



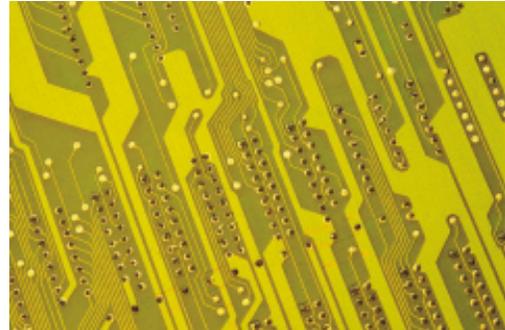
Principles of Test & Evaluation

A Workshop in Two Days

Product Assurance Linked to Requirements

Test and evaluation (T&E) provide the means to ensure that a product performs in the intended way and with the intended results. Testing starts very early in a product system development, however, because test planning is dependent on good requirements. This course is an overview of test and evaluation from product concept through operations, including:

- Creating good test requirements
- Test planning for complete coverage
- Test conduct during integration and verification
- Data collection, analysis, and reporting



Product testing must cover every last detail to ensure product success.

What You Will Learn:

- How T&E fit into the system development
- A useful life-cycle model for T&E
- Converting product/system requirements into test requirements
- Cycles of planning for T&E
- The differences in performing T&E during system integration and during verification/validation
- Overview of statistical methods used in T&E

The course is aimed at

- Test Engineers
- Design Engineers (any engineering discipline)
- Systems Engineers; Project Engineers; Technical Team Leaders
- System Support Leaders
- Technical and Management Staff
- Project Managers

An overview of test and evaluation (T&E) principles and methods for complex systems, including T&E tasks from beginning to end of a project. Topics include test requirements, test planning, verification and validation methods, development testing, integration testing, test conduct, record-keeping, analysis, test reporting, test data management.

Course work includes a case study in several parts, practicing the techniques learned to plan testing for a collaborative robotic system.

Drawing from decades of accumulated knowledge in system development, this course provides you with highly effective tools to use in your work. The material is augmented by examples from real-life experience, including participative examples from the attendees. Lessons include:

What is Test and Evaluation? – Basic definitions and concepts for the course. Test and evaluation overview; application to complex systems, relationship to other engineering and management disciplines. Roles of test and evaluation throughout product development, test phases (requirements, planning, conduct, analysis & reporting), correlation with program phases.

Test and Evaluation Model – An underlying process model that ties together all the concepts and methods. Verification and validation principles, verification methods (Inspection, Analysis, Demonstration, Test, etc.), Verification vs. Test, Verification vs. Validation, Test and evaluation processes in each model step.

Test Requirements – Requirements as the primary method for measurement and control of systems development. Where requirements come from; how to evaluate requirements for testability; how to derive test requirements from higher level requirements. Quantifying an operational need; analyzing missions and environments; defining performance, interface, and constraint requirements; evaluation of requirements for testability; deriving test requirements; the importance of a requirements verification matrix (RVM); Qualification vs. Acceptance requirements; design proof vs. first article vs. production requirements.

Test Planning – Evaluating the system concept to plan verification and validation by test. Trade-offs involved in test decisions; maturity at different phases; level of detail. System analysis for test planning; analyzing and evaluating alternatives; test resource planning; establishing a test baseline; developing a test schedule; change management; Test and Evaluation Master Plan (TEMP); task management as a test planning tool.

Integration Testing – How to successfully manage the intricate aspects of system integration testing; level of integration planning; managing complex system integration; work-arounds. Development test concepts; integration test planning (parallel/serial test sequencing, scheduling); preferred order of events; component testing; conducting integration tests for complex systems; work-arounds for anomalies and failures.

Test Conduct – How to perform testing; differences in testing for design proof, first article qualification, recurring production acceptance; rules for test conduct. Testing for different purposes, verification vs. validation; test procedures and test records; prerequisites management; readiness certification, test constraints, test article configuration; troubleshooting and anomaly handling; measures of success and indicators of difficulty; test tools.

Data Collection, Analysis and Reporting – Statistical methods; test data collection and analysis; report formats and records

Qualified Instructors

Dr. Eric Honour, CSEP has been an international leader in systems engineering for a dozen years, with 40 years of complex systems development. His energetic and informative presentation style actively involves class participants. He is a former INCOSE President, and INCOSE Founder, and an INCOSE Fellow. He has been a systems engineer, engineering manager, and program manager contributing to the development of 17 major systems in military, law enforcement, space exploration, and consumer products. He has been the President of Honourcode for over 20 years. Mr. Honour has a BSSE (US Naval Academy) MSEE (Naval Postgraduate School) and PhD from the University of South Australia based on his ground-breaking work on the value of systems engineering.



Dr. Scott Workinger has led innovative technology development efforts in complex, risk-laden environments for 30 years in the fields of manufacturing (automotive, glass, optical fiber), engineering and construction (nuclear, pulp & paper), and information technology (expert systems, operations analysis, CAD, collaboration technology). He currently teaches courses on program management and engineering and consults on strategic management and technology issues. Scott has a B.S in Engineering Physics from Lehigh University, an M.S. in Systems Engineering from the University of Arizona, and a Ph.D. in Civil and Environment Engineering from Stanford University.

