

Hydrographic surveying using high resolution satellite images

The Swedish Maritime Administration (SMA) distributes official nautical charts and publications in Swedish waters and different methods and techniques are used to collect the relevant data. Remote sensing is one of the techniques that has only been used to a very limited extent so far but that has the potential, especially in shallow areas, of improving the contents of nautical charts. The Swedish Armed Forces (FM), SMA and the Geological Survey of Sweden (SGU) are the only bodies authorized to perform hydrographic surveys, without seeking specific permission, according to the law regarding the protection of landscape information. We have evaluated the possibility of using high resolution satellite data to collect information on islets and rocks (location, size and depth), to what extent beacons and navigational marks can be identified in the images, if the shoreline could be mapped/updated where necessary, and finally, and most important, to analyse the possibility of estimating depth from high resolution optical satellites.

The investigation is based on QuickBird images depicting a part of the archipelago of Stockholm, Sweden. QuickBird generates images with a spatial resolution of 0.6m in panchromatic mode and 2.4m in multispectral mode. In this geographic area, the depth penetration is rather limited due to dark, humic, waters but in clearer water the depth estimation possibility is increased.

The preliminary results show a potential to use high resolution satellite data for mapping of maritime objects. In areas where detailed information in the SMA database is limited the potential to improve the information content using high resolution satellite data is obvious. With respect to depth estimations, the analysis performed so far has indicated the possibility to identify objects down to 3-4 meters depth.