## AGS Abstracts

## The resolution and information content of EM100 and EM1000 multibeam imaging sonars

## J.E.H. Clarke

## Ocean Mapping Group, University of New Brunswick, Fredericton, New Brunswick E3B 5A3, Canada

With the recent introduction of shallow water multibeam sonars into Canada, their capabilities as geophysical investigative tools is only beginning to be realised. In order to use these tools, however, their resolving capability and information content need to be understood.

The EM100 sonar was designed primarily as a hydrographic tool capable of resolving features that have a height of as little as 1% of the water depth and spatial resolution of about 15% of the water depth. In order to meet these specifications, an excellent knowledge of both the horizontal position, tidal elevation and vessel motion is required. With differential GPS and synchronous tide gauges, the first two parameters are well constrained. At present, the third parameter, the vessel motion (particularly roll), is limiting the quality of the bathymetric data. For geophysical purposes, however, as long as the nature of the artifacts in the data is recognised, it can still be of use.

In addition to bathymetry, the EM100 is capable of

providing information on the backscattering strength of the seafloor at the same spatial resolution as the sounding data. With additional non-standard processing, this image data can be manipulated into maps of seafloor backscatter, of use in remote sediment classification.

The EM1000 sonar provides similar hydrographic data quality although extending over a wider swath. The wider data is, however, even more sensitive to roll and refraction artifacts. In shallow water this does provide up to three times the swath width of the EM100.

The EM1000 was specifically designed to provide imagery comparable to sidescan sonars with the added advantage of full topographic control and higher acquisition speeds (up to 18 knots). The imagery has a theoretical resolution of 15 cm. Operationally, only targets of 2 m or greater can be resolved with confidence.

Examples of the quality and imaging capabilities of both sonars will be presented.