



International  
Centre for  
Radio  
Astronomy  
Research

ICRAR  
E info@icrar.org  
T +61 (08) 6488 7766  
www.icrar.org



GCO ELECTRICAL  
CASE STUDY



## GCO ELECTRICAL

A Geraldton electrical contractor is poised to take a slice of the SKA pie after years of working with ICRAR in the remote Murchison region. It's all part of ICRAR's commitment to preparing local industry to participate in the construction of the world's largest radio telescope.

GCo Electrical was selected by ICRAR as the lead contractor for the Murchison Widefield Array (MWA) telescope infrastructure, and has had a presence on the SKA site ever since. The company has been involved in maintenance, upgrades and related infrastructure for the MWA and fellow precursor telescope the Australian SKA Pathfinder (ASKAP). Most recently, GCo worked with ICRAR on SKA pre-construction plans, developing and costing a blueprint to deploy more than 130,000 antennas for the low-frequency part of the SKA.

ICRAR acting director of engineering Tom Booler said GCo made a huge contribution to the \$50 million MWA telescope right from the start, impressing early in the competitive bid process. "They helped us understand what the big drivers of our costs were, and what we needed to do to bring in those costs," he said. "Just as importantly, they were completely transparent and willing to talk to us about the risks in our project, such as the possibility of encountering hard rock during

trenching, problems with site access or roads closures due to rain. If we hadn't had their help to understand that risk, the project would have run out of money halfway through the program and there'd be no MWA today."

**"It's hard to overstate how important they were in the successful initial construction of the MWA."**

TOM BOOLER  
ICRAR

GCo was ultimately selected as the lead contractor for the MWA. They managed the deployment of the telescope infrastructure, subcontracting other local businesses along the way. "Geraldton companies were the only way we got it done," Mr Booler said. "It's hard to overstate how important they were in the successful initial construction of the MWA."

Over time, GCo has been called upon again and again because



of their willingness to help in the planning stages, openness about costs and familiarity with the site. The company's ongoing involvement in the Murchison since the initial MWA construction includes deploying cables over long distances, maintaining infrastructure on the site, installing solar power systems and even doing some of the cabling inside ASKAP dishes.

GCo chief executive Murray Hadley said constructing the MWA gave his team the opportunity to work on a unique endeavour. "It also introduced us on a meaningful level to a globally significant project in the SKA," he said. "From our MWA and ASKAP project experience GCo has developed an understanding of the infrastructure, construction and assembly requirements of a specialised construction delivery market sector."

One of ICRAR's roles in SKA pre-construction is planning the deployment of the antennas that will make up the low frequency part of the telescope in Western Australia. This colossal job involves the assembly, installation, plugging in and commissioning of more than 130,000 antennas. The scale of the challenge is unprecedented in radio astronomy.

With all their experience, it made sense for ICRAR to engage GCo to help with this planning, and the company compiled a detailed plan for the roll out of the antennas,

complete with costs and timings. The resulting document contains everything from the number of truck movements needed to the numbers of people required on site, the time taken to do individual actions, the time to walk between antennas and the parts needed.

The report is highly parameterised so it can be broken down and refreshed as the design and scope of the project changes. It was submitted directly to the SKA Office in Manchester. While ICRAR will not have its hands on the levers of SKA procurement, the work GCo is doing at this early stage gives them the best possible chance at securing a contract for SKA construction.

**"The work GCo is doing at this early stage gives them the best possible chance at securing a contract for SKA construction."**

Mr Booler said it is important to change the perception that regional companies are somehow less capable. One of the things that impressed him most was GCo's willingness to challenge themselves in meeting the SKA Project's needs. "They recognised immediately that—while they had all of the expertise, experience and on-the-ground know-how to do the job—they didn't have the

in-house capability to document and present it in the way that was needed for the SKA," Mr Booler said. "They went and got themselves an experienced engineering manager and a technical writer to make sure that their return was suited to the purpose and audience. That to me demonstrates real organisational maturity."

Without ICRAR, Mr Booler said the contract for this critical pre-construction work package would almost certainly have gone to a consultancy firm in the UK or the Netherlands, with no experience of the local market or site conditions. In the absence of the practical experience of building the MWA and related infrastructure, and with only a European perspective of what constitutes a remote site, the plans would be far less credible and robust than those laid out by GCo.

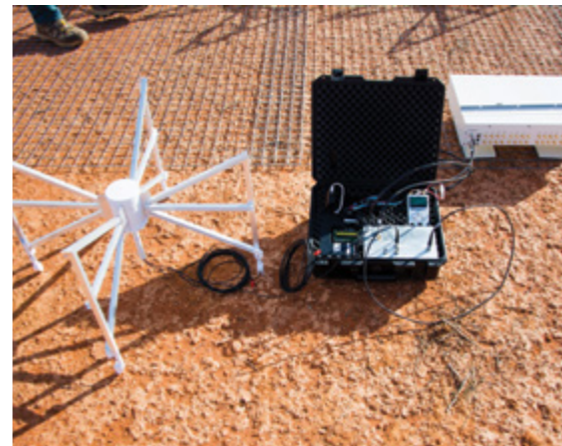
It is experiences like this that have led ICRAR to become a vocal advocate for West Australian companies. "It's so important to talk to local industry—to us it's a no brainer," Mr Booler said. "One of ICRAR's really important roles in pre-construction is to make the rest of the world aware of the particular considerations of the site. There's a huge risk that people consider that costs in one market are relevant to this environment and they're just not."

**Cover** A member of the GCo Team pulling cables that will carry signals collected by the tiles of the MWA as the radio telescope observes distant galaxies, some billions of years old.

**Centre** ICRAR Engineering team member Luke Horsley working with GCo on site at the Murchison Radio-astronomy Observatory.

**Left** GCo managed the excavation of more than 7000m of trench for the deployment of the original MWA power and fibre infrastructure in 2012.

**Right** GCo have laid more than 10,000m of power cable and more than 30,000m of fibre optic cable in support of ICRAR's activities on the MRO.



**Left** This ICRAR designed test kit enables GCo personnel to test the installation of antennas and beamformers before the supporting power and signal infrastructure was available at the remote tile sites.

**Right** A member of the GCo Team installs dipole antennas at one of 56 new tile locations deployed as part of MWA's Phase 2 expansion program. All components, tools and equipment are hand carted to the remote tile locations to minimise the environmental impact.