The Illuminated Diver Umbilical *LIGHTPATH*

– a Significant Safety Advance from Photosynergy Ltd

The concept: To see the entire route of a dive umbilical has been identified as a significant contribution to safety.

PSL have achieved this with a unique side emitting 5mm diameter fibre that carries no electrical power, only light up to 150m in length. The fibre is spirally wound into the umbilical thereby creating a flexible continuous line of light from a low power LED light source which can be either steady state or flashing.

The initial testing and evaluation took place at The Underwater Centre in Scotland, their Open Days contributed significantly in raising the profile of the illuminated umbilical concept.

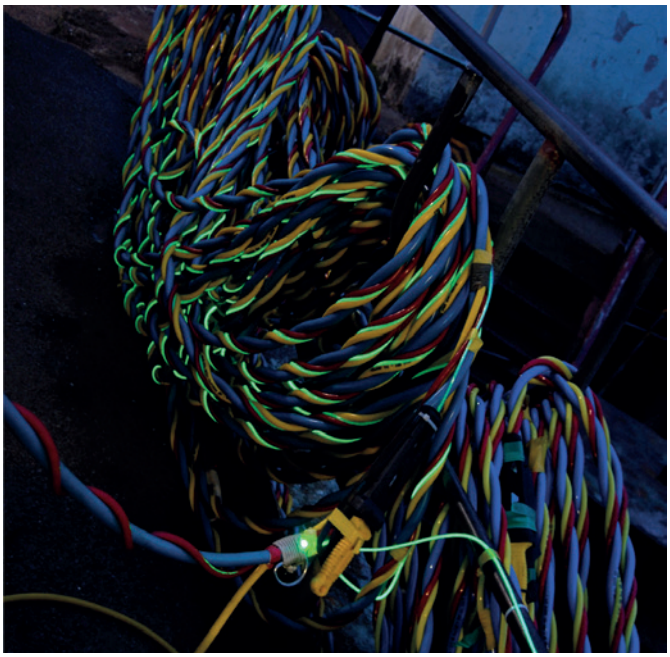
Operational experience with ***LIGHTPATH*** has been gained in the North Sea through collaboration, support and advice from Bibby Offshore, Helix Well Ops UK Ltd and Boskalis Offshore Subsea Services operating in both Saturation and Wet Bell systems. The positive feed-back provided and photographic evidence of performance supports ***LIGHTPATH*** as an innovation that helps de-risk diving operations; a major industry concern.

LIGHTPATH enhances safety for all parties operating in the subsea environment. This has been proven for the individual diver, his colleagues in the water and the bell-man. ROV pilots are aware of the route of the umbilical which minimises the risk of collision and helps detect cases of dive umbilicals snagging on structures. ***LIGHTPATH*** can be used to identify the individual diver through choice of light output colour, Green/Blue/White.

The SLS5000 unit operates over the 12 to 24V DC range with an optional non-penetrating on/off/flash switch.

The colours adopted are Green and Blue as they penetrate most efficiently in water with White as a third alternative. The Green system operates near the peak eye response, the optimum wavelength for the human eye, and provides extraordinary output from minimum power, typically <7W, target life of 5 years continuous operational use and projected maintenance free life.

The SLS9000 has 3 output channels which can be configured in any combination of green, blue, white or red. Power demand is 20W.







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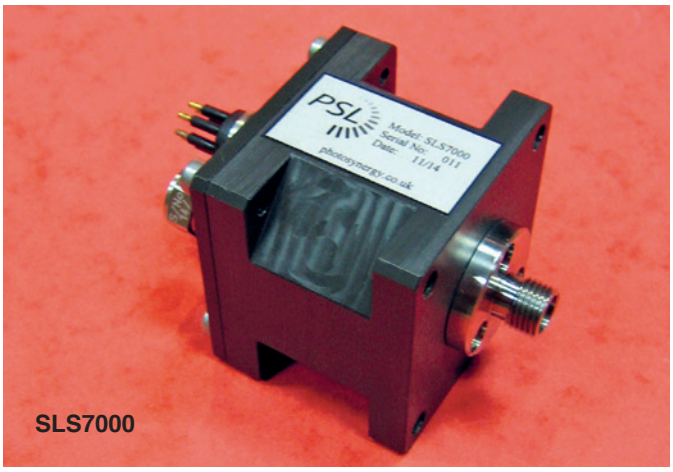
Subsea professionals have identified a number of applications including the lighting of tool boxes, tether lines and restraint systems including the golden gate. ROV pilots highlighted the lighting of manifold valves, control panels and docking or garage guidance systems. Salvage divers identified guide routes into wrecks utilising a continuous line of light and marine archaeologists are looking at controlled site access and 'grid location'.

Marine applications to enhance operational safety on deck include guard rails, open hatches, temporary work areas and below deck identifying egress routes.

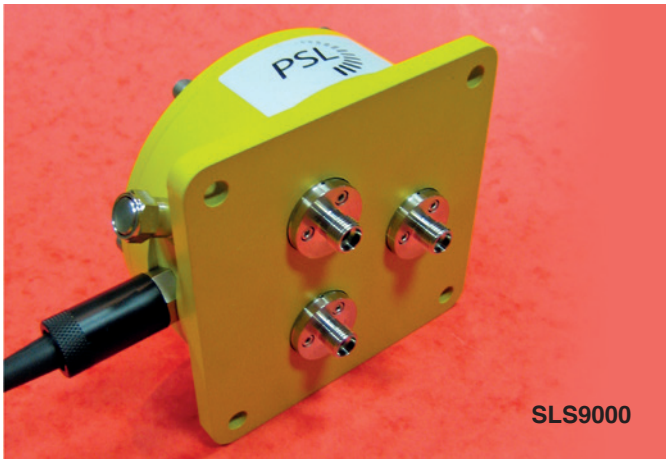
Offshore Wind safety applications identified as tower access lighting and ship personnel transfer systems; PSL are working with SE Offshore Wind Expert Support programme and BVG Associates.

For deep water applications, eg delineation of seabed matting and installations, PSL have developed the SLS7000 unit capable of operation to depths of 3000m.

PSL will continue to develop and promote equipment that will contribute to enhancing the safety of those in the marine, offshore, dive and subsea community with the continued support of operators.



SLS7000



SLS9000

Comment courtesy of The Underwater Centre

"We were delighted to be able to provide PSL with the opportunity to test their illuminated rope in the controlled environment of our pier, using divers in training. Our onshore tank, which has viewing panels on all sides, also provided the perfect location for a demonstration of how the light rope works, to potential clients. It's a very important piece of new technology, which we can see has significant benefits to commercial divers, and ROV pilot techs, when working offshore or in poor light."

General Manager, Steve Ham

Comments courtesy of Helix Well Ops UK Ltd.

"In low viz situations, it's a real safety bonus when the divers can, at a glance see the direction their umbilicals are going. We are continuously doing SIMOPS with work class ROVs & the ROV pilots have commented on how much easier it is manoeuvre around the divers umbilicals now that they are (the umbilicals) illuminated.

The umbilical really did light up really well; with the divers able to follow the umbilical all the way back to the bell. I believe this is a real step forward in the ability for better diver umbilical management & safety.

The ROVs have also commented on how much easier it is to see the Diver's umbilical.

What is really noticeably is the way the umbilical stands out when the ROV is moving around. This has got to be a major safety feature. If it wasn't for the light string, you wouldn't know the umbilical was there."

Comment courtesy of Bibby Offshore

"On the Bibby Offshore DSVs we use different colours for each diver so there is no confusion when the divers are working close together in poor light conditions. The main benefit is that the divers can readily identify where their umbilicals are at any time, preventing potential problems with unseen snagging hazards. The ROV can also quickly check the divers' umbilcals are completely clear before landing large items on the seabed. The divers themselves started requesting umbilical lighting quickly following the early offshore trials. This, in itself, speaks volumes."

Nigel Kenrick
Diving & Dive Systems Operations Manager

Comment courtesy of Boskalis Offshore Subsea Services

"Very nice system could be a bit brighter but for the rest excellent and helps to improve safety.

Our customer made a special note on the final audit report, the note was (a good way to improve the safety of the diver under water better visible umbilical) they are even recommending using the SLS 9000 unit."

For more information about Photosynergy, please visit our website:
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