Japan
Meets the Challenges

The News from the dSPACE Japan User Conference 2009,
held by dSPACE Japan K.K.

Ecofriendly engineering requires highly sophisticated control systems, but developing these costs a lot of man-hours and money. Plus, to be successful, a good design has to pull together a multitude of cutting-edge electronics technologies in development processes and products. Model-based development is the answer: streamlining development, improving software quality, and enhancing safety. Numerous engineering fields are using it more often – as seen in the diversity of user applications presented at the dSPACE Japan User Conference 2009.

Hosted by dSPACE Japan K.K. in Tokyo on June 19, the conference featured customers' use cases, and provided information on the latest products and advancements. These focused on model-based development and its increasing use for safety, the environment, and comfort functionalities.
In his opening address, Dr. Herbert Hanselmann, President of dSPACE, described the spread of model-based

development in various fields and the increased use of dSPACE tools. Since its beginning, dSPACE has achieved impressive results in mechatronics. Recent years have seen dSPACE technology spread to railroads, aerospace, construction machinery, medical technology, and other fields. There is a palpable sense that the merits of model-based development are widely appreciated nowadays. In the customer case sessions, many customers agreed on the advantages of model-based development.

Figure 1: dSPACE Japan's President Hitoshi Arima talked about smart power grids.

Figure 2: Exhibition area: full of detailed discussions about cutting-edge dSPACE products.

Figure 3: Demo station for ASM Electric Components Model and the electric drive simulator.

Automatic Pilot for Aviation Applications
In his contribution from the aviation industry, Hideto Fujii of Mitsubishi Heavy Industries described how Micro-AutoBox is being used in research on automatic formation flight. Intro-

ducing model-based development led to the realization that control system developers can work up to the implementation stage, so software developers can concentrate on developing the aircraft dynamics simulator and expanding its functions. This efficiently utilizes human resources and considerably reduces the development time; particularly since manual work on specification documents and coding are not necessary. Recognizing the value of

ments at the front line of development were the creation of added value and the swift introduction of products onto the market. Conventional development methods need to be rethought to meet the growing system complexity, the increase in onboard ECUs as vehicle control devices, and the expanding scale of hardware and software. One way to reform development methods is prototyping, including the bypass system. This can reduce develop-

to the construction of new development processes through linking with model-based development support tools.
At another customer case session for automotive industry clients, Nobuhide Kobayashi from DENSO CREATE spoke in detail about cases of constructing vehicle system development environments using AUTOSAR at each system architecture phase.

Green Success with dSPACE Products

One of dSPACE's leading product categories is test environments that allow the integration of high-end electronics technologies for hybrid and high-output motor control development. Masahiro Kaneda of Mitsubishi Motors reported on the use of the HIL simulator to develop Mitsubishi's i-MiEV electric car. With respect to electric car development, he said that because various functions are distributed across an onboard network, it is vital to ensure the quality of the total vehicle system as well as that of the ECU software. (For details, please see page 14.)
The biggest issue in Green Success is the efficient, swift development of unique and innovative products that enhance system efficiency functions while minimizing the impact on the

> "Introducing model-based development has resulted in efficient utilization of human resources and a considerable reduction in development time."
>
> *Hideto Fujii, Mitsubishi Heavy Industries*

dSPACE's prototyping systems, Hideto Fujii mentioned the contribution of ControlDesk's powerful monitoring and online tuning functions.

Magnetic Levitation Benefits from Prototyping

University research also benefits. Professor Xiaoyou Zhang of the Nippon Institute of Technology reported on how prototyping is being applied to research into technology for controlling the magnetic levitation systems used in mag-lev linear-motor trains and various other fields.

Per Bypass in the Fast Lane

Hideki Takamatsu of Toyota Motor Corporation described how dSPACE bypass systems are currently being used in automobile development. He stated that the principal require-

ment man-hours by between 10% and 30%. At the same time, conventional document creation is not necessary, and considerably less production reworking is needed to deal with problems detected during vehicle testing. Hideki Takamatsu said that prototyping also demonstrates vehicle performance at an early stage. It has helped achieve efficiency improvements in advanced development and has contributed

> "Prototyping, including the bypass system, is a means of rethinking conventional development methods, and can reduce development man-hours by between 10% and 30%."
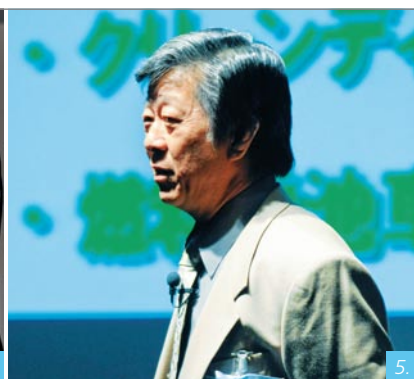>
> *Hideki Takamatsu, Toyota Motor Corporation*

Figure 1: Rapid prototyping use case: High-speed nanoscale servo control for an atomic force microscope from The Fujimoto Research Laboratory, Yokohama National University.

Figure 2: Dr. Herbert Hanselmann, CEO, dSPACE.

Figure 3: Mr. Hideto Fujii, Mitsubishi Heavy Industries, Ltd.

Figure 4: Mr. Hideki Takamatsu, Toyota Motor Corporation

Figure 5: Mr. Kazutoshi Mizuno, Nissan GT-R Chief Vehicle Engineer & Chief Product Specialist held the keynote speech. He pointed out, that "High performance and service engineering should advance at the same rate, otherwise it will not be possible to provide customers with the products they want."

environment. When introducing dSPACE's latest products, Mr. Hagen Haupt, dSPACE GmbH, focused on the ASM (Automotive Simulation Model) Electric Component Models, which are dedicated automotive models. Conference visitors were highly interested in the venue's electric drive display. Takashi Miyano of dSPACE Japan's Engineering Division described an electric drive development tool. He explained that the tool could develop electric motors with the same flexibility, high efficiency, and other advantages offered by conventional dSPACE products, and seamlessly integrate applications using hybrid functions or electric motors with existing HIL systems.

Energy Supply with Smart Power Grids
Smart grids were another hot topic. Because power generation systems and its infrastructure are so diverse, this field will most likely see an increase in the requirements for a whole range of applications. One factor behind this is the current growth in equipment that needs to be controlled by software. dSPACE Japan's President Hitoshi Arima mentioned dSPACE's impressive product track record already achieved in this field. Engineers use the products to

perform generator or power transmission infrastructure simulations and also in related equipment, in training simulators and in simulators for generating abnormal states. In these fields, too, the quality of the

software that delivers security and safety can have major social impacts. dSPACE will continue to enhance its engineering services and provide test environments for improving environmental performance. The goal for the future is to propagate the use of model-based development centered on HIL simulators, harnessing the potential that these have for improving software quality.

Thank You
This conference clearly benefited from the active support of guest speakers and partners. We would like to sincerely thank everyone who so generously cooperated, and we hope that visitors gathered much useful information and went back home with many tips on developing control systems. ■

Green Success

Ecofriendly engineering solutions were a major topic at the dSPACE Japan User Conference 2009. Even in this new field, customers rely on dSPACE's well coordinated development tools and services.