

# Innovative Measurement Technologies for Hydrometry in Open Channels and Rivers

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Lack 23.05.2018

***BMsonic***

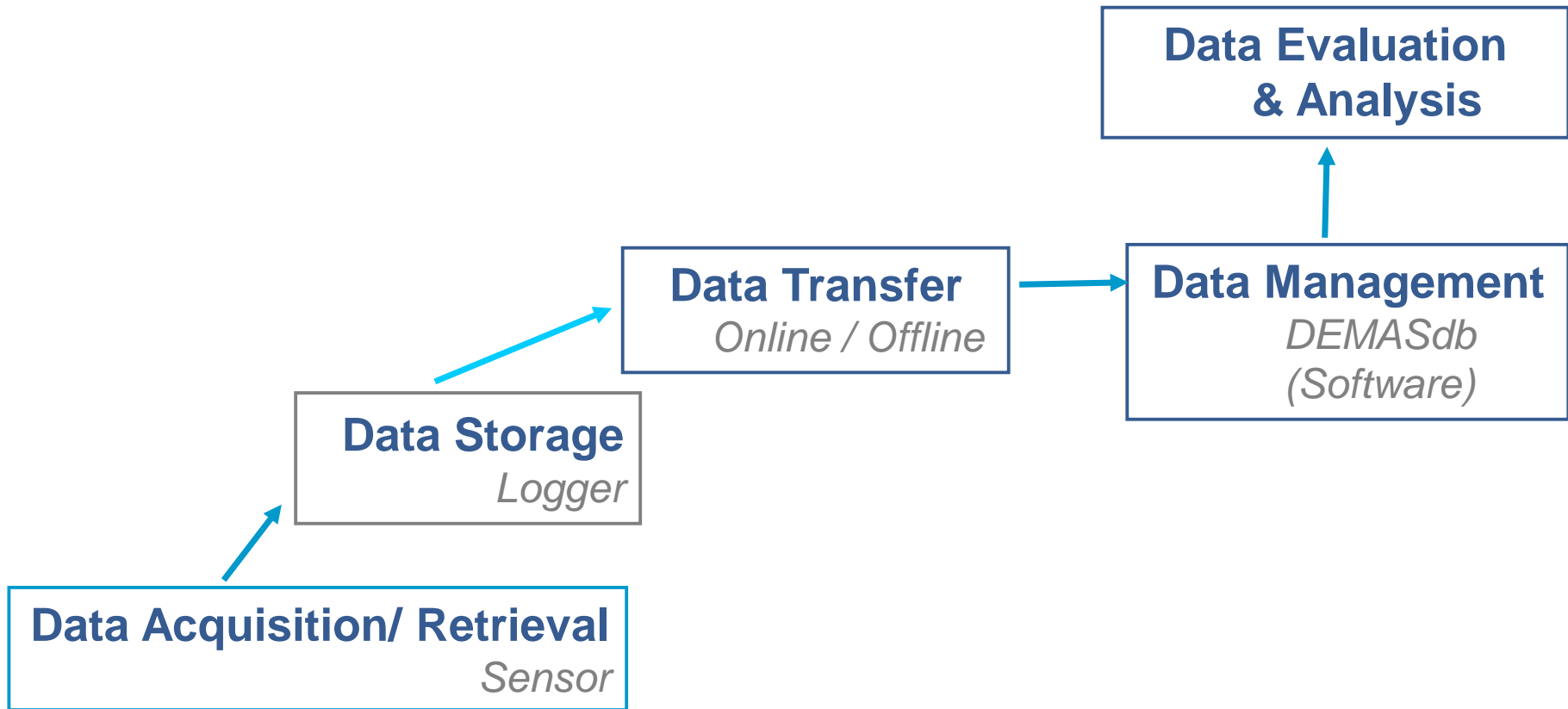


- Founded in **1967**
  - SEBA Hydrometrie is one of the worlds leading manufacturers of environmental monitoring equipment.
  - Employees: 95
  - Agents in more than 140 countries
  - **ISO 9001:2008** certified production
  - **> 300 000** Installations of instruments worldwide
- 30 years of experience
  - Measurement services
  - Open channel flowmeters
  - Ground water monitoring
  - Meteorological equipment



# Way of Data

Main components following the data flow from sensor to master station



Groundwater



Surface water



Discharge



Water quality



Meteorology



Sewage water

# Water Level Sensors/Instruments

- Staff gauge (vertical, horizontal/angle staff gauge)
- float-operated – SHAFT ENCODER
- touchless - RADAR
- bubbler principle – PNEUMATIC GAUGE
- pressure sensors – DS
- NEW: optical water level sensor



# Mobile Flow measurement

- FlowSens
- HydroProfiler<sup>®</sup>-M-Pro
- Current Meter F1 / M1
- ADCP moving boat (*RiverRay, StreamPro, Workhorse Rio Grande*)

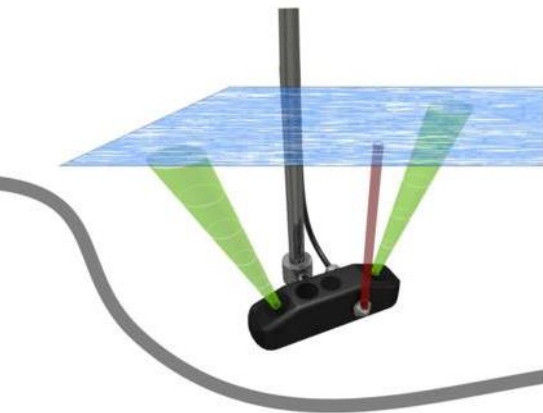


# HydroProfiler<sup>®</sup>-M-Pro

- Direct measurement of **2-D** velocity profile
- in up to 128 individual cells
- mobile ADCP sensor for use on rod
- Integrated water level sensor
- Discharge calculation according to EN ISO 78
- ASCII and XML data export to Software Q 3.0
- Graphical menu on robust tablet PC type HDA-Pro



Tablet-PC Type  
HDA-Pro



mobile on rod  
Type **M-Pro**

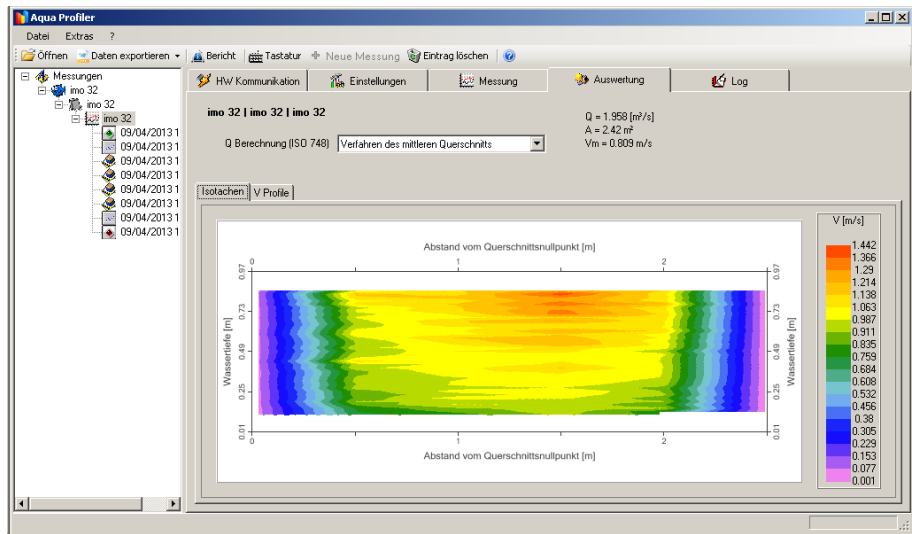
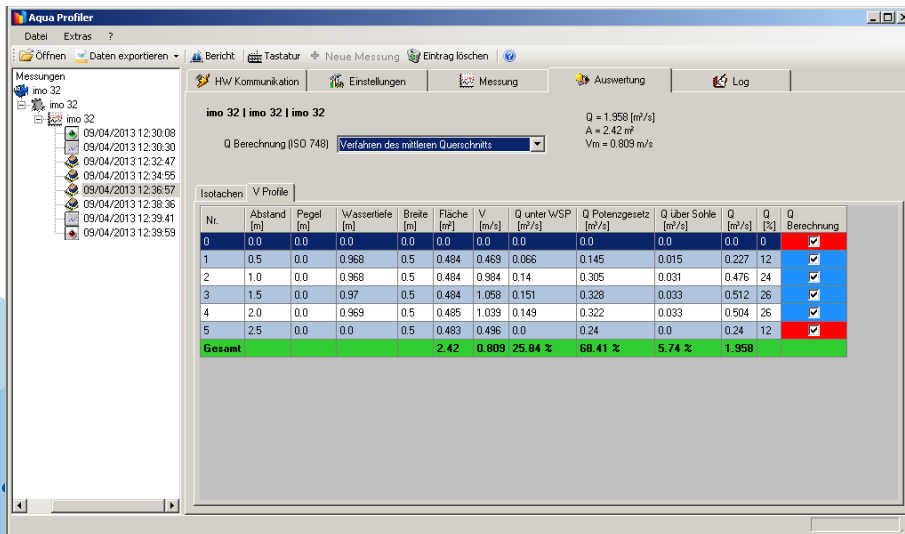
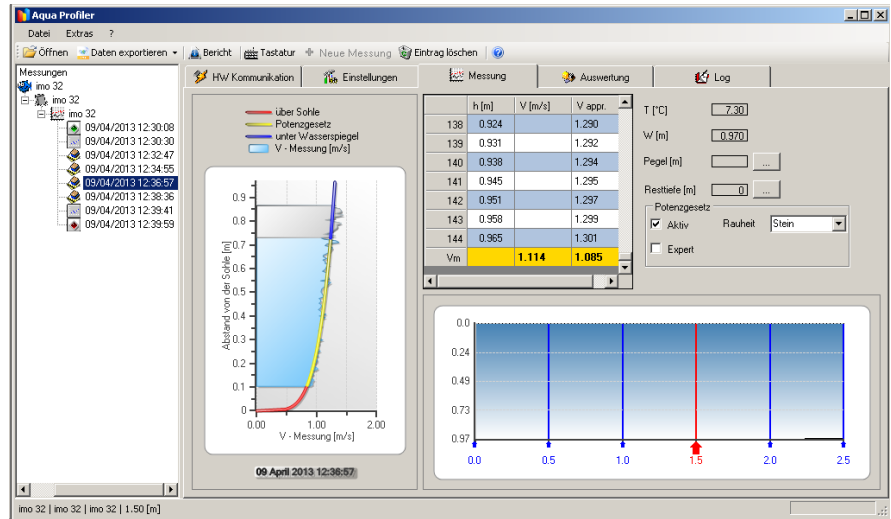
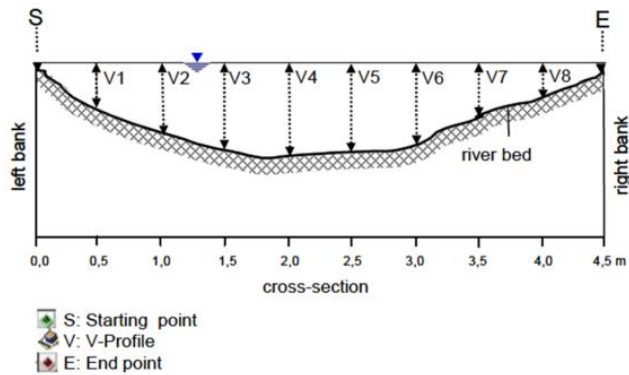




# Hydro-Profiler-M / M-Pro:

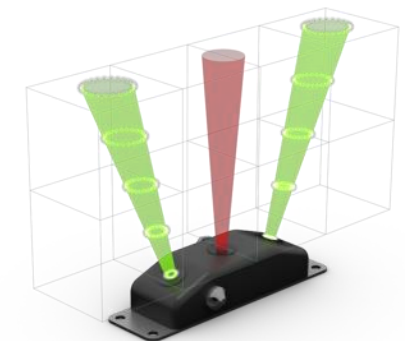
Measures velocity and water depth in one single measurement!

Discharge is automatically calculated!



# Stationary Flow Measurement

- small channels – **LogCom-Q**
- medium sized channels - **AquaProfiler**®
- large channels – **Kanalis TT**
- **Cable Way Installation**
- **NEW: Optical system – DischargeKeeper**

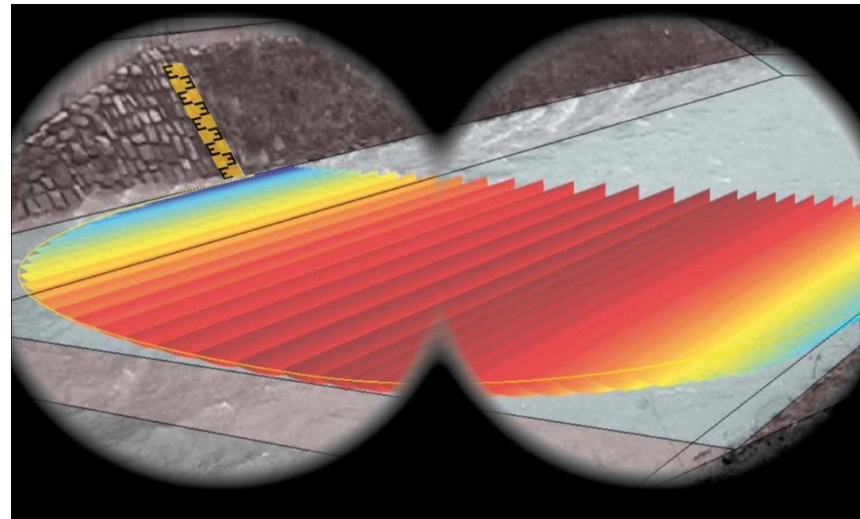




# DischargeKeeper

## The newest SEBA-innovation

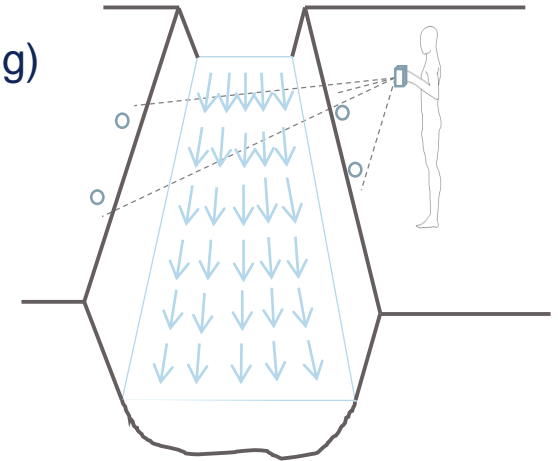
*flow velocity profiling, water level and discharge acquisition*



# Measuring overview

- **Input parameters (defined):**
  - Profile data (that could be done after the measuring)
  - Four reference points
- **Measured parameters (optically captured):**
  - 1- Water level  $h$
  - 2- Surface velocity
- **Modeled parameters:**

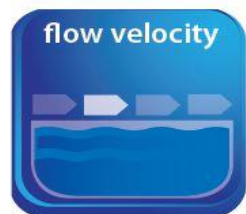
Vertical velocity profiles
- **Calculated parameters:**
  - 1- mean velocity
  - 2- Discharge



- **Results:**
  - ✓ Water level  $h$
  - ✓ Mean surface velocity  $v_m$
  - ✓ Discharge  $Q$



+



+



=



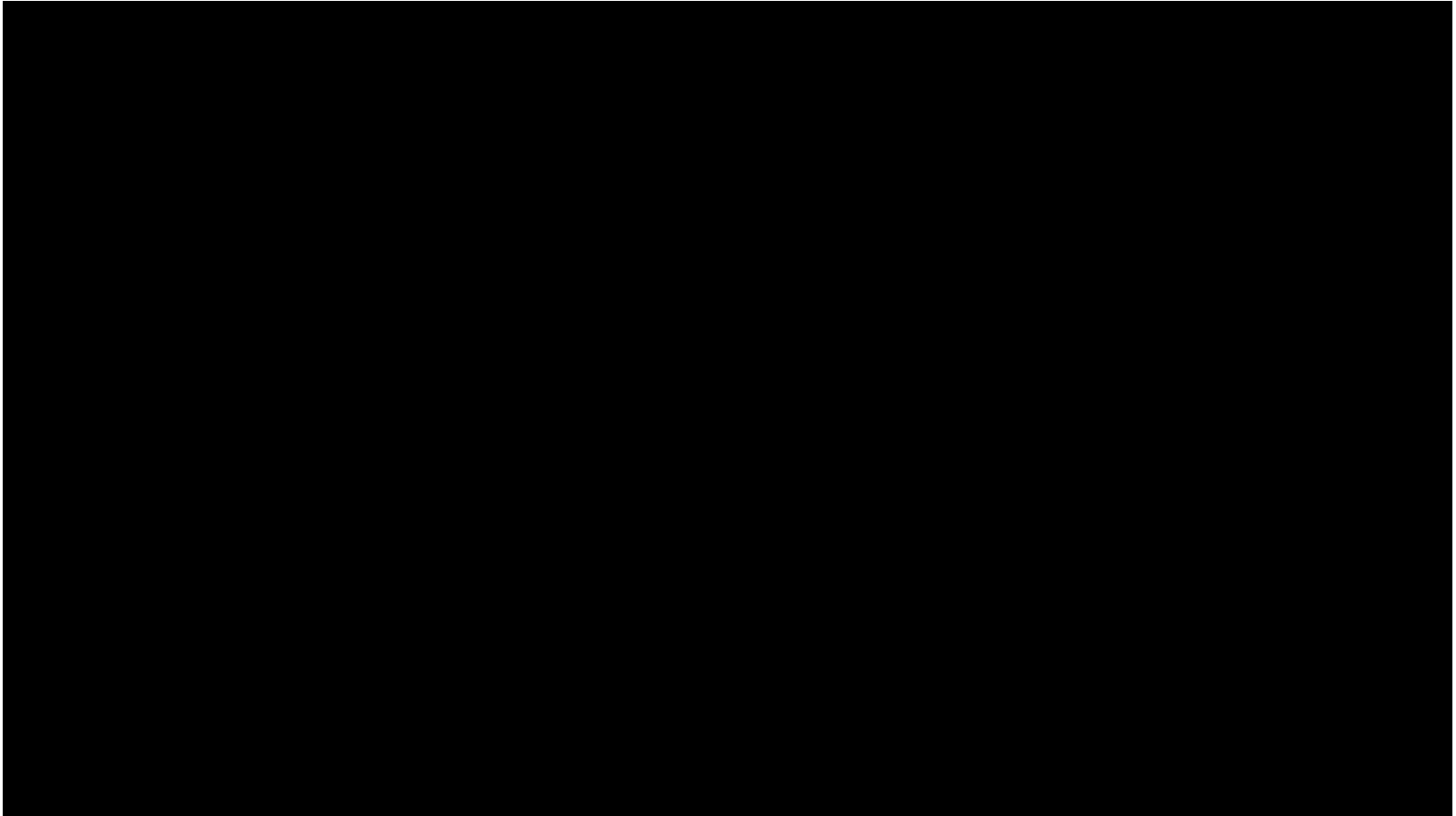
optically captured

optically captured

defined

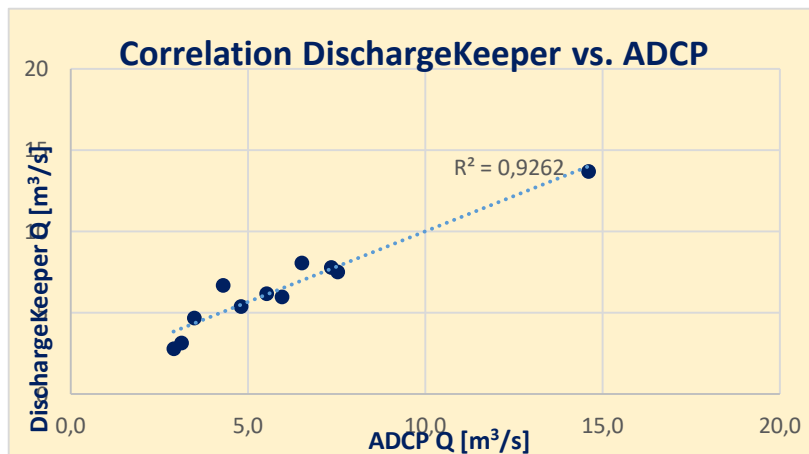
calculated

# Application in the Hydrology Sector



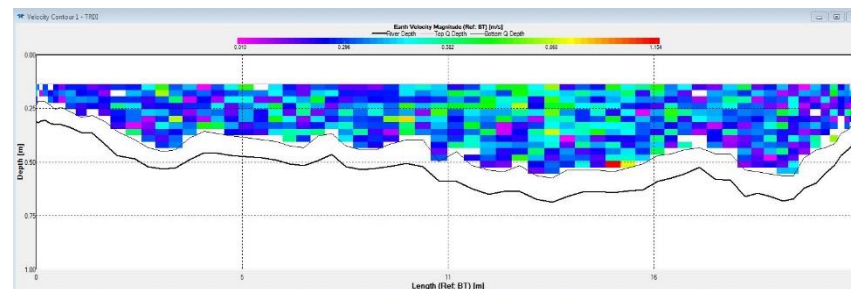
# Validation

## ADCP-Reference measurements

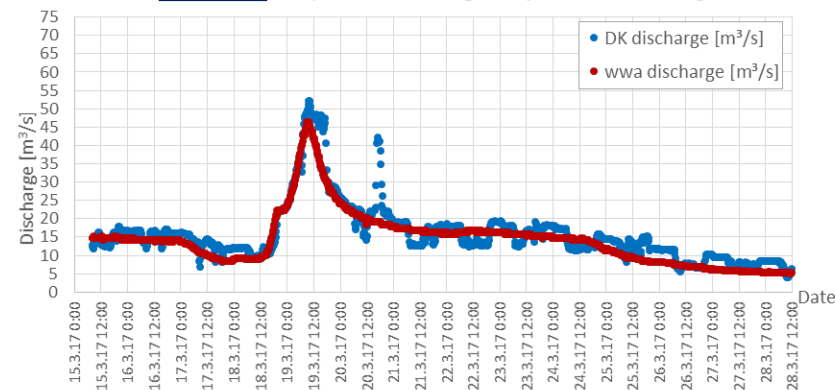


### Percentage from the comparative measurements

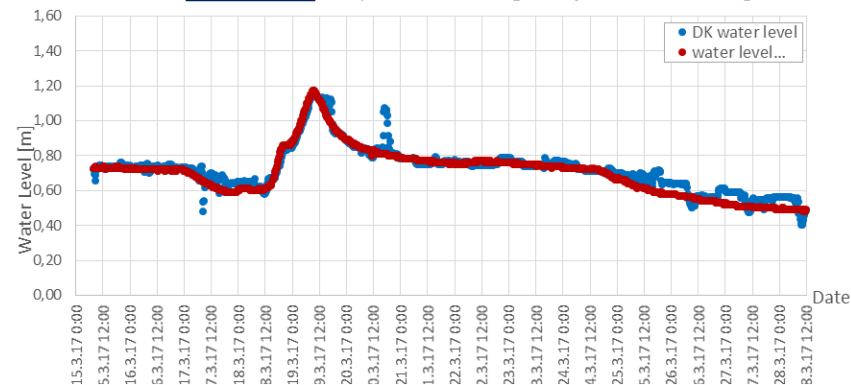
40	<5%
60	<10%
80	<15%



### Discharge: Comparison DischargeKeeper vs Reference gkd

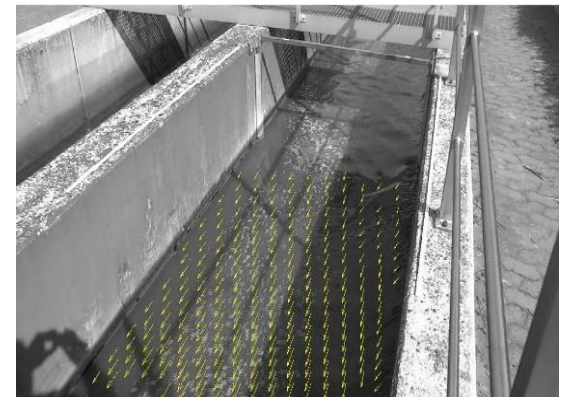
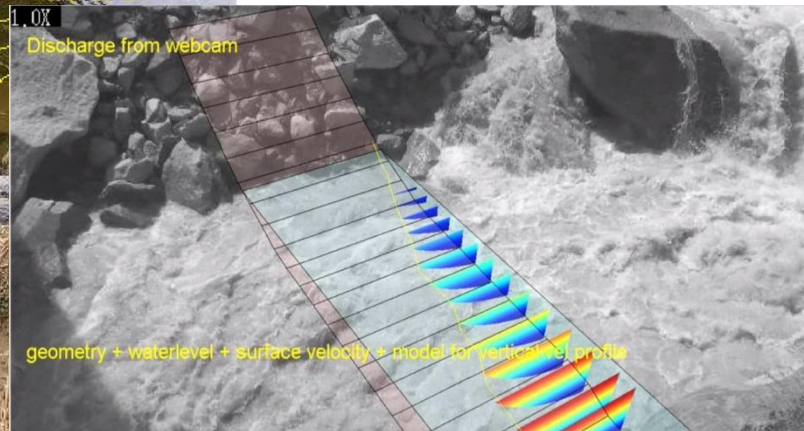
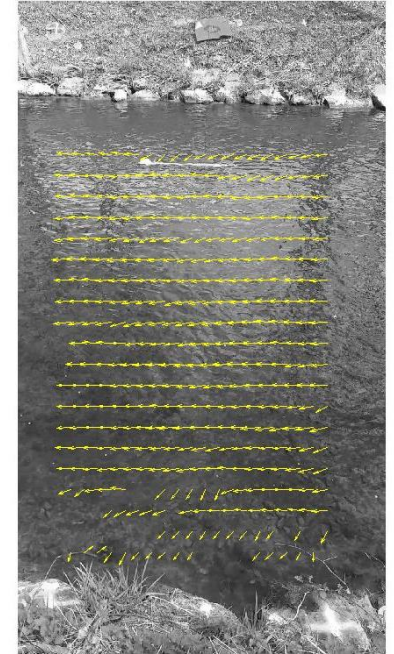
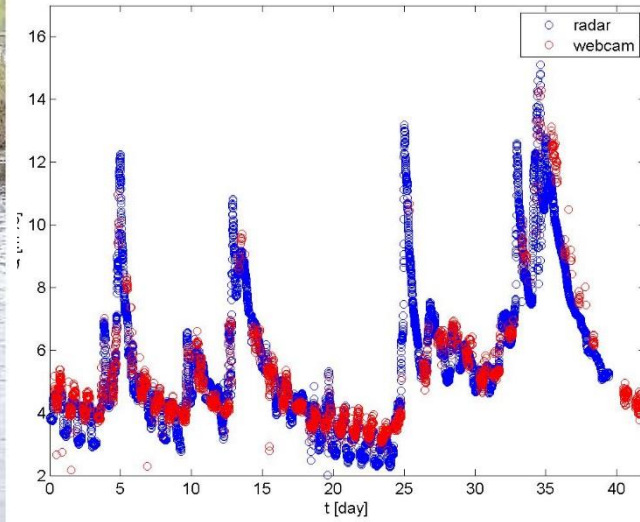
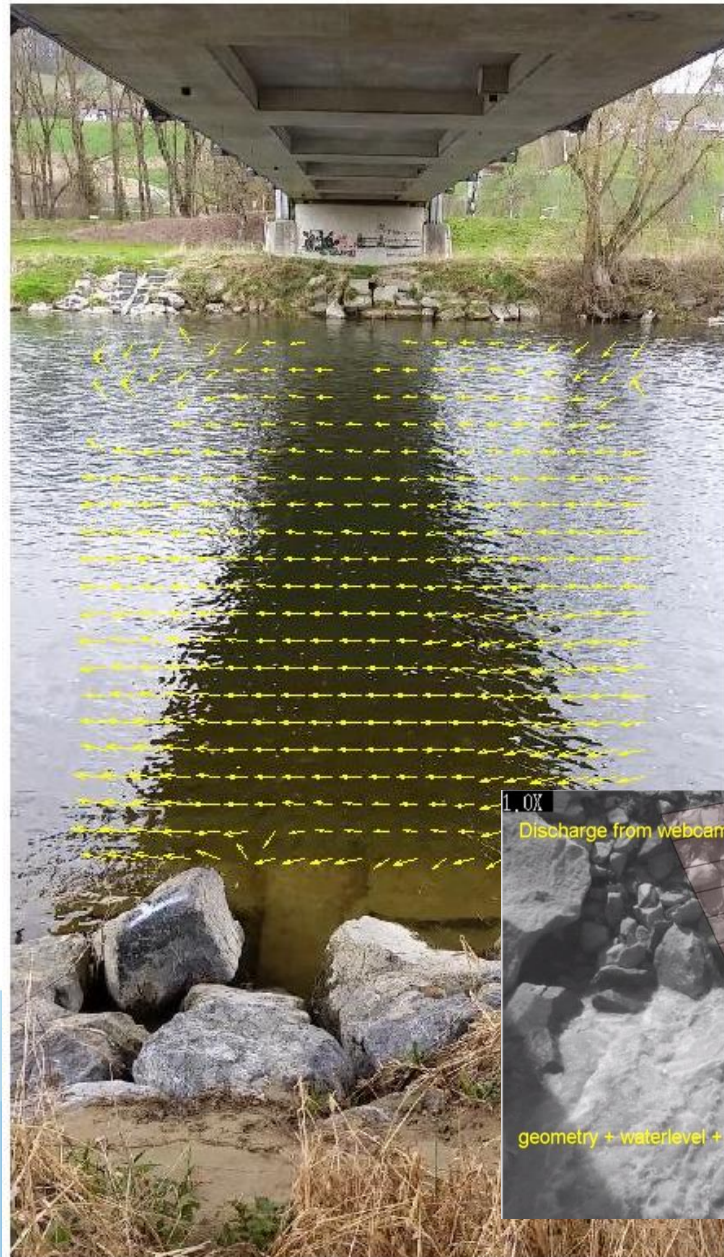


### Water Level: Comparison DischargeKeeper vs Reference gkd





# Application Areas



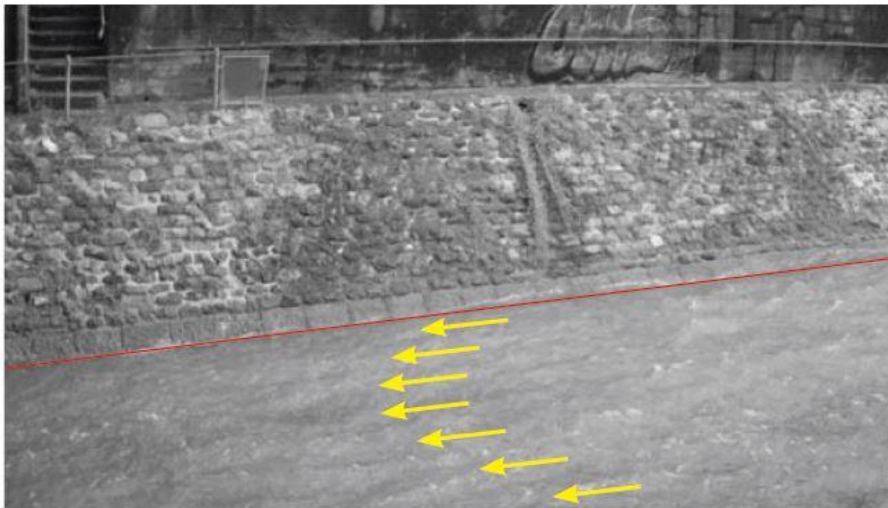


# SEBA DischargeKeeper-Hardware

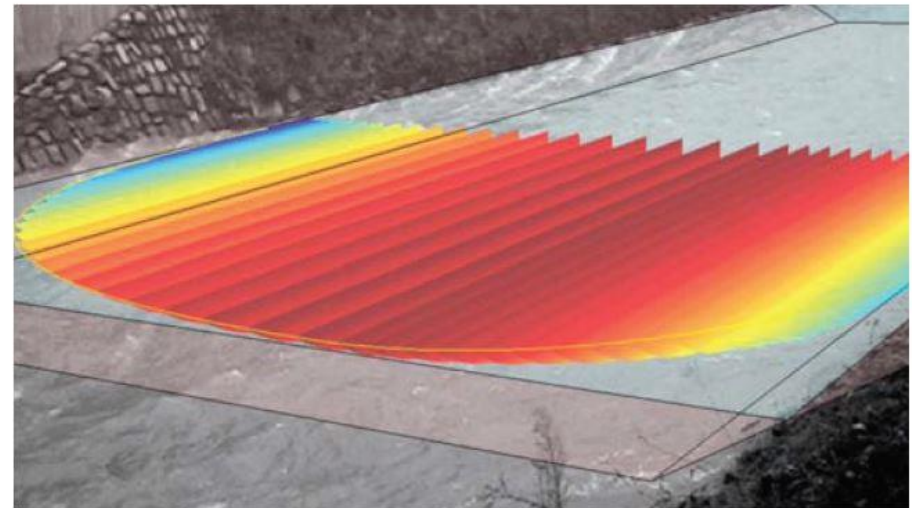


# Special features and benefits

- ✓ **Simple and cost-efficient installation**
- ✓ **Flexible positioning of the measuring equipment**
- ✓ **No flow tracers required**
- ✓ **Representative and non-intrusive measurement**
- ✓ **On-site evaluation**
- ✓ **A smart alarm management system**
- ✓ **Autonomy, Robust, weather insensitive, precise**
- ✓ **Remote transmission of measurement data, videos and images (evidence photos)**



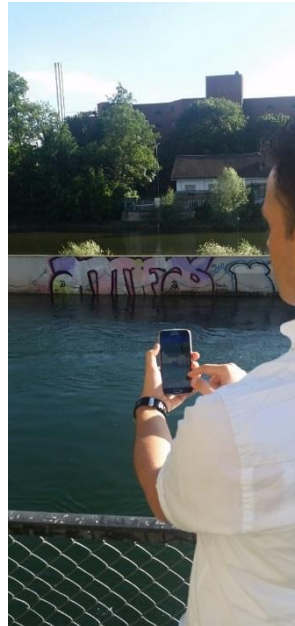
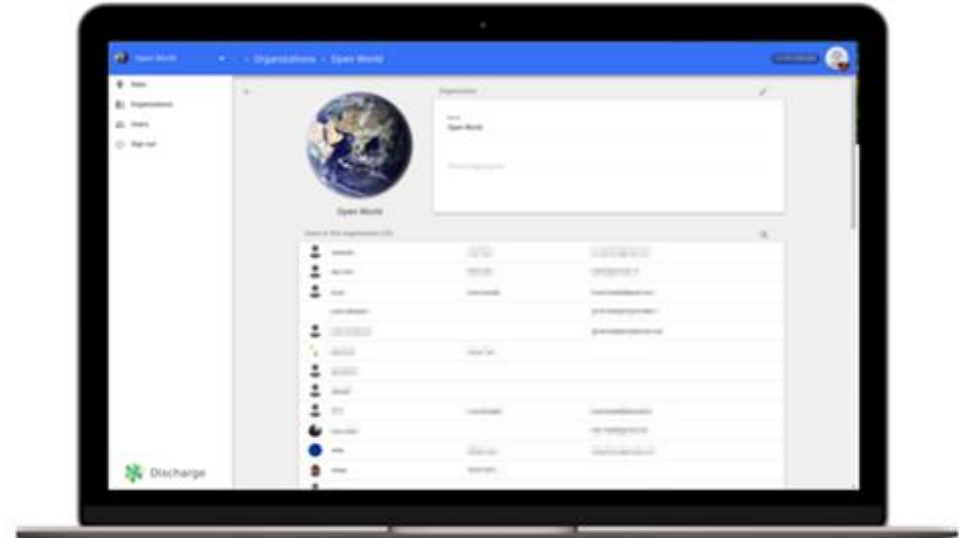
Water level detection



Velocity profile



# Outlook – The DischargeKeeper App



# Thank you for your attention!

Time for questions and discussion



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