Laboratory / Center profile

Systems Engineering Center

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Systems Engineering Center is a new center which was founded this past April. It aims to identify issues concerning the lifecycle of various systems including *System of Systems*, to seek how these issues can be addressed, and to implement solutions.

The Center conducts research into the latest systems engineering, including *System of Systems* and *Enterprise Systems Engineering* based on the approach of systems engineering. It also carries out activities with a view to penetrating systems engineering in society.

The Center supports international activities, such as functioning as the Japan Chapter (JCOSE) of the International Council on Systems Engineering (INCOSE) and translating the SE handbook and related textbooks into Japanese. It also organizes symposiums and meetings, including the Asia Pacific Council on System Engineering (APCOSE) and the Council of Engineering Systems Universities (CESUN) in cooperation with the University Society. For private companies, the Center provides training on topics, such as system architecture, and integration/system evaluation and verification/project management. It supports certifications for systems engineering such as Associate Systems Engineering Professionals (ASEP) and Certified Associate in Project Management (CAPM). The Center is active in organizing training for private companies and for the public concerning systems engineering and project management.
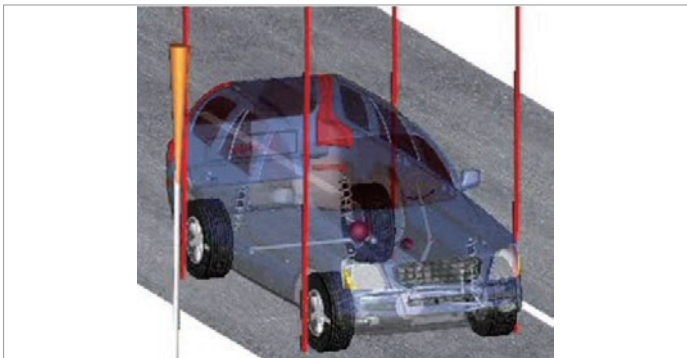

Figure 1: Development of MBSE for Next-Generation Mobility Design (Benchmark Problem Provided by the Society of Automotive Engineers of Japan)
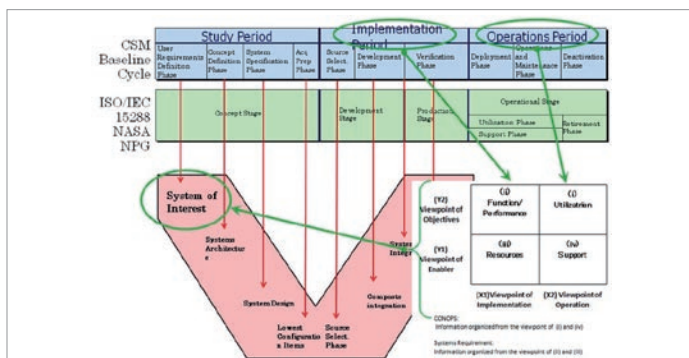

Figure 2: Requirement-Centered Software Development

MBSE Development for Next-Generation Mobility Design

We conduct research on design of chassis and drive-control system of four-wheel-drive compact electric vehicles. We carry out a wide range of system development by creating models following the flow of requirements, functions, logics, and physics, and by relating a functional model to an executable dynamic model.

Demand-Driven Software Development

Sixty-nine percent of the domestic software development programs fail. With a view to addressing this problem, we are seeking a method to introduce the V-model as advocated by INCOSE while pursuing a design method which focuses on "requirements" (ISO/IEC 29148, IEEE Std 830-1998).

Research on *Hodoyoshi* Reliability Engineering—Its Application to Development of Ultra-Small Satellites

By focusing on the complexity of systems instead of accidental failure rates of parts/components, we study *Hodoyoshi* Reliability Engineering based on systemic failure. Applying the *Hodoyoshi* Reliability Engineering, we are conducting joint research with the University of Tokyo in order to realize reasonable reliability at a moderate cost.

SE/PM Education for CanSat Development

We organize workshops about systems engineering and project management for students covering the development of a mock satellite, CanSat. More than ten universities have participated so far, such as Keio University, the University of Tokyo, Tokyo Institute of Technology, Tohoku University, and Osaka Prefecture University.

Figure 3: SE/PM Education Covering CanSat Development

The Systems Engineering Center published a translated version of a book entitled, "A Practical Guide to SysML (The MK/OMG PRESS, ELSEVIER)," with support from the members of the Model-Driven System Development Laboratory.
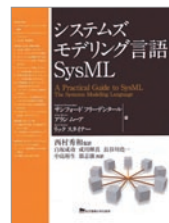
Title: "Systems Modeling Language, SysML"
Translation Supervisor: Hidekazu Nishimura
Joint Translators: Seiko Shirasaka, Terumasa Narukawa, Akihiro Hasegawa, Yusei Nakajima, and Chih-Chiang Weng
Authors: Sanford Friedenthal, Alan Moore, and Rick Steiner
Publisher: Tokyo Denki University Press
Release Date: May 10, 2012

With Mr. Sanford Friedenthal as guest speaker, we held a symposium about model-based systems engineering and a lecture on SysML from June 12 to 14. The report on these events will be available in the next issue of SDM NEWS.

SDM System Design and Management