Object-Oriented Systems Engineering Method (OOSEM)

Manage Requirements Traceability

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OOSEM Topics

- OOSEM Overview
- Method
  - Setup Model
  - Analyze Stakeholder Needs
  - Analyze System Requirements
  - Define Logical Architecture
  - Synthesize Candidate Physical Architectures
  - Optimize and Evaluate Alternatives
  - Manage Requirements Traceability
  - Integrate and Verify System
- Summary

Module Objectives

- After completion of this module, student should understand
  - The primary modeling artifacts from Manage Requirements Traceability
  - How a specification tree is modeled
  - How each specification is defined in terms of a requirement hierarchy
  - How to trace text requirements to the design, analysis, and verification elements at multiple levels of the system hierarchy
  - The need for a disciplined requirements management process

Motivation

- Requirements traceability is essential to understand:
  - How requirements are satisfied and verified
  - The impact of requirements and design changes

Manage Requirements Traceability

- Invoked throughout the process
- Manage traceability from the mission-level requirements to the component requirements
  - Trace requirements to design, analysis, and verification elements

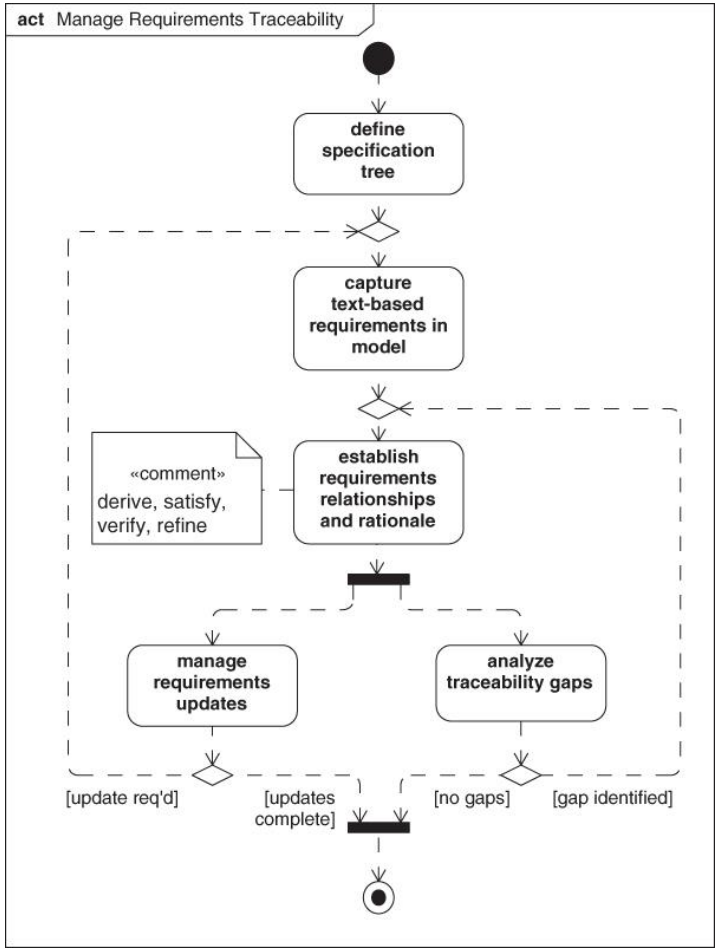
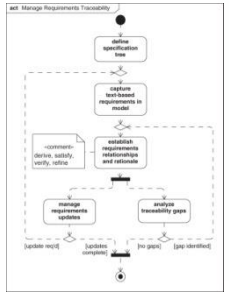


Figure 17.53

Define Specification Tree



- The specification tree shows the specifications at each level of the system hierarchy

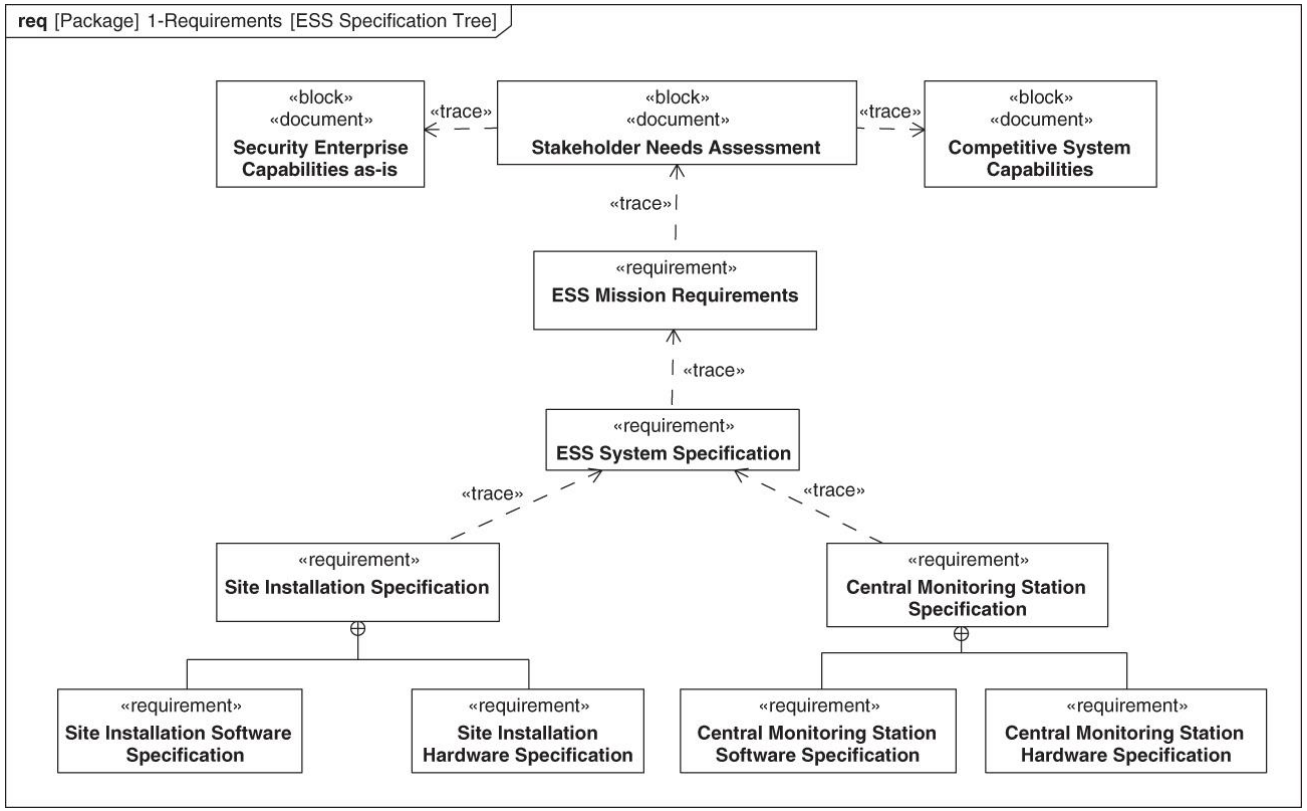
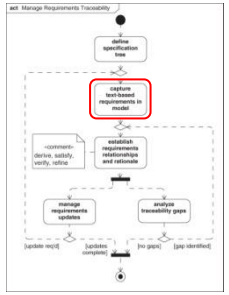


Figure 17.52

Requirements Hierarchy for Each Specification



- A top-level requirement for each specification is defined
  - The hierarchy or requirements corresponds to the way the specification is organized

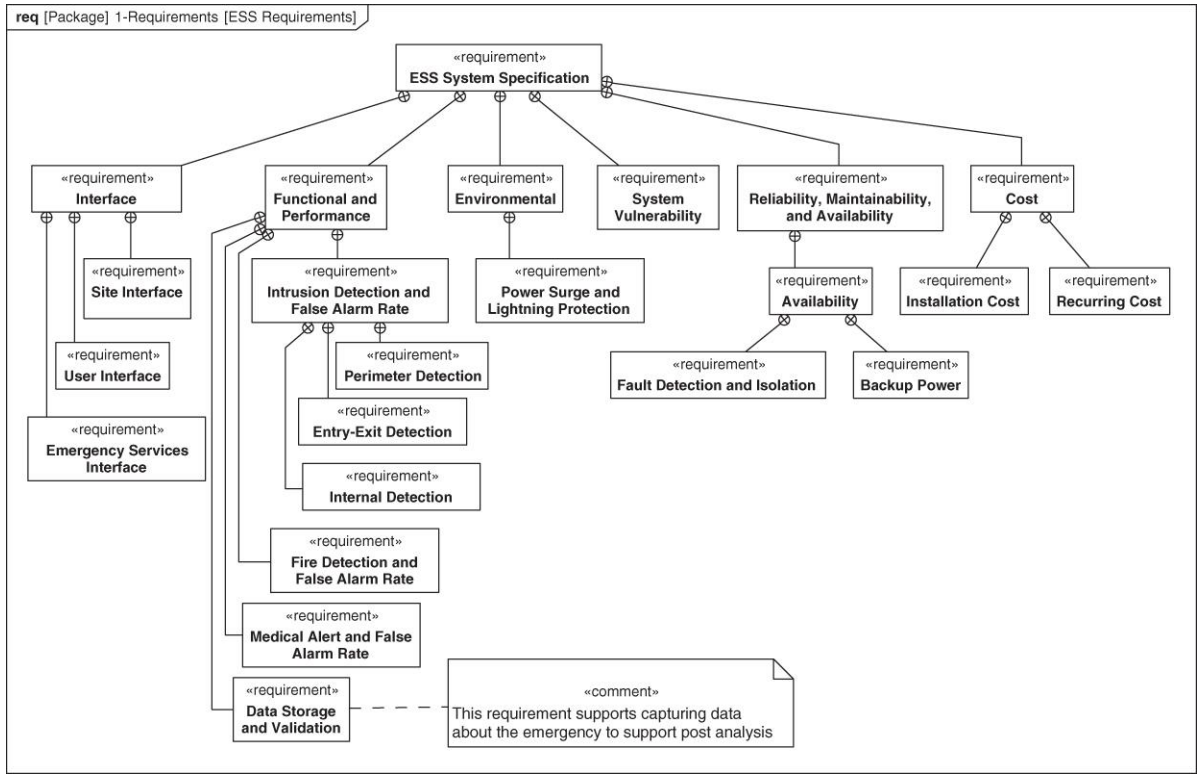
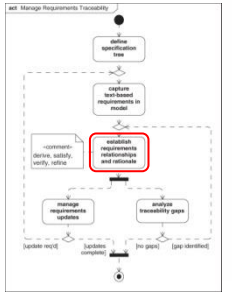


Figure 17.53

Establish Requirements Traceability



- Establish relationships between the text-based requirements in the model, and other model elements (including other requirements, design, analysis and verification elements)
- Capture rationale

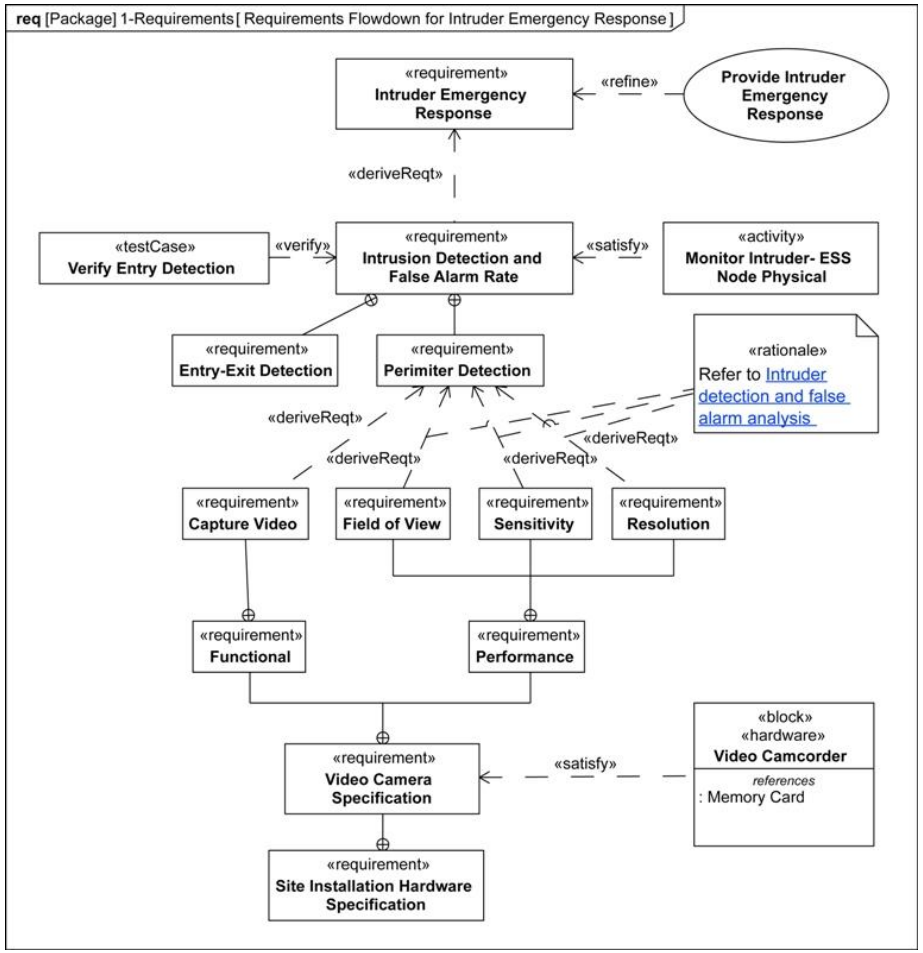
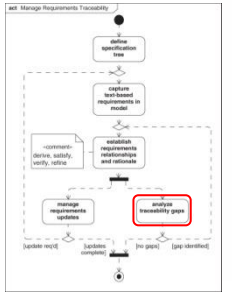


Figure 17.56

Analyze Traceability Gaps



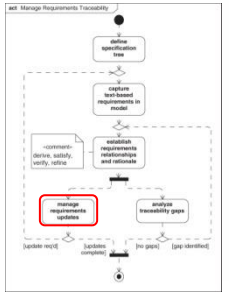
- Traceability reports can be generated from the model to analyze traceability gaps and assess how the system design satisfies the system requirements
- Viewpoints can specify a query to provide a view of the traceability from a stakeholder perspective

1-Requirements	14
2 ESS System Specification	14
2.2 System Vulnerability	
2.6 Interface	3
2.6.5 Emergency Services Interface	↙
2.6.7 Site Interface	↙
2.6.8 User Interface	↙
2.6.4 Wireless Activation and Deactivation (optional)	
2.6.8 User Interface	
2.6.8.2 Displays and Controls Interface	
2.6.8.1 Web Interface	
2.3 Reliability, Maintainability, and Availability	2
2.3.1 Availability	2
2.3.1.1 Backup Power	↙
2.3.1.2 Fault Detection and Isolation	↙
2.1 Environmental	1
2.1.1 Power Surge and Lightning Protection	↙
2.4 Cost	1
2.4.1 Installation Cost	↙
2.4.2 Recurring Cost	
2.5 Functional and Performance	7
2.5.4 Data Storage and Validation	↙
2.5.2 Fire Detection and False Alarm Rate	↙
2.5.1 Intrusion Detection and False Alarm Rate	↙
2.5.3 Medical Alert and False Alarm Rate	↙
2.5.1 Intrusion Detection and False Alarm Rate	3
2.5.1.2 Entry-Exit Detection	↙
2.5.1.3 Internal Detection	↙
2.5.1.1 Perimiter Detection	↙

System Satisfaction

satisfied

Manage Requirements Updates



- Manage updates to requirements via a defined requirements management process
- Requirements management tools can be used in conjunction with a systems modeling tool to manage the requirements
  - Tool integration required to synchronize requirements and their relationships in the different tools
- Requirements management process defines how changes are handled
  - Example: make changes to text requirements in the requirements management tool and update traceability relationships in the model
- Generate change impact reports and assess impacts by navigating model relationships to facilitate change process

Summary

- The specification tree identifies each specification and the traceability relationship between them
- Each specification contains a hierarchy of requirements
- Fine grained traceability can be maintained between the requirements in each specification and other requirements, design, analysis, and verification elements in the model
- Traceability reports can be generated from the model to analyze traceability gaps
- Updates to requirements are controlled by a management process and synchronization is maintained between the model and the requirements management tool