

The mission system for a revolutionary surface and sub-surface vessel



CGI OpenSea360 was chosen as the mission system for SubSea Craft's pioneering diver delivery unit. It assuredly accelerates critical mission phases and provides class-leading situational awareness and underwater communication for all crew.

SubSea Craft (SSC) has designed a pioneering diver delivery unit (DDU) – a vessel able to travel at high speed on the sea surface, then quickly submerge and continue its journey underwater. Rather than having mechanical controls, the SSC craft is completely 'fly-by-wire', meaning it needed a central mission system to monitor and, in many cases, command all on-board systems. This includes surface and sub-surface navigation using official Electronic Navigation Charts, situational awareness, buoyancy-control, underwater collision-avoidance, power management, communication and propulsion.

The conditions for those using the mission system are exceptionally challenging, particularly when underwater. The pilot and navigator will be cold, in the dark and fully submerged, with water reducing their visibility of system screens. Despite this, they must use the system to guide the craft and crew safely through the mission. This requires exceptional situational awareness for everyone on-board, and the ability to control the craft effectively at all times.

Moreover, the selected mission system needed to play an essential role in delivering on key promises of the SSC DDU, including facilitating fast craft start-up, as well as safe submersion in under two minutes.

The solution

SubSea Craft and its boat design partner chose the CGI OpenSea360 mission system as the nerve centre for the vessel. We configured our CGI OpenSea360 mission system for underwater use while automating critical mission phases. CGI OpenSea360 links together key on-board and off-board systems, providing a complete, real-time picture of the craft and mission. Its interfaces are intelligently designed to put the right insights and capabilities in front of crews at the right times.



CGI OpenSea360



- **TAILORING THE SYSTEM FOR UNDERWATER USE**

This would be the first time CGI OpenSea360 had been used in a submersible craft. We firstly needed to identify controllers that were certified for underwater use, while ensuring the system remained easy to operate. Following a detailed review of the market, we selected an appropriate controller and waterproof buttons to sit alongside options on the screen (similar to the controls on an ATM). Our user research demonstrated that these buttons would best sit above the screen in the DDU, rather than beneath it, as is generally the case in surface vessels. Our user experience designers adapted the interface to accommodate this.

Besides, with limited visibility underwater, we created tailored interfaces for when the craft is submerged, to ensure crews maintain exceptional situational awareness and the ability to control the vessel effectively. These interface designs drew on user research and findings from our DSTL-validated study on the usability of CGI OpenSea360.

As an underwater craft, the DDU's correct functioning and response to component failure are critical to safety. We worked with SSC and the design partner to ensure this integrity was achieved.

- **SITUATIONAL AWARENESS ON THE SURFACE AND WHEN SUBMERGED**

Out-of-the-box, CGI OpenSea360 integrates with many components that provide surface situational awareness, including satellite navigation, radar, radio and cameras. Underwater use, however, requires different systems, including a collision-avoidance sonar, an inertial navigation system (INS) and a Doppler velocity log (DVL). Our engineers-built adapters to integrate the data coming from these systems into CGI OpenSea360 and display it appropriately. Thanks to the system's open architecture, this was a quick process. Effective on-board communication and full-crew situational awareness.

In-vessel communication between pilots and divers has long been desired by operators of this type of craft, but challenging underwater conditions have precluded it.

The SSC DDU changes this by putting a display in front of each diver. This has two primary purposes. Firstly, it enables pilots to send navigation and other information to the divers, enhancing their situational awareness. Secondly, we created a two-way text communication system using these screens so that pilots can check on the wellbeing of their crew.

- **ACCELERATING KEY MISSION PHASES THROUGH AUTOMATION**

Realising SSC's vision of accelerating key mission phases – including start-up, diving and surfacing – required two things working in harmony: innovative design of the physical systems and intelligent



Realising the vision for our craft required a state-of-the-art mission system to complement the vessel's control systems. CGI OpenSea360 links everything together and is key in enabling us to create a fantastic craft that'll be far superior to anything else that's out there.

The partnership between SSC, CGI and our design partner has been essential in getting this programme to the point we have. Discussions are open and everyone is honest with each other: if the CGI team sees a better way of doing something, they tell us. And they've been excellent at adapting to our requirements, including delivering the console and critical simulation data in time for DSEI.

Bill Barfoot,
Head of Craft Operations
at SubSea Craft

About CGI

Insights you can act on Founded in 1976, CGI is among the largest IT and business consulting services firms in the world. We are insights-driven and outcomes-based to help accelerate returns on your investments. We are insights-driven and outcomes-based to help accelerate returns on your investments. Across hundreds of locations worldwide, we provide comprehensive, scalable and sustainable IT and business consulting services that are informed globally and delivered locally.

cgi.com

For more information

Visit www.cgi.com/uk/maritime

Email us at info@cgi.com