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Federal Systems

Application of Object Oriented Technologies in Developing the Resource Management Segment for the Air Force Satellite Control Network

Mike Farmer (michael.farmer@lmco.com)
Lockheed Martin Federal Systems

Tom Gallini (gallini@courier3.aero.org)
The Aerospace Corporation

Outline

- What is RMS?
- Overview of Methodology
- Capturing Customer/User Inputs
- Modeling System Behavior
- Detailed Design
- User Benefits
- Acquisition Agency Benefits

What is RMS?

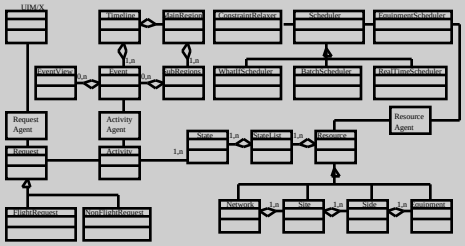
The Resource Management Segment (RMS) Provides Overall Control and Management of Air Force Satellite Control Network Assets.

- Resource Scheduling
  - Develops and Maintains Schedules
  - Automatic Schedule Deconfliction
  - "What-if" Analysis Tools for Hard Conflict Resolution
- Orbit Analysis
  - Generate Station and SV Crosslink Events
  - Detect RFI Conflicts
  - Perform Collision Detection and Avoidance Analysis
- Resource Control and Monitoring
  - Authorize Configuration/Deconfiguration of Comm/Range Resources
  - Tracks Status of Reportable SCN Resources
- Network Performance Evaluation
  - Report Resource Status, Usage, and Performance

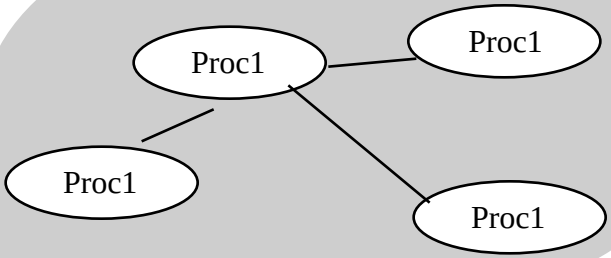
Overview of Methodology

Based on The 4+1 Model View -- Philippe Kruchten

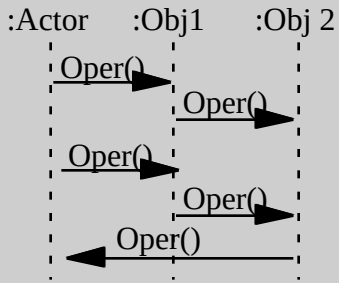
Logical View



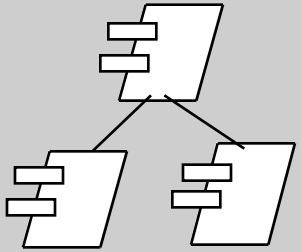
Process View



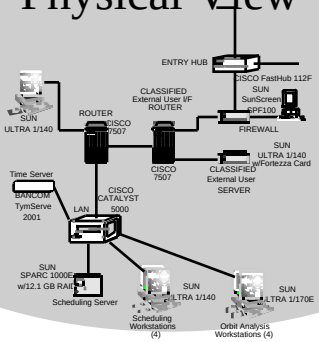
Scenarios



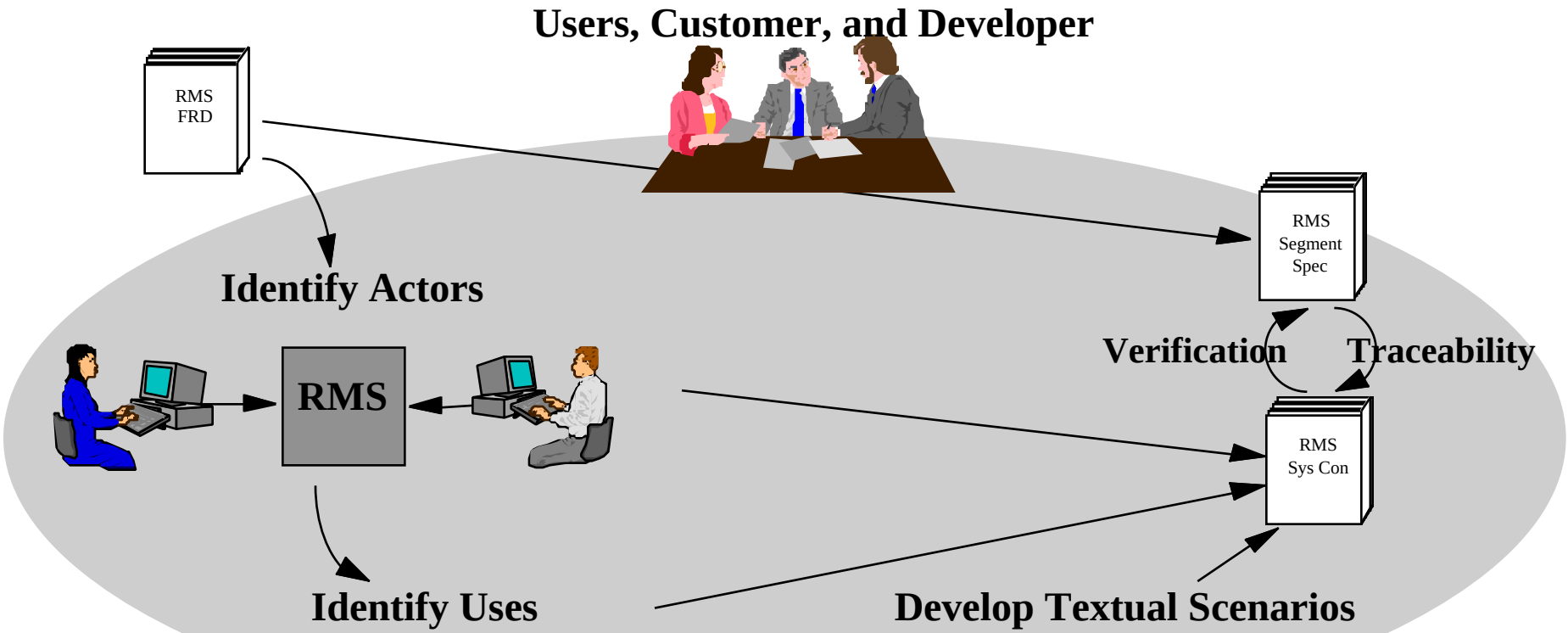
Dev View



Physical View



Capturing Customer/User Inputs Requirements & Use Cases



Actor	Use Case	Description
Scheduler	"What If"	Conduct what if on working schedule

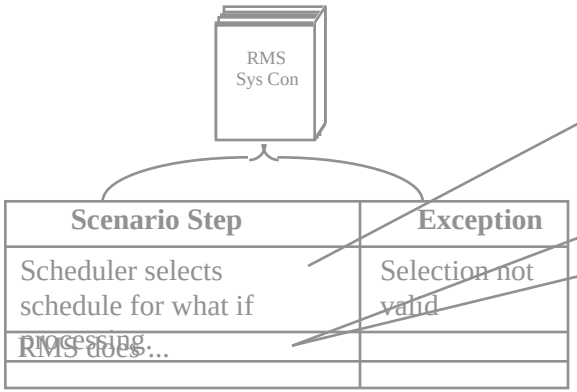
Scenario Step	Exception
Scheduler selects schedule for what if processing.	Selection not valid
RMS does ...	

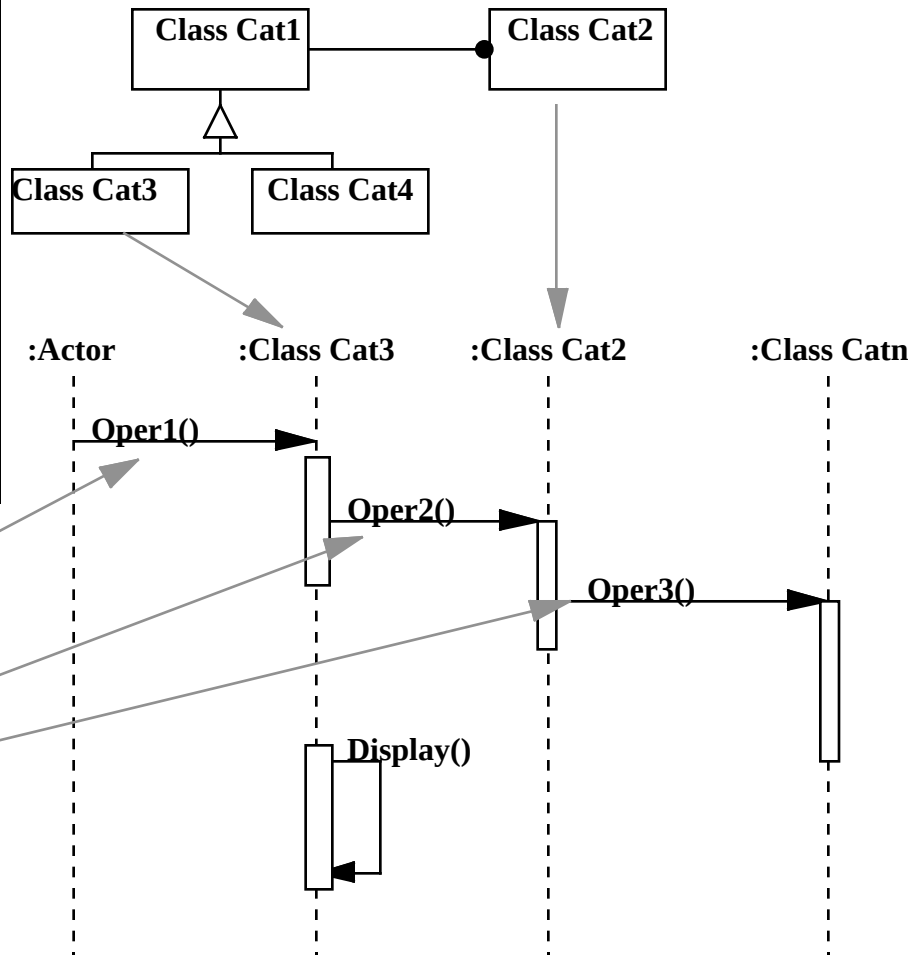
Capturing Customer/User Inputs
Uses of Use Cases

- System Test
  - Maintain traceability from Segment Specification into System Concept
  - Scenarios within use cases form test scenarios
- Users Manual
  - Scenarios define uses of the system, used as starting point for users manual.
  - Actor steps are expanded in the users manual.
- HMI Prototyping
  - Scenarios used to identify required screens.
  - HMI prototype used to verify scenario steps.
- Scenarios for System Design
  - Provides scenarios for design (more on this next)

Modeling System Behavior (Allocation of Services)

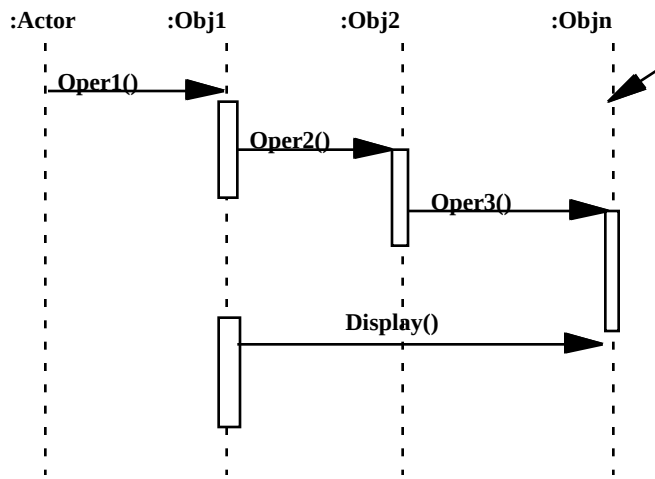
- Develop a high level logical model.
  - Abstractions (class category) based on subject matter.
- Develop a message trace for each scenario.
  - Each step in scenario is traced to one or more steps in message trace.
  - Additional system detail discovered.
- Operations on a class category defines it's public services.

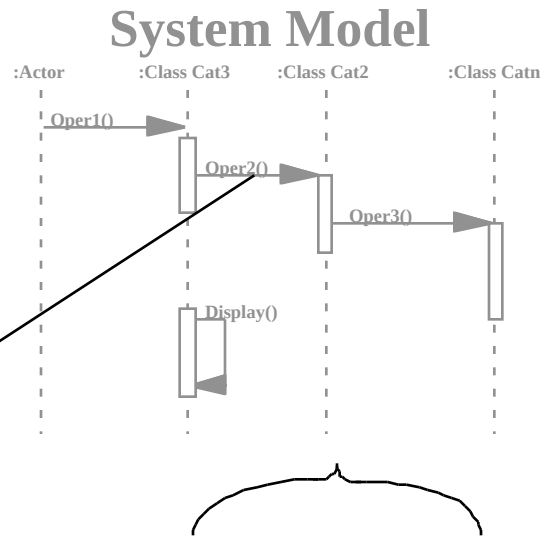


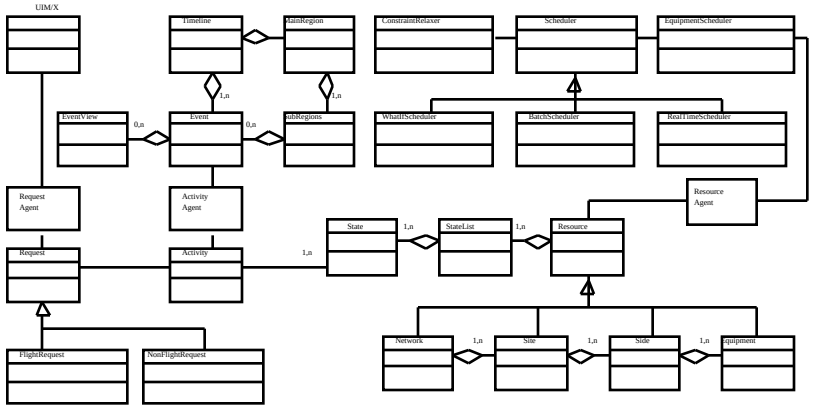


Detailed Design

- A detailed logical model is developed for each class category.
- Each public service is defined within a class.
- The behavior of the service is defined.
- Changes to services controlled at the system model.

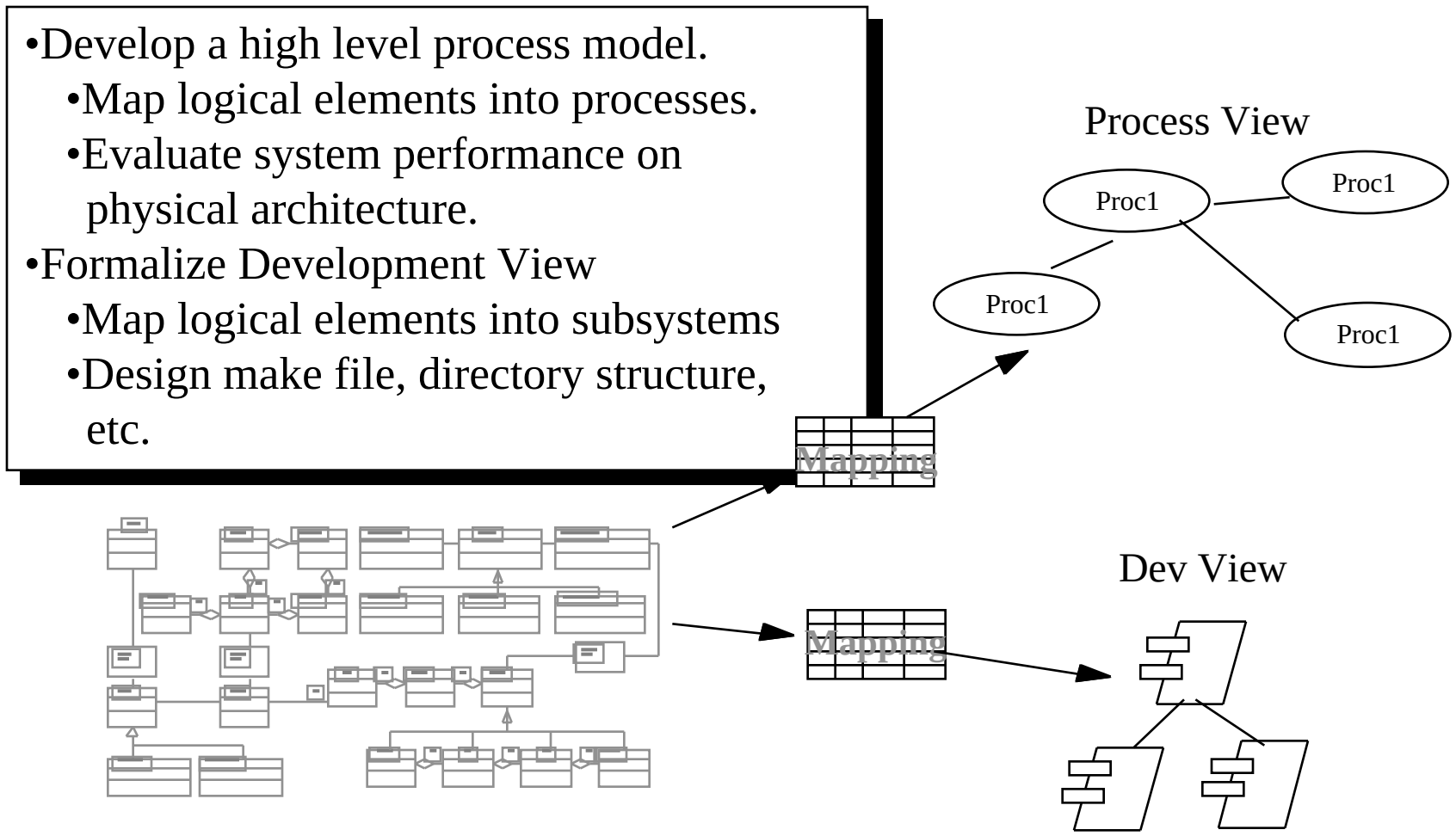




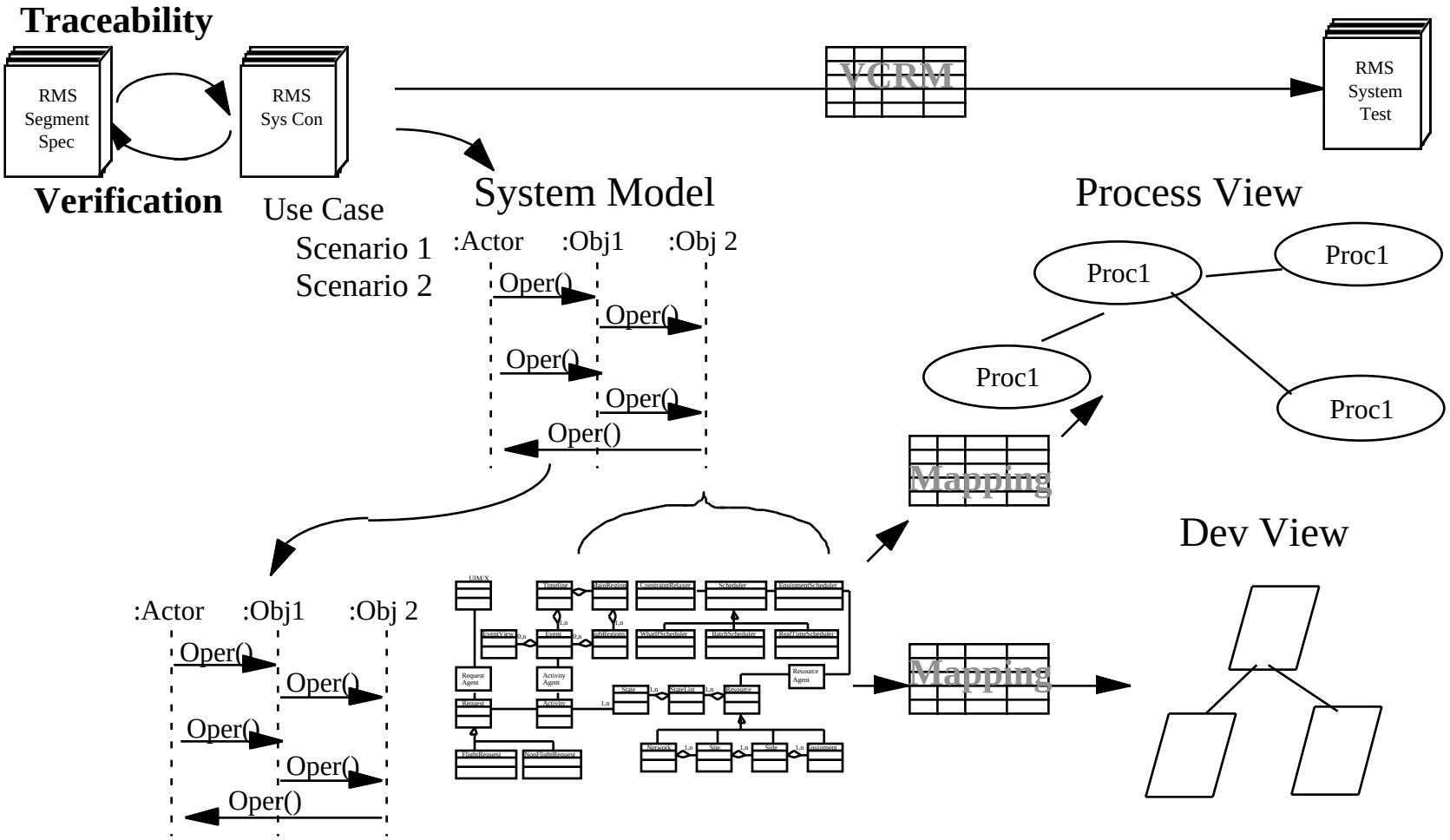


Detailed Design
Performance Requirements and Construction

- Develop a high level process model.
  - Map logical elements into processes.
  - Evaluate system performance on physical architecture.
- Formalize Development View
  - Map logical elements into subsystems
  - Design make file, directory structure, etc.



Putting it Together



User Benefits

- User Benefits
  - Early Insight Into System Operations
  - Common Understanding of Requirements
  - Users Follow System from Concept through High Level Design
  - Early User Buy-in
- Acquisition Agency Benefits
  - Early Insight Into Design
  - Early Customer Buy-in
  - Common Understanding of Requirements
  - Used as Starting Point for ECP Activity
    - Eases Estimation
    - Eases Reviews

Summary

- Object Oriented technologies provide a sound basis for architecture definition.
- An approach employing a common thread through architecture definition ensures a complete design.
- Customer and user involvement within the methodology frame work is key to success.
  - Involvement affords numerous benefits to the customer, user and developer.