



www.river-view.de



WATER QUALITY RELATED MONITORING AND MANAGEMENT

Extreme events, disasters and dynamic changes in water bodies due to urbanization, intensive agriculture, uptake of a wide range of contaminants and climatic changes: watercourses are subject to a variety of threats. To manage these challenges, high-resolution data, both on a spatial and temporal scale, will be indispensable in the future.

Based on the systematic collection of synoptic visual, hydromorphological, hydrochemical and hydrophysical characteristics of watercourses, RiverView® provides a holistic approach for water quality related monitoring and management. As a part of the joint project, an unmanned surface vehicle (USV) was developed for this purpose which is capable of navigating small and medium-sized rivers both autonomously and via remote control. Thanks to its built-in Global Navigation Satellite System (GNSS), the boat can repeatedly travel identical routes, thus allowing for comparative measurements over time. With the modular design of the measurement technology the boat can be equipped according to the requirements.

PROJECT PARTNERS



CONTACT

Research Institute for Water and Waste Management (FiW) e.V.
 Dr.-Ing. Friedrich-Wilhelm Bolle
 Dr.-Ing. Gesa Kutschera
 Fon +49 (0)241 - 80 2 79 72 / kutschera@fiw.rwth-aachen.de
 www.fiw.rwth-aachen.de

CLIENT

Federal Ministry of Education and Research (BMBF),
 Projektträger Jülich –
 Forschungszentrum Jülich

SPONSORED BY THE



SPONSORED BY THE



RiverView® – Collection of water data with high temporal and spatial resolution

© FiW Aachen 2018

THE RESEARCH PROJECT

RiverBoat

User-friendly remote-controlled and autonomously operating boat which monitors the characteristics of small and medium-sized watercourses: images and data are recorded simultaneously both below and above water. With the built-in autopilot, measurement runs along previously recorded routes can readily be repeated.

RiverDetect

Adaptation of available sensors for water quality monitoring: the automated and continuous collection of a multitude of water quality parameters is ensured by a set of permanently installed sensors which can be complemented by additional modular sensors according to the specific requirements. Water depth profiles can be determined by lowering the multi parameter pro-

be into the water using a trailer. Interfaces are designed in such a way that additional sensors can be added on a modular basis, if required. Real-time data transmission enables the user to immediately view the recorded data at the control panel.

RiverScan

Objective recording of the water environment including the surrounding vegetation and water engineering structures based on a mobile surface mapping system for (semi)automatic image analysis and measurement: with its panoramic camera unit, RiverBoat provides comprehensive spatial recordings with high temporal resolution. In combination with the sonar sensors, geometric structures below and above water are mapped along the course of the river. The data management feature RiverAdmin stores information on the time of the measurements, the navigation route and other water parameters for all recordings.

RiverAdmin

The developed geo-database management system is intended for the management, validation, processing, provision and coordination of the generated image, sensor and navigation data. The tool facilitates the central management of the heterogeneous data and offers simultaneous access for professional and other interested users, in compliance with the open data concept.

RiverWorks

Target-group specific knowledge transfer: the web portal and the RiverApp complement the geo-database management system and allow access to the data for various users, e.g. from the water industry and the interested public.

THE APPLICATION

Our services cover a diverse range of water management related topics:

Water topography

- Digital Terrain Models of the watercourse (DTM-W)
- Cross-sectional and longitudinal profiles
- Substrate of the river bed

The autonomously operating measuring catamaran is equipped with a single beam sonar. In shallow waters, underwater cameras are used for optical measurements. The watercourse structure and its depth profile can thus be determined with high spatial resolution. The double-antenna RTK (real-time kinematics) operated GNSS system is coupled with an inertial measurement unit (IMU) and accurately records the position of each data point. The underwater cameras allow for an assessment of the subsoil composition.

Water quality monitoring

- Water temperature
- Oxygen content
- Oxygen saturation
- Turbidity
- Electrical conductivity
- pH value
- Redox potential
- Suspended solids

High-resolution depth-profiles of physical-chemical data can be recorded by lowering a mobile multi-parameter probe from the RiverBoat.



Surface scan with 360° camera

- Vegetation
- Riverbank structures
- Buildings

The 360° camera unit produces panoramic footage from anywhere on the watercourse, allowing for the objective recording of the environment. Dense 3D-point clouds are generated from these images for surveying and other purposes.

Hydraulics

- Flow velocity
- Discharge

A modular ADCP device flexibly performs velocity and discharge measurements along the entire water body.

For further information and questions please do not hesitate to contact us.

