



OTT Hydromet Dam Monitoring Expertise

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WHO WE ARE





Hydrology Solutions



Sensor

A sensor is an instrument placed in the field that takes critical measurements of certain parameters, such as **water level**, **precipitation**, and **water flow**.



Datalogger

A datalogger is a device which you can connect to your sensors, or cameras, to record the data that is taken in the field.
With an established connection to a server, they can transmit data from the field back to you in your office or smart device.



Software

A software solution provides access to the data, so it can be viewed just-in-time. Software is typically a data visualization tool that receives, ingests, and processes the transmitted data. Interfaces can feed data into external solutions, websites, and information systems.



Alarming

You can program certain thresholds into your field stations for each parameter you measure. You can choose to trigger certain actions if the threshold is reached, such as an alarm to go off or an SMS text to be sent to the phones of stakeholders.



Open channels, including:

- Rivers
- Streams
- Canals
- Man-made channels



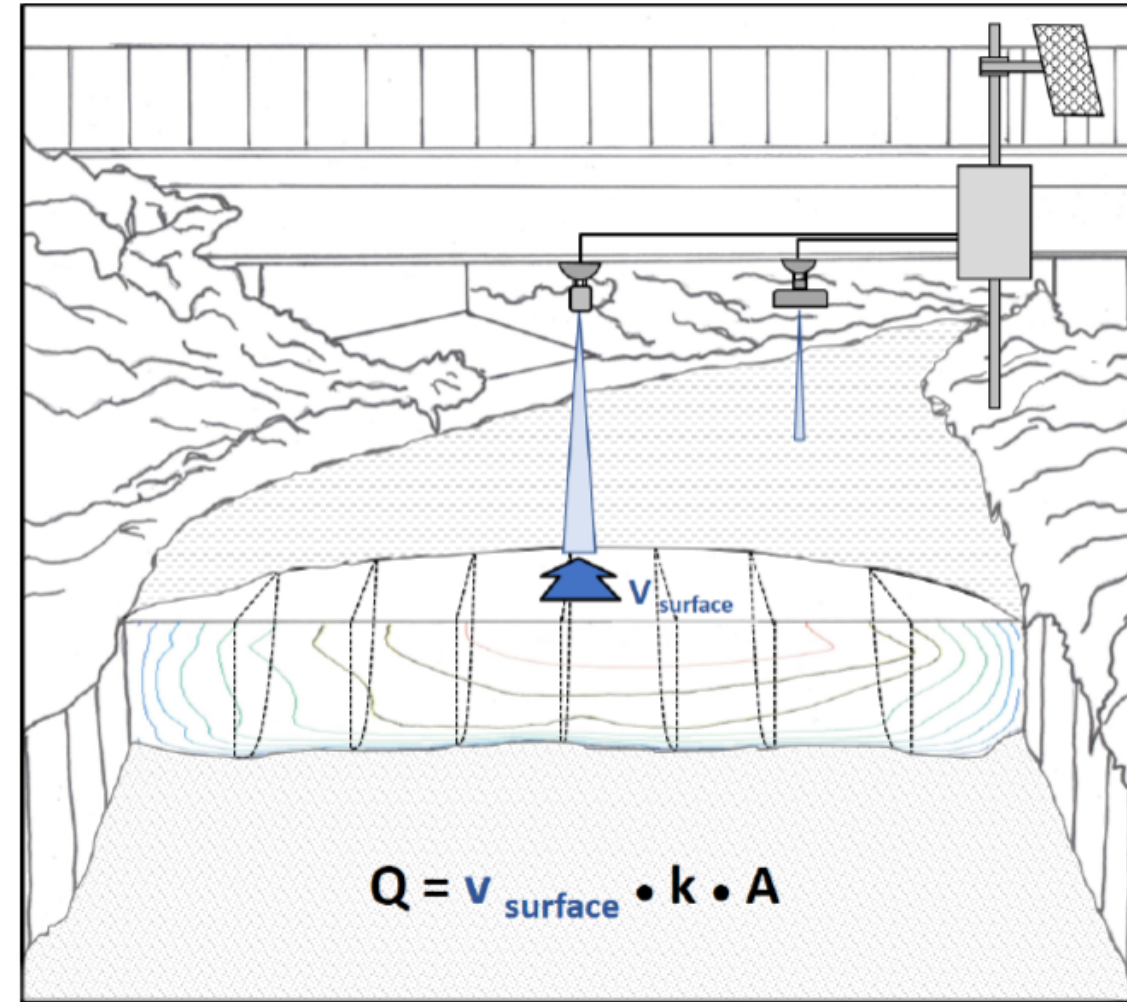


Discharge Computation

Discharge for any open watercourse can be computed based on the equation:

$$Q = v_m \cdot A$$

- Q = discharge
 A = area of the cross-section normal to the flow direction
 v_m = mean velocity for the cross-section
- Water surface velocities are differing from the mean channel velocity \rightarrow calibration factor k is necessary to compute v_m ($v_m = v_{\text{surface}} \cdot k$)
- This factor will be computed by OTT Prodis 2, an easy to use software tool for calculating k - values based on either theoretical models or applying the velocity – index – method.



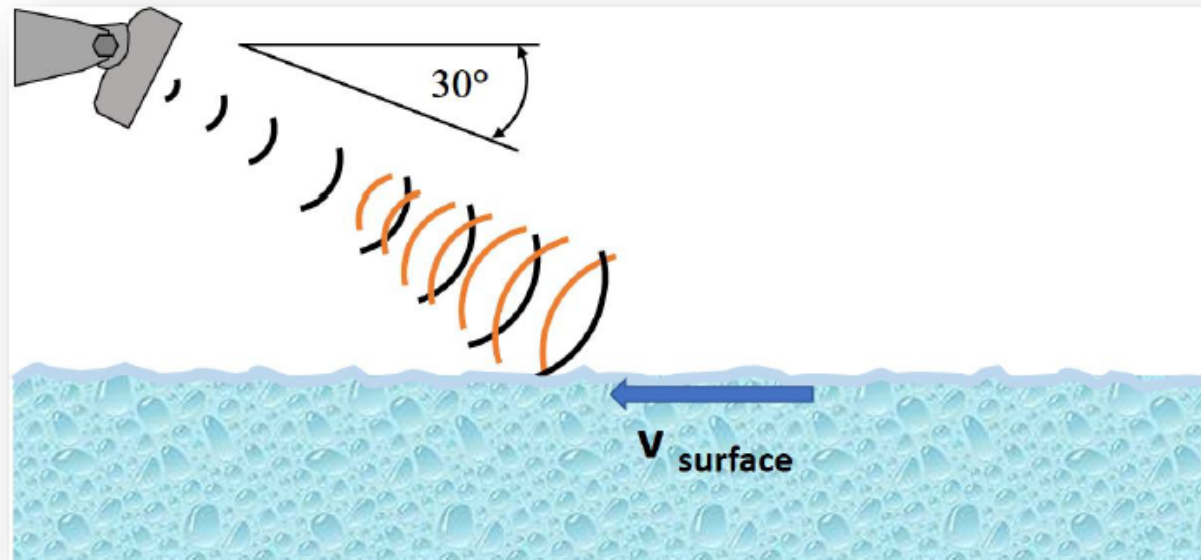
Discharge Computation



Non-Contact Measurement

Non-contact measurement principle

- To measure water surface velocities the radar sensor uses the Doppler effect
- Oriented parallel to the main flow direction and tilted at a nominal 30-degree incidence angle α against the water surface it is transmitting and receiving electromagnetic waves
- From this the water surface velocity can be derived



OTT SVR 100 measures the Doppler shift to derive velocity



Non-contact measurement principle

Non-contact surface water velocity measurement

- Ideal for measuring velocity at sites where reliable velocity data is required
 - Continuously
 - During floods
 - During periods of high concentrations of suspended sediments
- Sensor is mounted above the water surface, away from floating debris
- Mounted with a flexible bracket for vertical or horizontal installation



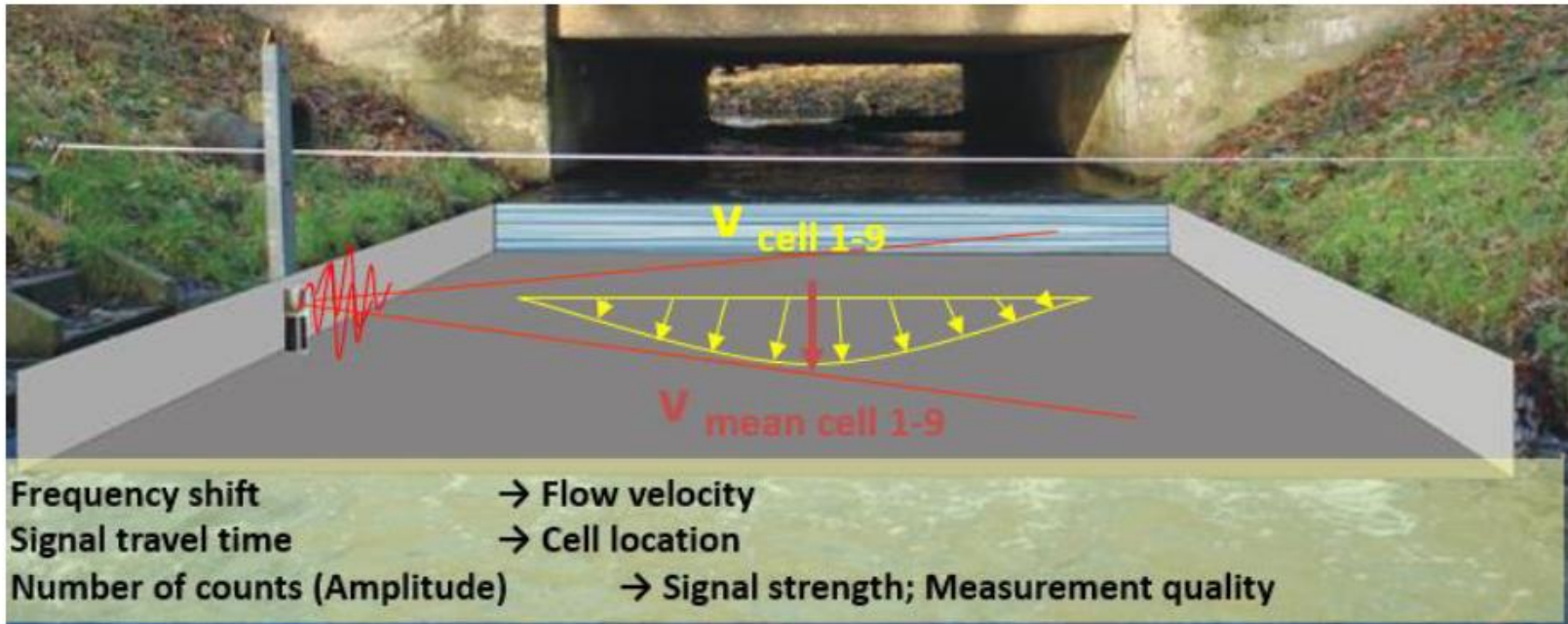
River with flooded flood plain



Side looking doppler (SLD)

Side looking doppler technology measurement principle

- Velocity measurement in X – and Y – direction
- X – component used for discharge computation
- Blanking and Cell size adjustable depending on the frequency
- Data transmission to data logger for discharge computation





System approach

Due to standard SDI-12 and Modbus protocol compatibility the OTT SVR 100 / SLD is designed to interact with a variety of data loggers such as:

- OTT netDL
- Sutron SatLink3
- XLink

Providing a multitude of advantages

- Internal discharge computation and quality control
- USB interface for local communication
- Fully IP compatibility
- Data transmission via satellite
- Remote maintenance opportunities (with OTT netDL)



Complete hydrological gauging stations with telemetry



Total solutions



OTT SVR 100:

- Measure velocity (average speed)
- Meta data

Level Sensor:

- Measure water level

OTT netDL:

- Trigger & log measurements
- Calculate discharge
- Alarming based on measurements and metadata
- Hardware interface between sensor and PC
- Powering the sensors

SDI12 Interface Software:

- SVR 100 Settings
 - Set sensor address
 - Set filters
- Retrieve measured data
 - Continuous and single measurement
 - Shows graph and table



Portable measuring instruments



Portable Velocity Current Meter
with Electromagnetic Sensor and optional
Depth Sensor



Precipitation gauging systems

Weighing Precipitation Gauge



Advantages

- Highly precise
- Almost maintenance free
- Precisely captures heavy rain events

Important to know

- The monitoring network should contain at least one Pluvio to determine the amount of precipitation with the highest possible accuracy

Tipping Bucket Rain Gauge



Advantages

- Small footprint
- Cost effective

Important to know

- Needs to be maintained regularly, as leaves and insects can block the sensor
- Does not precisely capture heavy rain events.



Dataloggers and data transmission



Mobile Data Transmission

- Important to know
 - Independent of existing infrastructure
 - Low cost for installation
 - Need to check if network is available at the measuring site



Satellite Data Transmission

- Important to know
 - Independent of existing infrastructure
 - Independent of existing mobile infrastructure
 - Larger antennas required
 - Higher costs for equipment



SOFTWARE & DATA HOSTING



Cloud Hosting

Advantages

- Do not need own infrastructure
- Access to data anywhere via PC or mobile phone

Important to know

- Independent of existing infrastructure
- Low cost for installation

Local Data Hosting

Advantages

- Have the data in house
- No regular fees
- Additional network management functions possible

Important to know

- Need to setup infrastructure with FTP or HTTP server
- Server needs to be accessible by the datalogger
- Depending on software



Dam safety & water resource planning project

A modern hydrology monitoring network in the Indian Ocean





Dams Safety and Water Resources Planning Project Sri Lanka

Overview

- Ministry of Sri Lanka
- More than 120 Hydromet stations
- Timeframe 2012–2016
- Flood warning, irrigation, hydro power



Product Scope

- Operational decision making in water resources management
- Flood forecasting, flood and drought frequency analysis and mitigation
- Operation of dams and water infrastructure in extreme hydrological events
- Seasonal water allocation planning



The OTT HydroMet Solution

- End-to-end solution: from sensor to decision support
- Main turnkey supplier
- Project management
- Site survey & site design
- Civil works, commissioning
- Partner responsible for local services and IT equipment





Insights for Experts