

## Successful modernisation of the VTS system at Oberwesel, river Rhine

Kornwestheim, December 12, 2007 – The traffic on the river Rhine at the section of the Loreley is now detected and guided with the highly sophisticated system *inVTSbox* and *RADARpilot720°* VTS/AIS.

The highly bended section of the river Rhine between Oberwesel and St. Goar (Figure 1) makes high demands on traffic coordination. Here, the valley has high cliffs, many curves; and the fairway is very narrow. Due to the cliffs, the sight is restricted and radio communication between vessels is possible only via relay station.



**Figure 1: River Rhine at Oberwesel**

At the same time, the demands on traffic monitoring increase because the traffic volume increases steadily on the river Rhine, and vessels are bigger than in the past. Sometimes, downstream vessels need the whole channel of a narrow bend and are not able to stop. Therefore, encounters of large vessels have to be prevented in this area.

In order to inform upstream vessels about downstream vessels coming up, the WSV (Wasser- und Schifffahrtsverwaltung = state department for inland navigation) provides the so called Wahrschau System (from the Dutch word *waarschouwen* = to warn). In earlier times, the traffic situation was observed at five Wahrschau posts, and the posts indicated the traffic to the upstream vessels with the help of flags. As soon as the flags were replaced by lights (Figure 2), it was possible to warn the bargemen also at night, and the river section could be open even when the light conditions were to poor for signalling by flags.



**Figure 2: Wahrschau by lights and the traffic centre at Oberwesel**

Since 1997, the traffic of this river section is not observed by human posts, but with four radar scanners that provide complete surveillance. The radar image is displayed in the traffic centre of Oberwesel, and the light signals can be set accordingly.

For several reasons, the WSV decided to modernize the existing system of radar processing and radar display: first, hardware of the previous system was outdated and replacement parts were not available anymore; second, electronic charts should be replaced by official river charts meeting the Inland ECDIS standard, as they are used on vessels, normally. Furthermore, bidirectional use of information should be provided as it is possible with AIS technology (Automatic Identification System). The observer in the traffic centre should see the static data of a vessel like name and size directly on the screen in order to facilitate identification of the vessel and evaluation of the traffic situation.

In the beginning of 2007, the WSV invited to tender the modernisation of the existing VTS system. In May 2007, the order was placed with in-innovative navigation GmbH, a company that had already developed several VTS systems processing different sensor signals for traffic surveillance. These systems are in operation for traffic coordination at various locks and at the river Danube (Donau River Information Services DoRIS).

In Oberwesel, installation of the new system was finished in July 2007, and since August the VTS system modernised is trial running without complains, the final delivery was in the end of November.

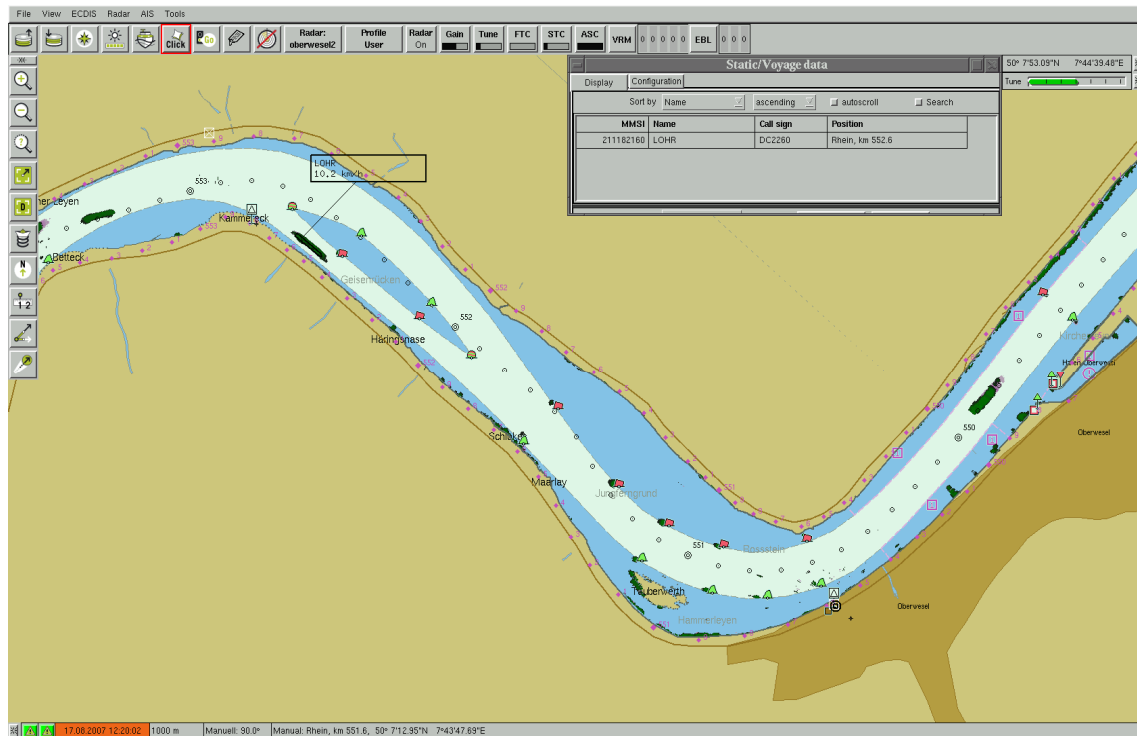


**Figure 3: Traffic coordination in the control centre of Oberwesel**

The new system installed by in-innovative navigation GmbH provides a continuous overview of the complete current traffic situation following the most modern standards of radar technology and IT. Data transfer is provided by TCP/IP standard network.

Due to the high capacity tracking function, the system calculates from radar echoes the moving direction and velocity of vessels approaching the difficult river section. At one glance, the Wahrschau service people can recognize the upcoming traffic on the display. Additionally, the new software allows parallel processing of data from all five radar sensors, and, if desired, all information can be made visible simultaneously on each display. This option bears the advantage that radar images coming from adjacent scanners can be correlated with each other. Thereby, false echoes arising from multiple reflexions of a radar beam can be distinguished from real radar echoes.

The exact overlay of radar image and electronic chart, together with information about location of vessels by AIS facilitates the interpretation of radar images tremendously. The user-friendly graphical surface allows fast detection and perfect overview of the traffic situation.



**Figure 4: Example for display in the traffic centre**

The use of AIS (Automatic Identification System) is mandatory for marine navigation for years now, and for inland navigation, too, AIS becomes more and more important. The vessel sends an identification signal by transponder, and, furthermore, simple and fast information exchange is possible with land stations like control centres and lockkeepers. Many inland vessels already carry a transponder sending periodically static data as name and MMSI, and traffic related data as load, destination. The transponder can also send safety related messages.

The information is optimally processed and presented in the control centre at Oberwesel. So far, only radar information was available and all other data like identity or had to be found out using other communication devices. Now, identification of a vessel is done automatically, if it carries an AIS transponder, and the display of dangerous goods for example is symbolised on the screen.

Due to their operating frequency of 2m, the range of AIS signals basically is larger than the range of radar with an operating frequency of 3 cm. Additionally, three so called AIS repeater stations (Oberwesel, Betteck und Bankeck) enlarge the area covered up to 30 km. Therefore, vessels approaching and equipped with AIS can be detected and displayed very early in the traffic centre.

By AIS, not only the sending of static, voyage related and safety related messages is possible, but also the management of the electronic Wahrschau lights along the river section is thinkable. If desired, Wahrschau service people can control and set the signal directly on the graphical user interface of the new system in the control centre. At the same time, the signal is sent to the vessels by AIS, and the signal would be visible on the screen of an according navigation system

in the wheelhouse of the vessel receiving these signals, before the vessel passes the Wahrschau light signal.

Therefore, the new VTS system implemented by in-innovative navigation GmbH in the control centre of Oberwesel represents the state-of-the-art technology for vessel traffic control and guarantees security and efficiency of traffic management along this difficult river section for the future.