

*Autonomous Remote Sensing of Water Level and Waves*  
*The LOG\_aLevel<sup>®</sup> - System*

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Technology Company since 1996*



# GENERAL ACOUSTICS GmbH



**General Acoustics GmbH is a leading edge technology producer of special echo-sounders, water level and wave sensors as well as flow measuring systems.**

The company, was founded in 1996 by physicists and engineers and is located in Kiel, Germany. The company has established a global network of distributors for its products in more than 60 countries.

**DSL<sup>®</sup> ultrasonic sensor technology**

enables analytical sub-bottom profiling  
detection and imaging of geological formation as well as of “substances”  
and “objects” in sub-marine ground formations up to a depth of more  
than 80 m below sea-bed.

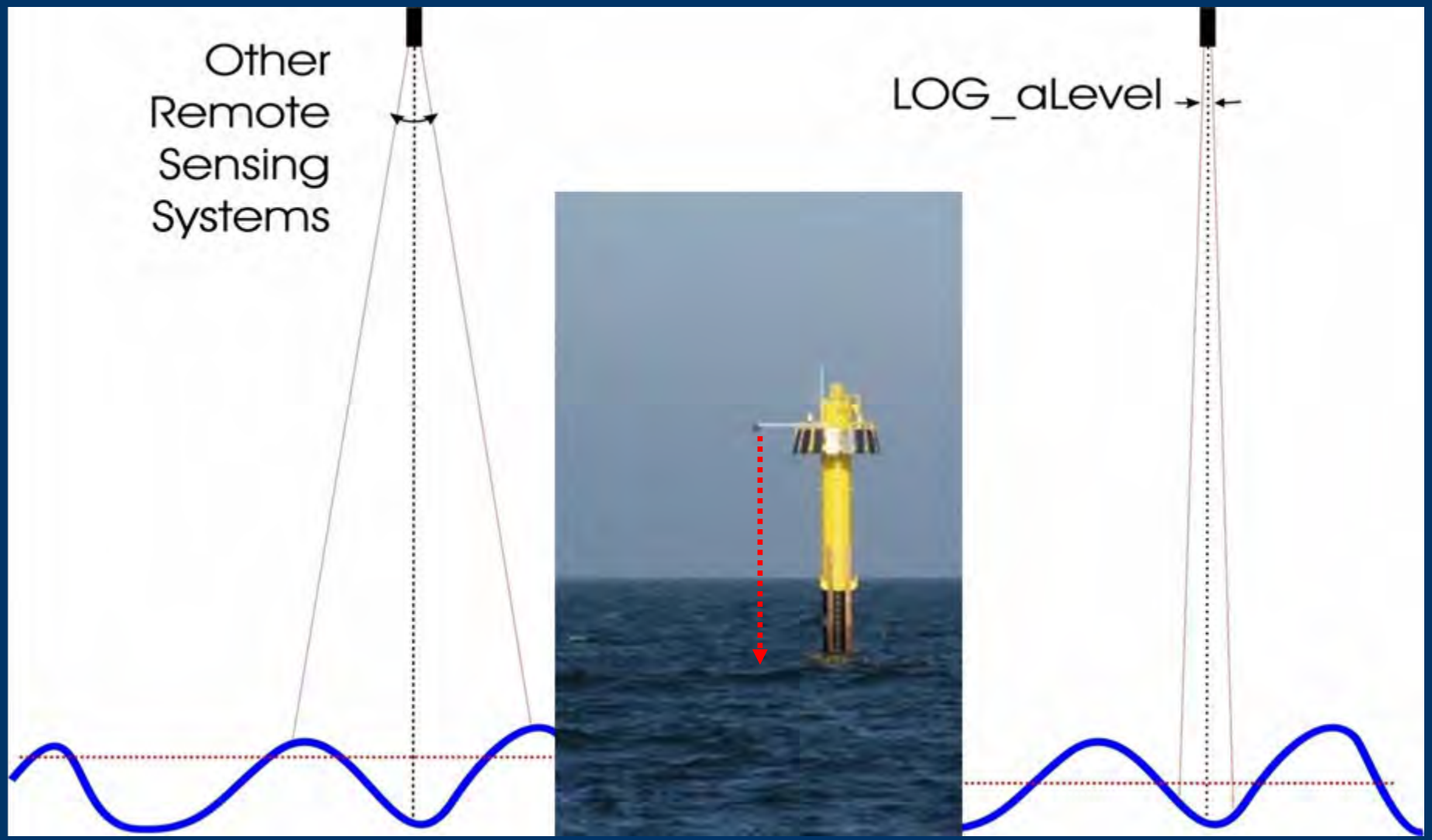
**fluiddynamic interpolation technology for identification of flows in fluids**

An application of this technology is the GA software product  
LOG\_aFlow<sup>®</sup> to generate high quality flow charts for harbors, coastal  
zones and inland waters.

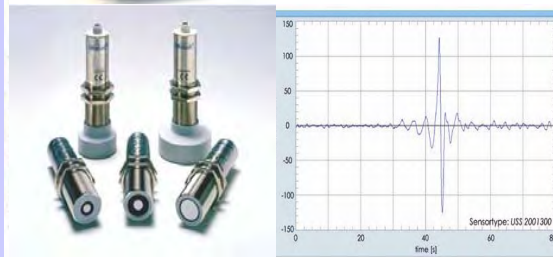
**unique ultrasonic level gauge and wave measurement systems**

capable to measure dynamic water surfaces with high resolution  
applications for Ship Model Basins, Simulation Facilities – Hydraulic  
Laboratories, Water Resources Management, Harbor-, River- and Coastal  
Management, Coastal Defence, Hydrography, Oil-and Gas Industry.

# General Acoustics ultrasonic wave measurement systems / common systems



# Lab Measurement Engineering



High resolution measurements of water levels, dynamic water surfaces and waves for R&D in:

- Ship Model Basins / Navy Model Basins
- Hydraulic Laboratories
- Simulation Facilities of Physical Models

Applications:

- Optimisation of Ship Models
- Measurements in Flood- and Water Surface Models
- Optimisation of Hydraulic Constructions
- Determination of Wave Parameters
- Analysis of Wave Fields
- Measurement of Object Contours

**GA-product line UltraLab<sup>®</sup> ULS stands for high resolution measurements of water levels, dynamic water surfaces and waves on the basis of air ultrasound USPs :**

- Distance measurement also at steep, small and fast waves with high resolution and accuracy
- Measuring of wave contours up to breaking waves
- Measurements up to 15 m/s relative target speed
- Array operation with minimum grid size for 2D/3D measurements
- Free of calibration

**Solution:**

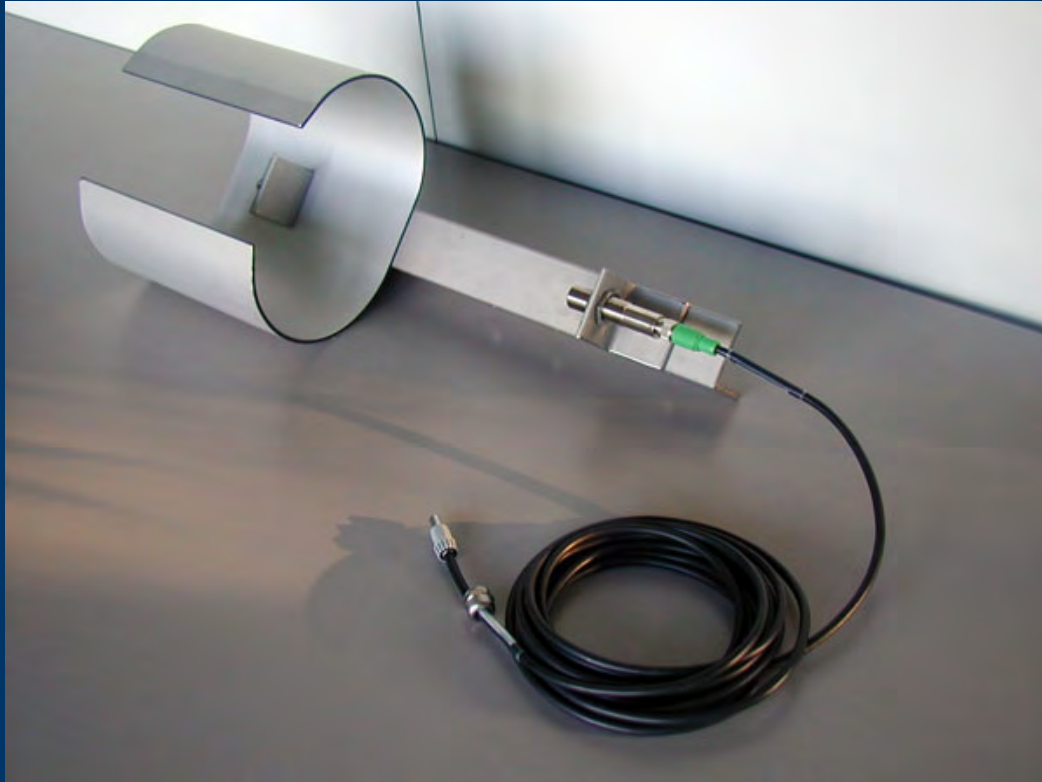
- Narrow beam, high sensitive sensors
- High repetition rate up to 100 Hz
- Measuring range from 3-250mm up to 800-6000mm
- Resolution up to 180  $\mu\text{m}$
- Synchronisation of sensors

**Key reference clients:**

MARIN (NL), French Navy (FRA), HSVA (GER), SVA (GER), SVA (AUT), Universities of Delft (NL), RWTH Aachen (GER), Illinois (USA), Seoul (ROK), Trondheim (N)

# LOG\_aLevel<sup>®</sup> Reference-Sensor

Sound Velocity measurement due to the possible change of temperature, air pressure and humidity

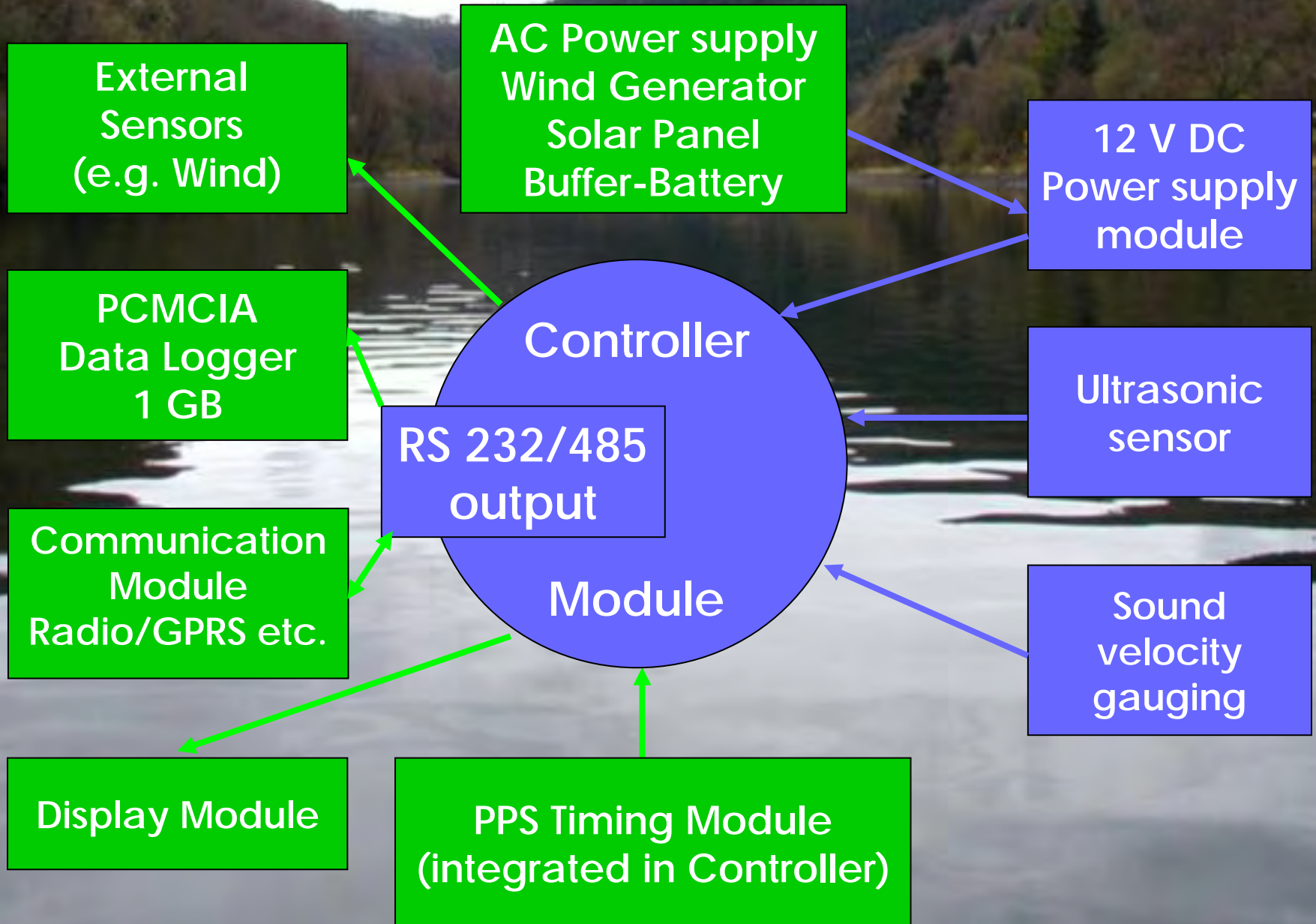


By using the directly measured ultrasound velocity in air and the measured travel time it is possible to accurately compute the water level due to the continuously calibration.



## Optional accessories

## Standard equipment



# LOG\_aLevel® system control (example)

## Modular Construction

- Controller
- Data Logger
- Power Supply 12 V
- Power Supply 230 V
- GSM/GPRS
- 80 Ah Buffer Battery



## Example

# The Storm-Tide- Network in the Port of Hamburg



Wind Generator

GSM/GPRS  
Antenna

Solar Panel

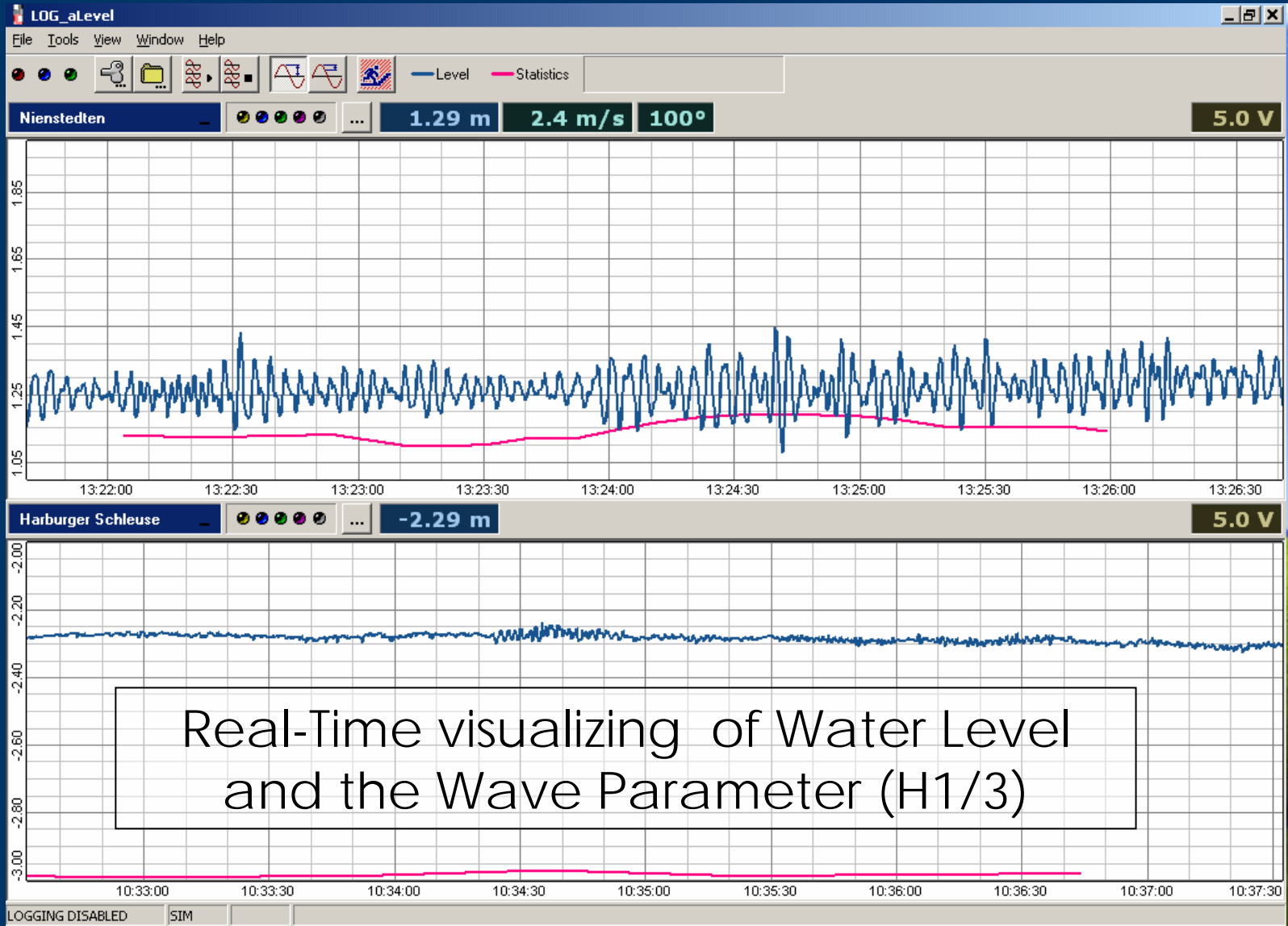
Controller  
Housing

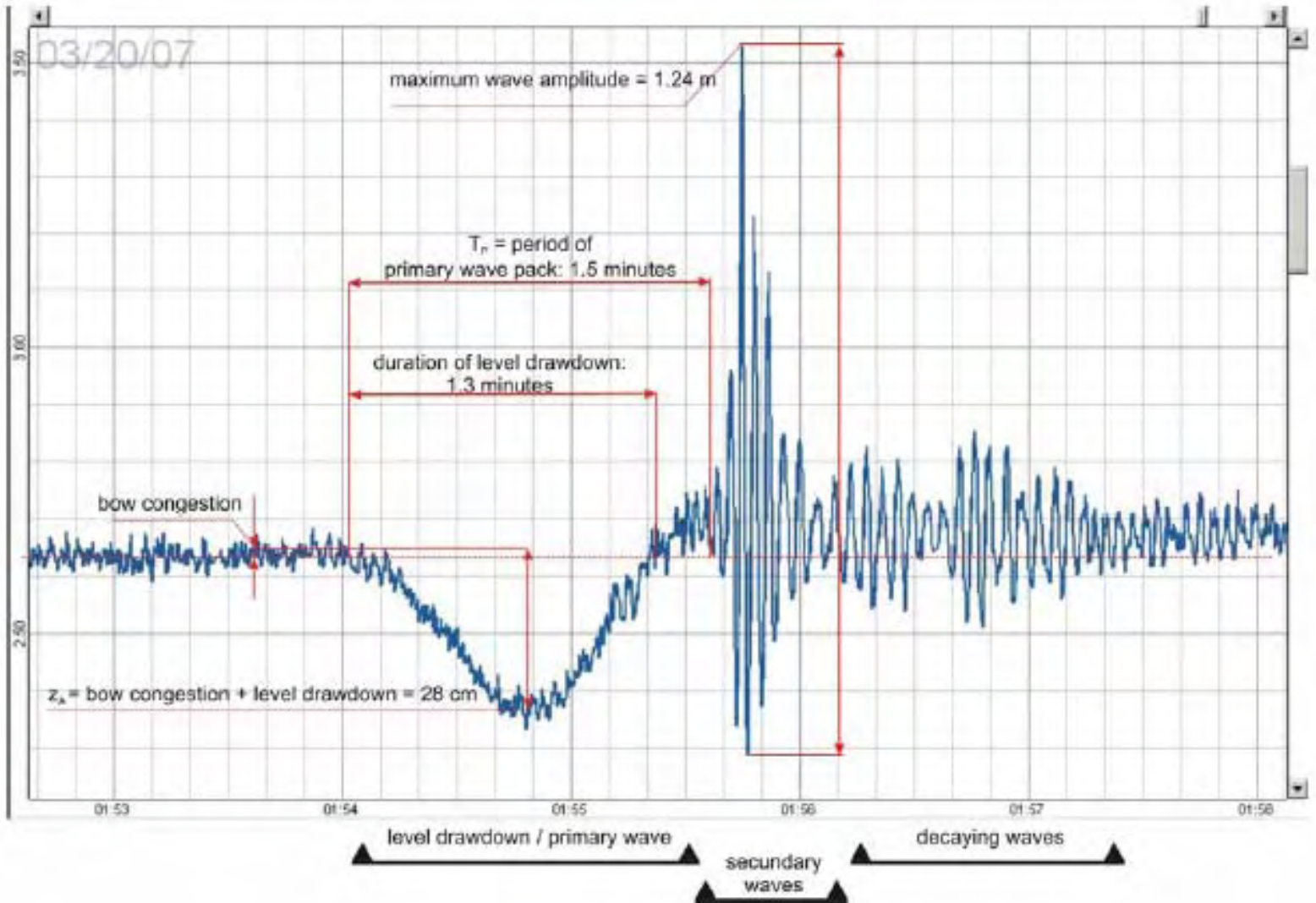
Measuring of  
Sound Velocity

Array of  
3 Ultrasound Sensors



# The LOG\_aLevel<sup>®</sup> - Software for data logging and control





# Water Level Gauge and Wave Measurement LOG\_aLevel®

Calibration-free remote sensing of water levels and waves - based on revolutionary ultrasound technology for

- Inlandwaters, Harbors, On- and Off Shore
- Commercial Shipping and Authorities
- Energy Producers, Oil and Gas Industry
- Water Resources Management
- Harbor-, River- and Coastal Management

## Applications:

- StormTide, Flood and Tsunami measuring networks
- Coastal Protection and - Defense
- Hydrography
- Environmental Monitoring
- Operating Level Gauge for Dredging and Surveying
- Monitoring Discharger of e.g. Power Stations
- Determination of Wave Parameters



## LOG\_aLevel® - Water Level Gauge

### USPs :

- Calibration free due to outstanding sound velocity compensation
- Precise level measuring due to high accuracy surface detection
- High resolution wave measurement
- Maintenance free, cost effective, low installation effort, portable
- Environmental hazard proof

### Solution:

- Narrow beam, high power and - sensitivity sensors
- Measuring ranges up to 13m with internal resolution up to 360 µm
- Field accuracy of distance measurement 1cm
- Option:
  - Measuring networks – GPS time based,
  - Autonomous Power supply (wind, solar, battery)
  - Data transmission and remote control via Ethernet, radio, GSM/GPRS
  - Integration of additional (hydrological and meteorological) sensors

### Key reference clients:

USACE (US), Rijkswaterstaat (NL), Varanday Oil- and Gas Terminal (RUS)  
Ports of Hamburg (GER), Adelaide (AUS), Seoul (ROK), Le Havre (F), Spencer Gulf (CAN); NIOT (IND)

**Potential Solutions:** Longer measuring distances

## LOG\_aLevel® around the World



**LOG\_aLevel** is used on all continents in more than 20 countries under all possible environmental conditions