

Assignment 2

CSE 681 SOFTWARE MODELING & ANALYSIS

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SYSML

A SUBSET OF OML DESIGNED FOR COMPLEX SYSTEMS ENGINEERING

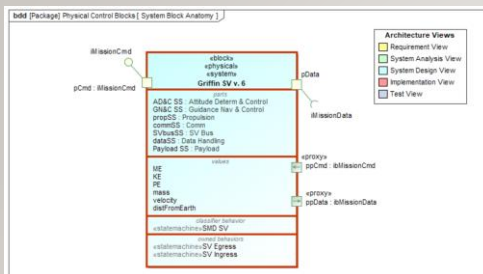
BY ANTHONY REDAMONTI

WHY USE MODELING LANGUAGES?

- Systems are becoming increasingly complex and are rapidly changing. Modeling languages are needed to decrease response time to rapidly evolving specifications.
- Improved team communication:
 - A picture says 1,000 words. Modeling languages help illustrate the complex interactions between software components in a system.
- Architectural + Behavioral modeling:
 - System Structure + Class Hierarchy
 - Interaction with user
 - How processes + threads interact with each other
- Provides Traceability: the team's progress is displayed and updated in real-time. Proves that the system requirements have been met through test case validation.

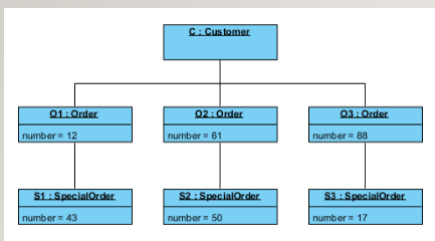
WHAT IS SYSML?

- A subset of UML.
- It's a graphical modeling language targeting model-based systems engineering: Integration of software + hardware.
- Created by members of INCOSE and the Object Management Group (OMG).
- 3 additional diagram types not included in UML: Structural, Cross-Cutting, and Behavioral.



STRUCTURAL DIAGRAMS (SYSML)

- **Block Definition Diagram (BDD):** represent system components (software or hardware), their interfaces and relationships.
 - Compartmentalizes a unique ID for the block and the requirement(s) it fulfills.



OBJECT DIAGRAMS (UML)

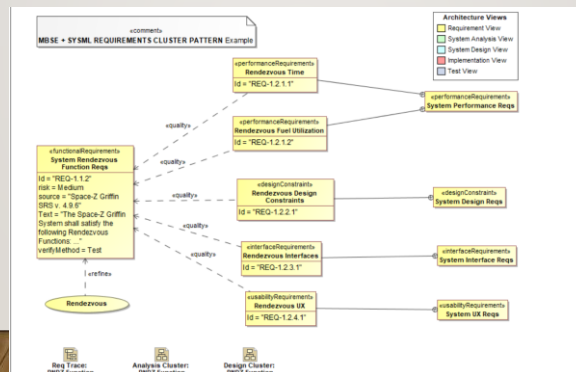
- Encapsulates an object in a class diagram, showing the state of an object at a point in time.

```

stateDiagram-v2
    [*] --> Created
    Created --> Shipping : request shipment
    Shipping --> Delivered
    Delivered --> Closed : confirm arrival
    Closed --> [*]
    Closed --> Cancelled
    Cancelled --> Created : cancel order
  
```

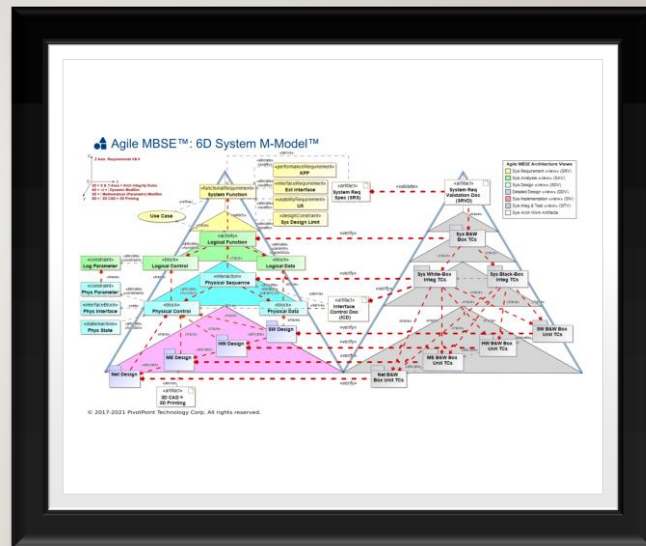
NEW CROSS-CUT DIAGRAMS (NOT IN UML)

- Requirement Diagram (REQ): a structural diagram that illustrates the relationships between requirements, models that satisfy them, and test cases that verify them.



SysML INTEGRATION WITH AGILE MBSE

- One key improvement from UML to SysML is the integration of Agile Model-Based Systems Engineering (MBSE).
 - Scalable
 - Simulatable
 - Pattern-based for reuse
 - Test-driven



COMPANIES USING SYSML TODAY

- Lockheed Martin Corporation
- ARTiSAN Software Tools
- Telelogic Systems
- EmbeddedPlus
- IBM Software Group