Massachusetts Institute of Technology

Model-Based Systems Engineering: Documentation and Analysis

Week 2: Building an MBSE Model

Project

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Instructions

Before you begin, you should save your project on your local drive. We recommend the following format:

Lastname_Firstname_Course3_Week2

Please note: You will not be able to re-download your file after submission; therefore, please keep this file in a central location for future reference.

The work in the project deliverable is **individual**.

After you submit your project, you will self-assess your work. If you have any questions, feel free to start a thread in the Discussion Forum.

Although work is strictly individual, sharing ideas and concepts with other students is encouraged.

Note: edX has a 10MB file size limit for document submission. If you have selected large image(s), you may need to resize before submitting, OR you may simply include a web URL for the image in the image location. Be sure to submit your assignment at least one hour before the deadline to provide time for troubleshooting.

Once the deadline passes, you will not be able to upload the document and therefore will not be able to submit and complete the assignment.

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Week 2 Project

Overview

For this week's project you will construct database queries and create SysML diagrams for the system you chose in Week 1.

Note that scratch pages are included at the end of this document for you to capture any ideas, sketches, etc. that you have as you work through the project. These will not be assessed, and you are not required to submit them with your project (but you may do so if you think they offer any additional insight into your thinking process!).

REQUIRED STEPS

Step 1: Develop five queries for your system

Step 2: Develop a requirement diagram

Step 3: Develop a use case diagram

Step 4: Develop a behavior diagram or structure diagram

Step 5: Submit and self-assess your project

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Step 1: Develop Five Queries for Your System

As you know by now, models provide a good deal more than just a collection of attractive diagrams. Models are often stored in repositories with a defined data structure. Like databases, model repositories make it possible to query the model for specific information, e.g. an impact analysis when changing a requirement. SysML doesn't define a query language, and most modeling tools allow the user to write a script to query the model. You can write queries like "are all actions allocated to parts?", "are all requirements satisfied?" and so on.

If you had a full data model available for your system, what would be five of the most important queries you would write to inform your system engineering functions?

Query	Rationale
Are all safety and non-safety requirements allocated to a component?	*This ensures that all requirements (particularly) the safety requirements are being met by a component*
What is the total load capability (mechanical or electrical) of the system?	*Load capability ensure that the system has the correct size of mechanical and electrical components for the vehicle*
Are there any additional features included for this particular system?	*Understanding the number and types of features can provide a good understanding of the resources needed by the system*
Is the system meeting the given targets? For example weight and cost targets	*This ensures that the system is within target and that all teams are within their constraints boundaries*
Does the model include all the needed diagnostics in case of failures?	*Diagnostics indicate the users of the system if there is a failure that requires attention. All teams need to ensure all diagnostics are included.*

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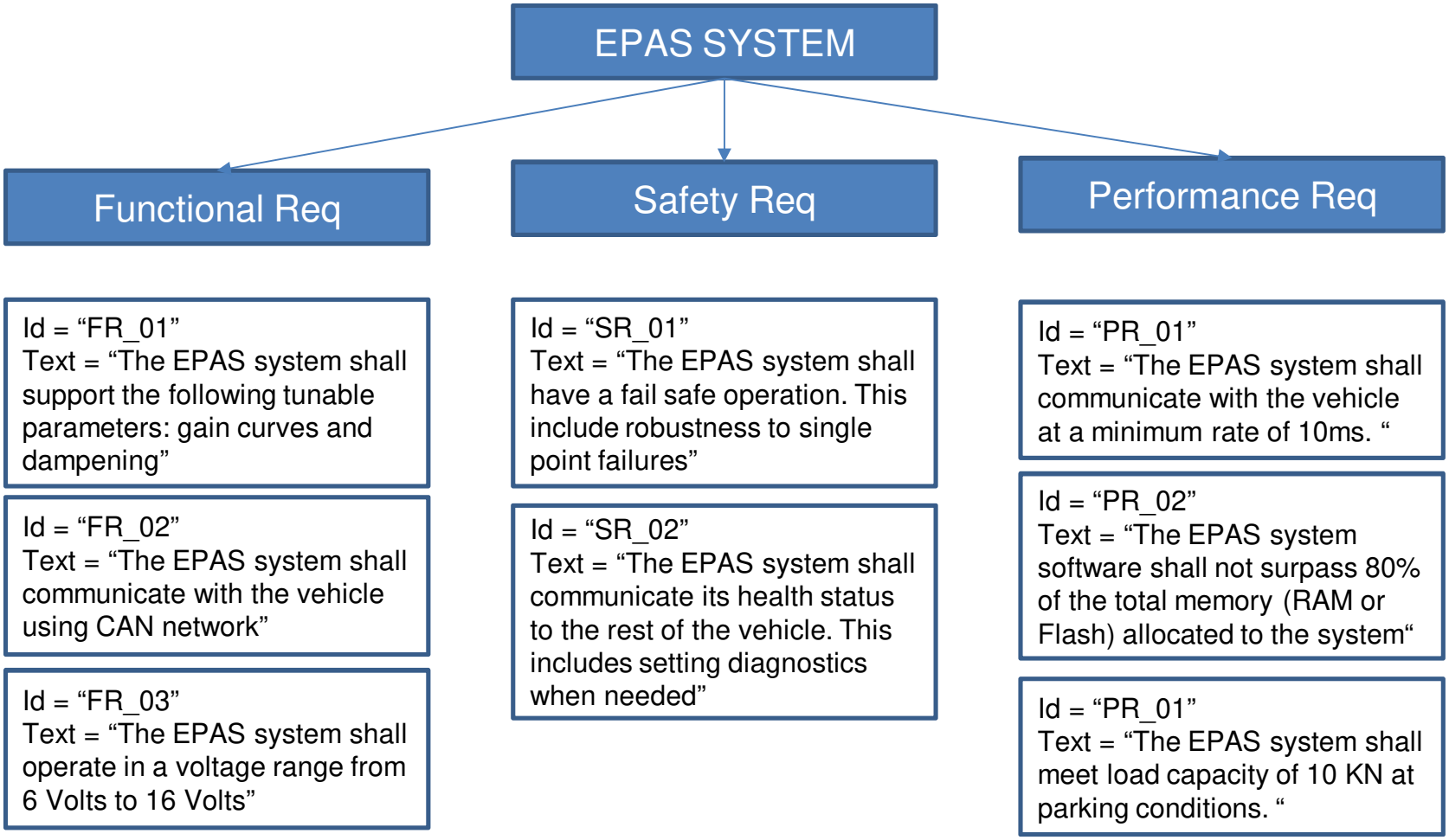
Step 2: Develop a Requirements Diagram

For the system you chose in Week 1, please create a requirements diagram below. Include at least five requirements.



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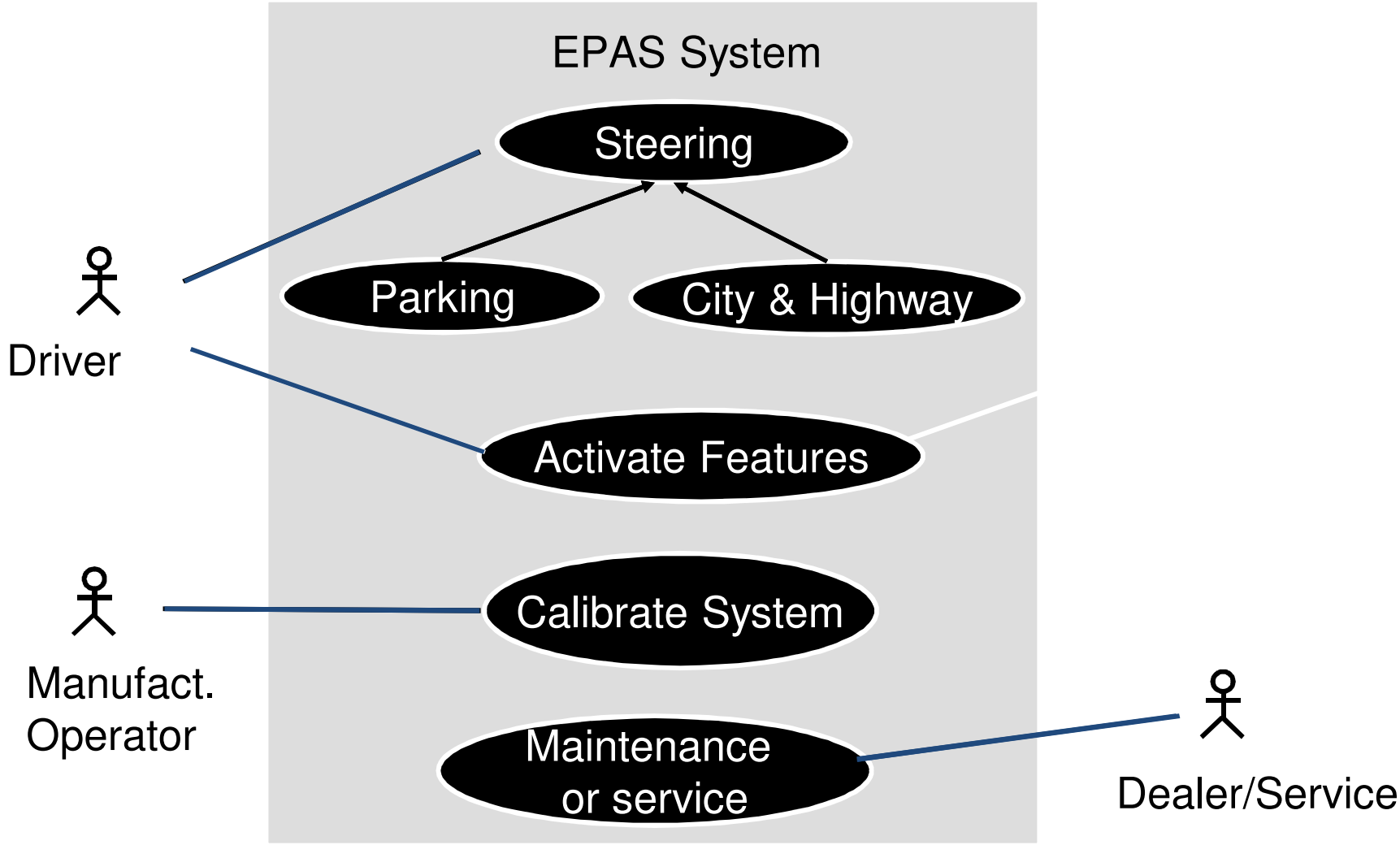
Step 3: Develop a Use Case Diagram

For the system you chose in Week 1, please create a use case diagram. Please feel free to leverage the format below or create your own.



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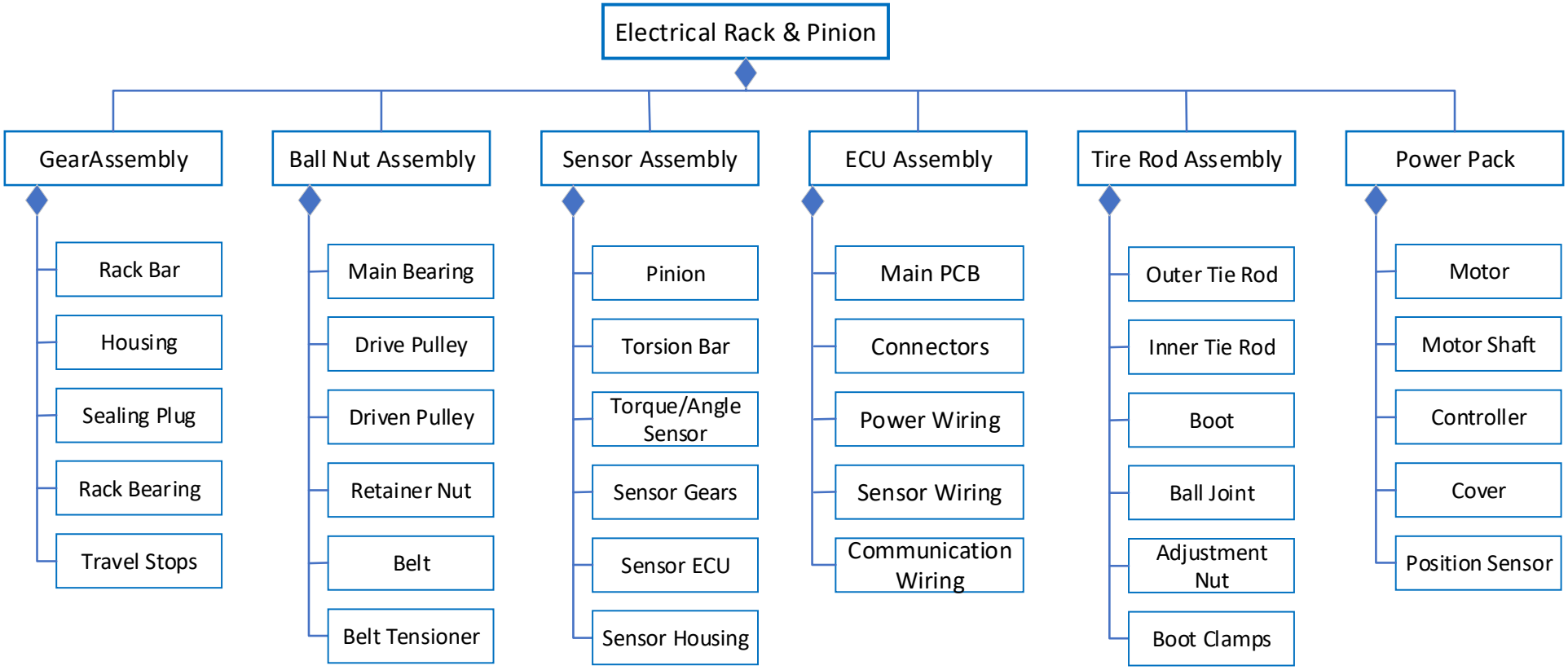
Step 4: Develop a ~~Behavior~~ or Structure Diagram

For the system you chose in Week 1, please create either a behavior diagram or a structure diagram. You do not need to use an MBSE modeling software; we suggest using simple shapes available in PowerPoint to represent the blocks, and arrows for direction.



Step 5: Submit and Self-Assess Your Project

Submit your completed Week 2 project file

- Note: The maximum file size that can be submitted is 10MB.

Assess your own Week 2 project

- A scoring rubric can be downloaded from the Week 2 Project Instructions page