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October/November 2008



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# IT risk management helps integrate complex software

A new approach is needed for managing the increasingly complex software embedded as part of safety and business critical systems, says Kenneth Vareide of DNV IT Global Services

While DNV's activities as a maritime class society ensure adequate safety standards, the focus within its IT Global Services business unit is on system operability, maintainability and availability. DNV IT Global Services will accomplish this by helping companies to control the processes of developing, testing, operating and maintaining the increasingly complex software-based systems found on modern ships.

The business unit was born from a restructure at DNV two years ago. In addition to the core business represented by DNV Maritime, DNV Energy for the offshore oil and gas sector, and DNV Industry, the Norwegian class society recognised a need for an equally important business unit addressing IT risk management across all these sectors. The intention is that from next year it will begin to provide consultation as an official service offering.

Since being established, the IT Global Services team has been talking with owners, yards and suppliers in order to better understand their challenges, as well as carrying out a series of pilot projects. Owners, suppliers and yards around the world all acknowledge software systems are increasing in importance. They also acknowledge that this will pose new challenges, particularly with regard to how they are maintained.

The problem arises because, for the most part, software is designed with a three-year lifecycle. Ships on the other hand are designed with 20-25 year lifetimes. The situation is made worse when dealing with large fleets with software from multiple vendors.

With so many different components emanating from a diverse group of suppliers all required to work together it is no wonder that integration is causing headaches. It is necessary to assess how the various interfaces work and how information is flowing across the system.

Commissioning consistently reveals common problems. "Some of the yards we have had

discussions with are spending more time than expected on commissioning, largely due to integration issues," explains Kenneth Vareide from the new business unit. "And because they are working to such tight schedules, a delay of even three or four days can have a serious knock-on effect. Yet many of the bottlenecks seem to occur at the same point in each project." For this reason, DNV IT Global Services plans to publish recommended practice on how to integrate systems, which will outline who should be doing what when.

System specification is another problem area. "One of the issues we have identified is that the shipping industry tends to copy what has gone before," says Mr Vareide. "Owners are very conservative in the specification, often stating only that they want what was in previous vessels. Unfortunately, it usually was not specified properly in the previous vessel either, so the yard contacts its suppliers to try to interpret it as best it can."

"Tangible hardware assets are fully specified, but the software does not receive the same level of scrutiny. My view is that software is still not regarded as a 'real' component in the system. But, how can you maintain something that you have not specified or even recognise exists?" he continues.

On a cruise ship, for example, the power management system has to distribute power to the propulsion system, hotel services, safety functions and a complex dynamic positioning system among others. Because there are so many operational modes, it becomes very difficult to test. "It is impractical – if not impossible – to try and verify each logical scenario. Gone are the days when engineers could test 100 per cent – the systems have moved beyond that level of complexity."

Other industries – particularly aviation and automation – have faced similar problems in the past. The solution there has been to focus on the processes used to develop and integrate systems. This has resulted in a number of methodologies for verification and validation. "It is our belief that many of these principles can be borrowed and adapted for the maritime industry."

Mr Vareide thinks the industry itself has been slow to recognise the benefits of a process-based approach – from initial design specification until the ship is scrapped – in keeping downtime to a minimum. "The willingness in the oil and



*Kenneth Vareide: "Gone are the days when engineers could test 100 per cent – the systems have moved beyond that level of complexity"*

gas industry is much higher because so much more rests on a project running successfully first time. The value proposition is very clear. But the merchant marine industry has a lot to gain too," he says.

In the oil and gas sector, the motivation for having the systems up and running 100 per cent of the time is much higher than a crude oil tanker going from A to B. There is a different sense of urgency. Modern drilling units are equipped with a host of advanced systems, not least dynamic positioning, which means the whole operation is much more 'software intensive'. But if a platform is down for half-a-day, that is a US\$500 million loss.

Likewise, while existing classification rules and regulations work to ensure a ship is safe, they were not intended to ensure operability, especially of non-safety critical systems. This is particularly evident in the cruise sector, where a malfunctioning air-conditioning system will not register as a risk factor but could invoke the wrath of 5,000 passengers and crew, resulting in damage to brand and considerable financial consequences. In short, because cruise operators have more complex system on board ship, they are more exposed to elements failing. **MEC**