OE ThoughtStream

James Watson, ABS

Securing intelligent systems offshore

Often I am asked – what is classification? We get this question a good bit in the offshore industry where the role of class might not be as pronounced as it is in the marine industry.

Class is one of the many stakeholders in the global safety regime. Our role is to act as the independent third-party certification and verification body, and in that trusted role, we work closely with government regulators and industry to develop and verify compliance with certain standards. We are a mission-driven organization which, simply put, is to protect life, property, and the natural environment.

In recent years, a significant focus of ABS offshore technology has been leveraging "big data" and software integrity. In our modern and interconnected world, software integrity is an increasingly important area for the safe operation of floating assets and mobile offshore drilling units.

The concept of overall software integrity is rooted in three core areas: software quality engineering, verification and cybersecurity.

The key to maintaining software integrity is to begin as early as possible in any given project. Software repair costs only increase as an asset ages. Estimates place the cost for each bug to be around $3000 in software support, which does not include potential downtime.

And in the offshore industry, where we see software integrity already becoming a major focus, an estimated 30% of errors in software are due to interface issues.

How complex are these systems? The integration of multiple pieces of hardware, from multiple manufacturers, using multiple pieces of software provides seemingly limitless concerns if the integration is not executed with sound engineering principles. For older vessels, the problem might grow exponentially as outdated software on main systems could have trouble interacting with more modern software on newer subsystems.

Historically, class society rules focus on steel and equipment. ABS has developed the Integrated Software Quality Management (ISQM) notation, which is a risk-based software development and maintenance process that can be used to verify the software installation and to monitor for consistency when software updates or hardware changes are made.

ISQM focuses on the software that controls the equipment and provides a process to minimize software-related risk throughout the life of an asset. Initially, it was developed for the offshore industry, with a particular focus on complex newbuild control systems. The recent use of ISQM on the ultra-deepwater drillship *Rowan Renaissance*, the first vessel built using ISQM, helped facilitate the integration and testing of more than 35 subsystems developed by a dozen major suppliers.

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Clearly, the end goal for industry is to reduce safety, environmental, and productivity risks while increasing reliability, efficiency, and productivity.

But ISQM is only the beginning. Even with high-quality software engineering, vessel owners must take a lifecycle approach to software integrity. That includes consistent verification and validation of systems and subsystems, and it also requires periodic cybersecurity risk assessments and a consistent approach to capturing lessons learned.

Looking to the future, as an industry we must continue discuss issues that affect our security as technology advances beyond what we thought was possible a decade ago. As we become more dependent on connected and integrated systems, cybersecurity and software integrity are key to the overall integrity of an asset. OE

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Prior to joining ABS, Watson served as director of the Bureau of Safety and Environmental Enforcement (BSEE) at the US Department of Interior, where he provided regulatory oversight for energy exploration and production on the US Outer Continental Shelf. Before becoming BSEE director, Watson served as the US Coast Guard (USCG) director of Prevention Policy for Marine Safety, Security and Stewardship.

Watson earned a bachelor of science degree in marine engineering from USCGA in 1978. He received his master of science in naval architecture and his master of science in mechanical engineering from the University of Michigan in 1985. Watson earned an additional master of science in strategic studies at the National Defense University in 2001.