The Synthetic Aperture Mapping Sonar SAMS150 onboard Ulyx AUV 6000m : An advanced solution for simultaneous detection and identification of deep-sea geomorphological features

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Résumé

The concept of synthetic aperture mapping sonar (SAMS) system has emerged historically about 18 years ago with the first system developed at iXsea in 2006. The last generation of the SAMS, the SAMS-150, benefits from many new features: implementation of interferometric capabilities together with an improvement in hardware and processing design and performances. This technology combines a number of acoustic pings to form an image with much higher along-track resolution than conventional sonars to provide high-resolution mapping of subsea geomorphological features with a along/across track resolution of about 6cm/2.5cm. Recently the first prototype of SAMS150 has been integrated in the 6000m depth rated AUV *UlyX* developed by ECA through the CORAL project for the Ifremer. The *UlyX* AUV system is an observation platform equipped with a complete set of payloads (optical still photo, sidescan and multibeam bathymetry sonar, echosounder, physical& chemical measurements) dedicated to the exploration of deep ocean resources and high-resolution mapping. The precise georeferencing and high-quality sonar imaging and mosaicking for short to middle range (up to 2 times 250m swath) was the key requirement for the exploration mission. For instance, it enables the best fusion of the multibeam bathymetry acquired at high altitude and video mosaicking produced at very low altitude of only a few meters from the seabed. The aim of this presentation is to demonstrate the performances of the SAMS150 as the appropriate imaging solution for deep sea multi-sensor exploration. The first part will be dedicated to the principle, capabilities, and performances of the SAMS 150 system. The hardware and software architecture of the system will be described in the second part. The third part will emphasize the specific integration aspects within the AUV system and resulting imaging performances will be illustrated and discussed on real data sets acquired during recent sea-trials with the *UlyX* AUV. We will highlight how this new disruptive technology can better help future geosciences projects.

Mots-Clés: synthetic aperture sonar, bathymetry, AUV, SAMS, UlyX, seabed mapping, seismic reflection

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