



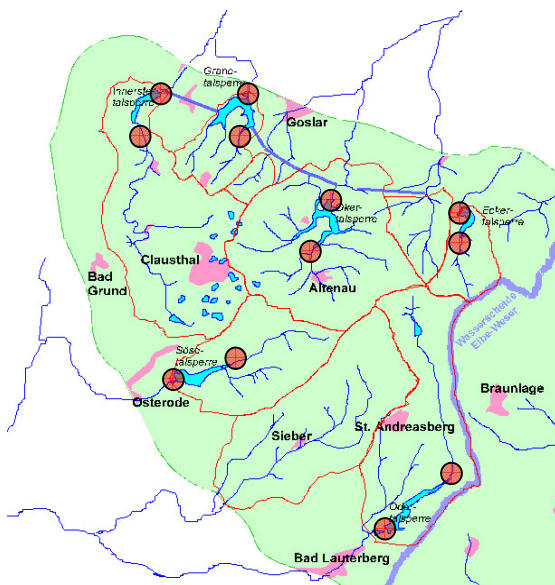
## Redundant Measuring Stations in the Dam-Information System TALIS® of the Waterworks in the Harz Mountains

### Water Storage Level Measurement With Bubble Sensor OTT CBS (Measuring Range 30 m) and Data Transmission via GPRS to FTP-Server

#### Background

The Harz Waterworks GmbH has been operating a wide hydro-meteorological measuring network for many years, to control the 6 big dams in the West Harz. About 50 automatic measuring stations collect approx. 300 values (water levels, precipitation, temperatures...). In the past two years, the system was upgraded by a redundant measuring system with the following features:

- Additional sensors
- Shorter measuring- and storage intervals
- Second path for data transmission
- Shorter transmission intervals



Redundant stations at dams in the West Harz Mountains



Eckert Dam

#### Task

The most important measuring stations (inflow-, outflow- and water storage levels) at the dams were to be equipped with redundant, state-of-the-art technology systems.

Due to the great variations of water storage levels in the dams caused by seasonal influences, a large measuring range of up to 30 m and the highest possible accuracy ( $\pm 5$  mm) were important criteria.

The following specifications had to be fulfilled:

- Measuring range up to 30 m
- Minimum accuracy  $\pm 5$  mm
- 5 minutes measuring- and storage interval
- Data transmission every 5 minutes via GPRS / GSM

- Data collection with existing software **OTT Hydras3 Rx** and subsequent processing with software **OTT Hydras3**
- Visualization of data in the Dam-Information System **TALIS** of the Harz Waterworks GmbH

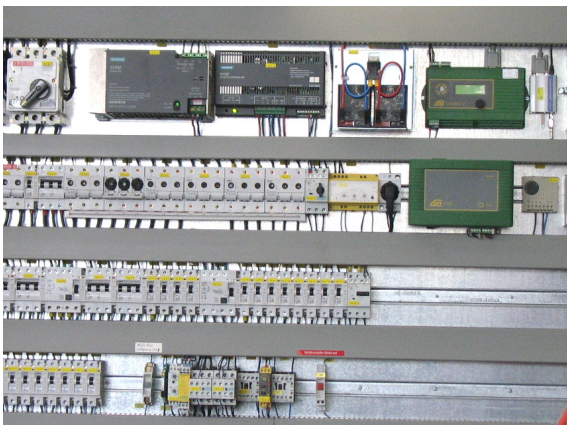
## Solution

For the water level measurement at in- and outflows the compact bubble sensor **OTT CBS 15 m** was installed, in combination with the dataloggers **OTT LogoSens2** and **OTT DuoSens**. Direct GPRS-data transmission to an FTP-Server runs via GSM-radio modems.

Water storage levels are measured with the same technology but with the bubble sensor **OTT CBS** with 30 m measuring range.



Innerste Dam control way – Water storage level measurement  
**OTT CBS 30 m**, **OTT DuoSens**, GPRS data transmission

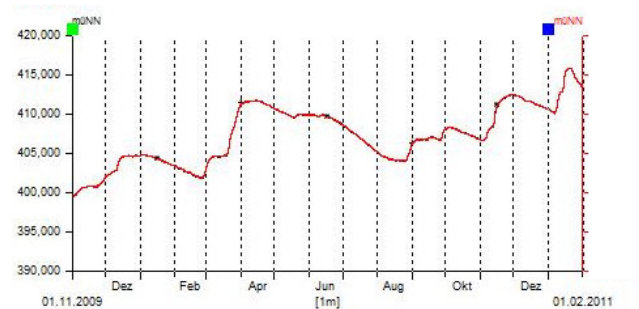


Okertal Dam Gauging House – existing station with integrated water storage level measurement  
**OTT CBS 30 m**, **OTT LogoSens2**, GPRS data transmission

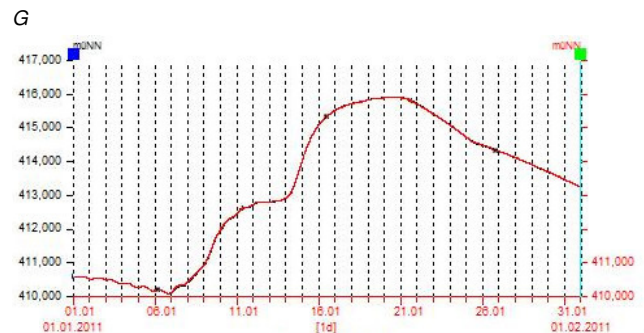
## Advantages

- Simple measuring principle
- Cost-efficient solution
- High accuracy ( $\pm 5$  mm)
- Large measuring range (up to 30 m)
- Flexible and reliable data transmission, active data forwarding (GPRS – FTP)
- Quick data availability

### Comparison of curves with existing data of water level storage:



Water storage level annual curve Okertal Dam



Water storage level monthly curve Okertal Dam

## Summary

**OTT CBS** technology stands the continuous operation - test up to water depth of 30 m at best. Compared to the existing systems the accuracy of the measured data is throughout of high quality. GPRS-data transmission via **OTT LogoSens2** / **OTT DuoSens** has now been running reliably for two years.



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