Stackable computers out of this world

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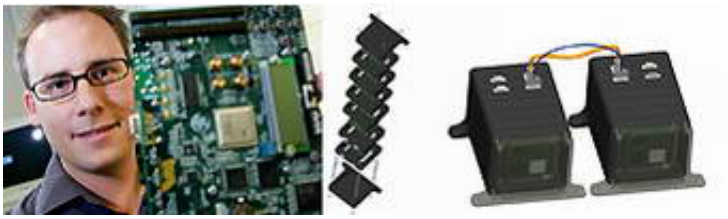

Brisbane engineers have teamed up with NASA to help build a new computer system for future space missions to the Moon, Mars and beyond.
The team of electronics engineers from The University of Queensland, led by Dr John Williams, is building the software operating system for the American space agency's Reconfigurable Scaleable Computing (RSC) project.

Image: Space-age computing: Dr John Williams with a computer board, similar in size to the RSC boards that can be stacked together (middle) and linked for more processing power (right).

RSC is a modular computer system with small motherboards, about 13cm X 10cm, that can be stacked and linked together in different sized clusters, depending on their use.

Dr Williams said RSC would be used for data-rich processing in space

such as controlling exploration rovers, robotic mining vehicles, real-time cameras and sensors, and surface and atmospheric analysis.

“Conventional silicon chips can only perform the task they were designed to do, but RSC uses reconfigurable logic chips that can be infinitely reprogrammed to perform almost any function,” Dr Williams said.

“This is particularly useful for missions which require fast processing as well as flexibility to update their function or correct design errors after a spacecraft is launched.”

RSC principal investigator Dr Robert Hodson said NASA wanted an alternative space computing system to improve processing speed and reduce the expense and time to retest systems for different space missions.

But RSC would not replace all space computing such as shuttle take-off or flight control systems.

“NASA recognizes UQ as a leader in embedded operating systems for reconfigurable computing and views their contributions to the RSC project as vital to its success,” Dr Hodson said.

The RSC operating system is a modified version of Linux, an open-source alternative to Microsoft Windows or Apple MacOS which is widely used in scientific and academic computing.

Dr Williams has been modifying Linux to run on reconfigurable hardware, and has freely released his work to the public which was how NASA became aware of the UQ group’s expertise.

UQ’s School of Information Technology and Electrical Engineering has

signed a partnership agreement with NASA's Langley Research Centre for its four-year RSC project, worth approximately $18 million.

UQ is the only non-US partner in RSC, and the agreement follows NASA's continued relationship with UQ's Hypersonics research team.

"The RSC system is vital technology needed to implement the NASA's Vision for Space Exploration – a comprehensive program to extend human and robotic presence throughout the Solar System," Dr Hodson said.

Source: UQ