GSAM2005 Tutorial G:
Evolutionary Acquisition and Spiral Development

Length: Half Day

Overview:

The publication of Department of Defense (DoD) Directives 5000.1 and 5000.2 established a preference for the use of evolutionary acquisition and spiral development in the acquisition of complex weapon systems. National Security Space Acquisition Policy 03-01 provided some Space-oriented customization of the fundamental acquisition life cycle models and, similarly to the original DoD directives, also positioned evolutionary acquisition and spiral development as preferred strategies for the Space domain. The tutorial's key objective is to emphasize to both acquisition and development organizations that these approaches should be implemented not simply for policy compliance's sake, but because they represent a prudent risk mitigation strategy. In addition to the Spiral Development Model, an increasing number of development organizations are choosing RUP®, the IBM/Rational Unified Process as their main development life cycle model. A secondary objective of this tutorial is to explain the similarities and differences between Spiral and RUP®, and provide tangible life cycle modeling guidelines for the acquisition organizations during the formative stages of the contracting process.

Despite the fact that evolutionary concepts were introduced in the early 1960's and spiral development in the 1980's, substantial confusion remains about the use of these approaches. One of the main sources of confusion is that the development of complex, software-intensive systems requires a high level of concurrency and the use of different life cycle models in the various parallel process threads. This tutorial presents a detailed, risk-based analysis of the basic LCM patterns that is essential in defining the overall project's life cycle processes. Special attention is given to the discussion of the Spiral Model, due to its central importance in system development. Students and practitioners alike have difficulty understanding and applying the Spiral Model. The difficulties stem fundamentally from the flexibility of the model. While it was originally introduced as a software development life cycle model, in reality it is much more; it is a meta-model, with multiple applications. It is, in fact, a risk-driven process generator that is applicable not only to Software Engineering, but Systems Engineering as well, and it can be applied to the development of any process, concurrently with product development. The spiral approach is applicable to both acquisition and development, and while it is nowhere explicitly mentioned in the literature, its process generator capabilities are also essential in the creation and understanding of any evolutionary acquisition or development life cycle processes.

Instructor: Peter Hantos, The Aerospace Corporation

Biography:

Dr. Peter Hantos is currently Senior Engineering Specialist in the Software Acquisition and Process Office of the Software Engineering Subdivision at The Aerospace Corporation. He has over 30 years of experience as manager, software engineer, professor, and researcher. Prior to joining Aerospace, as
Principal Scientist at the Xerox Corporate Engineering Center, he developed corporate-wide engineering processes for software-intensive systems. Earlier, as Department Manager, he directed all aspects of quality for several laser-printer product lines. Dr. Hantos has authored over 40 publications. He is a Member of ACM, Senior Member of the IEEE, and holds MS and PhD degrees in Electrical Engineering from the Budapest Institute of Technology, Hungary.

**Who Should Attend:**

The tutorial is introductory in nature, and targeting a broad audience of people in both acquisition and product development environments. There are no formal, topical pre-requisites, just a basic familiarity with the system and software development process; all concepts introduced are discussed methodically, in a bottom-up fashion, in detail. Program office personnel, project managers, executives, process architects, and software engineers can all benefit from the tutorial with, of course, amplifications on slightly different areas of the material.