Acergy and Schilling got together to design a bespoke ROV

Designer ROV

When ROV engineers develop new underwater vehicles, they have to design them to be suitable to carry out a wide variety of tasks that the customer may require, from measuring temperatures in a mid-oceanic ridge, to complex equipment handling task. It is therefore necessary that the designs have to be as adaptable as possible.

Conversely, experienced ROV operators have a far more understanding of the specific applications for which they intend to use the vehicles. They therefore take existing, high-level vehicles and adapt them for their requirements by adding manipulators, cameras etc.

Acergy, however, realised that if it was to successfully develop the complex deepwater fields of the future, this would place far greater demands on the vehicles in terms of operational capability, reliability and efficiency. It would simply require a new generation of vehicles.

"Most suppliers are very experienced in the design, development and manufacture of systems, but lack the operational experience required to ensure industry requirements are satisfied," said Nigel Wilmott, Project Manager – Asset Development.

Around 18 months ago, therefore, engineers from Acergy and Schilling Robotics met to discuss a solution to this potential problem. This resulted in a comprehensive redesign of the Quest ROV into what was to become the Acergy Core Vehicle. The details of many of these changes remain confidential.

"The normal Quest system has two large thrusters on the front of the vehicle as well as one at the back for levelling it," said Program Manager at Schilling, Daniel Harrell. "This makes it very good for doing front-heavy work.

Acergy, however, was looking for something that would be more dynamic and manoeuvrable. The biggest change, therefore, was the inclusion of a fourth thruster, which would make the system vastly more controllable and useful for their applications.

"In an ROV system, the designer might typically say 'what is the shortest path possible to get the hydraulic fluid moving from A to B' and position the lines accordingly. Common pieces of equipment would be positioned in central locations for easy access. The meetings with Acergy were to change this way of thought," said Harrell.

"One of the principal demands from the operator was to maximise deck area. So, for example, if the manifold could be turned upside down and mounted it to the buoyancy, it might free up valuable space.

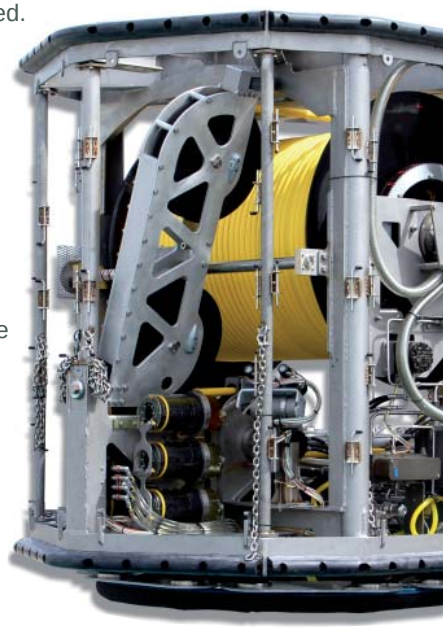
"Similarly, the by removing the internal plumbing and placing it in steel trays around the margins of the vehicle, locating manifolds next to each other and major pieces of equipment

Launch and Recovery System

The Launch and Recovery System (LARS) is designed to handle the vehicle from the deck to the subsea worksite at high speed. It must be able to operate continuously in harsh weather conditions.

"One issue concerning the design of the launch and recovery systems is the speed of getting the assembly to the worksite. This is particularly true in deep waters," said a spokesman. "Winch systems now need to operate at up to 140m/min,"

In order to enable the ROV to dock safely and minimise the risk of damage to the equipment, the launch winches have to be Active Heave Compensated (AHC). The designers selected electric drive AHC winches because they are now a well proven technology. They are considerably quieter than hydraulic systems as well as being easier to maintain.



flat against the frame, this could give more space for tooling. ”

“This liaison with Acergy was good for our engineers and we got good ideas for an operational perspective. We agreed that we wouldn’t use some of the ideas on any other customer but looking from another viewpoint was a very good exercise.

Schilling are constructing two types of systems for Acergy. Both use the same platform but one is designed for construction applications whereas the other will be used more for survey applications.

The relatively large number of pieces of equipment available such as bathymetry systems, sonars, lights, cameras etc, can take advantage of the Quest’s novel telemetry system. This is based on a gigabit Ethernet, and the design allows a number of nodes to be daisy chained together. By adding another module, this essentially allows a further 16 pieces of equipment to be controlled.

Of the four current vessels, two are shceduled to go to Singapore and the remaining two will be based in Aberdeen.

Left: The launch and recovery system. Top: Back view of the ACV. Right: Side veiw showing the two Schilling manipulators

Stationkeep

The ACV will incorporate the latest Stationkeep subsea dynamic positioning system. This will provide an enhanced level of control during intervention operations.

TheStationkeep system will allow the vehicle to maintain its position in the water automatically, and thus allow many subsea tasks to be automated.

Tooling and Performance

According to Acergy, the overall aim of the ROV development programme was to create an Intervention Class system – not just another Work Class ROV. In order to minimise on-deck preparation time, the vehicle features an open frame design. This enables easy access for maintenance or the replacement of components.

The tooling modules used for construction operations are generally large therefore they need to be mounted externally. As a consequence, the external surface of the vehicle is equipped with a number of structural docking points based on a guide pin and locking system.

The drive to increase the vehicle’s performance and manoeuvrability necessitated incorporating a number of improvements into the hydraulic and control systems. To ensure the clearest thruster wash The ACV uses carefully located enhanced thrusters.

Another addition is the use of the latest High Definition Television Systems (HDTV). The ACVs will be able to transmit High Definition video signals to the surface via a dedicated fibre optic link. Because of the large file sizes of images generated, this will pose a problem for the storage of the recorded HD video, however, it is anticipated that within the next few years, this technology will be in common use.