I AM HYDRO CAM ERASYSTEM

Multispectral & Multifunctional Underwater Camera System

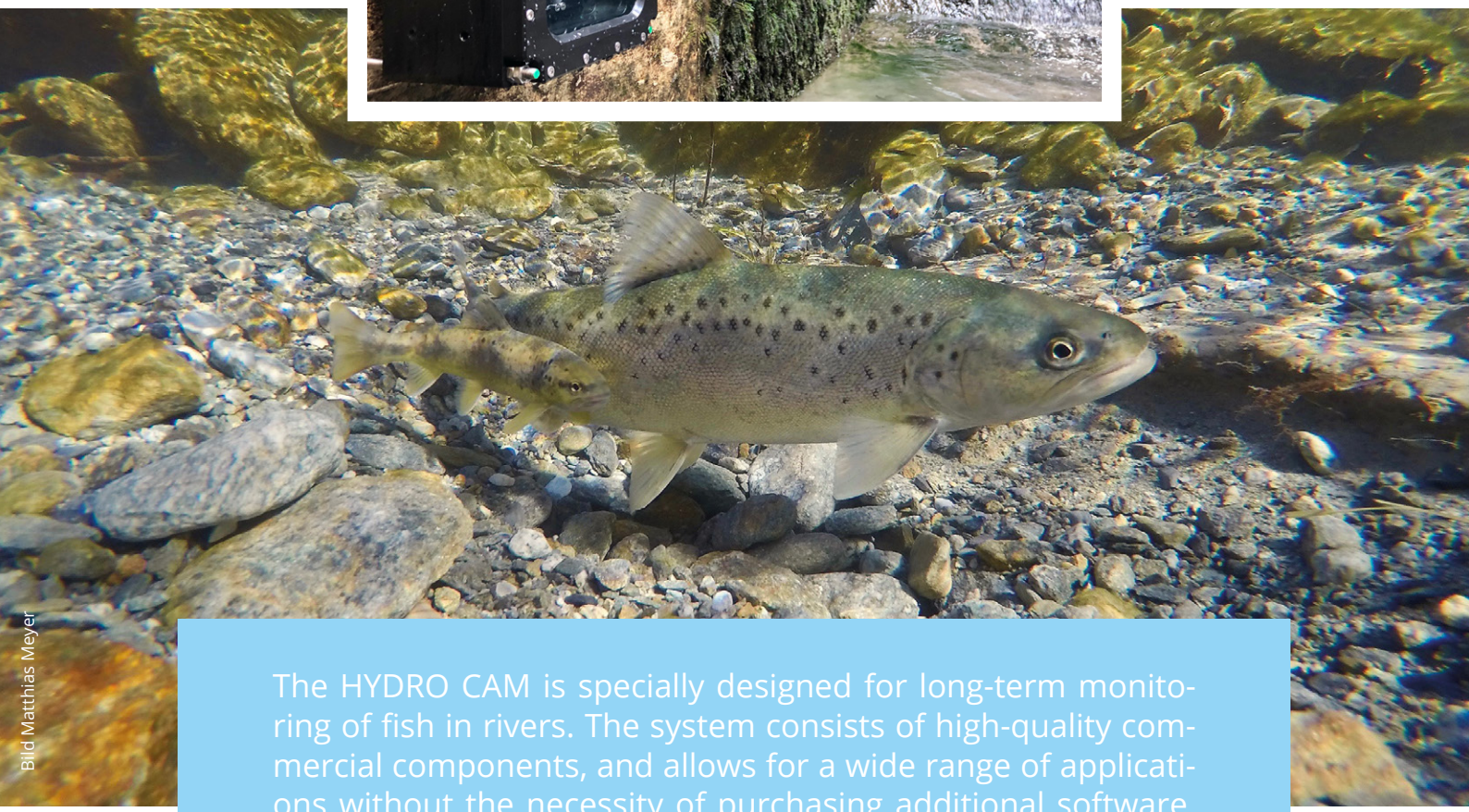


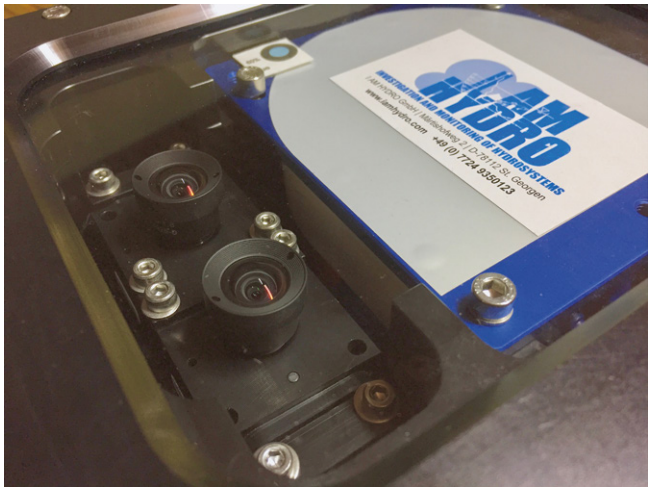
Bild Matthias Meyer

The HYDRO CAM is specially designed for long-term monitoring of fish in rivers. The system consists of high-quality commercial components, and allows for a wide range of applications without the necessity of purchasing additional software. The housing is robust and compact, and has been designed for easy installation in rivers, fishways and hydraulic structures either for short-term or permanent installations.

Camera

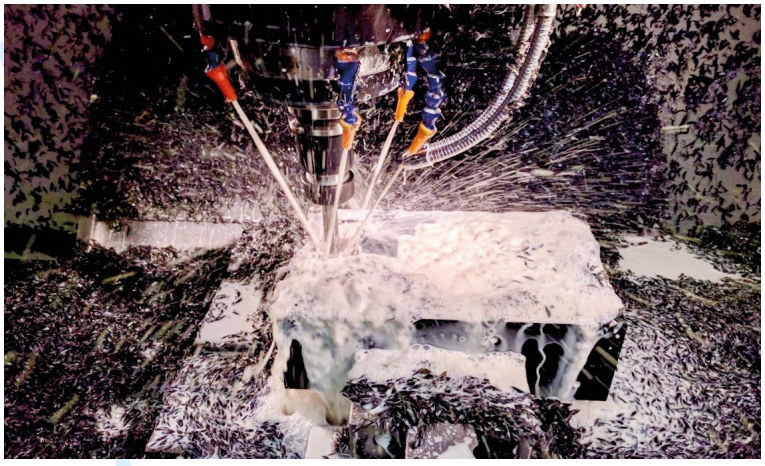
The HYDRO CAM uses the S16 Dualflex IP camera developed by the German security company Mobotix.

The dual camera system features day-light color and low light infrared sensors. Through the use of two optical sensors, the system can automatically adjust to local lighting conditions and delivers high-quality underwater video and imagery at up to 6 MP (3072 x 2048) resolution.



Lightning

The multispectral lighting of the camera system consists of separate white, infrared and ultraviolet LEDs.
Each spectrum can be controlled separately and the intensity and duration of the lighting can be setup via a simple web interface. The infrared lighting allows for a non-invasive illumination which is especially useful for low-light or night time monitoring. The UV light reduces the biofilm growth on the lighting module. Both the lighting and the cameras are included in the same high-quality waterproof housing and are connected using marine-rated underwater cable to the Logger Box.



Housing

The housing is made from a durable, high-quality polymer, Polyoxymethylene (POM) and is milled using CNC from a single block. The material was chosen for its ubiquitous use in deep-water marine applications, where it is well-known for long-term underwater deployments in harsh environments.
Triple-layer laminated security glass is used to protect the camera system from impacts and damage due to sediment transport and woody material. The laminated glass allows for the outer layer to be damaged including an additional elastic inner layer to prevent water entering the housing.

Logger Box

The Logger Box is a high quality powder coated metal cabinet for outdoor use. The Logger Box is designed to be installed outside of the water and includes the electronics modules for the camera configuration, lighting and NAS storage.

The Logger Box includes IP68 rated external connectors for LAN connections, as well as external LTE antennas for the cellular modem.

Installation

The camera and Logger Box are specially designed for rapid and secure installation in challenging underwater environments. Both systems are outfitted with M8 threaded holes for mounting on the sides, top or bottom. The camera and Logger Box can be quickly and directly mounted to surfaces or commercially-available track systems.

Operation

The Logger Box contains an integrated cellular modem (2G/3G/4G) and requires a user-supplied SIM card. This allows for remote access via Cellular, WiFi or LAN connection. The choice of power supply is also flexible: using a 10-48V DC connector or a 230V AC converter. This allows for operation in remote locations using batteries. The system can be operated without the addition of any specialized software. The configuration of cameras, lighting and motion detection can be managed via a simply web interface and is intuitive.

The cameras can be set to record continuously over user-defined intervals, or dynamically using specified motion detection events. When in event detection mode, the user defines a region of the image, which is monitored for motion, after which video is recorded.
This system uses the MXActivitySensor, as well as the integrated motion detection algorithms which can be calibrated to maximize the efficiency of fish monitoring under challenging environmental conditions. The freely available Mobotix software, MxManagementCenter can be used to manage, evaluate and export the data to a local computer or external hard drive.
Using the system as hardware for other software applications (e.g. AI and Deep Learning) is fully possible as the ONVIF standard is supported by the system.

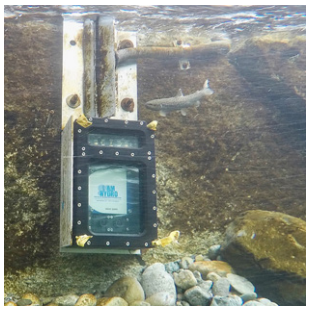
Examples

Due to its compact form, the camera system is used for:

Example 1: Functionality control of a vertical slot pass on the Danube river (Germany). Installation of the camera using a rail system for easy cleaning access.

Example 2: Efficiency study of a fishtrap installation on the river Rhine (Switzerland). Installation in the trap cage, recording of the trap efficiency with different fyke designs.

Example 3: Lake trout monitoring in the Aare Gorge (Switzerland). Installation at a point that is pessimal for fish migration, so the complete width of the channel can be monitored with a single camera.



Example 4: Camera system (from example 3) after a massive landslide, the camera housing was torn off the rock wall and recovered approximately 2 km below the installation site. The housing and safety glass are massively damaged, but no water penetration into the camera system, which is technically still fully functional and all data on the internal storage was retrieved successfully.

The cameras for monitoring and counting fish are mainly installed in fish ladders, fishways, nature like fishways, bypasses, even fish lift systems or in open channels at migration corridors. Further the cameras can support fish counters, fish traps or counting facilities and hydraulic structures. Monitoring can also be implemented over a longer period of time using remote access and large storage capacity.
The cameras are used from the Arctic Circle to southern Europe, from fjord systems to high alpine waters for various issues and have proven their durability and reliability many times over in studies of passability or functionality of fishways and bypasses, research and behavioral studies as well as ethohydraulic studies.

Technical Specifications

Camera Box	CNC machined POM housing
Dimensions	315 x 200 x 110 mm (H x W x L)
Cameras	Mobotix S16 Dualflex
Image sensor, daylight	Color, 1/1.8“ CMOS, 6MP (3072 x 2048), 92° Angle of view
Image sensor, night	B/W, 1/1.8“ CMOS, 6MP (3072 x 2048), 92° Angle of view
Lighting	Infrared (860 nm), White (4000 K), UV (410 nm). Intensity and duration of lighting defined by user
Storage	128 GB internal camera storage
Accessibility	Access and control using web interface or Mobotix software

Logger Box	Powder coated outdoor metal cabinet
Dimensions	400 x 300 x 155 mm (H x W x L)
NAS storage	4TB (mirrored, extendible upon demand), download via USB 3.2
Modem	2G/3G/4G. Connections for external antennas (SMA). SIM card with sufficient data volume required.
External connections	RJ45 (Network), 10-48V input, LTE antennas (SMA) (all IP68) & WiFi

Power supply	10-48V DC or 230V AC
Energy consumption	ca. 4W without and up to 20W with NAS system
Data export	Export via USB 3.2 or network
Live-Stream	User interface is accessible on-site as well as online (resolution dependent on the available bandwidth, and can be user-defined)

I AM HYDRO

INVESTIGATION AND MONITORING OF HYDROSYSTEMS

I AM HYDRO GmbH
Leopoldstrasse 1
78112 St. Georgen
Germany

fon +49 (0) 7724 935 012-3/4
email kontakt@iamhydro.com
web **www.iamhydro.com**

Distribution Partner

Austria
blattfisch e.U.
Clemens Gumpinger
office@blattfisch.at

Estonia
TalTech
Gert Toming
gert.toming@taltech.ee

Sweden
AFRY
Mats Anderson
mats.l.andersson@afry.com

Switzerland
KWO – Fachstelle Ökologie
Matthias Meyer
matthias.meyer@kwo.ch

06.2021