# Successful introduction of radar simulation software at German Water Police Academy, Hamburg

**Kornwestheim, November 2006 – in-innovative navigation GmbH together with ELNA GmbH and BARCO Orthogon AG have installed successfully the system for modernization of the training simulator of the German Water Police Academy in Hamburg. This academy provides schooling for all officers of the water police throughout Germany. The new system built by state-of-the-art technology of radar simulation conditions, reaches highest standard and provides best quality training.**

The official inauguration of the system took place on 11 September 2006. Upon certifying the simulator for use as radar training and examination tool, experts from the Traffic Technologies Centre of the German Federal Waterways Administration (FVT - Fachstelle für Verkehrstechniken) and the industrial services company German Lloyd manifested laudatory about the simulator training system. "This system provides the most realistic and comprehensive radar video generation I have seen among European ship simulators," stated Hermann Haberkamp, Germany's leading expert for inland and coastal radar navigation.
The system consists of three trainee consoles that are set up like real ship bridges with original radar, radar display and navigational instruments. To come as close as possible to the conditions on the helm of a modern police boat, the simulator generates and processes the raw analog signals which are required to drive the radar hardware and the entire navigational equipment.
The simulator allows conducting radar and navigation exercises both on coastal and inland waterways, taking into account specific conditions and characteristics of each.

**Figure 1: Virtual bridge of the simulation system at WSPS Hamburg**

A trainee can choose between twelve different types of vessels, ranging from a small speedboat to an unwieldy freighter. Finally, the simulator is able to include live traffic of the port of Hamburg into the training exercise, which makes the training experience even more realistic.

in-innovative navigation GmbH implemented the modules necessary for the interface between simulation software and hardware. NMEA data exchange provides the generation of all signals at the bridge consoles, stimulating the hardware components like GPS, anemometer, gyrocompass, echo sounder, rate-of-turn indicator and AIS. Additionally, realistic sound signals from the engines, collisions or while running aground, are replayed on the training bridge.

Furthermore, in-innovative navigation GmbH delivered the Inland ECDIS navigation system RADAR*pilot720°* for the bridge consoles. RADAR*pilot720°* is a unique navigation system, approved as Inland ECDIS navigation system following the standards given by the CCNR. The software integrates information from radar, AIS, GPS and electronic charts on one screen, thus, optimal orientation is possible even under poor visibility conditions (Figure 2). Simulated radar signals in any training situation can also be displayed by RADAR*pilot720°*.

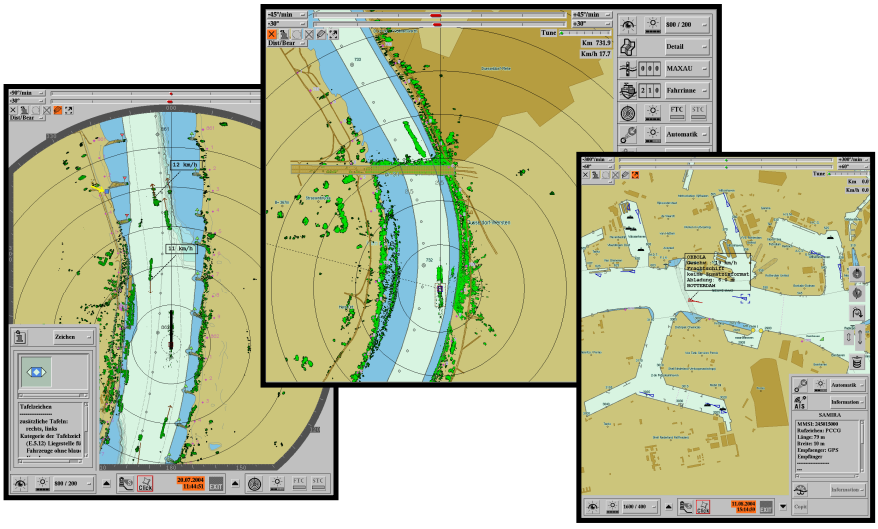

**Figure 2: ECDIS display of the navigation system RADAR*pilot720°***

The whole system includes a control room, in which two instructors can supervise and direct the trainees' operations, a separate exercise preparation room and a central server room.

The virtual navigation environment VWW - VIRTUAL WATERWAY is specifically designed to simulate traffic on coastal waters and inland waterways. It focuses on realistically modelling the dynamics of a large number of vessels and objects in moving water, and on generating a variety of typical sensor measurements such as radar, Automated Identification System (AIS), or Global Positioning System (GPS) data. Furthermore, the simulation incorporates various environmental influences like rain, wind or current. Thanks to the ability to simulate a large number of objects and vessels - besides the virtual ships navigated by trainees -, even complex traffic situations can be created, allowing flexible and comprehensive training lessons.

**Figure 3: Instructor workplace of simulator at the WSPS Hamburg**

Simulation software was originally developed in a collaboration of in-innovative navigation GmbH with BARCO Orthogon AG and the Institute of System Dynamics and Control (ISR) at the University of Stuttgart for testing of inland vessel autopilots. Amongst others, VWW is in operation for validation of VTS- and costal surveillance systems.

The new system upgrades the previous system to cope with the latest training requirements. It is now possible to create and to investigate highly diverse traffic scenarios under extreme realistic conditions.