

# HYDRO-ACOUSTICS AND WATER LEVEL/WAVE MEASURING DEVICES

## General Acoustics GmbH

General Acoustics GmbH is a producer of high-technology echo sounders, water level and wave-measuring systems, and developer of LOG\_aDSL/DSL technology. The company was founded in 1996 by physicists and engineers and is located in Kiel, northern Germany under the managing directorship of Hendrik Eden, shareholder and founder member of the company.

For nearly ten years General Acoustics has been established in the acoustic measuring market. A developer, producer and seller of its own high-technology devices, the company incorporated its predecessor, Eden, Vorrath & Partner, in 1996. Activities are supported by a network of representatives in more than 35 countries around the world, managed from company headquarters.

### The Company

The staff of General Acoustics consists of specialists in acoustics, electronics, hydrodynamics and geology, as well as software engineers and other highly qualified personnel. Managing director Hendrik Eden is a specialist in the field of hydroacoustics with more than fifteen years experience in the field. He helped develop the specialist technology for which his company is known. Since its inception General Acoustics has developed new technologies, for example DSLP-Technology (Detection of Sediment Layers and Properties) and ultrasonic sounding sensor devices. In 2002 the company commercialised this technology, making its acoustic products available to end-users for the first time. Company philosophy is to find solutions for customer problems by producing high-quality equipment and delivering the best possible solution for any specific project. General Acoustics continually develops new products to add to its portfolio, but it also undertakes the development of products for customers when requested.

The current range of products and services available from the company are used in a variety of industries, from hydraulic laboratories investigating wave motion to the offshore industry. Here the company's special techniques and equipment have proven to be singularly suited to the purpose of providing quality data previously unavailable using any other equipment.

### General Acoustic Products

LOG\_aDSL is based on highly specialised, multi-frequency hydro-acoustic technology with ultra-short, high-energy adjustable sound impulses and closely matched transmitters and receivers for optimum performance. It is the only product available anywhere in the world able to detect and classify exact fluid/ solid interface (precise bathymetry), unambiguous sediment layers with a different inner structure independent of density (impedance), and sediment transport processes.

Using DSLP technology all definable geological layers can be clearly detected and exactly assigned to their respective geological properties. The necessary database generated by the DSLP assessment method is used for evaluation, to identify the structure of geological stratification and different geological properties. Various layers, depths and properties of material are accurately detected, down to the slightest material variation. The digital results can be used with different graphic applications (CAD, XTF, GIS etc.). These DSLP products, along with high-quality survey, are made available all over the globe.

### Acoustic Devices

The LOG\_aLevel system offers high-precision water level/wave measurement for harbours, rivers, lakes and coasts. Autonomous remote sensing of water levels and wave characteristics are measured by a complete, stand-alone system based on ultrasonic sensors. The system can be easily integrated into a network, providing remote access to measure water level and waves. This technology has won several comparison tests, the most recent against fifteen different level sensors within Europe. The latest trial tested different types of measuring methods, including radar sensors, mechanical sensors, optical sensors, pressure sensors and ultrasonic sensors.

A LOG\_aLevel network was successfully established last December in the Port of Hamburg and is used to continuously measure tide-level and waves under extreme weather conditions, including storm tides. The data is transferred to the port authority via GPRS and can be easily processed and configured using LOG\_aLevel Software. In the event of a storm the entire network can be automatically switched to a mode for measuring wave fields.

UltraLab is an indoor version of the LOG\_aLevel, designed for Hydraulic Labs and Towing Tanks. These products provide high accuracy and repeatability.

### Software

LOG\_aFlow is a Windows-based software package written to provide current flowcharts in harbours and rivers. It is hydrodynamic calculation software based on ADCP data and providing real current flowcharts for every point in time and location within an area covered by a survey. Discharges on chosen profiles can be exactly calculated. The LOG\_aFlow has a proven long-term track record, reason why it has become a standard installation at the Ports of Hamburg and Rotterdam.

### Projects and Regions

Recent successes for DSLP technology include a site survey for the multinational energy group E.ON/ Germany. The purpose of this project was to investigate the subsoil of an area of the Baltic Sea where E.ON plans to build an offshore wind park. An array of high-quality

low-frequency transducers (see Figure 1) was deployed on a specially manufactured catamaran, which was towed over the specified area. Penetration of the seafloor was achieved to about 100 metres and geological properties of all significant layers mapped. Embedded objects with a size of under 0.5m were also located. The quality of the data was very high; risks involved in construction at this site have been greatly reduced by the results of the DSLP technology survey.

General Acoustics's™ distributor in France, Mesuris SA of Rennes, has recently installed a tide gauge LOG\_aLevel in the Port of Le Havre. It delivers level data via radio to a digital display onboard a dredger. The water level will also be transmitted to a PC in the harbour office to display level data on the LOG\_aLevel Software. This application may also prove interesting for surveyors due to their need for a working level.

RUCO Limited, the representative in the UK and Ireland, has recently received a variety of enquiries for General Acoustics systems, including wave monitoring for jack-up vessels, high-speed wave measuring in hydraulics laboratories, and tidal monitoring in harbours. Requirements for improved data in the coastal zone for the prevention of coastline erosion has also led to an increase in interest in DSLP products (see Figure 4). General Acoustics is a member of the Tsunami Working Group of the northern federal state of Schleswig-Holstein of Germany, set up to offer technical solutions for a Tsunami Early Warning System. LOG\_aLevel stations have also recently been delivered to the National Institute of Ocean Technology (NIOT) in India as part of its shore protection programme.

#### The Future

For the near future, the target of General Acoustics is to extend its existing network of representatives and to open the door to new markets, especially in the United States and South-Korea, and so provide the best possible support for all customers.

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