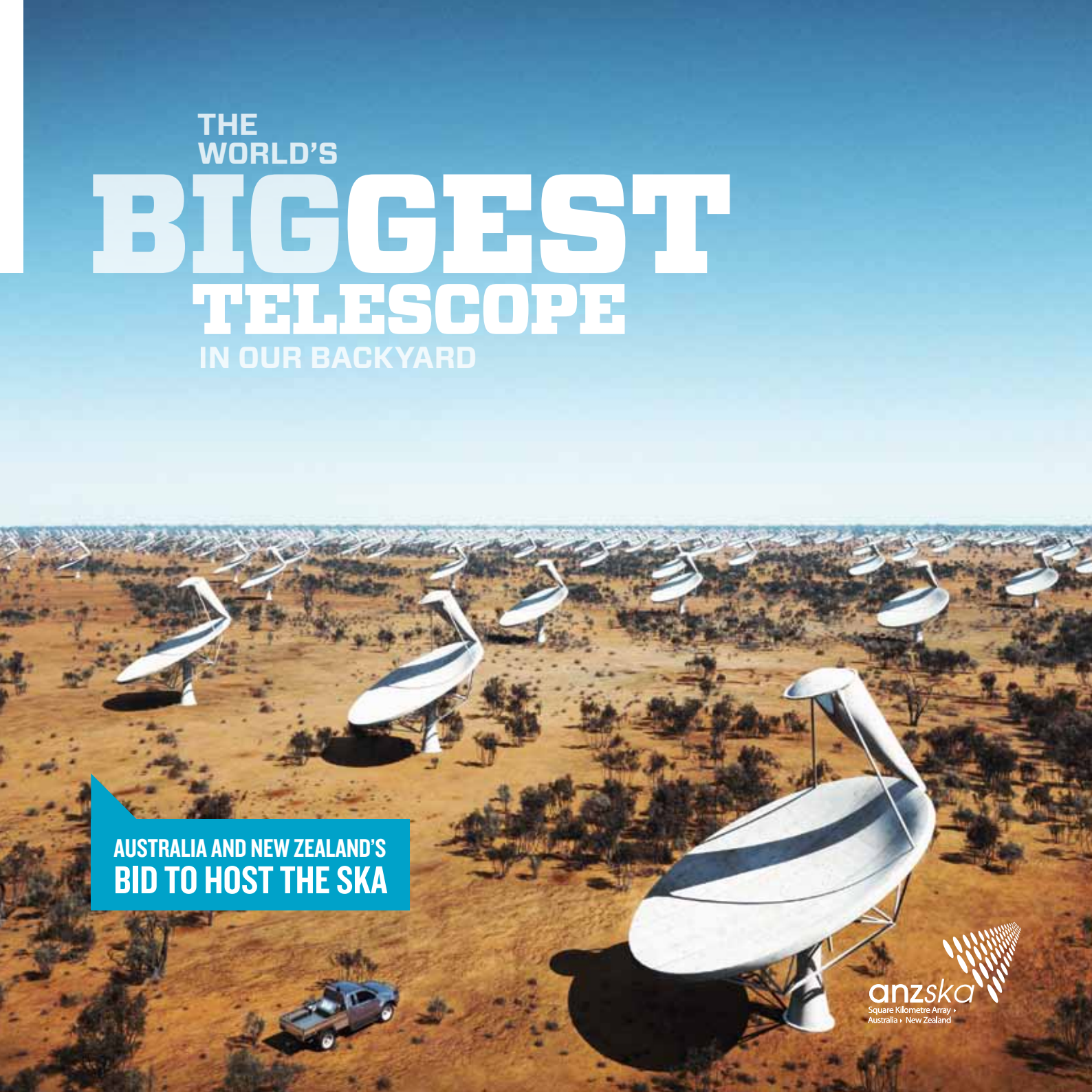


THE
WORLD'S
BIGGEST
TELESCOPE
IN OUR BACKYARD

**AUSTRALIA AND NEW ZEALAND'S
BID TO HOST THE SKA**

anzska
Square Kilometre Array
Australia • New Zealand



A NEW HORIZON FOR DISCOVERY

Australia and New Zealand have teamed up to win the bid to host one of the greatest science opportunities known to humanity – the Square Kilometre Array (SKA).

The SKA will be the biggest and most advanced radio telescope ever constructed. It will generate the most precise images of the cosmos the world has seen. Using this unique telescope, astronomers will peer into the farthest reaches of the universe and make giant leaps forward in discovery. The SKA will answer some of our fundamental questions about the universe.

LOCATION

The SKA will be jointly funded by several countries, but built in one of two short-listed locations – Australia/New Zealand or Southern Africa.

With our unique and extremely low levels of radio interference, state-of-the-art fibre-optic infrastructure and rich history of radio astronomy and innovation, Australia and New Zealand are ideally suited to host the SKA.



“ THE SKA WILL REVOLUTIONISE THE WAY WE DO ASTRONOMY. IT WILL BE THE KEY WITH WHICH WE UNLOCK SOME OF THE GREAT MYSTERIES OF THE UNIVERSE. ”



Dr. Brian Boyle
anzSKA Project Director

Australia and New Zealand have a fantastic opportunity to host what will be one of the largest and most advanced scientific instruments ever built. The SKA is unprecedented in its size and power and will be at the absolute forefront of scientific discovery and technological ambition for generations to come. I believe that the new discoveries made by the SKA and the other spin-offs from its development will change the world.

This is a once-in-a-lifetime opportunity for Australia and New Zealand – I am sure you will be as excited as me at the prospect of bringing this unique telescope to our backyard.



ONE TELESCOPE, 3000 DISHES.



WHAT IS A RADIO TELESCOPE?

– Just as optical telescopes detect light, radio telescopes detect radio waves coming from objects in space. By using radio telescopes, we are able to 'see' and understand parts of the universe that we otherwise couldn't reach.

AUSTRALIA AND NEW ZEALAND IN PARTNERSHIP

– Australia and New Zealand have joined forces to strengthen our bid. Placing outlying dishes in New Zealand – some 5500km from the core site in Western Australia – drastically increases the SKA's ability to see distant objects in greater detail.



THE SKA WILL BE MADE UP OF OVER 3000 DISHES, SPREAD OUT ACROSS AUSTRALIA AND INTO NEW ZEALAND AND CONNECTED TOGETHER BY STATE-OF-THE-ART FIBRE-OPTIC CABLES. MOST OF THESE DISHES WILL BE LOCATED IN REMOTE AREAS AWAY FROM RADIO INTERFERENCE – A VITAL COMPONENT FOR A SENSITIVE TELESCOPE LIKE THE SKA.



WHAT'S OUT THERE?

“ ... THE TOTAL NUMBER OF STARS IN
THE UNIVERSE IS GREATER THAN
ALL THE GRAINS OF SAND ON ALL
THE BEACHES OF THE PLANET EARTH. ”
CARL SAGAN

We know that the universe is incredibly vast, containing hundreds of billions of stars. At present we can see only a fraction of the universe, but the SKA will enable us to explore some of its farthest reaches. Who knows what we may discover?

Seeing further

The SKA will be 50 times as sensitive as the best current-day radio telescopes and will allow us to see 10 times further into space. This means we will be able to observe far more of the universe in far more detail than ever before. The SKA will also work 10,000 times faster than its nearest current-day rival – enabling it to carry out research more quickly than ever before.

this is us



How far we can see with the SKA — 10 x further

ASTRONOMICAL POTENTIAL

Five fundamental mysteries of the universe – the SKA may give us the answers



HOW WERE THE FIRST BLACK HOLES AND STARS FORMED?

The first black holes and stars formed 13 billion years ago, releasing energy, some of which is only just reaching Earth today. The SKA will be so sensitive that it will detect this energy, effectively seeing back in time to learn about this era.



HOW DO GALAXIES EVOLVE AND WHAT IS DARK ENERGY?

The universe expands at an ever-increasing rate due to dark energy – and nobody knows what it is! The SKA will enable us to learn more about dark energy and how galaxies form and evolve over time.



WHAT GENERATES GIANT MAGNETIC FIELDS IN SPACE?

Cosmic magnetism exists throughout the universe, influencing how objects in space form, age and evolve. Only by using a sensitive radio telescope like the SKA can we detect and learn from the giant magnetic fields out in space.



ARE WE ALONE?

The SKA will be able to help detect Earth-like planets and examine the way they are formed. It will also offer the possibility of detecting very faint radio transmissions that might provide evidence for intelligent life among the stars.



WAS EINSTEIN RIGHT?

Einstein's theory of general relativity involved predictions for the gravity of black holes – predictions that we've never been able to test before. By studying pulsars and black holes, we'll learn more about gravity and the very laws of physics.

BEYOND THE STARS

Everyday benefits for everyone



Using ideas drawn from his work in radio astronomy, CSIRO's John O'Sullivan and his team developed groundbreaking technology used in Wi-Fi. Today this technology is used in millions of laptops, smartphones and other devices around the world. It has earned CSIRO over \$200 million to support further research.



Dr John O'Sullivan, CSIRO Australian SKA Pathfinder (ASKAP) research scientist

By building the most advanced radio telescope ever, we will almost certainly discover new technologies that have applications in day-to-day life.

INDUSTRY

Many discoveries, like Wi-Fi, are a by-product of astronomy research which are later developed by industry. The scale and ambition of the SKA promises to provide many new technologies that will enrich the lives of people all around the world.

If Australia and New Zealand are successful in our bid, the SKA will create lots of opportunities for us and our businesses.

GREEN ENERGY SOLUTIONS

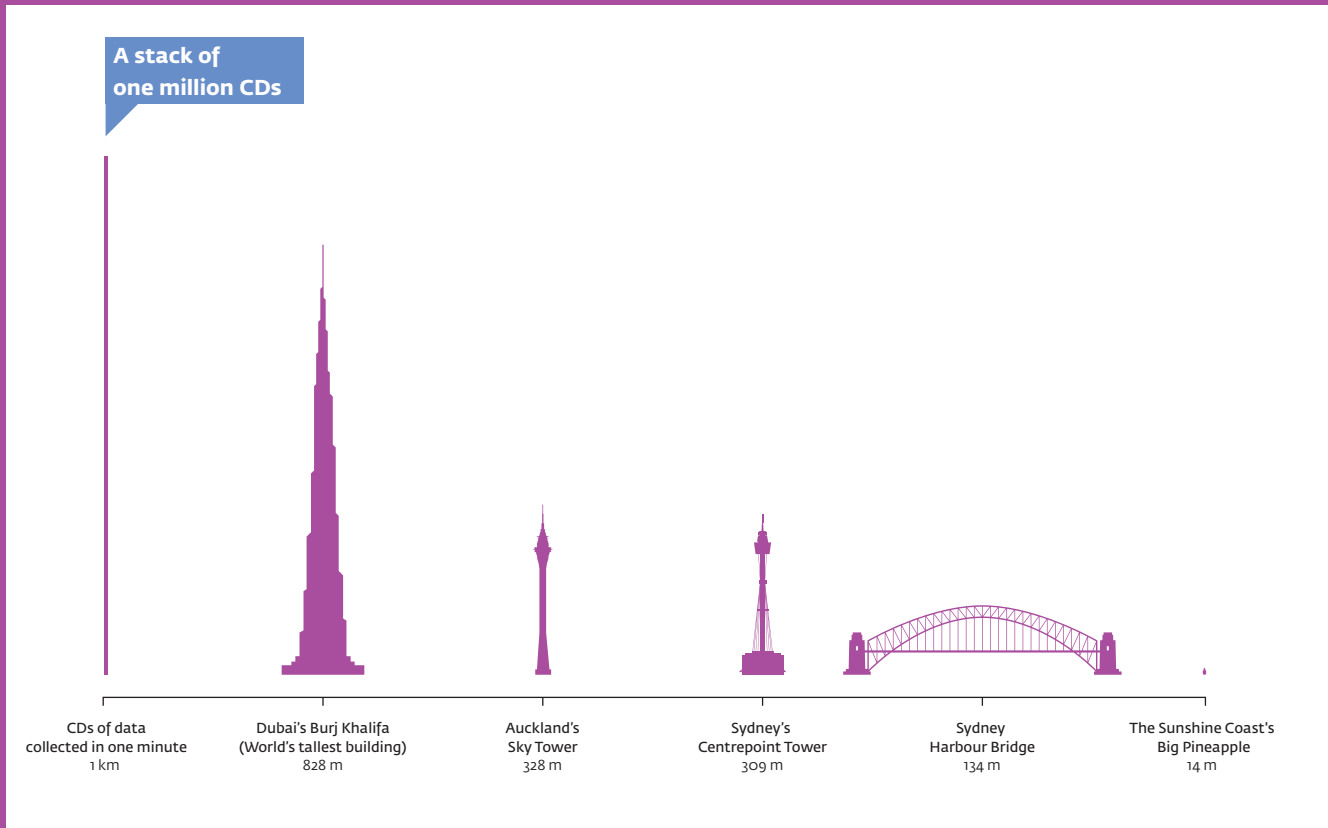
Building large hi-tech infrastructure in remote locations presents unique energy challenges. We are working with industry to develop green energy solutions that may have applications around the world.

EDUCATION

Undreamed of discoveries made by the SKA will certainly help inspire young people around the world to engage with science. Australia and New Zealand have developed a large number of educational programs that will harness the inspirational power of the SKA.

THE SKA'S GREAT DATA CHALLENGE

The SKA will capture volumes of data that no project has ever had to deal with before. This unique challenge will require tens of thousands of kilometres of fibre-optic cable, all congregating at a super computer that is bigger and more powerful than any currently in existence.



INFORMATION GATHERED BY THE SKA
IN ONE MINUTE



=



ONE MILLION CDs OF DATA
OVER ONE KM TALL

IN OUR BACKYARD?

Australians and New Zealanders have always loved big things, from the Ohakune Big Carrot to the Sunshine Coast's Big Pineapple. But even Sydney's Harbour Bridge and Auckland's Sky Tower don't match the scale of the SKA.

Our countries are very excited by this project and excited by the chance of hosting the world's biggest telescope in our own backyard.

Australia and New Zealand have a great opportunity to use our natural suitability for radio astronomy to further the world's understanding of the universe. Australia's extreme radio quiet and existing fibre optic infrastructure makes it ideal for the core of the SKA, while the distance between Australia and New Zealand makes us an ideal partnership for examining the universe in great detail.


This is an exciting opportunity for Australia and New Zealand and we encourage all Australians and New Zealanders to get behind our bid.

**Imagine what
we might discover!**



Support the bid

visit www.ska.gov.au
www.ska.govt.nz

 **Follow** anzSKA Project Director,
Dr Brian Boyle on twitter
twitter.com/BrianBoyleSKA



Australian Government

New Zealand Government



CSIRO

