

## **Laser Bathymetry (LIDAR) project in the Southern Baltic**

### **1. Three year project on Laser Bathymetry**

Although former tests of the use of laser bathymetry in the Baltic Sea region several years ago haven't led to satisfactory results, newer technological improvements like full waveform analysis, higher resolution and single colour laser lead to the decision for Germany to accomplish another in-depth investigation of the usability of this advanced survey technique in the western Baltic.

The project started in 2012 and is scheduled to be completed end of 2014. The project is conducted as a joint enterprise of the BSH with the Leibnitz University in Hannover as a contractor.

### **2. The goals of the project**

The main goals are

- To derive clear and detailed figures of the quality depending on a.o.:
  - o visibility
  - o topography
  - o sea floor conditions
  - o time of year
  - o weather conditions
  - o influence of operating altitude
- To what extend objects can be detected
- What are the maximum and minimum depth
- Whether a coastline can be derived
- To do a market survey
- How expensive is such a survey

Finally, to identify the areas in which that technology should be used economically, especially in cooperation with other agencies.

### **3. The current status**

A test suite has been developed in consideration of an area typical for the German part of the Baltic and well surveyed by conventional shipbound survey. The second principal decision affected the LIDAR-technology itself: The intention is to fly several campaigns for the same sea area but using three different LIDAR-makes of different OEMs. A first flight took place in November 2012, where the system Riegl VQ-820G was used. The second flight was done in September 2013 and a third one using AHAB systems started in April/May 2014, and will be finished in autumn with the new Hawkeye III system.

### **4. Preliminary results**

The current findings are premature and can only give some hints.

The Secchi depths measured in that area where 5-6 meters. A good resolution has been obtained down to this depth (5 points/m<sup>2</sup>), much less points from 5 to 10 meters.

Costs: depending much on the shape and size of the area, flight altitude and availability, in our case: roughly 300 to 1800 €/km<sup>2</sup>. Large areas lead to reasonable prices. Especially if a minimum number of turns is needed for the aircraft.

The achievable accuracy does not seem to be the critical problem in general, however, it appears difficult to derive a clear picture on a very inhomogeneous density of the data, from more than 5 points/m<sup>2</sup> to more than 5 m<sup>2</sup>/point; there are also bigger gaps in the data sets; it seems to be very difficult to detect objects on the sea floor.

Anyway, for the investigated Western Baltic it turned out, that the LIDAR technology can be seen as a supplement to the ship based hydrographic surveys in shallow areas, where vessel operations are especially difficult.

The project has attracted the attention of quite a number of other MS in the North and Baltic Sea and a LIDAR Seminar took place on 26/27 May in Hannover, Germany.

The results of that Seminar are being presented at the Conference. Germany will keep the Commission updated on the final result of the project.

### **The Commission is invited to**

- take note of the report;
  - take further actions as it is seemed appropriate
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