

Real-time Sonar Signal Processor for Australia



Sea acceptance testing of Kraken Sonar Systems' embedded real-time synthetic aperture sonar (RTSAS) signal processor for Australia's Defence Science and Technology Organisation (DSTO) was a success. In real-time signal processing, the analysed (input) and generated (output) samples can be processed continuously.

Kraken's RTSAS is a rugged, small-form-factor subsystem that incorporates an NVIDIA Kepler GPU. This kind of graphics processing capability is increasingly being applied in the aerospace and defence industry for complex digital signal processing. The RTSAS architecture has been designed from the ground up for maximum imaging performance and optimal performance per watt.

In essence, the GPU acts as a massively parallel embedded processor for Synthetic Aperture Sonar (SAS) data. SAS provides ultra-high seafloor image resolution at significantly longer ranges than conventional sonar. This is done by replacing traditional sonar hardware with signal processing software.

In 2013 DSTO procured an AquaPix Interferometric Synthetic Aperture Sonar system from Kraken for research related to enhancing mine detection and neutralisation techniques using Autonomous Underwater Vehicles (AUVs). As their research advanced, DSTO scientists required a real-time sonar signal processing capability embedded directly onboard their REMUS 600 AUV.

DSTO is also developing automatic target recognition algorithms to identify naval mines. Moving the algorithms directly onboard the AUV eliminates the requirement for data post-processing and has the potential to significantly increase the speed of operation for mine countermeasures. The key to fulfilling this objective is the capability to process the sonar data onboard the vehicle in near real-time, while producing detailed 3D imagery of the seafloor.

DSTO is a national leader in safeguarding Australia by delivering valued scientific advice and innovative technology solutions for the country's defence and national security.

Image: Kraken's real-time synthetic aperture sonar signal processor. Coffee cup used for scale.