# High Performance Computers in remote and restrictive environments





### Pawsey Supercomputing Research Centre



#### Background



### Pawsey Supercomputing Research Centre





Inyarrimanha Ilgari Bundara, the CSIRO Murchison Radio-astronomy Observatory

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CSIRO - Murchison Radio-astronomy... Meekatharra

## Murchinson Widefield Array





Solar Imaging



#### Space Situational Awareness



Fast radio bursts







Credit: Natasha Hurley-Walker (ICRAR/Curtin University) https://www.icrar.org/repeating-transient/



Credit: Natasha Hurley-Walker (ICRAR/Curtin University)

https://thewest.com.au/news/wa/wa-team-lead-by-dr-natasha-hurleywalker-discover-what-could-be-rare-star-magnetar-hidden-in-plainsight--c-11325087



Galactic and Extragalactic All-Sky MWA Survey

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## Australian Square Kilometre Array Pathfinder

700 MHz – 1.8 GHz, ~cm wavelength









Centre of the Milky Way Galaxy, 28 antennas: *ASKAPSoft*/Wasim Raja.



Credit: Wasim Raja and Pascal Jahan Elahi, CSIRO, Pawsey https://www.theguardian.com/australianews/2022/aug/11/australiansupercomputer-produces-fantastic-pictureof-supernova-remnant



Atomic hydrogen gas in the Small Magellanic Cloud as imaged with CSIRO's Australian Square Kilometre Array Pathfinder (ASKAP). Credit: ANU and CSIRO





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#### Connections to the world – for inspiration



#### smarter supercomputing



Geothermal

saving up to 7 million

litres of water a year

CSIRO-developed solution

NEW SUPER-

energy efficiency and computing power

COMPUTER

chosen for its

COOLING

**SOLAR PANELS** in the walls and facade of the building

214 electricity generated to offset carbon footprint saving 495kg of CO2 per day



photo voltaic panels installed on the roof

4



**smart Building** has real-time monitoring which facilitates efficient energy use

8

>45 petaFLOPS

>200,000 compute cores across 1600 nodes

>750 AMD GPU's

>548 TB of CPU and GPU RAM

35.81

Corre























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more powerful than our former HPC systems



petaFLOPS of power, making it most powerful research supercomputer in the Southern Hemisphere















#### FUEL MIX















The most reliable and comprehensive Western Australian climate change projections to date are being produced with the help of Setonix – one of the world's most powerful and energyefficient supercomputers.

The state-of-the-art projections will extend 75 years into the future and will help business, industry and all levels of government to better understand the impacts of climate change.

Climate models are our best tool to understand how the climate may change in the future.

Global climate models divide the world into grid cells ranging from 150 to 280 kilometres in size. Because of their size, these cells are often too big to examine the impacts of climate change at local scales – such as for regions or towns.



#### WA CLIMATE SCIENCE INITIATIVE

## Still finding the pieces to the puzzle







# THank you

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SETONIX