"In our case, when the UW visibility decreases I start piloting the submersible watching the TV monitor showing the LYYN T38™ enhanced video and stop looking through the front window…"

Dr. Iliya Shtirkov
Engineer
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Varna, Bulgaria

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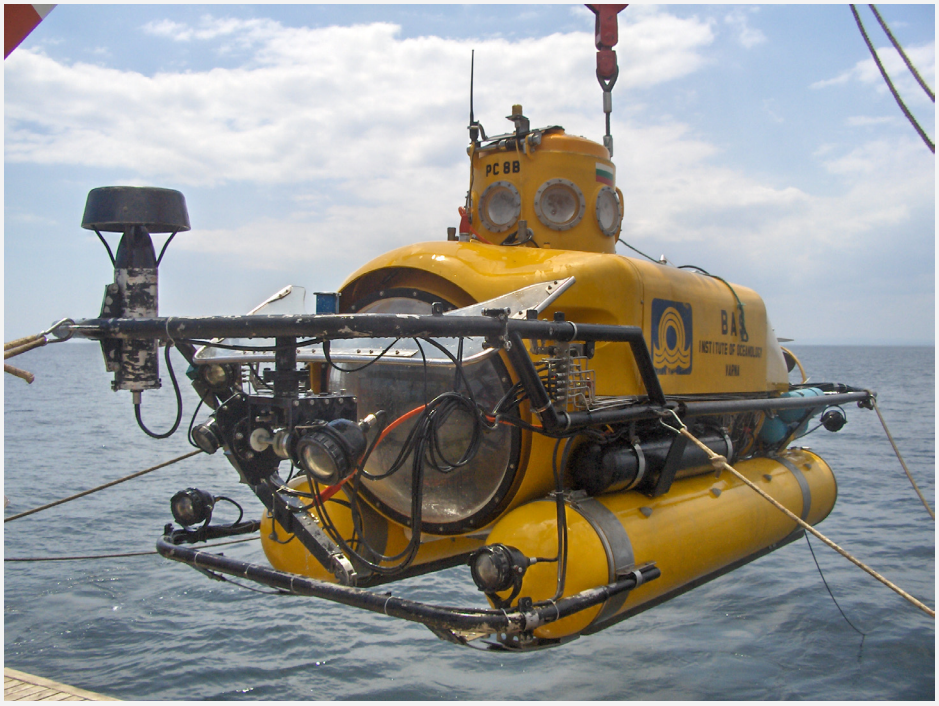
Piloting a submersible with LYYN T38™

A LYYN™ user with a clearer vision



The Institute of Oceanology, Varna is affiliated to the Bulgarian Academy of Sciences. The main research activities are focused on the field of coastal dynamics, marine physics, chemistry, geology, biology, ecology, and underwater investigations. Traditionally involved in all aspects of marine research it also offers consulting and expert services, environmental impact assessment studies, education and training. The main fields of research can be summarised as follows:

- Coastal zone Hydrodynamics (wind wave in deep sea and shallow water, wind wave climate, wind wave modelling, statistical wind wave models), Lythodynamics (sediment transport, contemporary bottom changes, beach dynamics and cadastre) and Coastal zone management.
- Marine Physics (marine hydrology, water circulation, currents, hydrophysical aspects of marine pollution, semi-enclosed and enclosed basins modelling - Black Sea, Caspian Sea, Mediterranean Sea).
- Marine Biology and Ecology (phytoplankton, zooplankton, macrophytobenthos and zoobenthos, fish-stock assessment, biodiversity, response to environmental parameters – eutrophication and pollution).
- Marine Chemistry (monitoring and analysis of hydrochemical components in the sea, rivers and lakes, indicators of marine environment ecological state: nutrients, oxygen, suspended matter, POC, heavy metals in sea water and sediments).
- Marine Geology and Archaeology (geological, geophysical and geo-chemical research, geological mapping, geomorphologic evolution and seabed processes, ancient sea coasts).
- Ocean Engineering (developing of oceanographic instrumentation, specialised and precise devices, deep diving and hyperbaric systems, hydro- and geo-acoustics).

Black Sea exploration is of special interest to the scientific community, the Institute of Oceanology believes. Evidence suggests that the region was a center of maritime trade for millennia, stretching from Roman and Greek times as far back as the Bronze Age. The Black Sea is also the only sea with a deep-water anoxic layer, oxygen-deprived waters where wood-boring mollusks cannot survive. Because of this, wooden shipwrecks of antiquity can remain in a high state of preservation for thousands of years.

LYYN is a product company working on image enhancement to improve visibility in various applications. Many years of research in the human vision system and imaging technologies lie behind the company's technology. LYYN offers products and solutions based on the V.E.T. – Visibility Enhancement Technology – platform. The technology can be applied to both still and video digital images from most color cameras, in real time and for post-processing of previously collected material. V.E.T. improves visibility in many situations, for example, fog, haze, snow, rain, dust, darkness, etc., as well as in underwater and medical applications. For examples please visit our website: www.lyyn.com.

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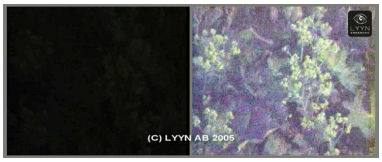
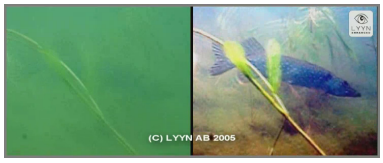
A misty morning on the road is not so misty anymore



How beautiful is the garden in moonlight?



The murky waters of the Baltic Sea are suddenly more agreeable

Finding New Yorkers in a blizzard...

...or soldiers in a sandstorm

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Institute of Oceanology, Bulgaria

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The Institutes research submersible PC–8 has been operated since 1987. Main characteristics:

Operating depth: 250m
Deadweight: 5t
Length: 6,5m
Crew: 2+1
Range of underwater cruise: 5 n miles
Endurance underwater: 5 hours
Scientific equipment: photo-camera, video-camera, manipulator, sampling devices, LYYN T38™.

The submersible has been used in many operations; one of the most publicly known is the series of expeditions to the Black Sea initiated by National Geographic Society explorer-in-residence and Institute for Exploration president Robert Ballard, the oceanographer and undersea explorer famous for his discovery of the Titanic and other historic shipwrecks.

In January of 2003 it was announced that the remains of an ancient trading vessel, reportedly over 2,300 years old, dating back to the time of Plato in Greece. It was first seen on the 1st. of August 2002, in 275 feet of water from the submersible PC-8 launched from the Institutes research ship Akademik.

One of the recovered artifacts became world famous thanks to National Geographic, which officially presented to the world on 16 January 2003 “The oldest shipwreck ever found in the Black Sea”. It was an amphora that contained bones of a large freshwater cat fish, some olive pits and resin. Cut marks visible on the fish bones, together with other physical clues and references from classical literature, lead researchers to believe the amphora carried fish steaks—catfish that was butchered into six- to eight-centimeter (two- to three-inch) chunks and perhaps salted and dried for preservation during shipping. Such everyday fare would have been consumed by soldiers and the masses. This led to the conclusion that it was a big supply boat full of butchered fish that was being brought from the fish-rich regions of the Black Sea and their associated lakes back to Greece.

In their latest set of tools the PC-8 has been equipped with a LYYN T38™;

“We have used the LYYN T 38 in our manned submersible during the inspection and video recording of a gas pipeline.

I am very happy for this device that works perfect in the muddy waters of the Black sea. In our case, when the UW visibility decreases I start piloting the submersible watching the TV monitor showing the LYYN T38™ enhanced video and stop looking through the front window…

To LYYN I send my sincere thanks, to your engineers and designers who developed this fantastic device.”

Dr. Iliya Shtirkov, engineer at The Institute of Oceanology, Varna, Bulgaria