Telescope to track space junk using youth radio station

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A combination of pop songs, talkback radio and cutting-edge science has enabled Australian astronomers to identify a way to prevent catastrophic, multi-billion dollar space junk collisions, a new study has revealed.

The inaugural research project spearheaded by Curtin University in Western Australia, will use the newly operational Murchison Widefield Array (MWA), one of three precursor telescopes for the $2billion Square Kilometre Array project, to detect radio waves reflecting off thousands of objects orbiting the earth.

The study has already tracked radio waves from FM transmitters located near Perth and Geraldton bouncing off the International Space Station as it passed over WA, approximately 500 kilometres above the Earth's surface.

Team leader Professor Steven Tingay, Director of the MWA at Curtin University and Chief Investigator in the Australian Research Council Centre for All-sky Astrophysics (CAASTRO) said the MWA will be able to detect the space junk by listening in to the radio signals generated by stations including popular youth network Triple J.

"We have shown that we are able to detect approximately 10 pieces of space junk simultaneously. Over time this means we are in a position to monitor a significant fraction of the space junk that is in Earth orbits," Professor Tingay explained.

The importance of this is that space debris is unpredictable and poses a significant collision risk to expensive space infrastructure, such as communication satellites, according to Professor Tingay.

"An early warning system has the potential to protect the billions of dollars' worth of vital infrastructure orbiting the earth but also prevent collisions that will result in even more space debris being generated, such as what happened in the case of the Iridium 33 satellite in 2009*[1]," he said.

Being one of the first completed studies undertaken using the $51 million MWA, the results are important as they confirm the revolutionary astronomy tool is functioning in line with expectations.

"The MWA was designed to be the most powerful low frequency radio telescope in the Southern Hemisphere and this was our chance to test its capabilities," Professor Tingay said.

"Prior to undertaking the study we had calculated how strong we expected the signals to be using simulations and theory.

"The measurements we took as part of the study were spot on in agreement with our calculations.

"This is an excellent result and bodes well for the other MWA science projects that are currently underway – including the most detailed study to date of the Epoch of Reionisation, the first billion years after the Big Bang."

The idea to use the MWA for tracking space debris came from an earlier study by Ben McKinley, a CAASTRO PhD student at The Australian National University, who was able to image the Moon using reflected FM signals and calculate the likelihood that alien civilisations were

listening in on us.

"CAASTRO's emphasis on all-sky astronomy naturally leads to this new capability with the MWA, showing that astrophysics research can cross over into having significant benefits for people in everyday life," Professor Tingay concluded.

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