# Position Details

## Research Projects- CSOF6

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| The following information is for applicants |
| Advertised Job Title | RFI & EMC Engineer - Square Kilometre Array Low Telescope (SKA-Low) |
| Job Reference | 78373 |
| Tenure | Indefinite, full-time or job-share |
| Salary Range | AU$115k - AU$135k pa (pro-rata for job-share), plus up to 15.4% superannuation |
| Location(s) | Geraldton, Western Australia |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | This role will be line managed within CSIRO by the SKA Low Deputy Telescope Director; project reporting and work direction will occur with the SKA Site Construction Director |
| Number of Direct Reports | 1-2 |
| Enquire about this job | Jimi Green, Interim SKA Low Deputy Director, James.Green@csiro.au; or Antony Schinckel, SKA Site Construction Director, Antony.Schinckel@skao.int |
| How to apply | Apply online at <https://jobs.csiro.au/> Internal applicants please apply via **Jobs Central**If you experience difficulties when applying, please email careers.online@csiro.au or call 1300 984 220. |

### Background

The Square Kilometre Array Observatory (SKAO) is a next-generation global radio-astronomy facility that will revolutionise our understanding of the Universe and the laws of fundamental physics. It is one observatory with two telescopes – SKA-Low in Western Australia and SKA-Mid in South Africa. Australia is a co-host member of the SKAO, an intergovernmental organisation headquartered at Jodrell Bank (near Manchester in the United Kingdom) responsible for SKAO construction and operation globally.

The first phase of the SKA will consist of two telescopes:

* Australia will host the SKA’s low-frequency telescope (SKA-Low). SKA-Low will comprise up to 131,072 antennas in clusters along spiral arms spanning 65 km at CSIRO’s Murchison Radio-astronomy Observatory (MRO) in Western Australia about 350 km northeast of Geraldton.
* South Africa will host the mid-frequency telescope (SKA-Mid). SKA-Mid will comprise up to 197 dishes spread along spiral arms spanning 150 km.

CSIRO is involved in several facets of the SKA-Low in Australia:

* Operating partner: SKAO will partner with CSIRO to operate the SKA-Low Telescope and support construction.
* Construction: CSIRO has been allocated work in digital processing, infrastructure, and antenna station management and deployment, integration and verification, and software.

CSIRO also operates the MRO which hosts multiple national and international radio astronomy telescopes and is where the SKA-Low Telescope will be located. CSIRO is responsible for land management, subleases, maintaining radio quiet protections, provision of services to the telescopes, and managing the Indigenous Land Use Agreement.

### Role Overview

The RFI & EMC Engineer for SKA-Low will form a critical link between the SKA Observatory (SKAO) HQ and the SKA-Low telescope project in Western Australia with regards to RFI & EMC management and control during the construction and operations phases. The position will form part of the SKA-Low Site Management Team to address the management of RFI through the guidance of SKAO HQ.

The position will lead a team of RFI engineers and technicians at the SKA Low site in Australia to eventually achieve the full scope of work below, and needs to be able to initiate work in each of the key areas before the remainder of the team is on-board.

Initially the focus of the position will be on the construction phase, compliance of equipment being installed at the Site, and activities on the Site to ensure the overall compliance of the SKA to its own and the MRO’s RFI/EMC standards. Over time, this will transition to the ongoing monitoring, analysis and control during the operations phase.

The position will play a key role, contributing to the co-ordination and management of RFI & EMC matters within the SKA-Low project. This will include the development of new management, engineering, and wider communication processes for the SKA-Low telescope, as well as implementation of existing SKAO policies and processes.

The position will deploy the RFI monitoring architecture design and will be responsible for actively monitoring RFI at the SKA site on the MRO, analysing results and following up as required on results.

The position will be responsible for promoting teamwork between SKAO HQ, SKA-Low and national stakeholders (CSIRO) in resolving RFI/EMC issues and to motivate, coach and develop people in the team to build functional skills in dealing with RFI & EMC related requirements.

The position will form part of the wider SKAO RFI group, representing the Observatory at national and international meetings and conferences, detailing SKA-Low activities related to RFI & EMC related SKA-Low project activities. At the national level they will contribute to the SKA’s RFI site policies definition and implementation.

The position will interact with a wide range of stakeholders, especially the CSIRO MRO Site Entity team and it’s RFI Compliance Leader, working collaboratively to help ensure the long-term quality of the MRO site.

Consideration may be given to performing this role on either a full time or job share basis. Please indicate your preference in your application.

### Duties and Key Result Areas

* The RFI & EMC Engineer (SKA-Low) will have regular meetings with SKAO HQ RFI Working Group to present the SKA-Low RFI & EMC related issues, environments and compliance management:
	+ Weekly presentations and regular written reporting to SKAO HQ.
* Work closely with the CSIRO RFI Compliance Leader to ensure SKA compliance to the MRO RFI/EMC Standard.
* RFI Qualification of SKA-Low and ancillary hardware/equipment:

The position will oversee the RFI qualification of equipment intended for the SKA-Low.

Some of the duties will include:

* + Review of RFI Qualification Test Procedure documents and Qualification Test Results reports.
	+ Assisting SKAO and external stakeholders in identification of suitable test facilities to perform RFI Qualification to SKA RFI/EMC Standard requirements.
	+ Assisting in the identification of RFI mitigation measures and solutions. Provide specialist advice on specific RFI & EMC issues as required.
* RFI Management, Control and Policies for SKA-Low telescope site:
	+ Work collaboratively with colleagues both in SKAO and external stakeholders to achieve SKA compliance with SKAO and the MRO’s RFI/EMC Standard requirements for activities and equipment deployed to the SKA site.
	+ Assess and “own” SKA-LOW project related RFI & EMC risk issues.
	+ Articulate and explain RFI & EMC constraints to various stakeholders at all levels.
* RFI Environment and Monitoring for SKA-Low:
	+ Lead the characterisation of the RFI environment for SKA-Low, including the deployment of RFI monitoring hardware and software systems. This includes measurements and data analysis using both fixed and mobile monitoring infrastructure, and characterising and identifying RFI emitters.
	+ If required, the RFI & EMC Engineer must be able to perform in-situ measurements in the field to identify and characterise RFI culprits using a variety of antennas, current probes and RF receivers. These include both time domain, as well as real time and sweeping spectrum analysers.
	+ Provide input and use-cases to the SKA-Low Signal Chain and Science Data Processing domain specialists and teams to characterise the impact of RFI on the signal chain.
* Communicate openly, effectively, and respectfully with all staff, clients and suppliers in the interests of good business practice, collaboration and enhancement of SKAO and CSIRO’s reputation.
* Work collaboratively as part of a professional regionally and internationally dispersed team.
* Adhere to the spirit and practice of both SKAO and CSIRO’s Values as well as the Code of Conduct, Health, Safety and Environment procedures and policy, Diversity initiatives and Zero Harm goals.
* Other duties as directed.

## **Selection Criteria**

#### Essential

*Under CSIRO policy only those who meet all essential criteria can be appointed.*

1. A degree in a relevant engineering or scientific discipline.
2. Demonstrated experience (at least ~7 years) in a similar or related role, and ~15 years in the RFI/EMC field.
3. Demonstrated understanding of commissioning, testing, compliance and verification processes used within the RFI/EMC field.
4. Wide-ranging knowledge of RFI & EMC issues associated with the diverse equipment and systems operating in the frequency range 50 MHz to 1 GHz (optionally to 30 GHz).
5. Substantial expertise in at least one of the following, and significant understanding of the principles of the remainder:

a. EMC/EMI Shielding techniques

b. Electromagnetic propagation modelling as applicable to EMC and RFI

c. Hands on experience with RFI/EMI testing measurement equipment, including data analysis.

1. Proven ability to use computers as planning and analysis tools, preferably with experience in the use of currently available RFI/EMC related software, and experience with programming languages such as Python, Matlab, etc.
2. Excellent interpersonal and leadership skills for dealing with a wide range of people, including effective team management and the ability to successfully transfer technical knowledge.

## **Desirable**

1. Post-graduate qualification in a directly related discipline.
2. Experience in RFI & EMC in the radio astronomy field.
3. Professional development (recognised CPD courses) in fields relevant to RFI and/or EMC control and management.
4. Appreciation of the challenges for RFI & EMC control & management posed by the local Australian ‘Radio Quiet Zone’ environment.
5. Knowledge of relevant RFI related recommendations and associated working practices within the radio astronomy community.

## **Required Competencies**

1. **Teamwork and Collaboration:** Cooperates with others to achieve organisational objectives and may share team resources in order to do this. Collaborates with other team as well as industry colleagues.
2. **Influence and Communication:** Identifies critical stakeholders and influences them via an influential third party, for example through an established network, to gain support for sometimes contentious, proposals / ideas.
3. **Resource Management/Leadership:** Sets up and maintains effective and efficient work teams and manages performance and resources, to achieve objectives. Chooses appropriate management strategies and communication styles to maintain high levels of motivation and productivity. Gives feedback for development purposes and provides support and direction for improvement.
4. **Judgement and Problem Solving:** Anticipates and manages problems in ambiguous situations. Develops and selects an appropriate course of action and provides for contingencies. Evaluates, interprets and integrates complex bodies of information and draws logical conclusions, synthesises proposals and defends options with reasoned arguments.
5. **Independence:** Assesses the risk and opportunity of identified strategies, options and actions. Overcomes problems and setbacks in achieving goals. Invariably includes consideration of value-added future impact on bottom line when determining the optimal and efficient use of resources.
6. **Adaptability:**Demonstrates flexibility in thinking and adapts to and manages the increasing rate of organisational change by adjusting strategies, goals and priorities.

Special Requirements

* The successful candidate will be asked to obtain and provide evidence of a National Police Clearance or equivalent. Please note that individuals with criminal records are not automatically deemed ineligible. Each application will be considered on its merits.
* If the successful candidate is not an Australian Citizen or Permanent Resident, they may be required to undergo additional security clearances, which may include medical examinations and an international standardised test of English language proficiency (i.e. IELTS test- <https://ielts.com.au/>).
* The successful candidate must be able and willing to undertake travel as required, including frequent trips to the MRO (2 or more times/month), and occasional trips to Perth, and interstate (a few times a year) and potentially to other SKA facilities in South Africa, UK etc.

## **About CSIRO**

We solve the greatest challenges through innovative science and technology. Visit [CSIRO Online](http://www.csiro.au/) and [Space and Astronomy](https://www.csiro.au/en/Research/Astronomy) for more information.

CSIRO is a values-based organisation.  In your application and at interview you will need to demonstrate behaviours aligned to our values of:

* People First
* Further Together
* Making it Real
* Trusted

## **About SKAO**

SKAO is coordinating a global effort to deliver the largest science facility on the planet. The SKA Observatory will build next-generation radio telescopes that will help to answer key questions in astrophysics, drive technological innovation and support human capital development. Visit [SKA Observatory](https://www.skatelescope.org/) online for more information.

SKAO’s values are:

* Diversity and Inclusion
* Excellence
* Collaboration
* Creativity and Innovation
* Sustainability