

INNOVATION

YEAR BOOK OF INDUSTRIAL DESIGN EXCELLENCE

By Anita Moryadas

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Spyfish@ STV User Interface

DIVE RIGHT IN!

There are approximately 28 million registered divers in the world; 85 percent of them are between the ages of 18 and 39. The rest of us have not had the opportunity to experience the world's underwater beauty firsthand... until now. With the Spyfish@, entrepreneur Nigel Jagger and his company H2EYE allow a much broader demographic the opportunity to explore and discover the undersea world.

Remotely operated underwater vehicles have long been used for scientific or commercial research purposes to explore areas that are inaccessible or too dangerous for divers. Applications for submarine telepresence vehicles have ranged from investigating the waters around Antarctica to the neutralization of underwater mines. Jagger's vision was a remote-controlled underwater camera that would allow leisure users to experience swimming with fish without having to be certified divers in order to actually do so. While the Spyfish's functionality and robustness make it ideal for traditional applications, it is the first such product designed specifically for the consumer market.

Over a period of ten years of research and development, H2EYE developed a suite of innovative technologies that form the technical core of a submarine telepresence vehicle. It turned to IDEO to design the user interface and the product.

Why Buy?

IDEO engaged with the client to develop the strategic approach that would inform the design of the product and the interface. H2EYE had developed technologies attractive to an early-adopter group; IDEO helped them clarify why their customers would buy a Spyfish and demonstrated how the design could be optimized for a given market. IDEO then grouped the potential motivations for purchase into four themes:

- Social: the opportunity to use the product collectively, unrestricted by age or experience;
- Underwater: the sensation of "losing yourself" underwater;
- Sport: demanding extreme skill and performance; and
- Pragmatic: a platform for the research scientist or amateur ecologist.

An integrated team of interface and product designers looked at how the physical form and experience of using the Spyfish should be tailored to these markets, developing different interfaces and designs for each. The final design of the interface and the product is a blend of the ideas that emerged from this process, with the spirit of the "underwater" and "social" themes most dominant.

Since the client identified the intended user as anyone aged 5 to 105, the Spyfish system had to be safe and intuitive, instill confidence in all users and be robust and reliable in a wide variety of conditions. The interface had to be legible in any underwater environment while being subtle enough to enhance the immersive experience regardless of the user's level of expertise. Prototyping was essential at every stage of the design. The design team investigated different control strategies for the Spyfish in order to create the most satisfying balance between user effort and the degree of control. Early prototyping of the user experience involved patching into a Sony PlayStation game pad running a submarine game. Different shapes for the controller were studied to find the most comfortable orientation over a two-hour period. In order to determine an ergonomic and ambidextrous handle and button arrangement for the hand unit, IDEO tested adjustable rigs on people of varied age, sex and hand size.

Simple Operation

The Spyfish system comprises the underwater vehicle, a cable winder, a processing box, a hand controller and a video screen. Live video is sent to the surface screen, and control signals are passed back down the cable to manoeuvre the vehicle and direct the cameras. The controller allows users to access a simple on-screen menu that allows users to switch on a flashing beacon, change depth settings, manage sound levels of music and release the cable.

The interface is extremely intuitive. Real-time video from either camera can be seen on screen. The video is overlaid with sound and graphics that show depth, bearing, camera, lights, battery level and the camera's pan and tilt status. The design of the interface heightens the sense of telepresence; its translucence evokes the feeling of being underwater while ensuring that the user feels comfortably oriented throughout their undersea voyage.

The user interface enables easy underwater navigation while building a complete experience. Depth and bearing markers scroll across the height and width at the edges of the screen. They become a natural part of the background environment enhancing the telepresence experience rather than instruments to be checked and measured occasionally. Blurred edges on each band help create a focus on the actual reading at the center. The compass and depth gauges directly map the location and movement of the Spyfish vehicle, The coordination of the movement of the graphics with the navigation of the Spyfish subtly aids the user in general orientation and perception of direction and speed. Icons appear gently, informing without interrupting. The quantity of information and pace of transitions helps users of any age and skill level engage with the environment in which they are swimming.

Complementary Skills

In the end, IDEO's human factors and design skills complemented H2EYE's innovative technology and production engineering. Simulations of the video screen, created in Macromedia Director, allowed IDEO to craft the graphic and audio on-screen feedback and the user's experience of piloting the Spyfish, The interaction design was subsequently implemented by H2EYE in Linux on custom video and graphics hardware, and collaboratively developed and refined.

"The Spyfish User Interface's appeal is its ability to create an intuitive awareness of the Spyfish's depth and direction without competing with the user's sense of underwater exploration and adventure. The translucence and subtle colour of the overlaid graphics are easily legible without detracting from the feel of being submerged in the ocean." Andy Diaz Hope, IDSA

The aesthetics of the interface, the hand controller and the Spyfish vehicle itself all evoke the undersea world. The Spyfish vehicle blends physically into its underwater environment - fish seem to like swimming with it! The interface affords users an immersive experience, regardless of their abilities. Now, even those who are unable to dive have an opportunity to experience the underwater world.

Designed by Tim Brown, IDSA of IDEO, US; Graham Pullin, Fran Samalionis, Luc Robillard, Patrick Hall, Marc Tanner, Andy Deakin, Roger Penn, Chris Avis, Tracy Currer, Philip Davies and Chris Kurjan of IDEO, UK; and Nigel Jagger, Chris Shelton, Gary Cochrane, Jan Paoli. Nick Kemp, Shaun Househam, Jeremy Cooper, Sanjay Patel, Steve Madsen, Jaime Valis Mira, Nick Wright, Colin Broad, Abol Chizari, Sarah, Buchanan and Leonor Riel-Williamson of H2Eyeo International Ltd., UK, for H2Eye International Ltd.