What Are the Future Challenges of Software Technology?

As this issue of CrossTalk goes to print, the Software Technology Support Center (STSC) and Utah State University are busy working the final details of the 14th Annual Software Technology Conference 2002 – "Forging the Future of Defense Through Technology." With abstract submittals up dramatically from the past year and a slate of distinguished keynote speakers, we are confident this year's conference will be as strong as ever.

What is the future of software technology? As military departments transform operations, commands define new methods of force employment, and industry develops the next generation of advanced weapons, the prognosis of many software technocrats is unfolding – increased demand for quality, rising importance of information assurance, and new requirements demanding interoperability and exchange of data across systems. These technical challenges must be met while competing for talent, training a new workforce, and developing more mature organizations that can consistently deliver new products on schedule while increasing efficiency. The articles in this month's CrossTalk explore some of these challenges.

First we present the results of a study by Dr. Richard Turner, faculty member of The George Washington University and assistant deputy director for the Software Intensive Systems Office of the Under Secretary of Defense. In *A Study of Best Practice Adoption by Defense Acquisition Programs*, Dr. Turner states that a survey of 14 software centers involving 150 programs indicated that despite demonstrated effectiveness and awareness, only about 25 percent of programs fully adopt any given best practice. He also explores barriers to implementation. The data show that with regard to software development and acquisition practices, leadership must focus on implementation.

How can organizations develop a culture and practices to achieve success? Dr. Barry Boehm, Dr. Daniel Port, and Apurva Jain of the University of Southern California and Dr. Victor Basili of the University of Maryland address this question in part four of a series of articles for CrossTalk. Building on the project-level benefits of Model-Based (system) Architecting and Software Engineering (MBASE), and Schedule as Independent Variable (SAIV) approaches in the previous article, this month's work, *Achieving CMMI Level 5 Improvements with MBASE and the CeBASE Method*, describes how to address the CMMI organization-level process areas, particularly those of achieving continuous improvement.

The need for cooperation and data sharing among intelligence, military, and law enforcement organizations is the backdrop for *U.S. Defense Department Requirements for Information Security* by Kevin J. Fitzgerald of Oracle Corporation. Information security and multi-level security requirements are becoming primary considerations for the design of any major system (weapon or information). Fitzgerald outlines the basic requirements and information security terminology and makes a case for secure, independently evaluated solutions that incorporate security into the entire computing infrastructure.

Following this, Dr. Linda H. Rosenberg, Goddard Space Flight Center, NASA, in her article, *What is Software Quality Assurance?* defines the link between system safety and mission success to software quality assurance.

As the size of software products grows, effective test automation becomes necessary. In our next article, *Surviving the Top 10 Challenges of Software Test Automation*, Randall W. Rice discusses common problems with test automation and describes strategies for improvement. Making test automation an integral part of the organization and engineering process is necessary to gain its benefits.

Lastly, *Information Security System Rating and Ranking* by Dr. Rayford B. Vaughn Jr., Ambareen Sira, and Dr. David A. Dampier all of Mississippi State University summarizes information gathered from a joint workshop conducted with both government and commercial sector engineers. The result was a characterization of information security metrics, and a case that processes, procedures, tools, and people all interact to produce assurance in systems. An effective set of measures must incorporate all these areas.

These topics – best practices, implementing organizational change, metrics, quality assurance, test automation, and information security – are but a few of those to be presented and displayed at this year's Software Technology Conference, April 29-May 2, 2002. We hope to see you there as we all share ideas that will carry us into the future of software technology.

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