remote locking of frequency standards	Y	Y	Y	Y			P	Y	P	Y	P	P	Y		P		Y																													
4 SKA.TEL.SAT.RTS - Remote Timer Server	Y	Y	Y	P			P	Y	P	P	P	P	Y																																	
4 SKA.TEL.SAT.NTW - Network Architecture	Y	Y	Y				P	Y	P	P	P							Y																												
4 SKA.TEL.SAT.LMC - Local Monitoring and Control	Y	Y	Y			P	P	Y	P	P	P	P		P	Y			Y	P								P	P																		
4 SKA.TEL.SAT.INFRA - SAT Infrastructure Requirements	Y	Y	P			Y	P	Y	P	P	P			P			Y	P					P																							
4 SKA.TEL.SAT.PWR - SAT Power Requirements	Y	Y	P	P		Y	P	Y	P	P	P		P	Y	P		Y	Y	P					Y																						

SKA.AI.PAF Phased Array Feed

		Organisation																																															
		Canadian SKA Industry Consortium (NRC led)	CSIRO led consortium	National Research Council of Canada led consortium	INAF - Istituto Nazionale di Astrofisica led consortium	Sanyati Holdings	Arup	Roke Manor Research	Cobham Technical Services	JLRAT/NAOC	NAOC	SELEX Galileo	SELEX Sistemi Integrati S.p.A.	Norsat International Inc	Reutech Radar Systems	Alberta Centre for Advanced Micro&Nanotech Products	BCF Solutions	Mott MacDonald Ltd	RF Module & Optical Design Limited [RFMOD]	Systems Engineering & Assessment	Callisto Limited/Callisto France	Telespazio VEGA UK Ltd	Tata Consultancy Services led consortium	Adaptive Array Systems Limited	Fluor Ltd	National Physical Laboratory	SSI Engineers and Environmental consultants	Japan SKA consortium	ARIYA Project Managers	General Dynamics SatCom Technologies	GHD Pty Ltd	Instituto de Fisica de Cantabria (IFCA, CSIC-UC)	MARAND PRECISION ENGINEERING	Micreo Limited	National Institute of Aerospace Technique	Nexeya Systems	P3-Group	STFC – Technology Department	STFC RAL Space Department	Teledyne Defence Limited	Universidad de Cantabria. Dept of Communications Engineering	University of Cambridge							
Consortium		Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
3 SKA.AI.PAF - Phased Array Feed (PAF)																																																	
LEAD:		Y	Y	Y	Y	Y																																											
Full Coverage:		Y	Y	Y	N	N																																											
4 SKA.AI.PAF.MGT - Management		Y	Y	Y			Y	Y	Y	P	P		P		P		P	Y	P					P		Y		P		Y												Y							
4 SKA.AI.PAF.SE - System Engineering		Y	Y	Y	Y		P	Y	Y	P	P	P	P	Y	P		P	P	P									P																P					
4 SKA.AI.PAF.R&D - Phased Array Feeds Research & Development		Y	Y	Y	P		P	Y	Y	P	P	P	P	P	P	P									Y		P		P		P		Y		Y									Y	P	Y	P		
4 SKA.AI.PAF.PA - Pathfinder Analysis		Y	Y	Y			P	Y	P		P	P	P	P		P				P																													
4 SKA.AI.PAF.SE-VSYS - System Engineering for Verification Systems		Y	Y	Y	P		P	Y	Y	P	P	P	P	Y	P	P	P	P		P		P																											
4.SKA.AI.PAF.TRA - Technology Readiness Assessment		Y	Y	Y	P		P	Y	Y	P	P	P		P	P	P			P		P																												
4 SKA.AI.PAF.VSYS - Verification Systems		Y	Y	Y			P	Y	P	P	P	P/Y	P	Y		P	P	P	P	P		P		P																									
5 SKA.AI.PAF.VSYS.MGT - Management		Y	Y	Y			P	Y		P	P	P	P		P		P	Y	P					P		Y																							
5 SKA.AI.PAF.VSYS.SE - System Engineering		Y	Y	Y			P	Y	Y	P	P	P	P	Y	P		P	P		P		P					P																						
5 SKA.AI.PAF.VSYS.D&D - Design and Development		Y	Y	Y	P		P	Y	Y	P	P	P	P	Y		P				P	P				Y											P		P	P										

SKA.AI.WBSPF Wide Band Single Pixel Feed

	Organisation	CSIRO led consortium	SKA South Africa led consortium	EMSS Antennas	Sanyati Holdings	Canadian SKA industry Consortium (NRC led)	Arup	CETC54	Alberta Centre for Advanced Micro&Nanotech Products	Callisto Limited/Callisto France	Cobham Technical Services	Minex Engineering Corp.	Reutech Radar Systems	SELEX Sistemi Integrati S.p.A.	INAF - Istituto Nazionale di Astrofisica led consortium	BCF Solutions	JLRAT/NAOC	Mott MacDonald Ltd	NAOC	Norsat International Inc	SELEX Galileo	Omnisys Instruments AB	Japan SKA consortium	National Research Council of Canada led consortium	Tata Consultancy Services led consortium	ARIYA Project Managers	Caltech Eng	Fluor Ltd	General Dynamics SatCom Technologies	Instituto de Física de Cantabria (IFCA, CSIC-UC)	Low Noise Factory	Materia, Inc	National Physical Laboratory	P3-Group	STFC - Technology Department	STFC RAL Space Department	Teledyne Defence Limited	Telespazio VEGA UK Ltd	Universidad de Cantabria. Dept of Communications Engineering	University of Cambridge				
3 SKA.AI.WBSPF - Wide Band Single Pixel Feed (WBSPF)	Consortium	Y	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
LEAD:		Y	Y	Y	Y																																							
Full Coverage:		Y	N	N	N																																							
4 SKA.AI.WBSPF.MGT - Management		Y	P			Y	Y	P			P	Y	P	P		P		Y							P	Y		Y																
4 SKA.AI.WBSPF.SE - System Engineering		Y	P			Y	P	P	P	P	Y	Y	P	P		P		P		P	P	P																						
4 SKA.AI.WBSPF.R&D - Wideband Single Pixel Feeds Research & Development		Y	P			Y	P	Y	P	P	Y	Y	P	P	P		P		P	P	P	P	P	P			Y		P	Y	Y	P	P											
4 SKA.AI.WBSPF.PA - Pathfinder Analysis		Y	P			Y	P	P	P	P	P	Y	P	P		P		P		P	P																							
4 SKA.AI.WBSPF.SE-VSYS - System Engineering for Verification Systems		Y	P			P	P	P	P	P	Y	Y	P	P		P	P	P	P	P																								
4.SKA.AI.WBSPF.TRA - Technology Readiness Assessment		Y	P			P	P	P	P	P			P	P		P		P		P																								