The Software Management Series



Implementing a Formal, Metrics-Based Risk Management Approach

Dr. Elaine M. Hall
Author of the
Software Risk Management and Metrics Guidebook,

presents:

SOFTWARE RISK MANAGEMENT

Sponsored by:

H. Silver and Associates (UK) LTD.
Advanced Systems Division

LONDON
11-13 March 1996

ABOUT THE PROGRAMME

The first rule of software development: Risk is inherent in all large software systems. The most common approaches to dealing with risks in software developments have been to ignore the potential problems and hope they do not happen, or to implement a piecemeal response to problems after they have occurred. As might be imagined, neither approach has been effective. However, studies in the US and Europe have shown that some leading software development organisations have been successful in minimising and combating risks using formal, quantitative risk management techniques and processes. How have they done it?

This seminar, presented by the leading US expert on Software Risk Management, explores the development of a comprehensive Risk Management approach based on the best methods utilised in hundreds of projects. Participants will learn how to implement quantitative risk management, assessing and controlling risk using a metrics-based process. You will learn how to identify the conditions under which specific product risks (e.g. complexity, integration and interfaces, and test feasibility) and project risks (e.g. changing requirements, cost/schedule constraints, staffing, and external interfaces) are likely to impact a development. You will learn methods for uncovering hidden risks, and analysing how risks interrelate. Finally, you will learn how to develop metrics — based on your risk scenarios — to manage risk, and determine when to implement specific corrective actions to combat problems.

- What Methods Have Proven Effective in Managing Risks?
- How do you Identify Hidden Risks? The Most Significant Risks? Evaluate Interrelated Risks?
- What do you do When the Customer is the Biggest Risk? When Management Won't Acknowledge Risks? When Risks Occur in Later Development Phases?
- How Can You Assess When Risks are Likely to Occur — And the Impacts of Responses to Risk Occurrences?
- What Software Metrics should be used to Track Schedule Risks? Technical Risks? Process Risks? Trigger Risk Mitigation Measures?

ABOUT THE SPEAKER

DR. ELAINE M. HALL is the Director of Risk Management and Metrics at Computer & Concepts Associates. In this position she is supporting the US DoD's Software Program Managers Network (SPMN) software best practices implementation, which is re-defining software acquisition and management practices for the US government. She is the author of their Software Risk Management and Metrics guidebook, based on the best proven practices derived from the study of hundreds of software development projects. A leading researcher in Risk Management techniques, Dr. Hall serves on the Software Engineering Institute Capability Maturity Model (SEI-CMM) Working Group that wrote a Key Process Area (KPA) for Risk Management, which will be incorporated in the upcoming SEI CMM for Software, version 2.0.

With over 15 years experience in software engineering and management, Dr. Hall specialises in large-scale software system development. She has consulted on numerous projects for the government, military and intelligence communities, under contracts to the US DoD, NASA, Federal Aviation Administration, and the Defense Mapping Agency. In her previous position at Harris Corporation, Information Systems Division, she was responsible for design and development of a major system modernisation for the FBI, where she led cross-functional action teams in software risk management, software requirements analysis, and peer review. She served as a computer engineering consultant for software development of the Joint Stars Target Attack Radar System (J-STARS), and wrote the database software for the J-STARS that flew in Desert Storm.

An experienced lecturer, Dr. Hall has presented seminars on Risk Management and Metrics for the US Defense Systems Management College, and on MIL-STD-498 via direct satellite broadcast for the US Joint Logistics Commanders. She has also presented numerous papers on Formal Risk Management, Metrics for Software Risk Management, and Streamlining the Risk Assessment Process for major DoD, SEI, and EFDPMA conferences.

AGENDA:

1. FOUNDATIONS OF SOFTWARE RISK MANAGEMENT

- Software Risk Management — Similarities and Differences of Boehm, Charette, et al.
- Risk Management Requirements in ISO, ANSI/AQC, IEEE, and Other Standards
- Best Practices in Formal Risk Management
  - Effective and Ineffective Practices
  - Airlie Council Consensus — Changes to the US DoD Software Acquisition Process
- Using Risk Management on Proposals — Evaluating Programme Viability, Budget, Schedule, Technical Risk

2. THE 1990s TOP TEN SOFTWARE RISKS — AND PRESCRIPTIONS

- What to Do If the Customer is the No. 1 Risk — Requirements Instability, Completeness Issues
- Dealing with Scarce Resources — Budget, Schedule, Staff Experience
- Addressing Project Planning Risks
  - Defining Roles and Responsibilities
  - Maintaining the Master Plan
- Guidance for Development Process Risk Areas — Planning, Formality, Environment Suitability
- Interfaces, Interfaces, Interfaces — Issues with Sponsors, Customers, and Contracts
- When "Silver Bullet" Solutions are Risks in Disguise
  - Risks in COTS and Object-Oriented Methods
  - Risks in Distributed Computing and Reuse

The following five sections will show you how to use risk management methods derived from Dr. Hall's study of hundreds of software projects. You will learn to assess how interrelated risks can impact a specific project, and how to apply quantitative methods to control these risks. Using numerous illustrations and software development scenarios, Dr. Hall will examine the broad variety of software risks, including requirements instability, using unproven software technology, complex requirements, dependency on delivery of tools or modules by outside suppliers, and insufficient schedule or budget — among others.

3. METHODS AND TOOLS FOR RISK IDENTIFICATION

- Techniques and Sample Questionnaires for Risk Identification
- Developing a Project Characteristics-Risk Factors Matrix
- Identifying the Most Significant Technical Risks
- Understanding Customer Risk Priorities — Performance, Functionality, Schedule, Cost, etc.
- Finding Unknown Risks
  - Using the WBS as a Checklist
  - Examining the Interfaces and Critical Path
  - Risks in COTS and Object-Oriented Methods
- Establishing a Baseline of Assessed Risks

4. METHODS AND TOOLS FOR RISK ANALYSIS

- Qualitative and Quantitative Methods for Estimating Likelihood and Consequence
- Determining the Timeframe that a Risk May Impact a Project
- Evaluating Interrelated Risks
  - Determining Risk Exposure
  - Creating a Cumulative Risk Profile
  - Techniques for Prioritising Risks
- Modeling the Impacts of Responses to Risks — Decision Trees and Influence Diagrams
- The Software Risk Management Index
- Getting Management Attention — What to do When Risk is a 4-Letter Word

5. STRATEGIES FOR RISK REDUCTION

- Risk Transfer, Avoidance, Acceptance, and Reserve Strategies — When to Use Each
- How to Reduce Uncertainty and Increase Control — Buying Information and Prototyping
- Anticipating Risks by Establishing Targets
- How to Prevent Risks Using Causal Analysis
- How to Reuse Successful Risk Mitigation Plans
- Getting Risk Reduction Leverage in Later Phases
  - Integration and Testing
  - Operations and Maintenance
- Risk Reduction as a Proposal Discriminator

6. METRICS-BASED RISK TRACKING

- Monitoring Risk Status —Top-N Risk List
- Tracking of Risk Scenarios
- Using Software Metrics as Indicators of Risk
  - Static Metrics vs. Dynamic Risks
  - Matching Technical Performance Measures to Project Risk Scenarios
- Establishing Risk Mitigation Triggering Mechanisms
  - Defining Thresholds for Early Warning
  - Triggering Events using Time or Thresholds
- Disciplines for Small Projects that Scale-Up — Using Earned Value Techniques

7. RISK CONTROL IN EXPANDING SOFTWARE ENVIRONMENTS

- Reporting and Reviewing Risk Status
- Balancing Multiple and Conflicting Objectives
- Making Mid-Course Corrections
- Integrating Risk Management into Normal Activities
- Using a Capability Maturity Model
- Managing Software Risks in the 21st Century
  - PeopleWare, Third-Wave Companies, the Web
  - Software Factories and Outsourcing

8. IMPLEMENTING THE RISK MANAGEMENT PLAN

- Components of an Effective Plan
- Defining the Plan's Content and Scope
- Assigning Roles and Responsibilities
- Tailoring Recommendations for:
  - Integrated Product Teams (IPTs)
  - Low-Cost High-Risk Projects

SOFTWARE RISK MANAGEMENT

❑ LONDON 11-13 March 1996

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Programme Information: The material presented in this seminar is based on unclassified technology and unclassified examples of technology application areas.