Australian Government

Department of Industry Innovation, Science, Research and Tertiary Education

EXPRESSION OF INTEREST TO PARTICIPATE IN PRE-CONSTRUCTION WORK FOR THE SQUARE KILOMETRE ARRAY PROJECT

RESPONSE TEMPLATE

(edited by Open Parallel for its website)

The Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) invites Australian science institutes and companies to express interest in participating in the pre-construction phase of the Square Kilometre Array (SKA) project, by answering the questions provided below.

The following questions are intended to assess your organisation's ability to contribute to a consortia bidding for a work package.

Q1: *Which work package does the following expression of interest relate to?*
SKA.TEL.SDP – Science Data Processor SKA.TEL.SDP.REQ – Requirements Analysis SKA.TEL.SDP. ARCH – Element Architecture In particular – SKA.TEL.SDP. ARCH. SARCH – Software Architecture

Q2: *Noting that Stage 1 is primarily to complete the preparatory work and define the system requirements, what types of work are you interested in contributing to as part of the* ***Stage 1*** *pre-construction work?*
• Definition of software architectural requirements building on baseline software architecture. • Starting from the reference architecture presented on the Conceptual Design Review (CoDR) perform gap analysis, analyse capabilities • Analyse use cases and operating scenarios against reference architecture capabilities • Evaluate methods of extending reference software architecture to include data flow • Analyse scaleability of baseline software architecture through SKA1 to SKA2

Q3: *Stage 2 is the longer pre-construction work phase to deliver 'construction readiness' during which one or more complete verification systems (e.g. Dish plus feeds) will be tested alongside a well-calibrated system. What types of work might your organisation be interested in contributing to as part of the* ***Stage 2*** *pre-construction work?*
• Software engineering • Building software components • Scaleability of common software libraries to SKA size problems • Systems test

Q4: Describe the particular expertise your organisation would contribute. For each area:

Describe relevant experience, outlining past work, scale/complexity, (any) linkages to radio astronomy/SKA and any experience in high technology developments at remote sites. In particular outline any involvement in the type of system description phase of a large project as envisaged for SKA preconstruction Stage 1;
Attach brief, 1-page CVs for key personnel you would allocate to this work;
Indicate any existing linkages to SKA institute participants e.g. ICRAR, CSIRO, ASTRON, NRC etc.

Open Parallel Ltd specialises in software for Multicore and Parallel Computing

Relevant work are Performance Optimization, Software Language Extension and Parallelization, Porting software modules to multithreaded environment, Computer Vision Optimization, offload engines, Remote Direct Memory Access, SPARC architectures.

Clients include Intel (USA), ARM (UK), Sun Microsystems (USA), NZTE (New Zealand)

Open Parallel is member of the New Zealand SKA Industry Consortium (NZSKAIC) since 2011, organised the workshop on Software and Open Innovation at the SKA event in Wellington in September 2011 (plus present our work), collaborated with CSIRO in the definition of the Intensity of Involvement for several Work Breakdown Structures and organises Multicore World -a conference specialised in software for parallel computing. In 2012 the conference had four talks focused in SKA including a keynote from Dr. Tim Cornwell (Wellington, March 2012)

Q5: Provide an early estimate of the resources required for the work you have described in relation to pre-construction Stage 1 (for example FTE staff, equipment costs, IP)?
3-5 FTE in R&D 1-2 FTE in Management and analysis IP: all software is open source Equipment should be standard from Open Parallel plus specific access to SKA related hardware in specific occasions for testing and performance First iteration of the project is estimated in $100,000 Further iterations are depending on results

Q6: Which aspects, if any, of your proposed engagement would or might: *Involve the SKA pre-construction consortium or other partners needing to licence any of your IP?* *Need to be conducted under a non-disclosure agreement?* *Be restricted in any other manner for commercial or other reasons?*
None in principle.
Comments and feedback *In addition to responding to the EoI questions, you are invited to provide any comments and feedback you may have, including, for example, on experiences your organisation may have gained through involvement in similar processes in the past.*

Open Parallel has strong capabilities in rapid research and development of software, and leveraging the capabilities of many developers worldwide in different communities (open source, universities).

We have built a reputation of being leaders at the convergence of software communities, academia, scientific communities and engineers and developers, with a strong focus on sound professional delivery.

Previous work included the leadership on achieving the status of Sun Microsystems OpenSPARC Centre of Excellence for the University of Otago (Dunedin, New Zealand), first of its kind outside of the United States

We consider that the work involved in development of algorithms and parallel software to deal with SKA size problems, can't be delivered for any unique organisation nor consortia, either from industry or academia, but from a community of talent working in an ecosystem, very similar to the process of the Linux kernel. Open Parallel has a strong understanding of these processes