



PRESS RELEASE

Tellumat Defence

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MeerKAT engineers proud of new ROACH

<http://www.dataweek.co.za/article.aspx?pkIarticleid=6903>

South African engineers at the MeerKAT project office in Cape Town are taking the lead in the development of new generation astronomy tools such as the ROACH (reconfigurable open architecture computing hardware) boards in a collaboration with UC Berkeley, the NRAO and others. The ROACH board is a primary building block for digital signal processing systems in many next-generation radio telescopes and is a cutting-edge innovation that enables highly specialised and high-performance computing.

Designed mainly in South Africa, about 300 of the ROACH-1 boards are already in use at high-tech facilities around the globe. The prototypes of a much faster and more powerful board - ROACH-2 - have now been manufactured. This provides a highly compatible upgrade path for all these facilities and opens up many more possibilities for new installations.

ROACH-2 has five times the processing capacity of its predecessor, four times the memory bandwidth, twice the memory capacity and twice the I/O bandwidth. This is made possible by using the latest advances in FPGA (field-programmable gate array) technology. "We try to take the best possible advantage of the reduced cost of computation by developing new hardware that can be programmed using common software tools," says Francois Kapp, DBE subsystem manager at the MeerKAT project office in Cape Town. "Progress in FPGAs is forecast to hold for at least another four generations, so we should at least see ROACH-3, -4, -5 and -6 in the coming years."

The design of ROACH-2 (like ROACH-1) was led from conception to production by engineers from the SKA (square kilometre array) South Africa Project, with collaboration from many international experts, especially the Centre for Astronomy Signal Processing and Electronics Research (CASPER) at the University of California, Berkeley.

Based on their experience with the KAT-7 array and fringe finder, the local team now takes the lead in specifying the ROACH boards, with the design process being led by David George, a member of the MeerKAT DBE team. Local content in the project is further boosted by **Tellumat**, a South African company assembling these complex boards. "While we are taking the lead with ROACH innovations, our international collaborations have been invaluable in the development of these and other cutting-edge radio astronomy tools," Kapp adds.

"**Tellumat** has always been associated with the manufacture of leading technology, but having the opportunity to produce components for an internationally significant project like the SKA is something we are particularly proud of," says Eugene van der Watt, business development manager at **Tellumat** Electronic Manufacturing.

According to specialists on the DBE team, valuable experience has been gained about which devices work in an open radio astronomy environment. This experience has led to testing of the ROACH board being changed significantly and is now based on a unified JTAG (joint test action group) chain, accessible via



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USB, making it much easier and more affordable to produce. ROACH-2 is also important in preparing the team for the wideband processing systems needed for MeerKAT.

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