Agreements with INTEL, SEACOM and NOKIA-SIEMENS boost SA's SKA bid

On 26 July 2011 Intel Corporation signed a memorandum of understanding (MoU) with South Africa's Department of Science and Technology (DST) and the MeerKAT engineering team. Intel has undertaken to supply to SKA SA, for a joint evaluation, cutting edge, high-performance computing technologies that will be required to capture, process and analyse the vast amounts of data that will be generated by the SKA and MeerKAT telescopes.

Christian Morales, Intel Corporation Vice President and General Manager for Europe, the Middle East and Africa, explained: "Intel will be providing cutting edge hardware and software architecture and the development tools necessary to make this project succeed. We are looking at providing a flexible architecture that is capable of evolving in the future and developing a high performance computing system that is able to stream and process a huge amount of data. We will be relying on the best architecture available today with strong capacity and the most efficient energy consumption." (Source: ITNewsAfrica.com)

For instance, the radio telescopes will require the latest technology motherboards supporting massive data rates and fast solid state drives that make it possible to record the data at high throughput rates. Much of this technology is in fact still under development.

Jasper Horrell, sub-system manager of the MeerKAT Science Processing Team at the SKA South Africa office in Cape Town that has been working closely with Intel, stated: "Intel has for a long time been one of the major players in computing innovation and their next generation hardware and software continues to reflect this trend. They are an important partner for SKA precursor instruments such as MeerKAT."

The Intel technology is currently being used to develop an ability to deal with so-called "raw voltage data" on KAT-7, itself a precursor to MeerKAT. This raw voltage data is the first stage of digital data that emerges at a very high rate (currently 1.6 GBps) from each antenna. This data stream is diverted into a raw voltage processor constructed using Intel technology as an alternative to the FPGA-based KAT-7 correlator. The raw voltage processor provides a new level of flexibility to the telescope. For example, data can be converted to a very long baseline interferometry (VLBI) format or recorded to high speed disk with some pre-processing to look for radio transient signals from the universe.

Prototype lab system, incorporating Intel solid state disk technology, used for high speed data capture and stream processing.

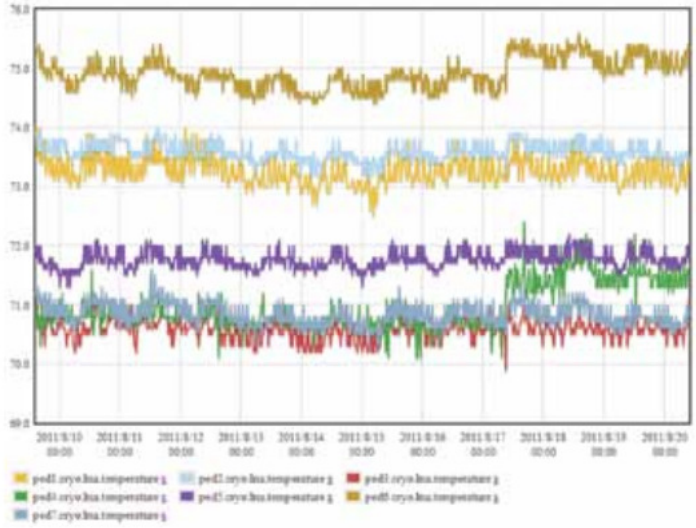
The DST and SKA South Africa also recently signed MoUs with submarine cable operator Seacom – to provide connectivity between remote SKA stations, as well as with Nokia Siemens Network (NSN) – to model the signal transport requirements of the SKA telescope. Other key partnerships in support of SKA SA include agreements with Eskom and Telkom – for provision of reliable and low-cost electrical power and data transport.

Crucial cold receivers successfully installed on KAT-7

On 8 August 2011, all seven dishes of the KAT-7 telescope had been successfully fitted with "cold" radio receivers. These receivers, designed and manufactured by EMSS in Stellenbosch, are cryogenically cooled to temperatures of about 70 Kelvin, or -203 celsius. This significantly lowers the noise floor of the telescope system, which enables scientists to make observations with significantly better sensitivity, thereby "seeing" much fainter objects than would otherwise be possible.

The successful installation of the 7th cold receiver is a significant milestone that marks the last major hardware installation effort on KAT-7 by the engineering team. It coincides with the formal acceptance of the KAT-7 correlator, which means that KAT-7 is now ready for more in-depth interferometric commissioning. The Science Processing Team wasted no time to start producing radio images with the new receivers.

Feed for cold receivers and dish with feed mounted



KAT-7 LNA (Low Noise Amplifier) temperatures(K) for the period of 9–20 August 2011

Apart from the interferometric commissioning work that lies ahead, the system engineering team is busy finalising the formal acceptance testing of phase one of KAT-7. Phase one includes the wideband correlator mode, whereas phase two includes the spectral line mode, tied-array beam-forming mode and very long baseline interferometry (VLBI). The formal acceptance testing of phase one, together with the as-built, operations, logistic support and maintenance documentation, forms the operational baseline of KAT-7, a further significant milestone.

"We are extremely proud of the KAT-7 achievements to date", remarks Richard Lord, KAT-7 system engineer. "This has been a fantastic team effort, involving the on-site technicians, the engineers and commissioners in Cape Town, and subcontracted companies like EMSS and Tellumat. We are looking forward to start using the telescope for some early science in the near future."