



## Danube WATER Integrated Management



### ACTIVITY 3: PURCHASING THE NECESSARY EQUIPMENT

#### *Final Report*







**Danube WATER**  
Integrated Management

## Final Report

<b>Danube WATER Project, MIS ETC 161</b>	
<b>Activity 3: Purchasing the necessary equipment</b>	
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### ACTIVITY 3. PURCHASING THE NECESSARY EQUIPMENT

This activity had as main objectives the purchases of the necessary equipment. According to the Procurement Plan / Detailed partners' budget.

During this activity the project management team organized tenders for necessary equipment for each partner.

Danube WATER project financed a large number of different acquisitions, as:

- ❖ **1 Ship-laboratory “Sarmisegetuza” completely equipped** with sampling and water quality analysis, used for complex monitoring on the Danube and for the first intervention for cleaning oil pollution (figure 1).



Figure 1. Laboratory ship “Sarmisegetuza”

❖ **Equipment for monitoring and laboratory analyses**

a) **Hydrological equipment** (80 automate stations for rivers and groundwater, maintenance machines, ADCP platform for discharge measurements, 1 AUV - EcoMapper, an topo-batrimetry registration equipment- Doppler systems, portable turbidimeter) (figures 2 - 6);

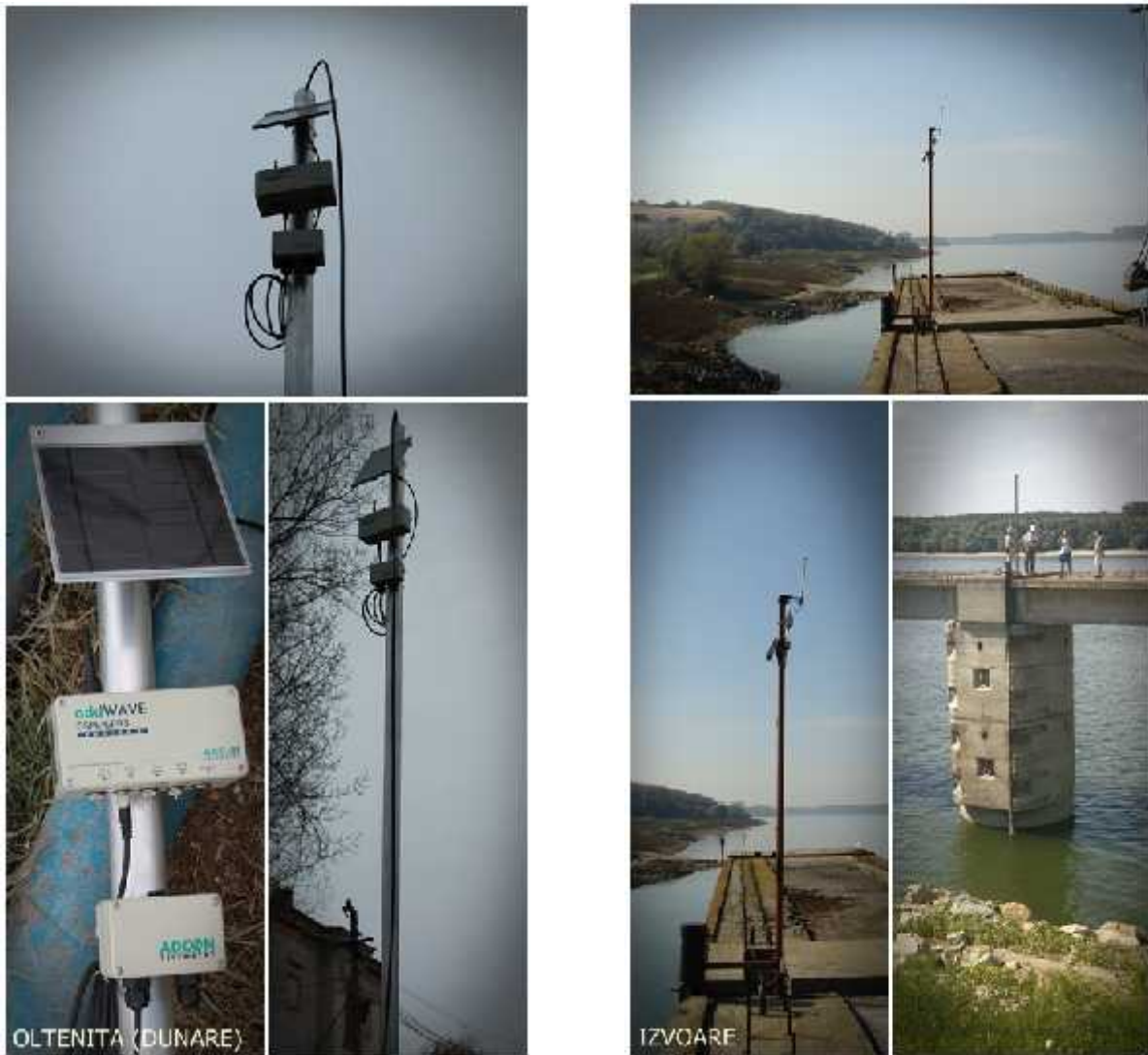


Figure 2. Automate stations for rivers



Figure 3. Automatic stations for groundwater wells



*Figure 4. ADCP River Surveyor M9*



*Figure 5. Portable turbidimeter and telemeter*



Figure 6. Topo-batrimetry registration equipment (AUV - EcoMapper)

b) equipment for laboratory analyses for water (Sample concentrator in nitrogen flow, HPLC, Software for evaluate the test results of laboratory inter-calibration, chemicals) and air quality analysis as PP5 NEPA station extension equipment and reagents acquisition (PM 10 sampler, including installation and start-up kit) (figure 7).



Atomic Absorption Spectrometer for supervision of the main pollutants in water



Atomic absorption spectrometer for monitoring heavy metals



Gas chromatograph for determination of total hydrocarbons and other volatile organic compounds



Water quality laboratory equipment

*Figure 7. Equipment for laboratory analyses*



- ❖ **Topographical and geodetic equipment** for field track and data collection (differential GPS systems, digital level equipment) (figure 8).



Figure 8. GPS systems



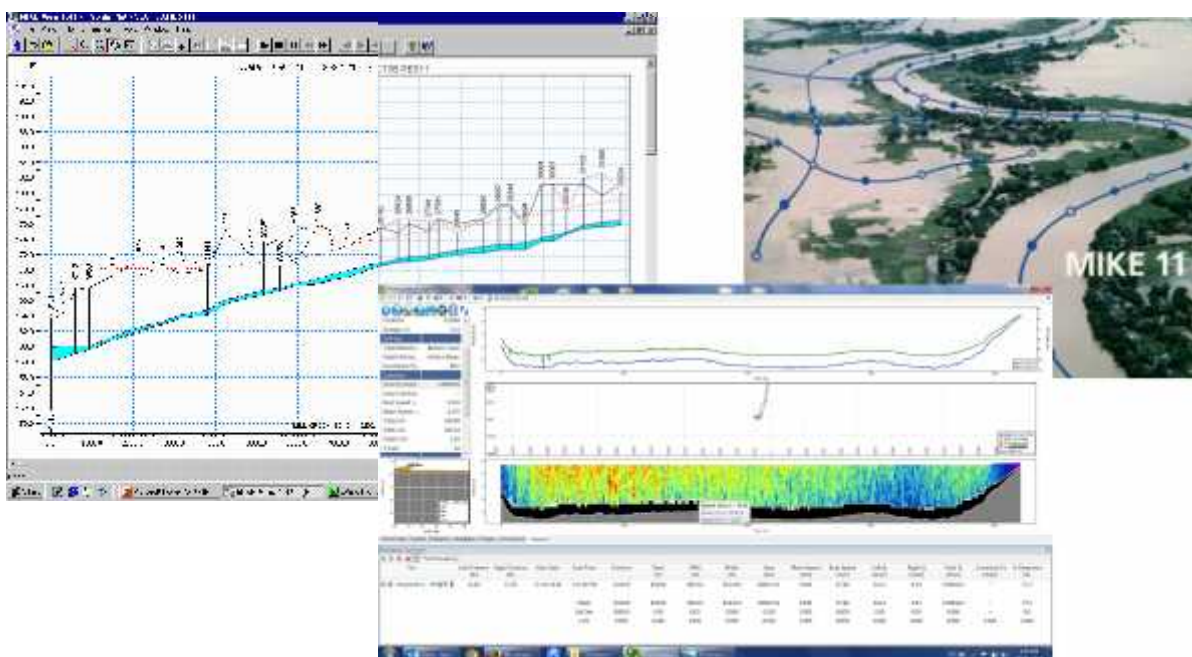
Figure 6. Digital level equipment

❖ **Flood protection equipment**

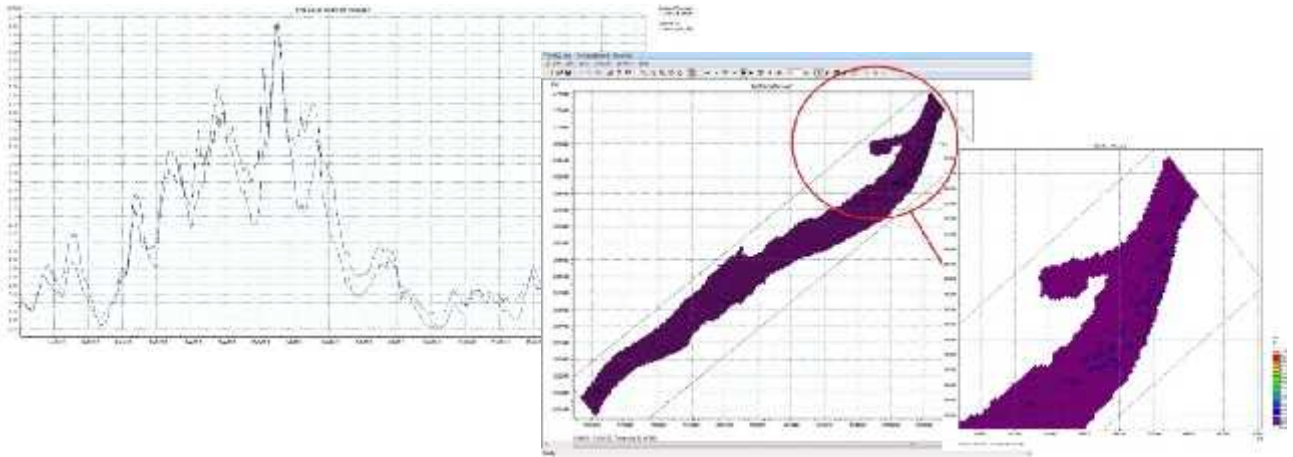


Figure 9. Mobile flood barriers

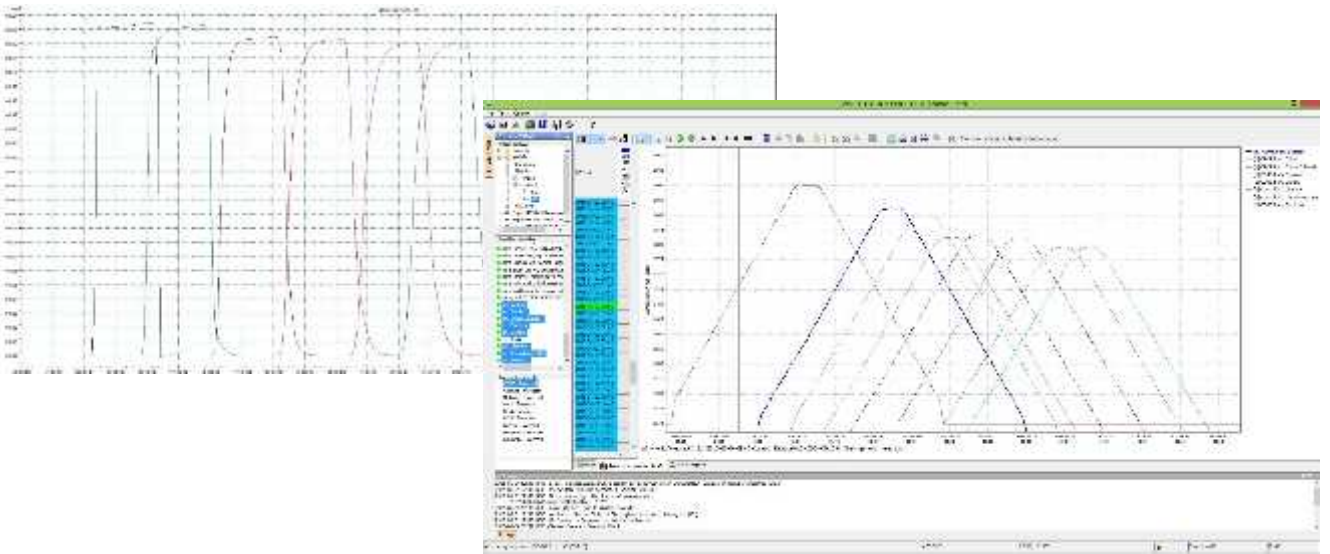
❖ **modelling software for and forecasting floods and accidental pollution (MIKE 11: AD (Advection Dispersion) Module for hydrodynamic modelling; ECO LAB Module for water quality and ecological modeling; ST (Sediment transport) Module and MIKE 21 - Spill Analyses Module, oil pollution modeling.**



Hydraulic transport modelling



Sediment transport modelling



Water quality modelling

Figure 10. Surface water quality modelling software

- ❖ **modeling software for groundwater** - for mathematical models of groundwater flow and the transport model was used software package GMS (Groundwater Modeling System) which uses the finite difference method.

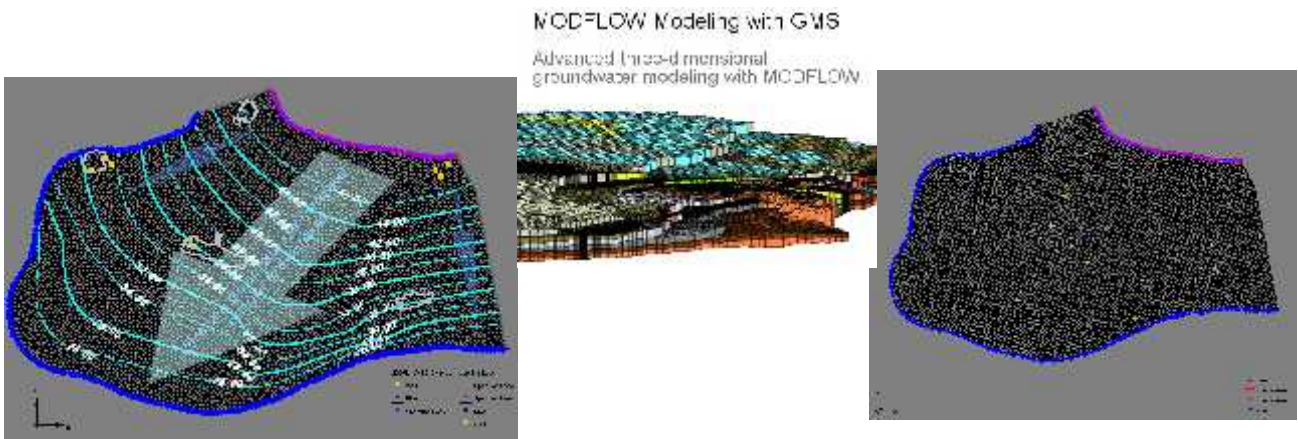


Figure 11. Groundwater modeling software

- ❖ **Equipment for emergency situation intervention** (mobile dykes, off-road automobile, rivercraft and boat towing trailer, excavators, engine bouts, oil pollution cleaning equipment and absorbent materials, equipment for communication as mobile phones, fax machines etc.).

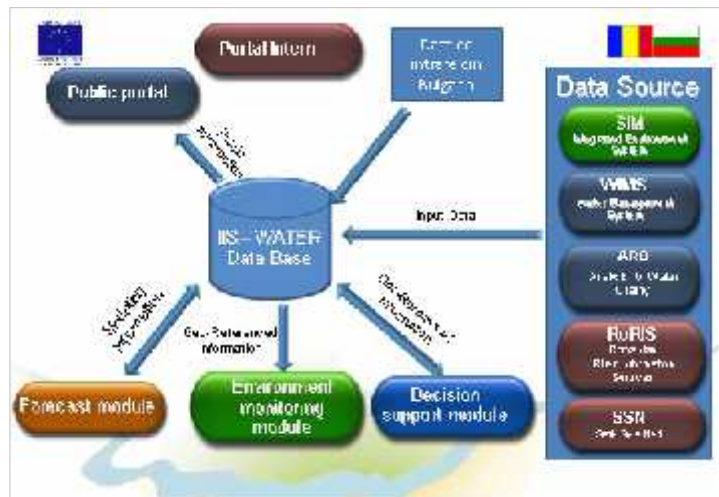


Figure 12. Equipment for intervention

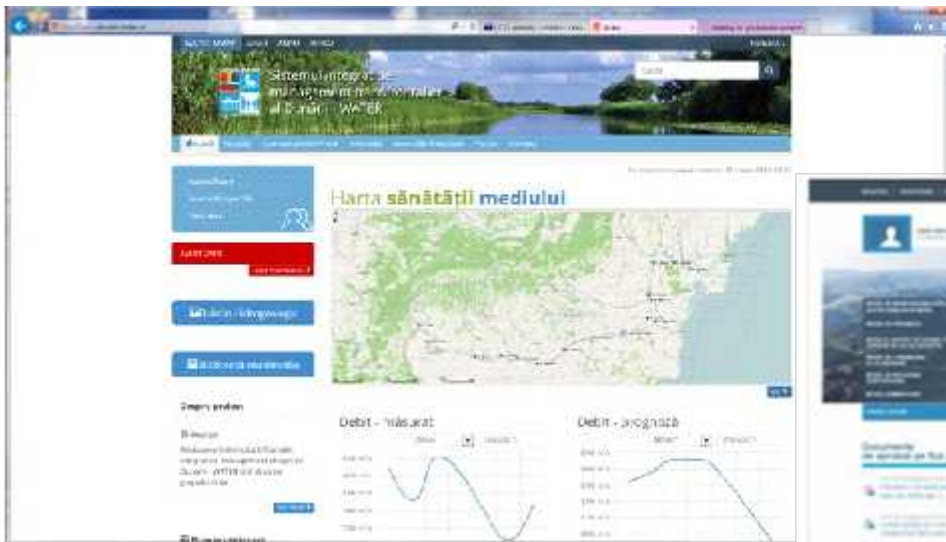
- ❖ **Integrated Informational System for WATER - Geo-portal** [www.danube-water.ro](http://www.danube-water.ro)



Server



SII WATER



External portal

Internal portal



Dashboard

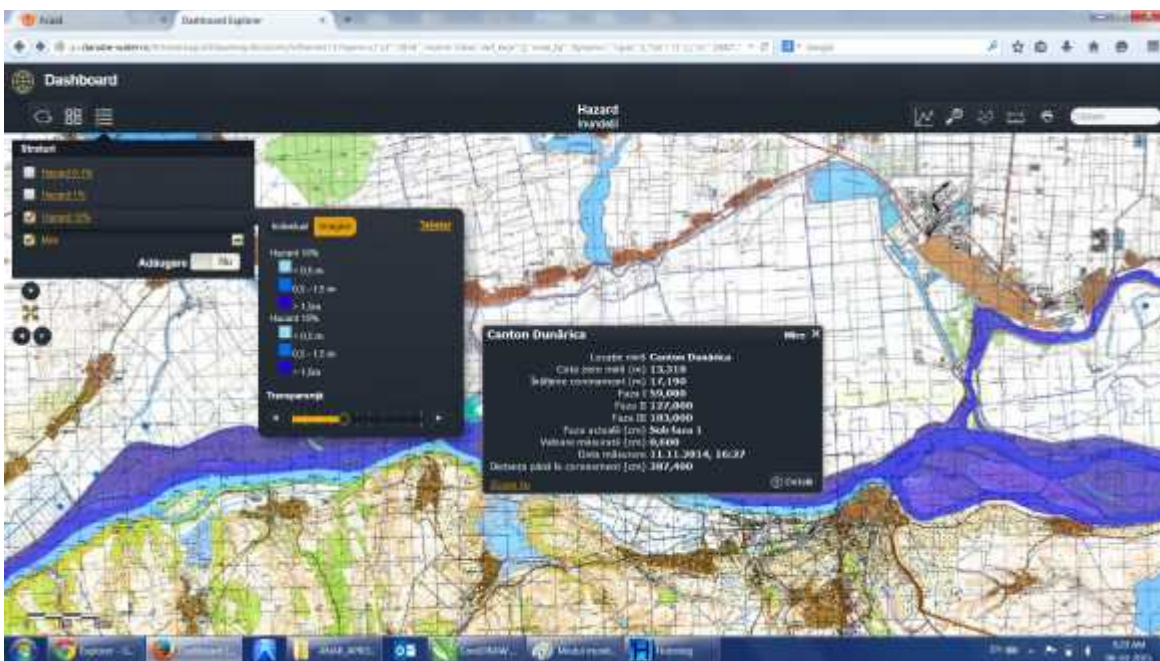


Figure 13. Danube WATER Geo-portal

❖ **Communication infrastructure and software application for emergency decisions** (servers network, dedicated software applications for data communication, data base, modelling platform, portal) to improve awareness on water quality and environment protection and to disseminate warnings for floods, hydrological droughts (low flows), accidental pollutions on air and water, radioactivity that also included:

- GIS software (Arc Editor and specialized extensions, Hydro GeoAnalyst);
- Software for data base (SQL server and Oracle) (figure 14), all including:



Figure 14. GIS software and linked equipment

- Software integration services, getting a greater functionality of the geodatabase and helping for an integrated monitoring system (figure 15):

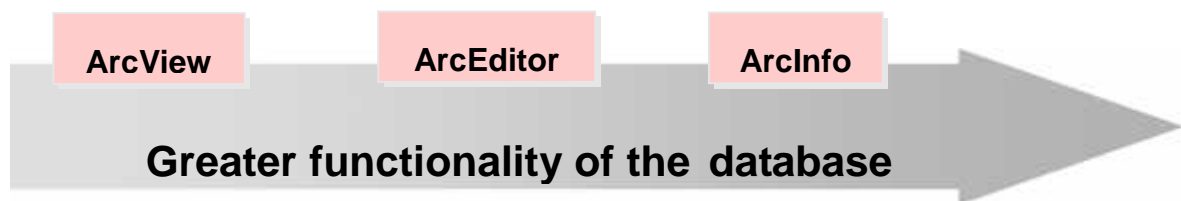


Figure 15. GIS geodatabase best functionality

- ❖ **Other goods** (computers and laptops, goods for laboratory analyses, for field campaigns, for IT equipments maintenance, for office endowments, etc.) according to the detailed partner's budget.

**Danube WATER Integrated Management** is classified as a strategic project for both the implementation of the Danube strategy and the Romania-Bulgaria cross border cooperation and development programme. The aim of the project is the modernization and development of integrated qualitative and quantitative measurements on Romania and Bulgaria's common sector of the Danube.



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"Romanian Waters"



National Institute of Hydrology and Water Management, Romania



Technical University of Civil Engineering Bucharest, Romania



National Environmental Protection Agency, Romania



National Research and Development Institute for Chemistry and Petrochemistry, Romania



Institute for Nuclear Research Pitesti, Romania



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Ministry of Environment Agency, Bulgaria



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