

80% Reduction in Time Spent on Traceability Management for ISO 26262 using PTC Integrity

Responding to larger, more complex software with PTC Integrity

Hitachi Automotive Systems, Ltd.

PTC Japan Inc. (PTC) holds private events to introduce PTC's latest solutions, technologies, product strategies, and user cases for leading companies. At this event, Mr. Yoshihiro Miyazaki, Supervisor for Electronic Platform Technology and Head Technician for the Technology Development Department at Hitachi Automotive Systems, Ltd., gave a lecture titled, "Efforts for Road Vehicles - Functional Safety Standard ISO 26262 and Examples of Using Software Development Tools".

At the start of his lecture, Mr. Miyazaki said, "In the past 20 years, as social demands for restrictions on exhaust and fuel efficiency have risen and consumers' preferences have become more varied, the software size for engine controllers has swelled several hundredfold. Therefore, embedded systems become larger in scale and more complex, and are more difficult to develop. However, in the same way we are required to reduce development costs, shorten development time, and maintain and improve reliability."

His company has continued various efforts to solve the issues surrounding the development of embedded systems. A representative example is the construction of electronic platforms. This can be roughly split into mounted platforms and development platforms.

A mounted platform is an infrastructure for standardizing and sharing software hierarchy specifications, basic software specifications, and interface specifications, etc. It's an approach for dividing software into parts, increasing their reusability, and reducing the amount of software to be developed. His company promotes compliance with the standards of AUTOSAR, an international group for standardizing vehicle-mounted software, and the standards of JasPar, a Japanese standardization group.

A development platform introduces an approach for reducing the load of development by using the control model description language and tools, modeling and simulating the controlled items, and automatically generating code. By employing a model-based development method that models the development process all the way through from upstream to downstream processes, they aim to improve the efficiency for the development of embedded systems.

There are also new trends in embedded system development. Momentum within the industry for complying with vehicle safety standards is growing. The vehicle functional safety standard ISO 26262 is supporting this movement. Many of the requirements are similar to quality management requirements that Hitachi Automotive Systems has been meeting until now. However, there are also several differences. For example, it's necessary to leave, as evidence, how the system was designed and verified from the viewpoint of functional safety, and some quantitative assessments are required in design and verification. This company plans to fill the gaps with ISO 26262's requirements and to maintain a status quo with a quality management level even higher than that of ISO 26262.

Ensuring functional safety presents a big challenge. Function groups controlled as a unit have specifications to perform mutual communication, thus providing service and giving additional values. At the same time, electronic control systems mounted in cars are becoming more advanced and complex. For example, there is a chance an error related to functional safety may occur due to the mutual operation between functional units, but massive amounts of time and cost are spent to design and verify the parts so this doesn't occur.

Mr. Miyazaki says, "We can also use Excel for traceability management. However, if there are more items and the hierarchy goes deeper, then, of course, management becomes more complex. Also, if the requirements change, it's necessary to identify the entire scope affected by that change and verify countermeasures. As a result, this lowers our development efficiency and increases development cost. To succeed in increasingly fierce global competition, we needed to ensure traceability for requirements, including functional safety, and to introduce tools that further increase our software quality and development efficiency."

That's when the company introduced PTC Integrity as a solution for realizing safety-related requirement management and traceability management. They had determined it was the most effective solution for further shortening the software development process and reducing lost opportunities as much as possible.



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Using PTC Integrity, they can link all managed requirements, specifications, source codes, and test cases, etc., managing these items in a traceable format. This ensures traceability for the entire development lifecycle, from defining requirements to architecture design, detailed design, coding, unit testing, combined testing, and overall testing. It's also possible to quickly check that the software product fulfills the safety requirements.

As an example of the results from installing PTC Integrity, Mr. Miyazaki introduced the time spent for traceability management related to safety management requirements for ISO 26262 in two cases, one using Excel and one using PTC Integrity. He revealed the result to the audience, saying, "Using Excel, it took about 40 hours, but with PTC Integrity, we were able to complete it in about 8 hours."

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