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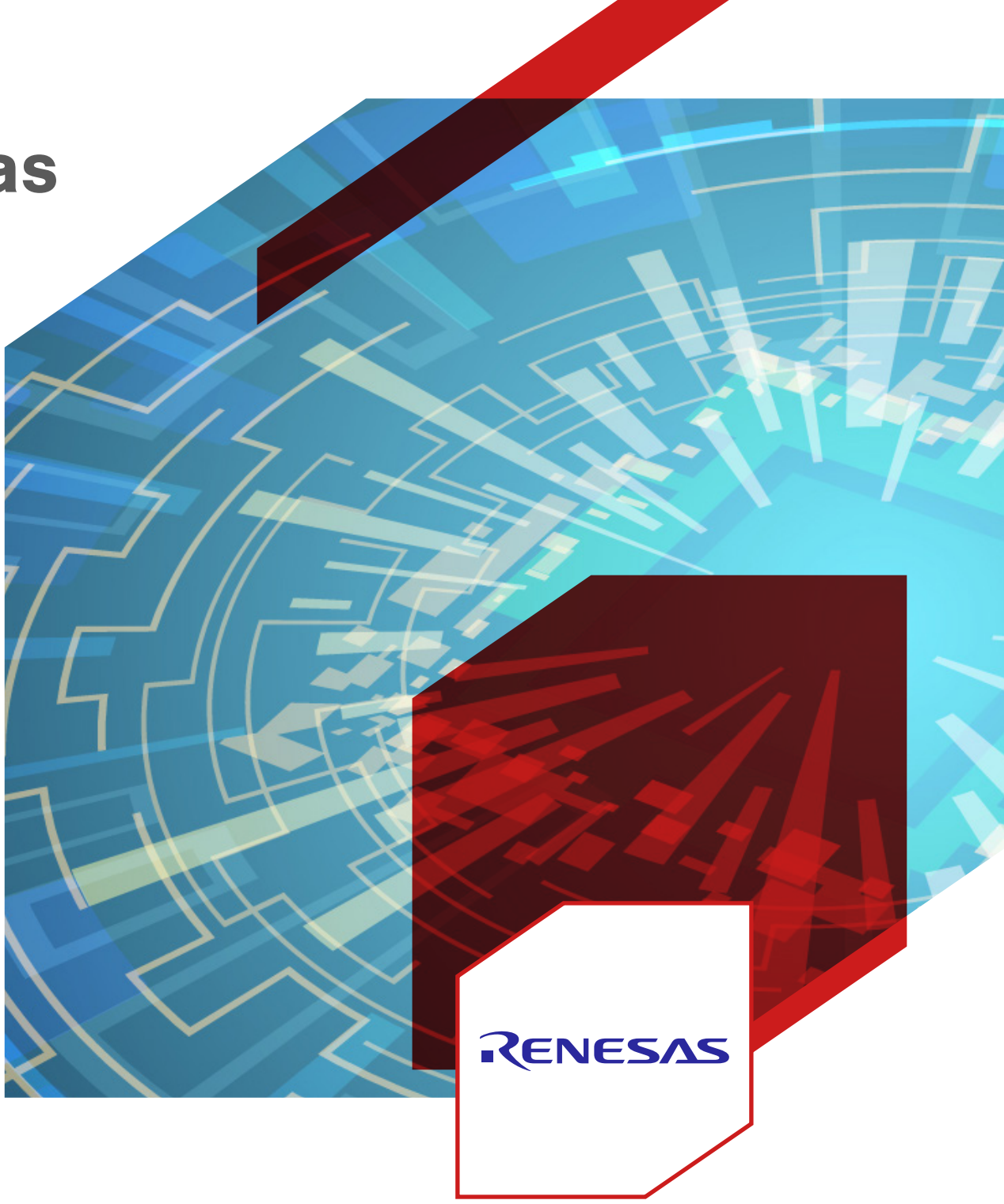


CASE STUDY

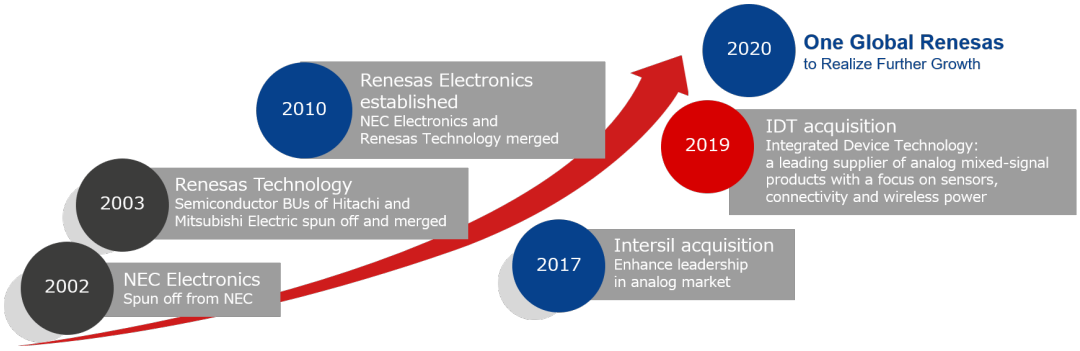
How Aras Innovator's Flexibility and Scalability Helps Renesas Build an Integrated Company

Renesas is a major global semiconductor company with locations in more than 20 countries worldwide. Renesas produces complex and diverse products to meet ever-changing market needs, while dealing with issues of system inheritance and data management due to mergers over the years. According to Renesas, when it came to finding a cost-competitive integrated management system that could solve all of these problems, the only solution was Aras Innovator.

INTEGRATING MULTIPLE ORGANIZATIONS TO BUILD A LEADING SEMICONDUCTOR COMPANY

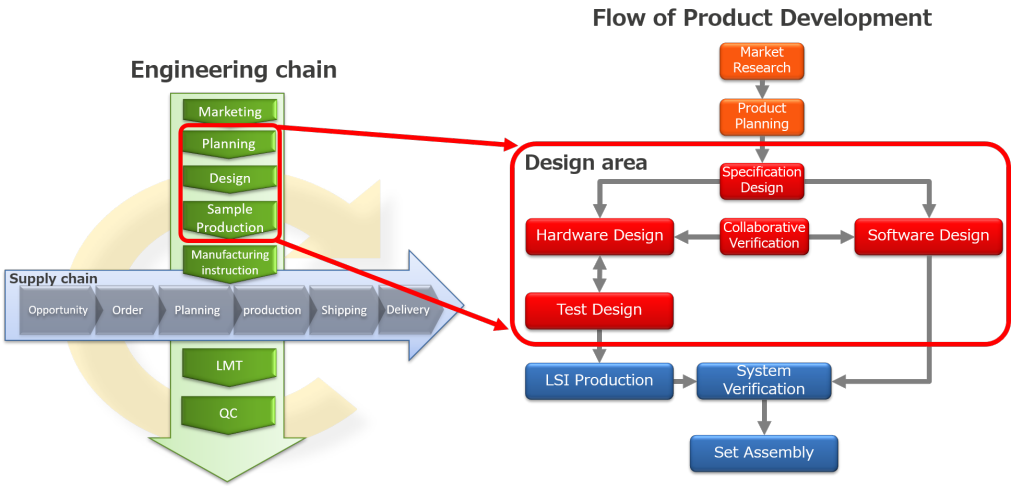
Renesas Electronics Corporation (hereinafter referred to as Renesas), a major semiconductor manufacturer, does business in a wide range of industries including automotive, industrial manufacturing, home appliances, medical care, OA (office automation), and ICT (information and communication technology). With semiconductor large-scale integrated circuits (LSI) at its core, Renesas is a world leader in microcontroller (MCU), analog, power semiconductor, and SoC (System-on-a-chip) products.

Renesas was established in 2010 through the merger of Renesas Technology, which had been spun off from Mitsubishi Electric and Hitachi, and NEC Electronics which was spun off from NEC. In 2018, Intersil, which develops semiconductors for power supplies and high-precision analog semiconductors, became a subsidiary of the company. In 2019, Silicon Valley's long-established semiconductor company, Integrated Device Technology (IDT), was acquired to further expanding the company.



History of Renesas

There are design and applied technology group companies and bases around the world in which engineers are engaged in LSI design and applied technology development. The company also works with more than 1,000 certified partners to build an engineering value chain. In this engineering value chain, the company has focused on the design engineering chain and proceeded with system construction.



Flow of Engineering Chain and Development

MEETING RENESAS' UNIQUE CHALLENGES FOR DATA INTEGRATION MANAGEMENT

Product development and document management are carried out based on company-wide technical standards, and development quality is guaranteed by individual product regulations.

The contents of the LSI are composed of various functional blocks. In the design process, documents such as various specifications, logic circuit diagrams, RTL, EDA (Electronic Design Automation) data, test programs, and other deliverables are generated. These are the company's assets and will be reused in the future development cycles.

Renesas LSI has a broad product portfolio including microcontrollers, analogs, powers, SoCs, and system platforms. The design extends not only to hardware, but also to areas such as drivers and middleware. In addition, we will develop personalized applications for our customers. In the company's LSI design, it was necessary to flexibly combine multiple products and software to deal with them.

However, the various mergers and acquisitions over the years has meant that development culture, business processes, and IT resources had to be integrated along with product design data—all of which were scattered in multiple systems. This has resulted in inefficiencies in data management, including design data retrieval, browsing, editing, and reuse.

Hidetaka Nishimura, Director of Product Development Support Systems Department, Information Systems Management Department, at Renesas, said: "Information on design defects is also managed individually by the person in charge at each site, and it is easy for the data to be difficult to find or deal with immediately. Furthermore, IP (intellectual property) is re-established. It was difficult to manage usage, and the man-hours for managing royalties were increasing."

BENEFITS OF ARAS OVER OTHER PLM SYSTEMS

To solve these issues, Renesas decided that LSI design data should be managed by a consolidated platform. The company has three expectations for Aras platform:

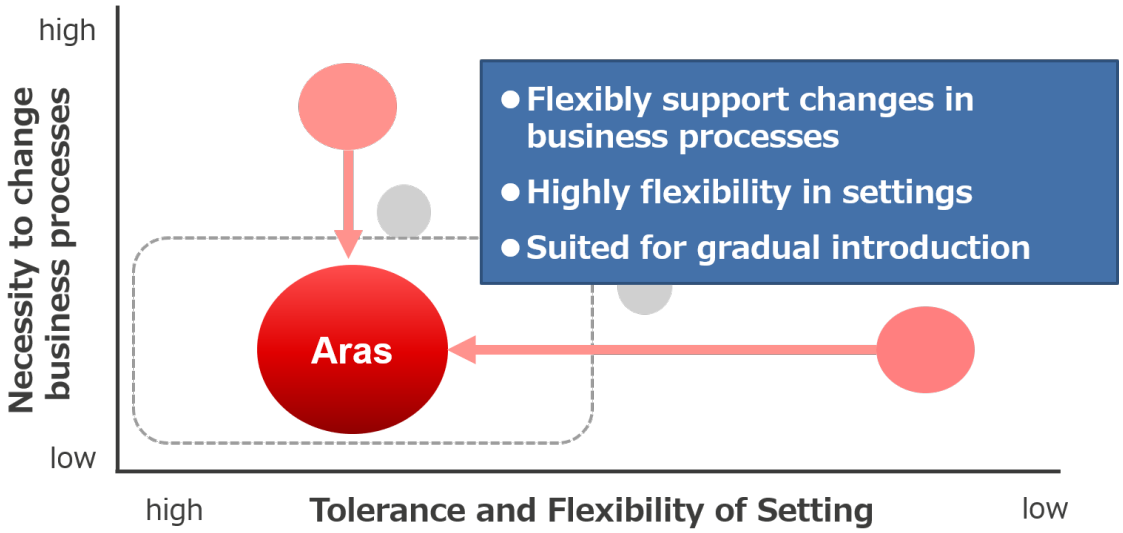
- Absorption of diverse business processes
- System continuity
- Global expansion

The global LSI market is changing rapidly every day. In addition, the company, which is a collection of companies, is still working on reforming its business and business processes. Therefore, the company demanded that the system be able to flexibly respond to changing needs. The functional requirements are:

- Easy to adjust to changes in composition and business operations
- Can contribute to standardization of business processes by integrating systems
- Able to build a system according to the current business and gradually introduce it throughout the company
- Scalable (including global support)

Based on this, the company made arrangements with several system providers, including PLM vendors, to gather information on market trends. But, while exploring different PLM systems, most were ME-CAD vendors who couldn't offer the functionality that's required from EDA tools used to design semiconductors and is different from CAD tools used in mechanical design.

As Mr. Nishimura says, "Even at the time of consideration, PLM was focused on managing mechanical CAD data, and it was difficult to find a system that supports development data management for EDA or a system optimized for semiconductor development that we require. It is easy to build an interface with the EDA environment, it can respond flexibly to changes in business processes, it has high flexibility in setting, it can take a soft landing approach in its introduction, and it can also be globally supported." Mr. Nishimura says that, ultimately, the cost-competitive system platform that combined all of these requirements, was Aras Innovator.



Selecting the System for the Platform

By introducing Aras Innovator, information management can be centralized, and as planned by the company, data management man-hours can be reduced, management accuracy, data searchability, and IP royalty management accuracy can be improved, and IP reuse can be promoted. It was an effective solution.

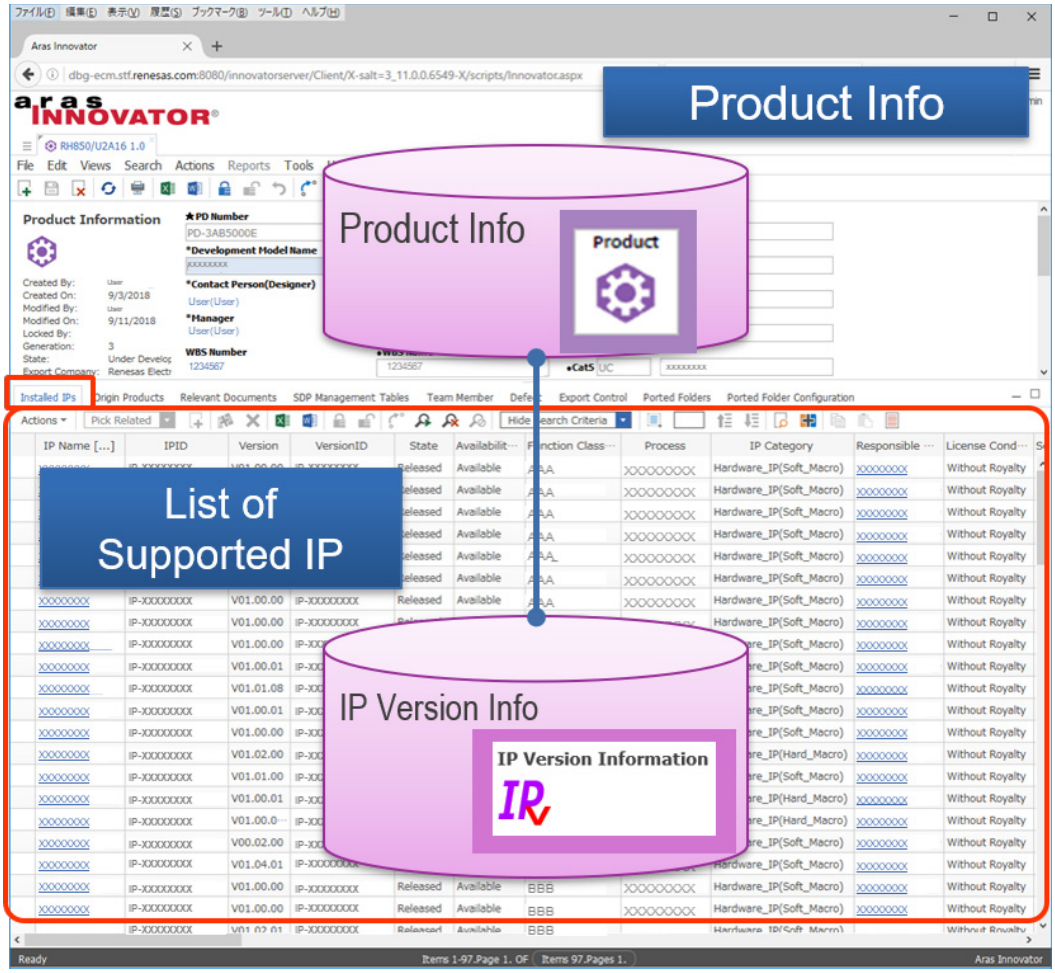
IP ROYALTY MANAGEMENT FUNCTION FOR EXPORT CONTROL AND EAR SUPPORT

Currently, Aras Innovator is principally being used in the company's design department and is mainly used by about 5,000 people at two domestic bases and five overseas bases. The introduction so far has been carried out in stages such as "product development management," "development defect information management," and "IP management / IP deliverables management."

"Design IP (circuit module) configuration management is difficult to handle with general PLM BOM management," says Nishimura. But, by connecting the design IP and product information with the relation function of Aras Innovator, it is possible to manage it in a list.

We are currently working on the next phase of IP royalty management. According to Mr. Nishimura, "Our design and development bases are scattered all over the world. For example, when sharing IP information with overseas bases, it is a "technology export" and must be based on the laws of each country. It is very difficult to realize management only with the access right control of conventional folder management."

Therefore, the company customized the functions of project management, product engineering, and document management of Aras Innovator, and developed a functionality to support export management and EAR (Export Administration Regulations: US export control regulations) to compare the owner country of the information as well as the person who accesses it.



Design IP management using the relationship function between Aras items

In addition, says Fumihito Sueki, Senior Manager of the Product Development Support Systems Department: "With the EAR function, we can make decisions using individual citizenship information as required by U.S. law. I don't think there are any other systems out there that can make a judgment based on individual citizenship."

"Documents are centrally managed, the time and effort required to search for data has been dramatically reduced, and information sharing has become much easier. As a result, we have achieved a reduction in man-hours for design information management," says Nishimura.

Freeing designers from the indirect work and management of design allows them to focus more on their original design work. He also says that Aras Innovator's low-code platform is attractive because it allows you to quickly add the system you want without having to write complicated programs. "We can adapt the system to our work," says Nishimura.

According to Mr. Nishimura, another distinct advantage of using Aras Innovator is that upgrades, including all customizations, are handled by Aras and are included in the subscription.

TOGETHER WITH ARAS—EXPECTATIONS FOR TAF AND MBD

Renesas is currently upgrading from Aras Innovator V11 SP12 to V12 SP9.

This upgrade takes advantage of Aras' new Test Automation Framework (TAF). Previously, the upgrade itself was done by Aras, but the results had to be tested by the customer. This meant that while Aras US and Aras Japan cooperated in reducing the load, "the test man-hours for both Aras and our company were quite a burden" says Nishimura.

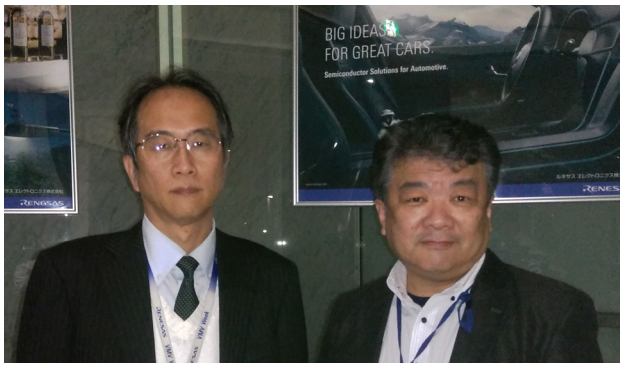
Mr. Sueki explains the difficulty, "There were more than 6,000 test items. It was done manually by a dozen people."

Regarding automated testing, Mr. Nishimura had been making requests to Aras for some time, and now, with the release of TAF, this will finally happen. Even in these early days for TAF, Aras and Renesas are working together, to improve its functionality while actually using it.

According to Nishimura, one of the attractions of Aras was the close relationship between Renesas and the Aras development team.

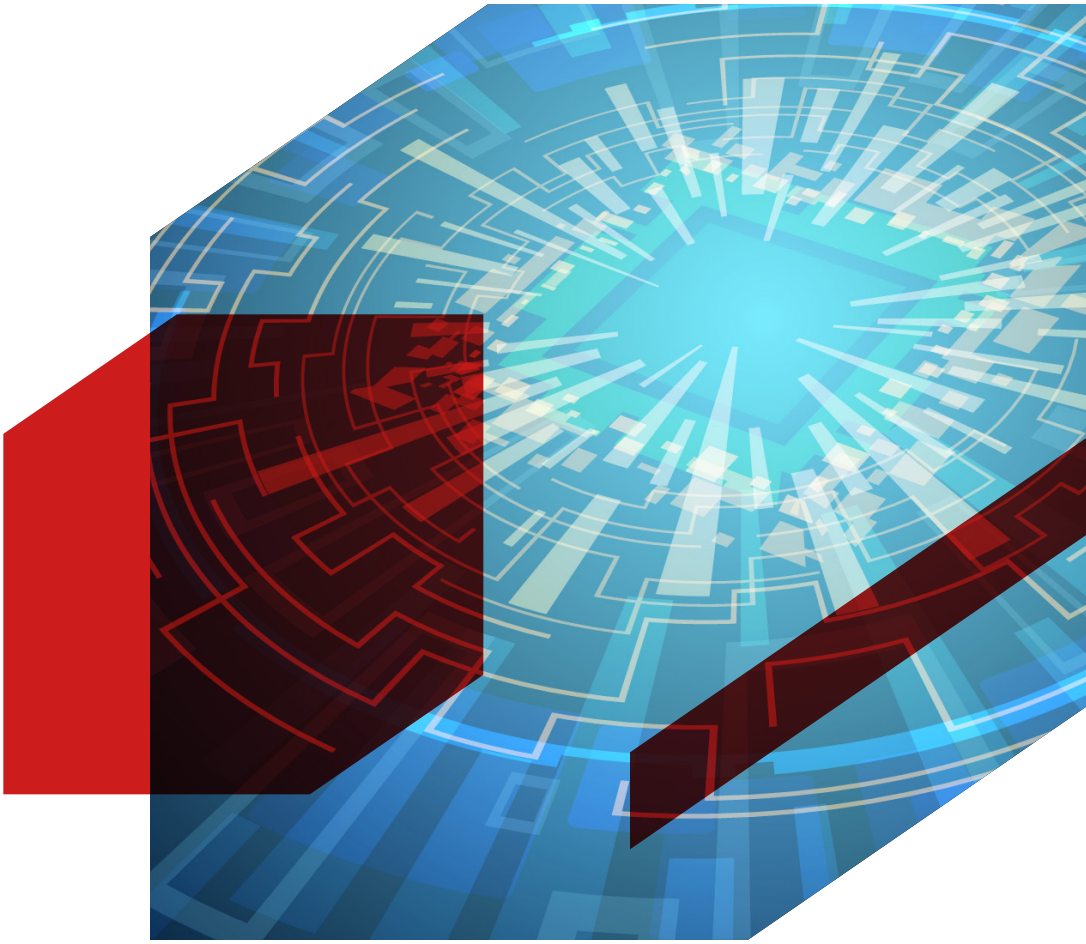
In the future, Renesas will implement new functions and expand the IP royalty management function that they are currently working on, as well as "OpsHub" that links Aras with other major development tools, "SAFe," an agile development method, and Systems Engineering. There are also plans to explore the use of applications such as Systems Architecture.

Looking ahead to future trends in the manufacturing and semiconductor industries, Mr. Nishimura says that he looks forward to continuing to work with Aras in the future. "In any industry development, in addition to mechanical and electric equipment, software is becoming more and more indispensable and an MBD (model-based design) system is required. We look forward to Aras becoming a solution that enables integrated management, based on MBD and systems engineering."



Renesas Electronics Corporation
Information Systems Div. Product Development Support System Dept.

Hidetaka Nishimura, Director (left)
Fumihito Sueki, Senior Manager (right)



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