

## **Study project "Surveying of the Swedish coastal zone".**

The project is funded by a grant by the Swedish Civil Contingencies Agency (MSB) Cooperation partners is the Geological Survey of Sweden, the Swedish Land Survey and the Swedish Geotechnical Institute.

The project aim is to conduct a methodological study to find cost-effective tools for measuring the shallow waters of the coastal zone as well as lakes and streams. With shallow water we here mean from the shoreline down to a depth of about 10 meters. Within this area there is a great need to have high-resolution in order to create reliable flood and dispersion models, detect and calculate erosion damage, and make analyses of climate's impact on the sea level. A prerequisite for this is a coherent terrain model for the coastal zone and other waterways. Today's high-resolution elevation data from the National elevation database can be used for a terrain model on land but which ends as soon as the water begins. Today there are very little high-resolution data in these shallow waters, largely due to that traditional measurement methods are very costly in shallow areas. Relatively new technology has developed in recent years that may enable a more cost-effective measurement in shallow water including different types of airborne laser system (LIDAR), interferometric sonar, etc. An analysis of the different measurement methods and their effectiveness in shallow water areas will be performed. The measurement efficiency, particularly LIDAR technology but also acoustic methods, in large part also depends on the water physical characteristics (quality) is included in the project analysis section to study how planning can be done and the respective method based on quality, time and cost (efficiency). The project will run for two years, where the first year is devoted to technical test activities and inventory of experiences from other LIDAR measurements. The second year is devoted to analysis and to create a general planning.

### **Planned work**

As test operations with airborne technology is very costly, the study will primarily be done with the support of an external expert (procured or project employed) who will study the results from surveys with LIDAR systems nationally as well as internationally. The experiences will then be analysed based on the specific conditions in the Swedish waters.

Tests with ship-borne sonar technology will be performed using existing systems at SGU vessel "Ugglan" and SMA vessel Petter Gedda, possibly also using leased or borrowed equipment. We will also make tests using an even smaller boat and an Imagenex Multibeam sonar on the shallowest parts of the areas.

Areas to test equipment and methods will be selected from different types of shallow areas along the Swedish coast. It might be the case that survey methods and equipment shows different results in different areas.



SGU vessel Ugglan



SMA vessel Petter Gedda during test fitting of the SMA Klein 5000-Bathy

## Organization and final results

Swedish Maritime Administration hydrographic surveys are normally concentrated to the fairway areas as funds for surveying only comes from the fairway dues.

The results of the study method will be the basis for a discussion on the needs and funding for establishing a national coastal zone mapping program. The depth database can, when filled also with shallow surveys, be used together with the national elevation database to create a seamless digital terrain model over the Swedish land and water areas.

Start of the project was in January 2014 and the end will be in December 2015.

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