Ahluwalia   *continued*

an enterprise and explain why it has flourished. By the same token these methods have been used to provide solutions for sustaining success in troubling times.

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Technical Activites

Announcing BKCASE: Body of Knowledge and Curriculum to Advance Systems Engineering

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In September 2009, Stevens Institute of Technology, together with the Naval Postgraduate School, began the Body of Knowledge and Curriculum to Advance Systems Engineering (BKCASE, pronounced "bookcase") project. BKCASE is a three-year effort to create a robust Systems Engineering Body of Knowledge (SE BoK) and a Graduate Reference Curriculum in System Engineering (GRCSE, pronounced "Gracie"). Endorsed by the INCOSE Board of Directors, with significant funding from the U.S. Department of Defense and support from the IEEE Systems Council, BKCASE is the response to a call from government and industry for a globally recognized, community-created foundation for the discipline of systems engineering. The BKCASE project hopes to materially influence standard practice, workforce models, certification, and graduate education around the world.

Figure 1 describes BKCASE, showing the project in the upper left-hand corner, and the products—comprised of SE BoK and GRCSE—in the lower right-hand corner. The BKCASE systems diagram describes the project development through a "story" of the relationships between the project and products, the systems-engineering community, and the various products in the community that will be developed based on BKCASE. The BKCASE vision is that competency models, certification programs, textbooks, graduate programs, and related workforce-development initiatives for systems engineering around the world will align themselves with BKCASE.

The SE BoK will define and organize the vast knowledge of the discipline of systems engineering, including its methods, processes, practices, and tools. Within that organization, the SE BoK will point to many thousands of pages of articles, books, Web sites, and other sources of knowledge about systems engineering. The SE BoK will facilitate a common understanding of the core of the field, and will aid fast and efficient knowledge retrieval. The SE BoK will build consensus on the boundary of the discipline and facilitate communication among systems engineers.

GRCSE will be based on the SE BoK and will define the entrance expectations, curriculum architecture, curriculum content, and expected student outcomes for graduate programs in systems engineering. GRCSE will recommend that students

learn about the application of systems engineering in an application domain or business segment. The use of GRCSE for guidance will enable consistency in student proficiency at graduation, making it easier for students to select where to attend and for employers to evaluate prospective new graduates.

The BKCASE team includes invited authors and volunteer reviewers from around the world representing different locales, business segments, professional societies, and areas of expertise. The team has representation from government, industry, and academia. Authors volunteer their time for one or two days per month, attend quarterly workshops, and participate in periodic virtual meetings. Reviewers work as time permits. Once fully staffed, the team will have thirty to forty authors and several hundred reviewers. Some authors and reviewers will work on both SE BoK and GRCSE; others will work on only one product.

Two interim drafts and the final products will be developed in one-year intervals starting in June (SE BoK) and September (GRCSE) of 2010, with version 1.0 products due out in 2012. Both INCOSE and the IEEE Systems Council will be heavily involved from the beginning, possibly leading them to take up maintenance responsibility for BKCASE products and to adopt them in their own products such as the INCOSE *Systems Engineering Handbook* and INCOSE professional certification program. Anyone interested in supporting BKCASE in any capacity, or anyone who has source material to offer, please contact the project leader, Art Pyster, by e-mail at art.pyster@stevens.edu. For additional information on BKCASE, please see http://www.bkcase.org.

Figure 1. Systems diagram describing BKCASE

Alice Squires 11/2/2009

New Guidelines for Graduate Software-Engineering Education

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A new set of guidelines for graduate software-engineering education was recently published by Stevens Institute of Technology. In 2007 academia, industry, government, and professional societies formed a coalition called the Integrated Software and Systems Engineering Curriculum (iSSEc) project to create a reference curriculum that reflects current development practices and the greater role of software in today's systems. The guidelines are published as the *Graduate Software Engineering 2009 (GSwE2009): Curriculum Guidelines for Graduate Degree Programs in Software Engineering* and are available at http://www.gswe2009.org. Earlier versions of this work used the name "Graduate Software Engineering Reference Curriculum (GSwERC)."

One of the primary goals of the iSSEc project was the incorporation and integration of systems-engineering knowledge and practices into graduate software-engineering programs. Large systems today include significant software content. The software engineers who work on these systems need to understand better the relationships between hardware, software and human components. INCOSE has been an active member of the iSSEc project, participating in authorship, review, and promotion of the effort.

We are indebted to the many experts who helped create the guidelines. A complete list of those participants and their supporting organizations is included in the report. We are especially grateful to Kristen Baldwin and others in the U.S. Office of the Secretary of Defense for their consistent, generous, and thoughtful support of this project.

History of the Project

In 1989 the Software Engineering Institute (SEI) of Carnegie Mellon University published a landmark report on graduate education in software engineering (Ardis and Ford 1989). Several universities in establishing their software-engineering degree programs used the recommendations in that report. Since then, the way software is developed has changed dramatically. Software's scale, complexity, and criticality have mushroomed, yet no significant effort has been made to revisit and update the original SEI recommendations.

GSwE2009 builds on the SEI curriculum foundations plus those of other initiatives, such as the *Guide to the Software Engineering Body of Knowledge* (SWEBOK; Bourque and Dupuis 2004) and *Software E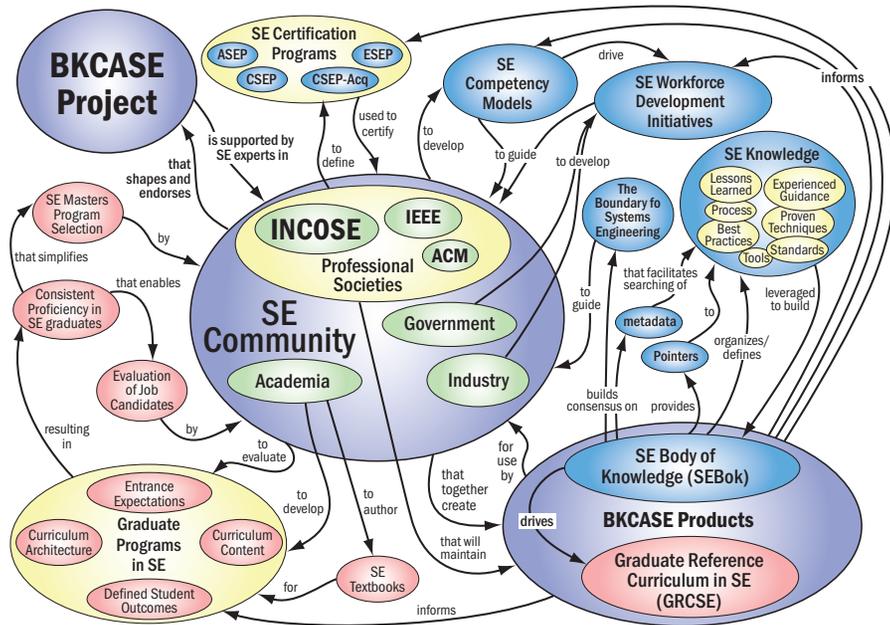ngineering 2004: Curriculum Guidelines*