Renewal of data acquisition platform

Introduction

The Norwegian Hydrographic Service (NHS) has continuous improvements of processes as a guiding principle. With respect to data collection, we are investigating solutions for autonomous survey operations, operator assisting systems and collection of new data types. Measures taken to achieve improvements include development of autonomous survey launches, new laser survey systems (LIDAR) and new mission planning software.

Survey launches and equipment

Norway has a very long coastline (100 915 km) with a high number of islands (239 057), making surveying quite demanding. The depth range in the coastal area is 0-1300m. In general, the coastal surveying is done by an expedition vessel equipped with two survey launches. Due to the complexity of the coast, the greater part of the surveying is managed from the launches. These are efficient in deeper waters (50-400m), but becomes increasingly inefficient when approaching shallow areas. Our research show that in the shallow areas the survey effort grows exponentially, as does the risk for the onboard crew.

The expedition vessel most of the time stays moored or anchored. It offers the living facilities for the crew as well as service stations for the launches. These crews currently work 12 hours shifts, yielding on average 8 hours survey time per launch per day. To reduce the number of transits from the expedition vessel to the survey area and increase survey hours per day NHS are investigating the use of autonomous unmanned surface vehicles (AUSV). The AUSV under development by Marine Robotics will have remote monitoring and be suited for 24-48h continuous survey operations.

The new vehicles will combine MBES and LIDAR instrumentation. The MBES will have an efficient operation range (good bottom coverage) of appr 150m (maximum range 300m). In addition, the system employs one or two high-density LIDAR scanners in order to survey both onshore and depths down to 3 meters. A well-suited data acquisition platform is a successful integration of the vehicle itself with the survey equipment, and necessary software and communication systems. For this reason, we are supporting the project by Maritime Robotics to develop and test the optimal solution for an AUSV. Adaptive autonomous mapping at surveying speed will be challenging, as so will maintaining high transit speed while avoiding navigational hazards. An operational product is expected within 3-4 years and we will supervise the development closely.

Fig. A new survey launch: Length 5.85m, breadth 2m, transit speed 30knots, 1 waterjet, MBES, and LIDAR.

Mission control systems

A vital part of the tools used for AUSV operations are mission planning and monitoring systems. Current launches requires a lot of manual interactions and judgments from the onboard operators. An AUSV will be operated from a remote control station, and the system will focus the operators effort on mission planning and monitoring. Being autonomous, the launcher will not be remote controlled, but there are remote override systems for manual control. These planning and monitoring systems may be put into operation on our current launchers as well in order to improve their efficiency and endurance.

Action Required of NSHC

The NSHC32 is invited to take note of this paper.