

# Introduction to SysML

## Part 3.0: Model Organization, Package and Use Case Diagrams

With tutorial exercises using MagicDraw

# Learning Objectives

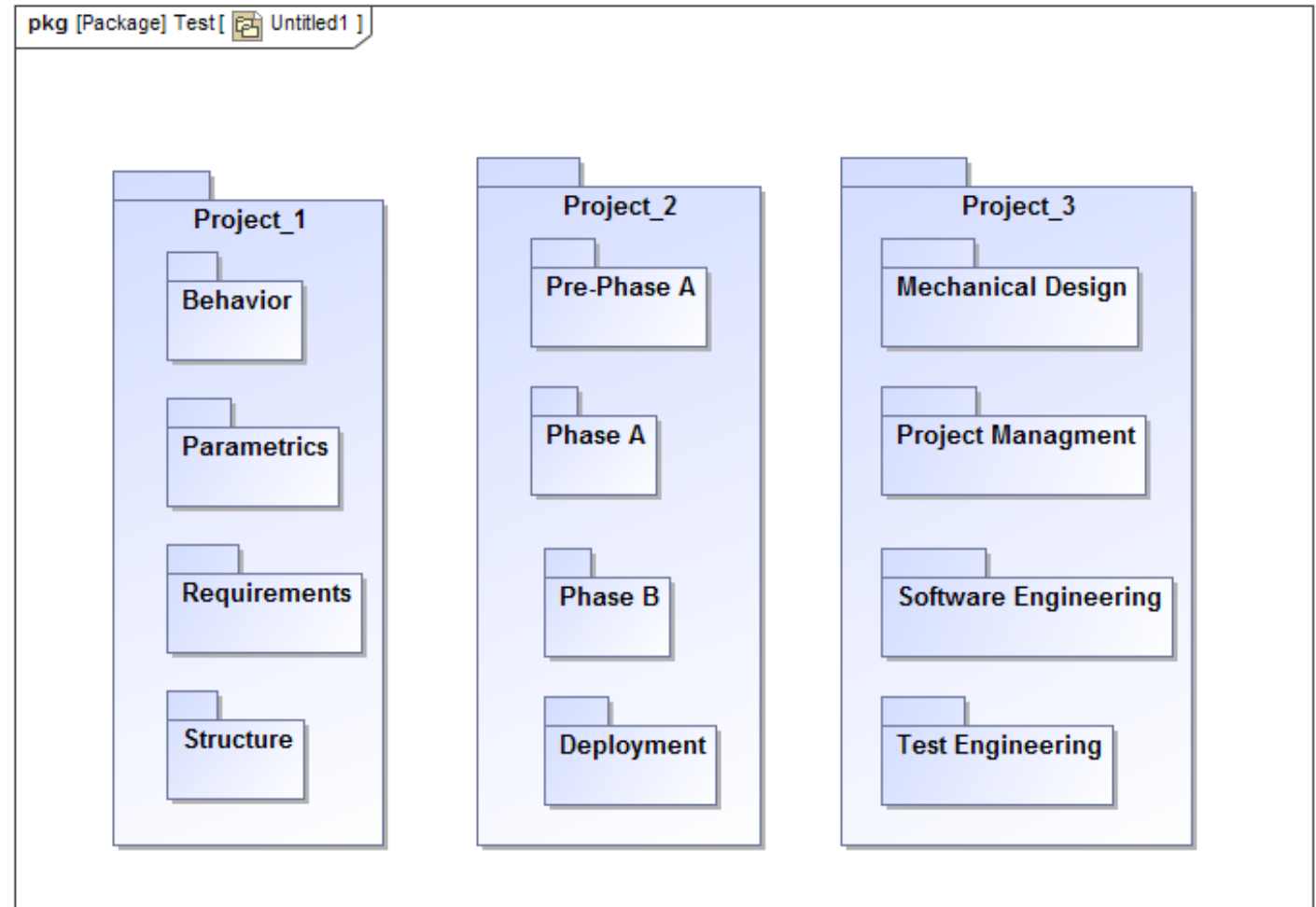
- ▶ Packages, Stereotypes, Profile and Model Libraries
- ▶ Package Diagrams
- ▶ First Exercise, creating a project and building a packaging diagram
- ▶ Use Cases and Use Case Diagrams
- ▶ Second Exercise, creating a use case diagram

# Model Organization

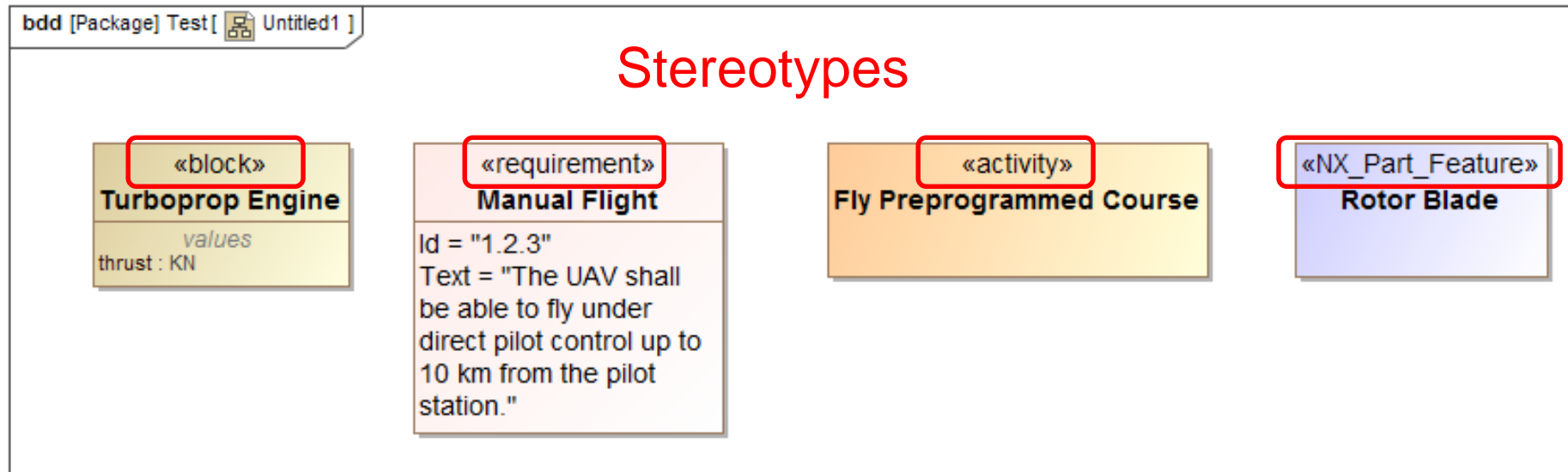
- In MBSE, the first step is deciding on model organization
- Good model organization
  - makes it easy to find elements of the model we want to work on
  - allows multiple modelers to collaborate on a model without getting in each others way.
- In SysML, model organization uses packages
- There can be multiple valid ways to organize a model
  - Model Organization  $\neq$  System Structure

# Model Organization

- There can be multiple valid ways to organize a model
  - Model Organization  $\neq$  System Structure

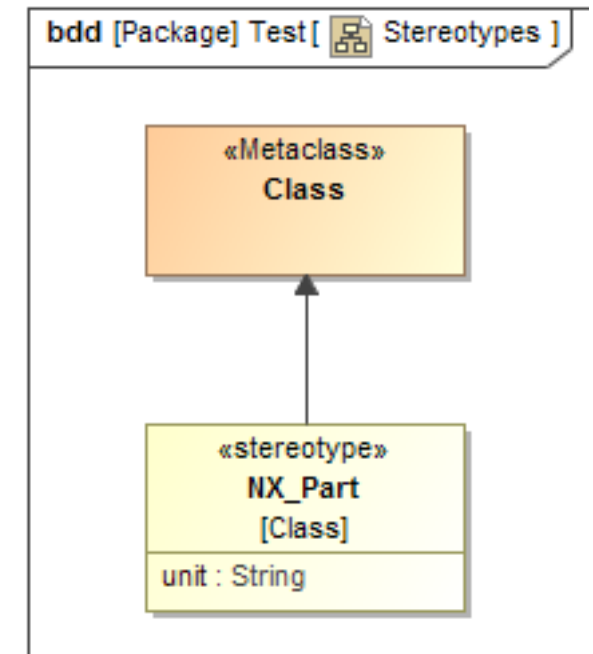
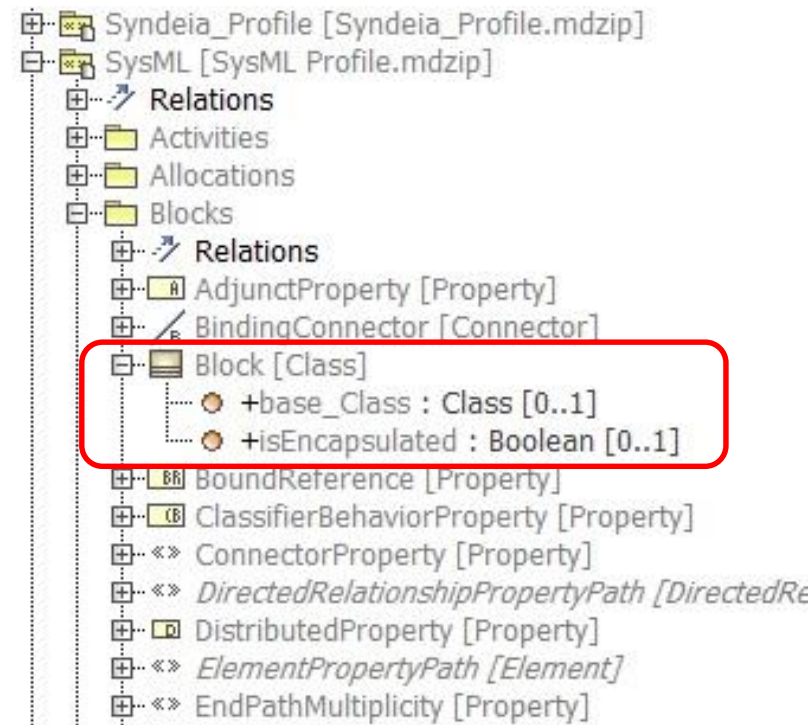
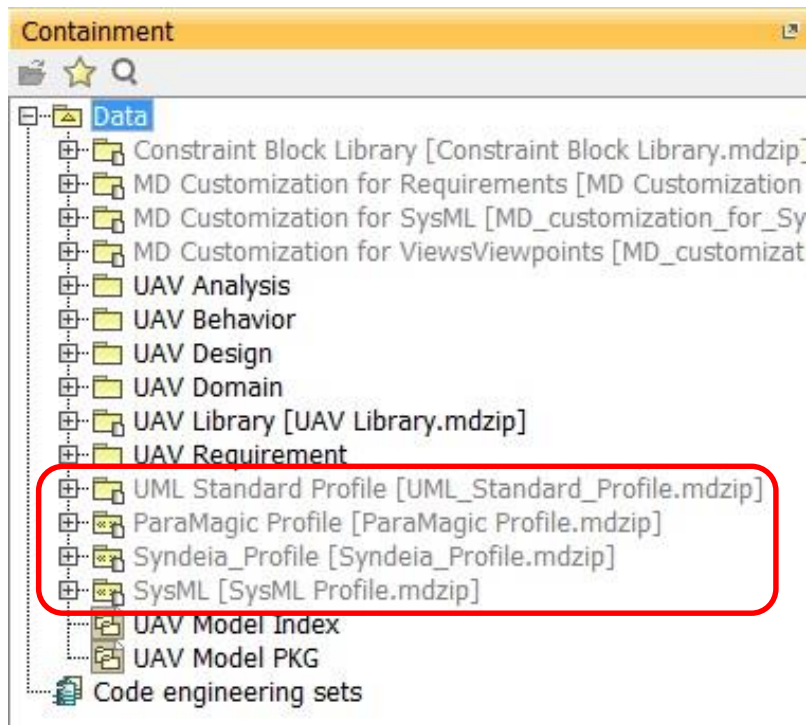


# Stereotypes and Profiles



# Stereotypes and Profiles

A package of stereotypes is called a profile

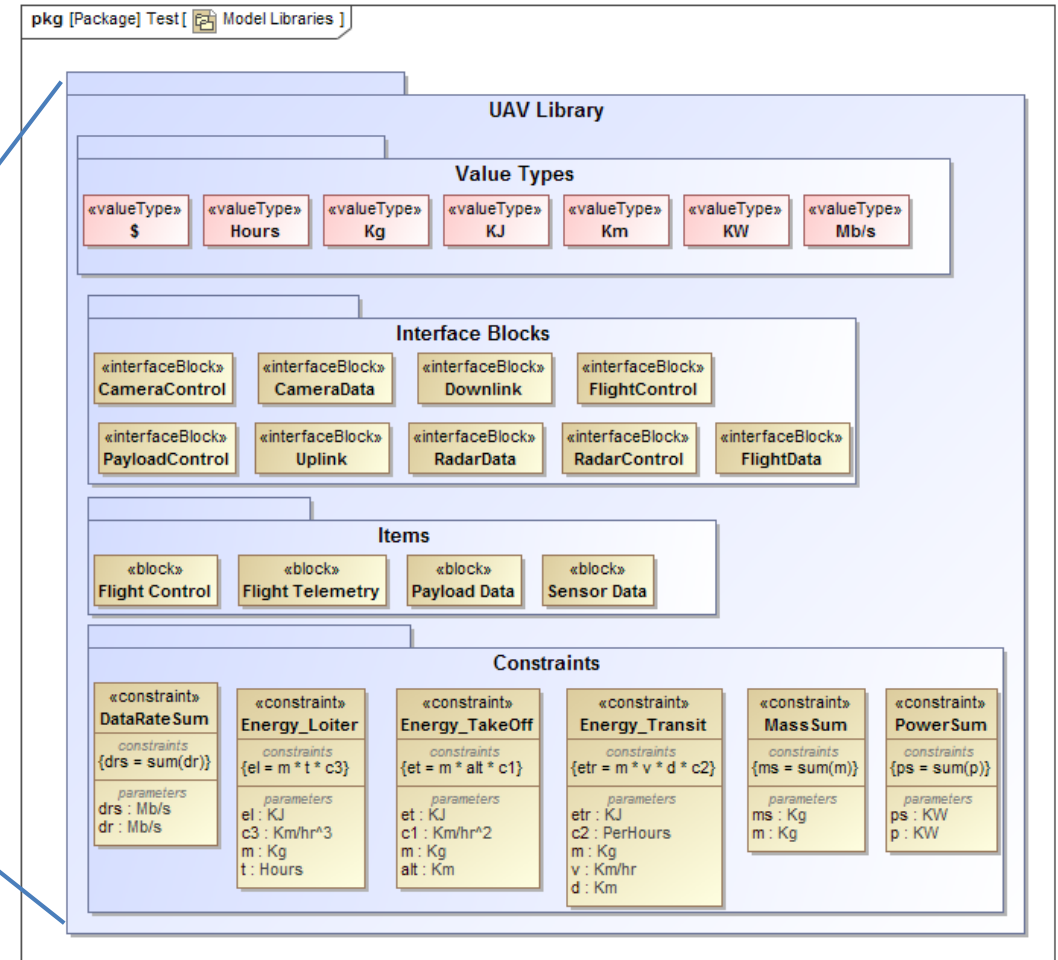
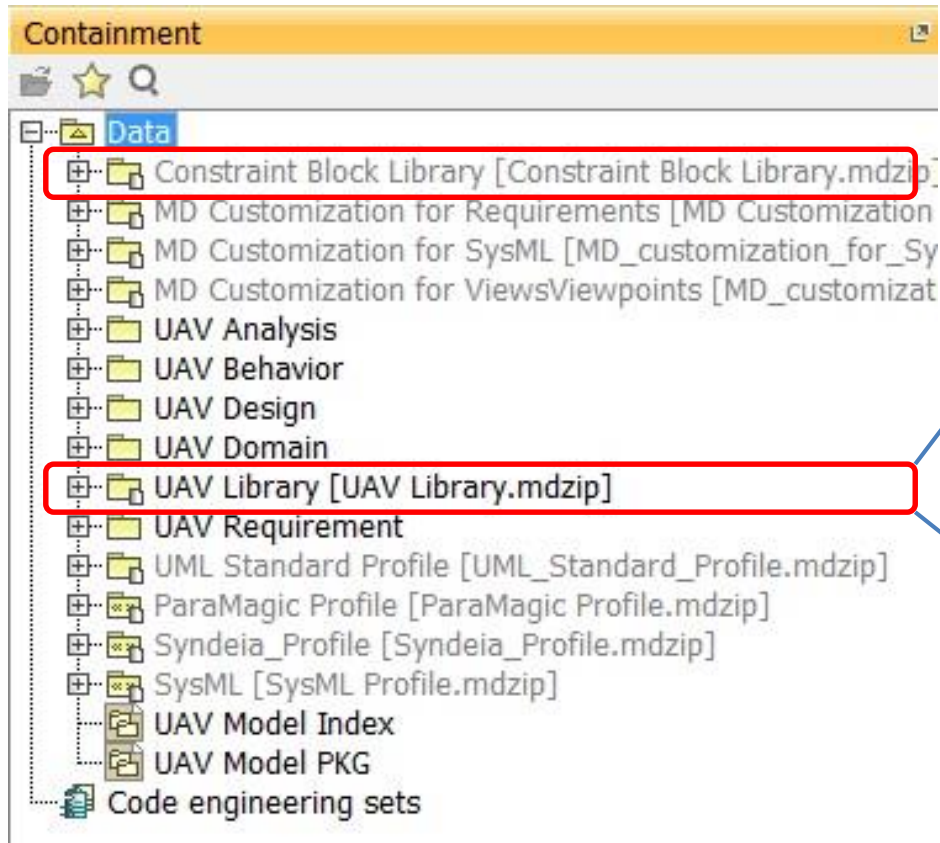


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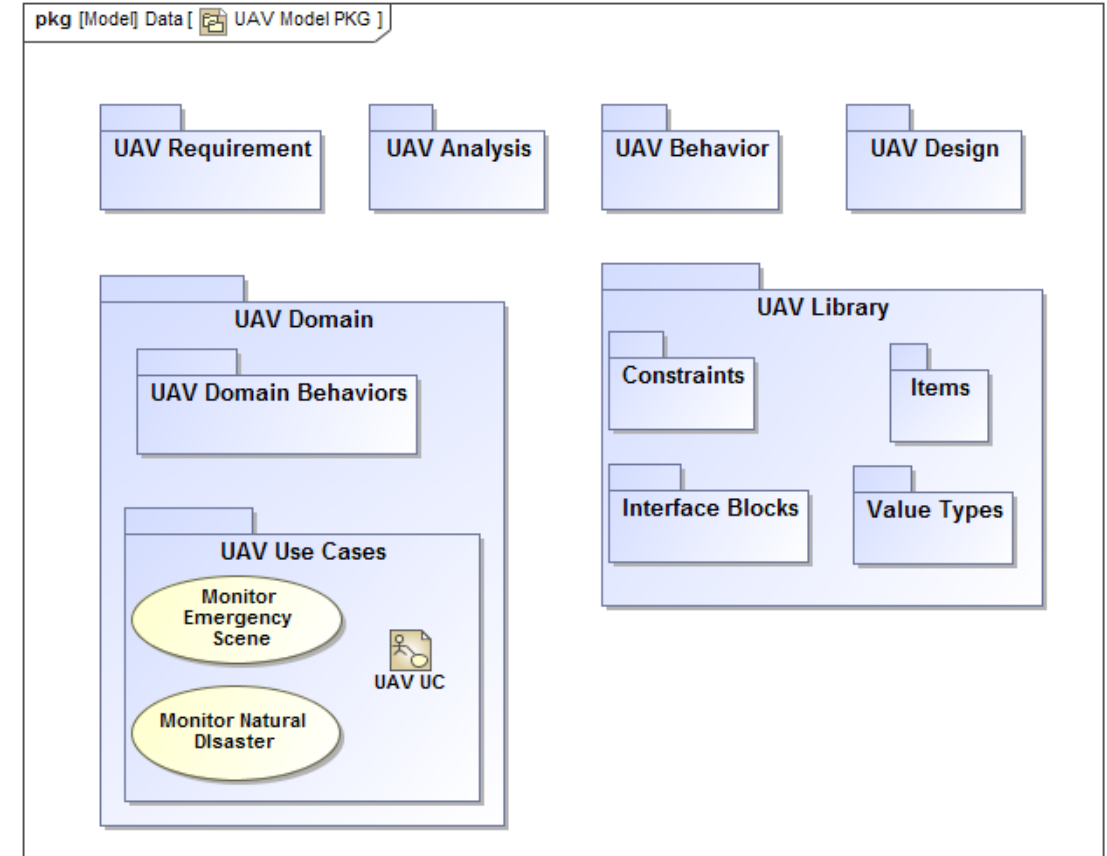
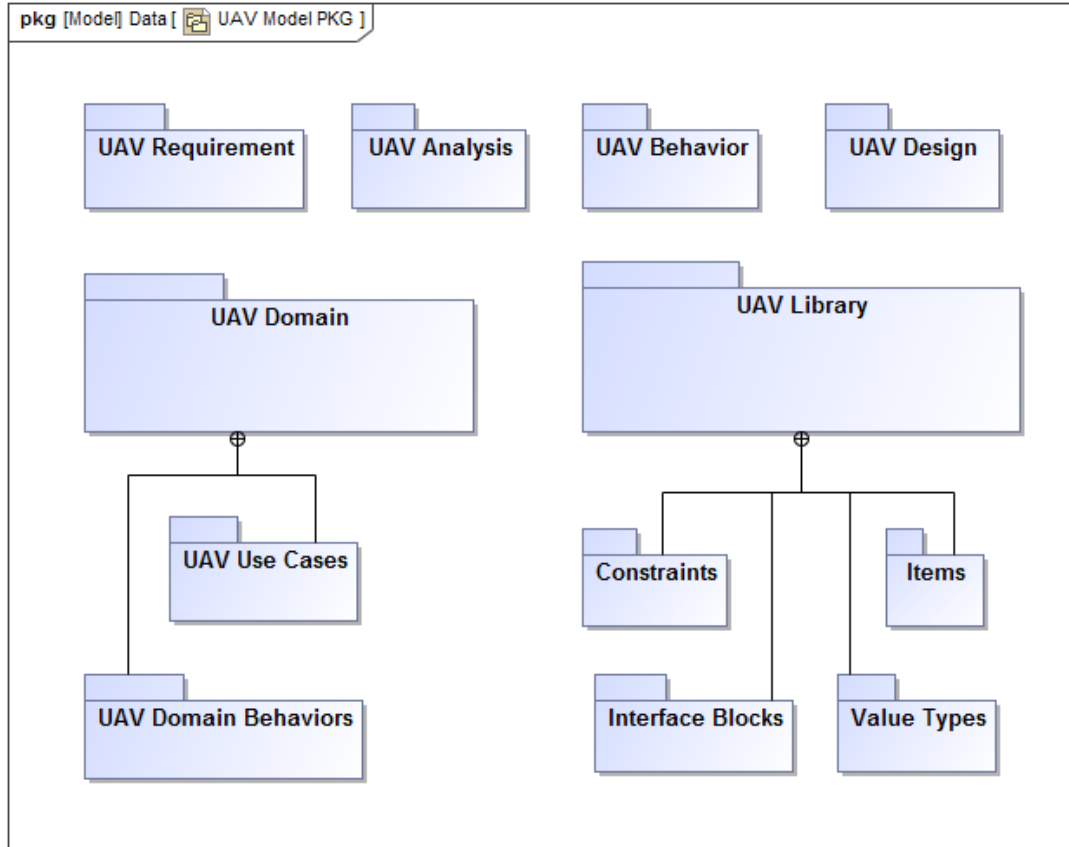
- ☀ **Modelers generally do not create their own stereotypes**
- ☀ **That makes it hard to share their models with others.**
- ☀ **Profiles are created, curated and distributed collectively by the organization.**
- ☀ **The modeler imports those profiles into their model at the beginning of the project.**

# Model Libraries





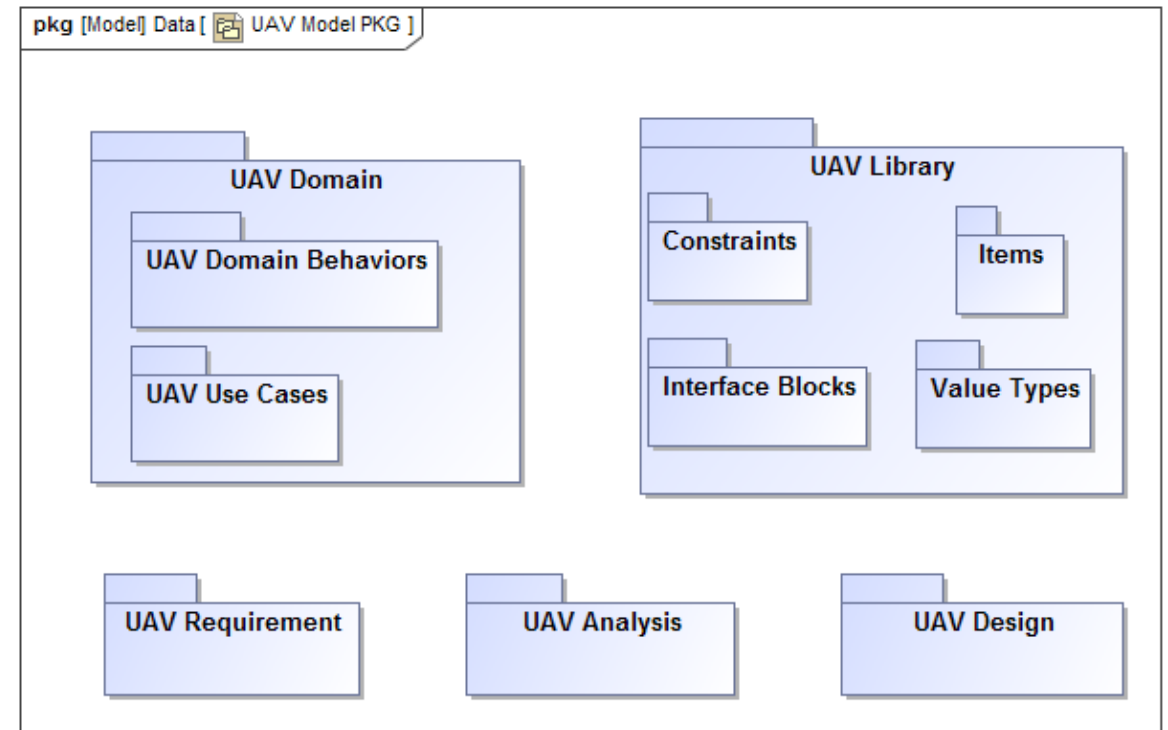
# Package Diagram



UAV Domain::UAV Use Cases::UAV UC

# Exercise 3.1

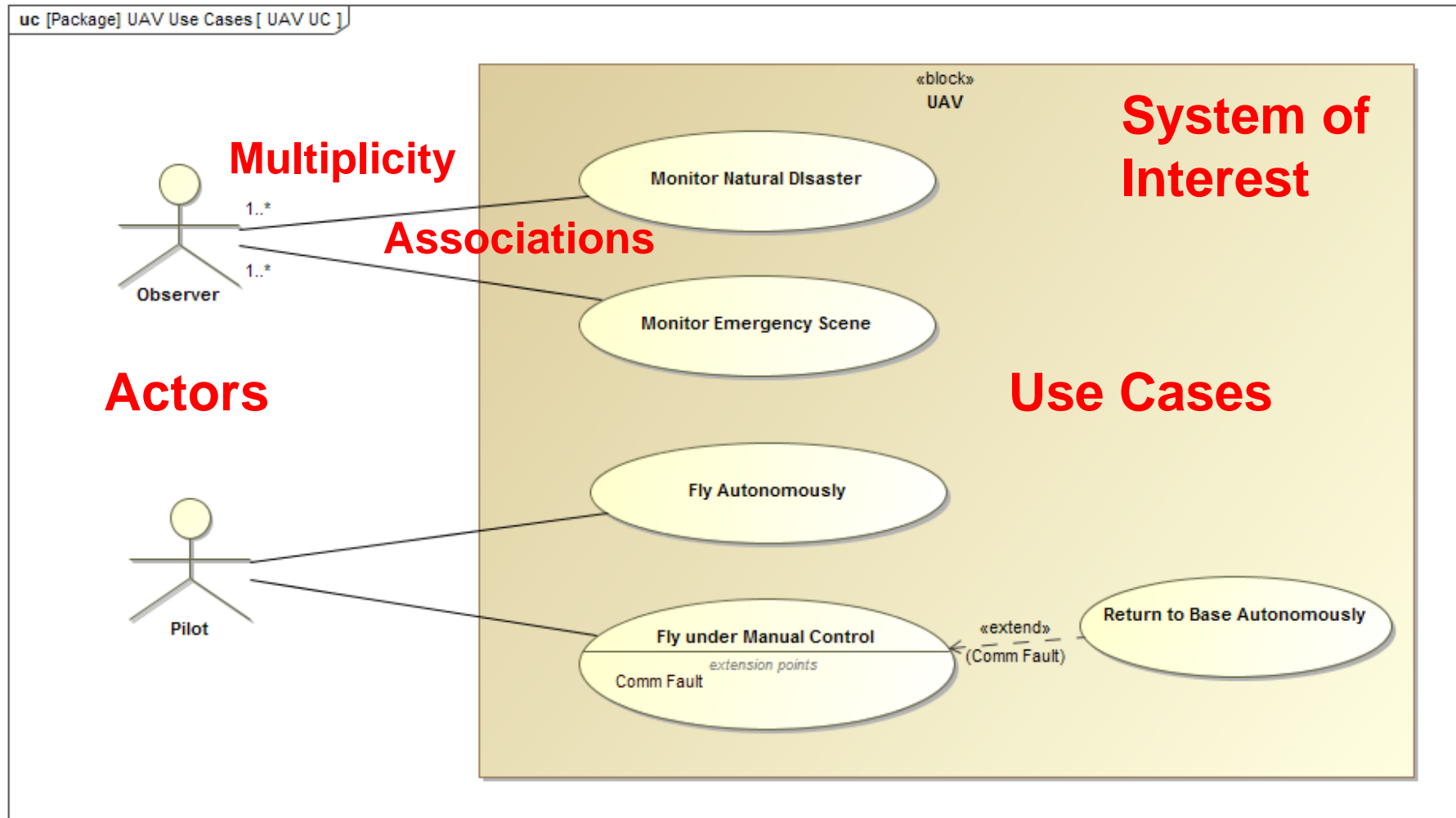
- Create a new MagicDraw project
- Apply ParaMagic profile
- Import UAV Library model library
- Create package structure
- Display package structure in package diagram



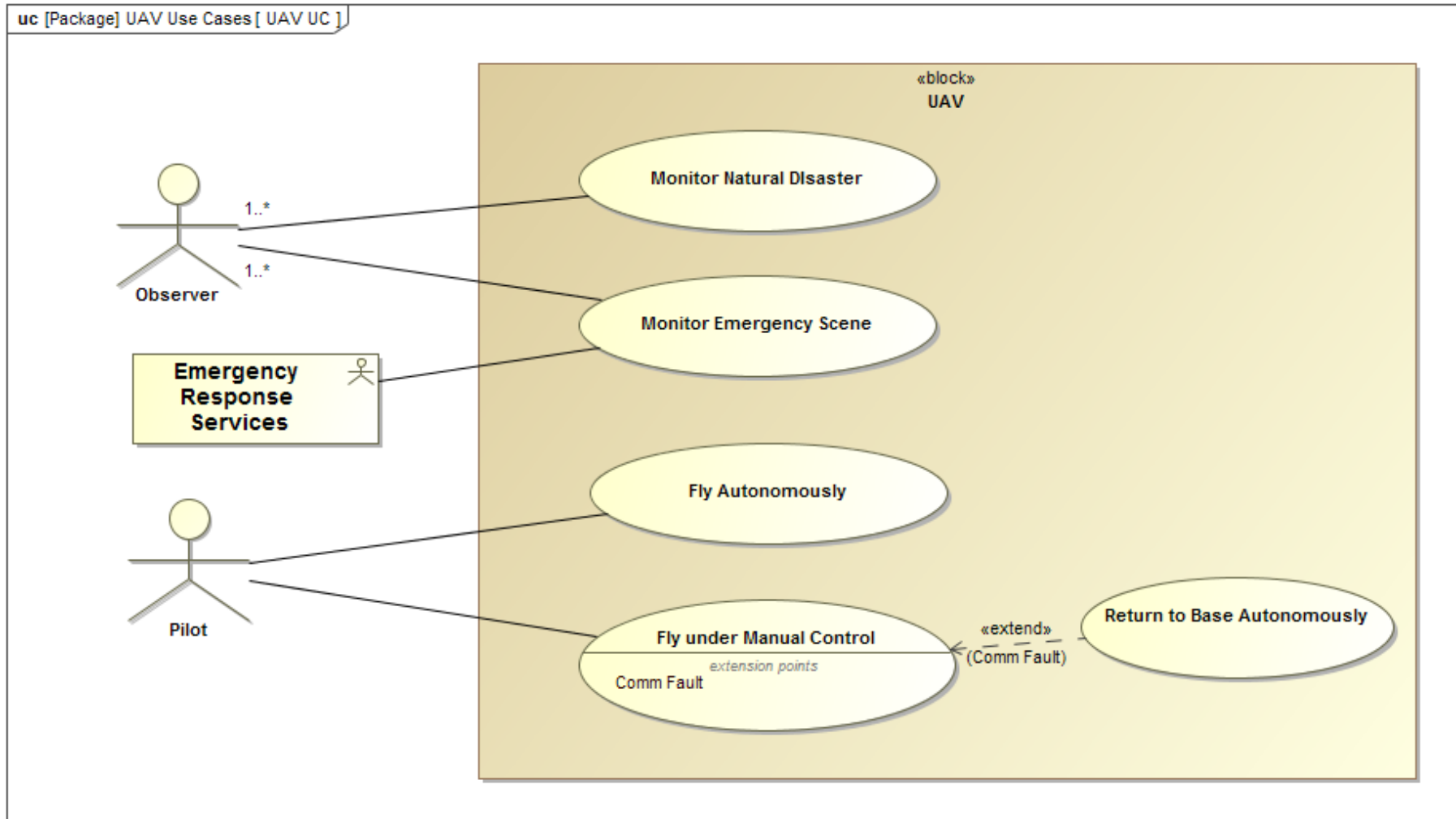
# Use Cases and Use Case Diagrams

- A Use Case Diagram answers three fundamental sets of questions for the viewer
  - What is the system of interest? What are its boundaries?
  - Who are its users?
  - What does it do for its users? Or what does it allow its users to do?
- Good Use Case diagrams are simple, to promote understanding and meaningful feedback

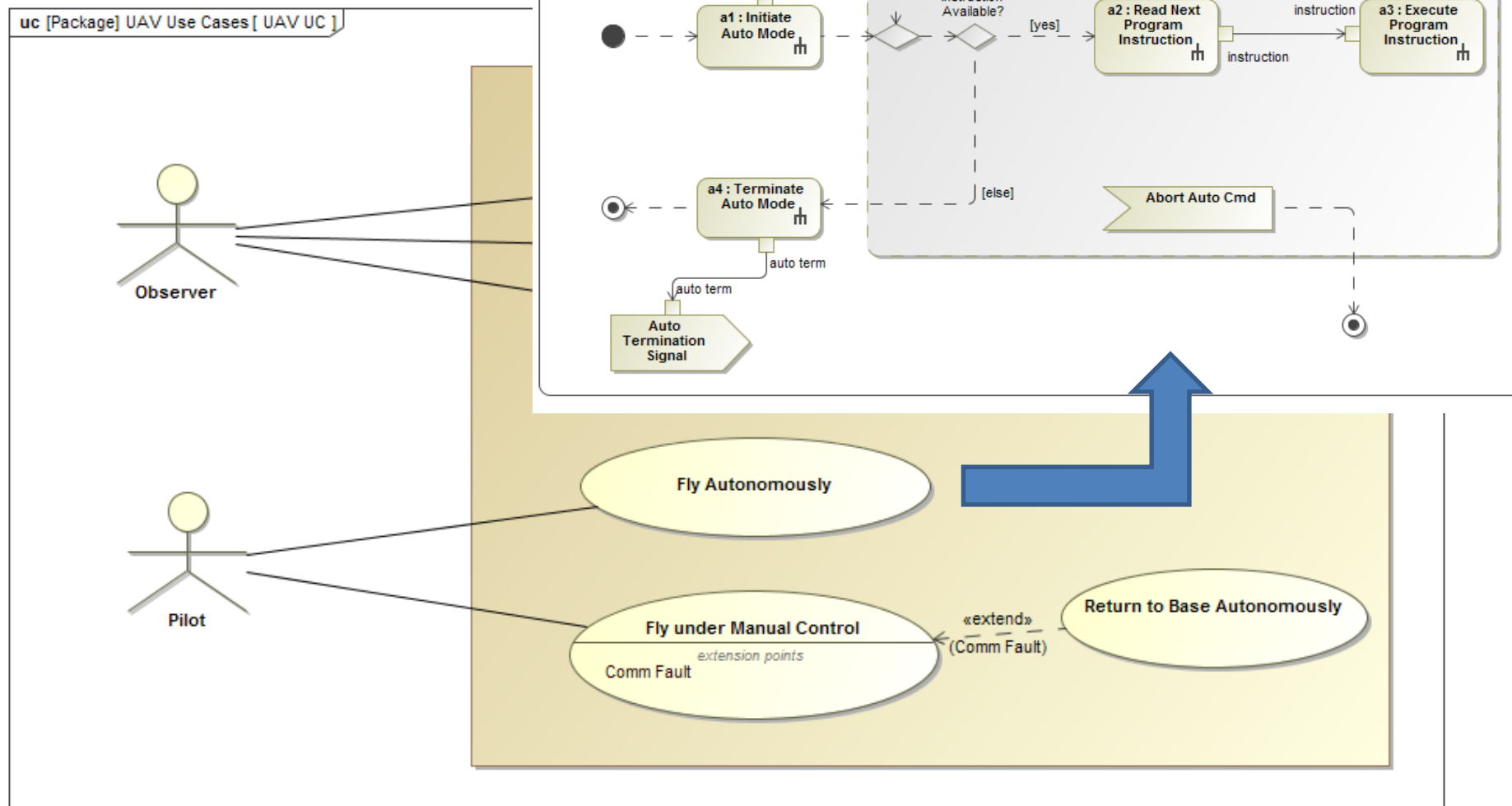
# Use Case Diagrams



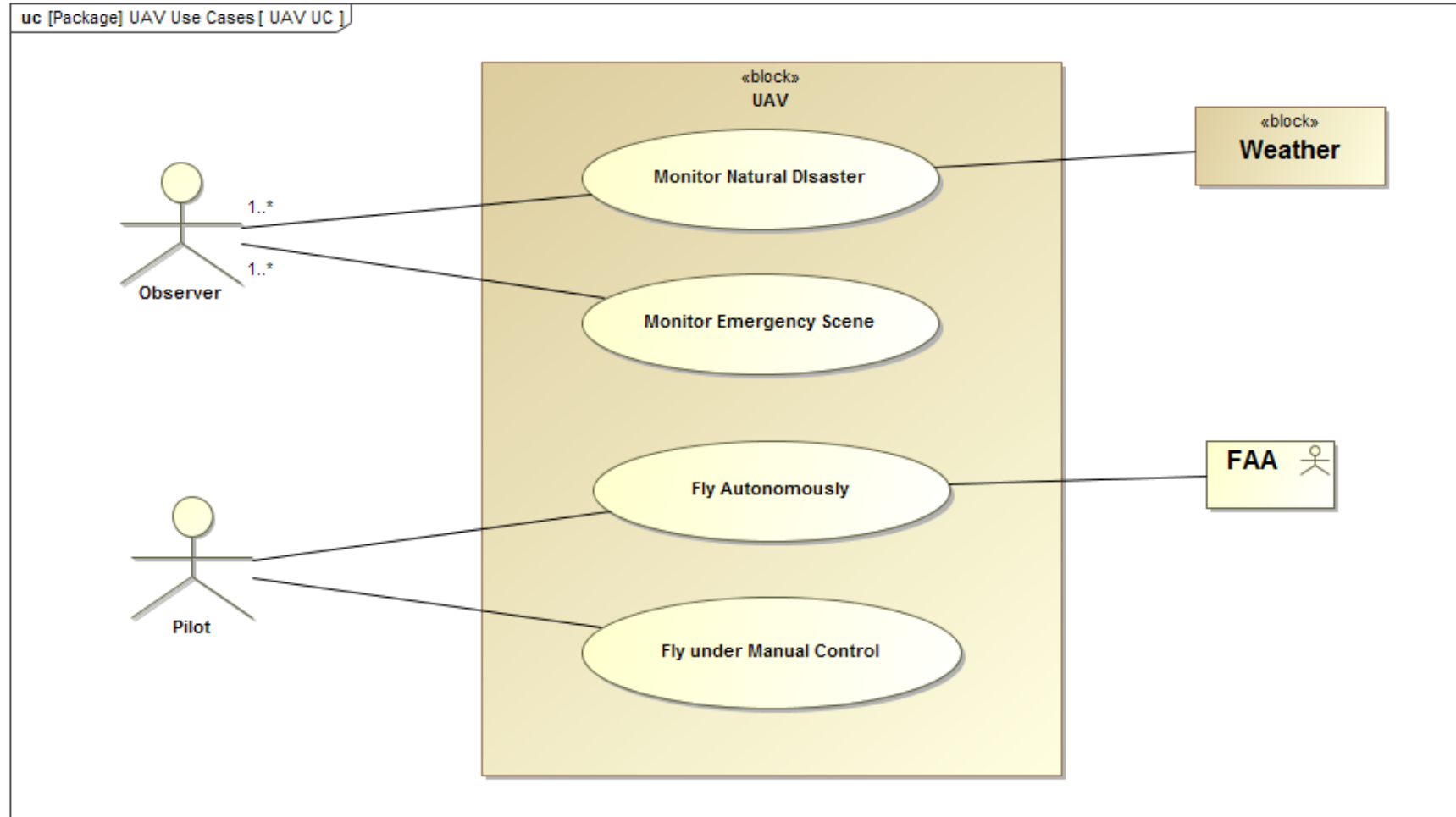
# Use Case Diagrams



# Use Cases

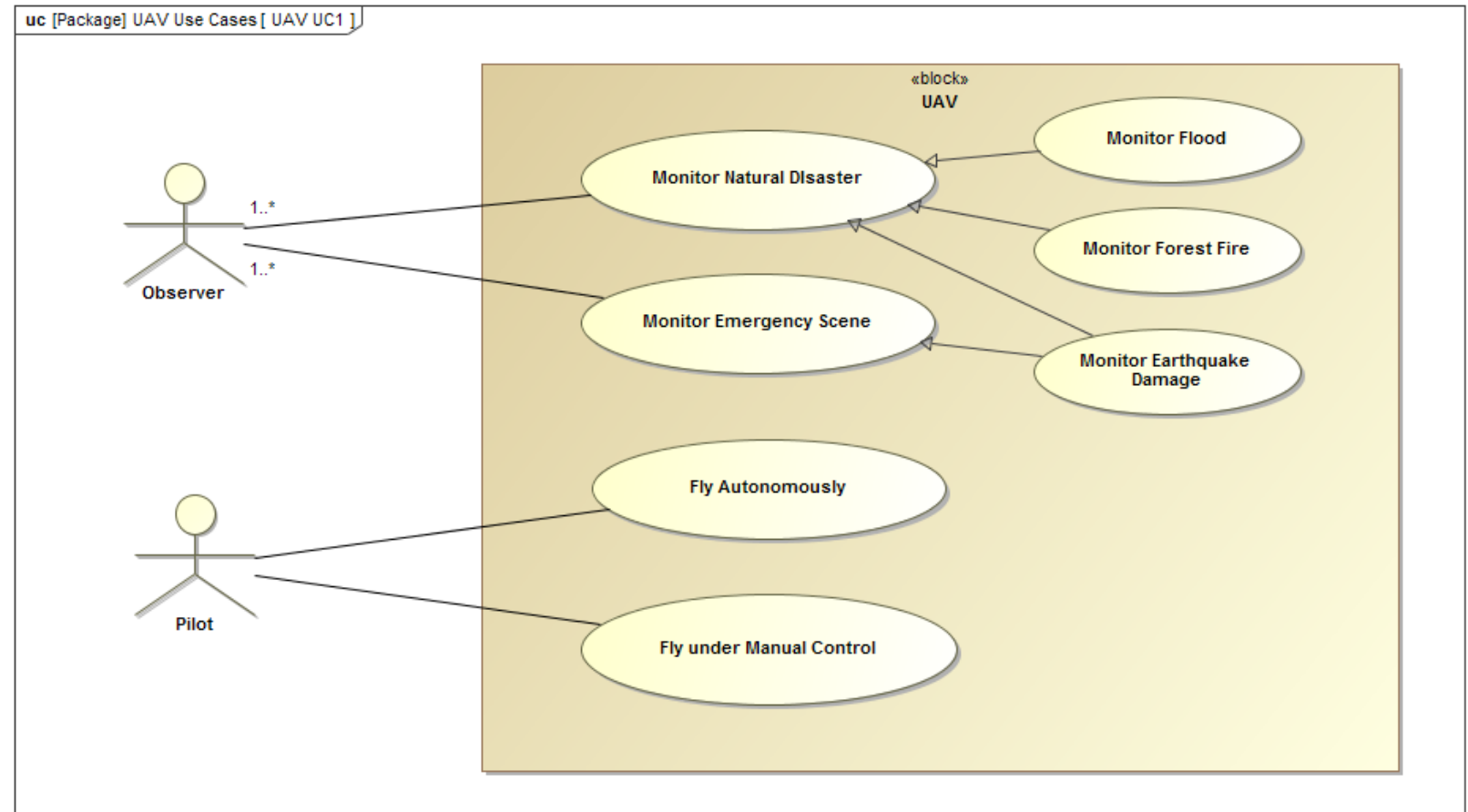


# Use Cases



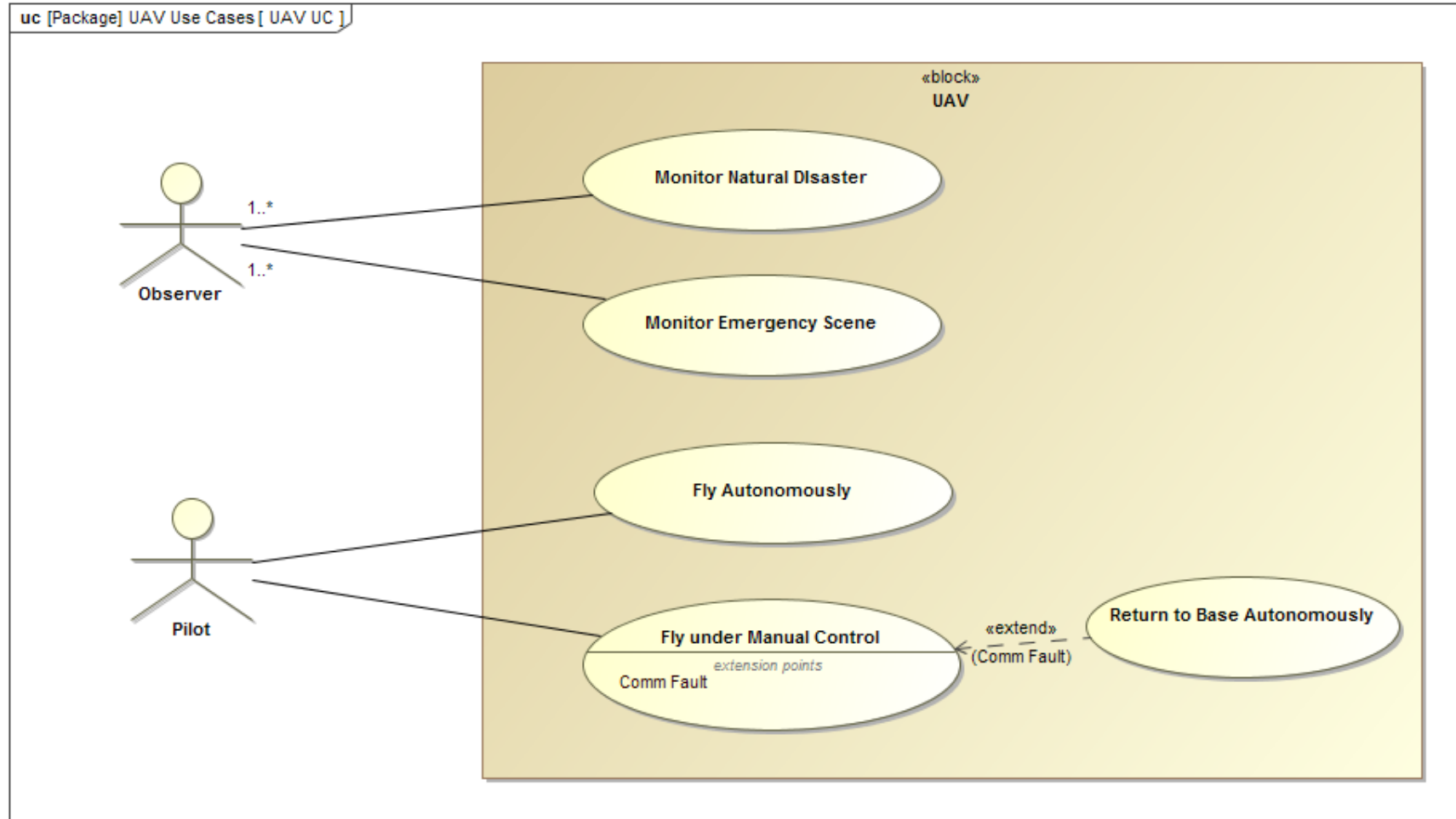
# Inheritance

- Use cases inherit characteristics of parent use case, including associations, and add unique features of their own.
- Multiple inheritance is allowed, but can be complicated

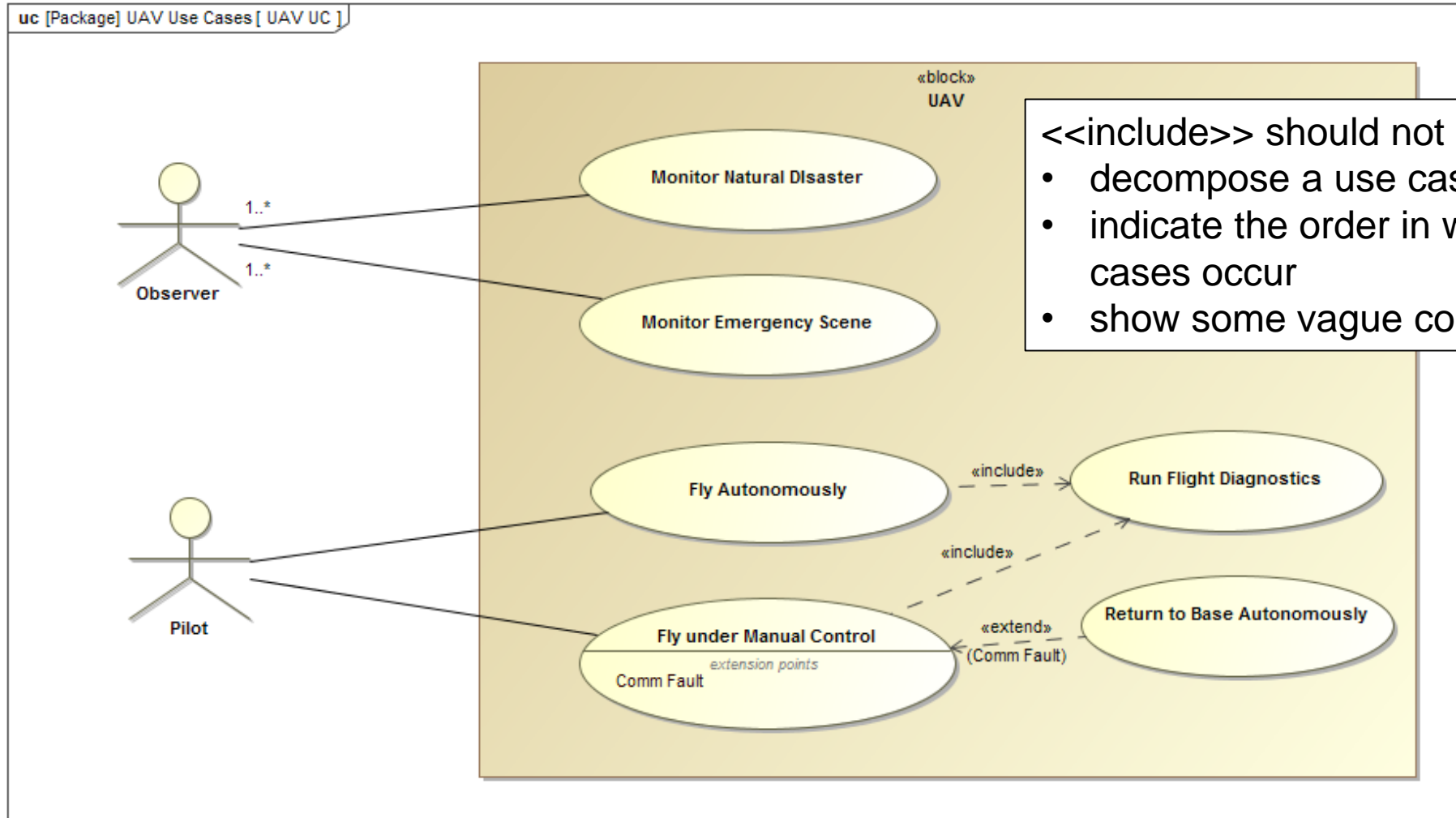




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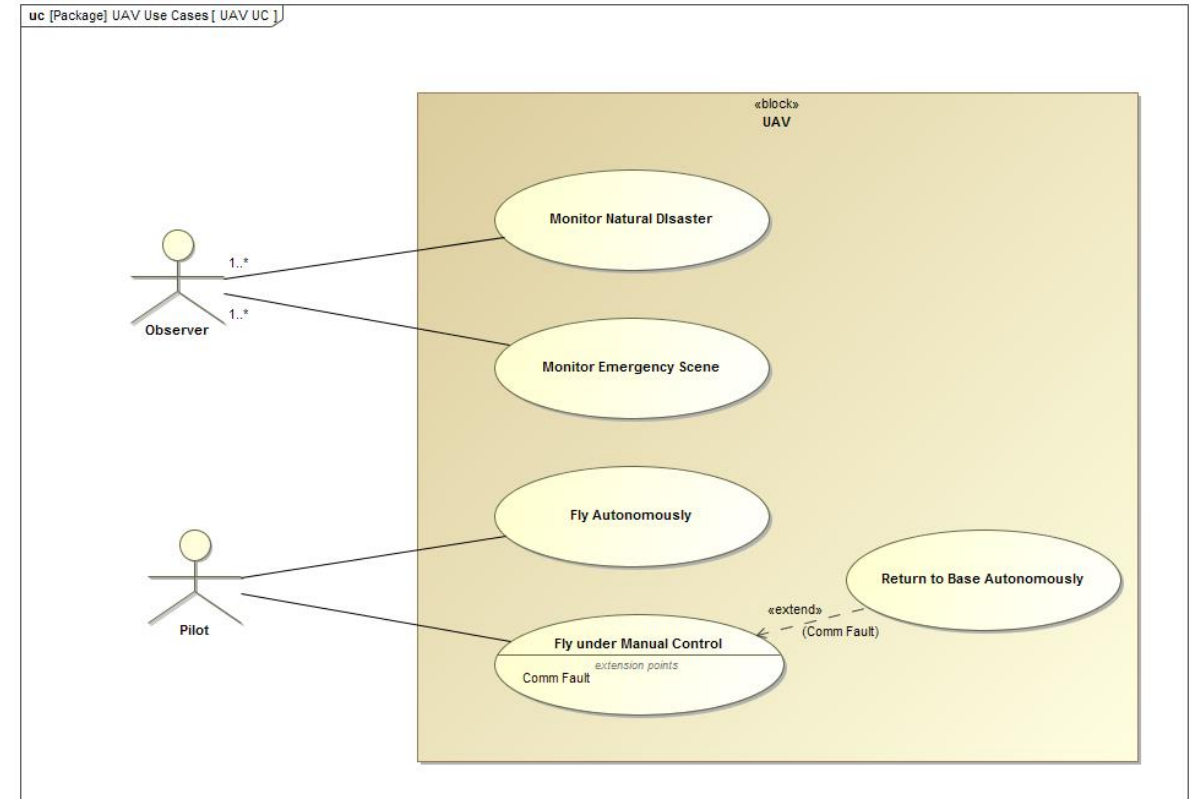


<<include>> should not be used to

- decompose a use case
- indicate the order in which use cases occur
- show some vague connection

# Exercise 3.2

- Create a Use Case Diagram
- Populate Diagram with System, Actors and Use Cases (pre-existing)
- Create a new Use Case
- Create Associations between Actors and Use Cases
- Create an Extend Relationship between Use Cases



# Recap

- At the end of the hands-on exercises, you should be able to
  - Explain the following terms: use case, package, actor, containment, stereotype, profile
  - Create a model package structure and display it in a package diagram
  - Create use cases and display them in a use case diagram
  - Identify the principle purpose(s) of package and use case diagrams

# Questions?

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