



# Becoming an Airline Pilot: A Systems Engineering Perspective

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## Introduction

Model Based Systems Engineering (MBSE) allows one to create a representative model to show components of a system and its interactions. To become a commercial pilot, there are many different licenses, hours of training and flying, certifications etc. that must be recorded. To show these components, I chose to present a few different diagrams.

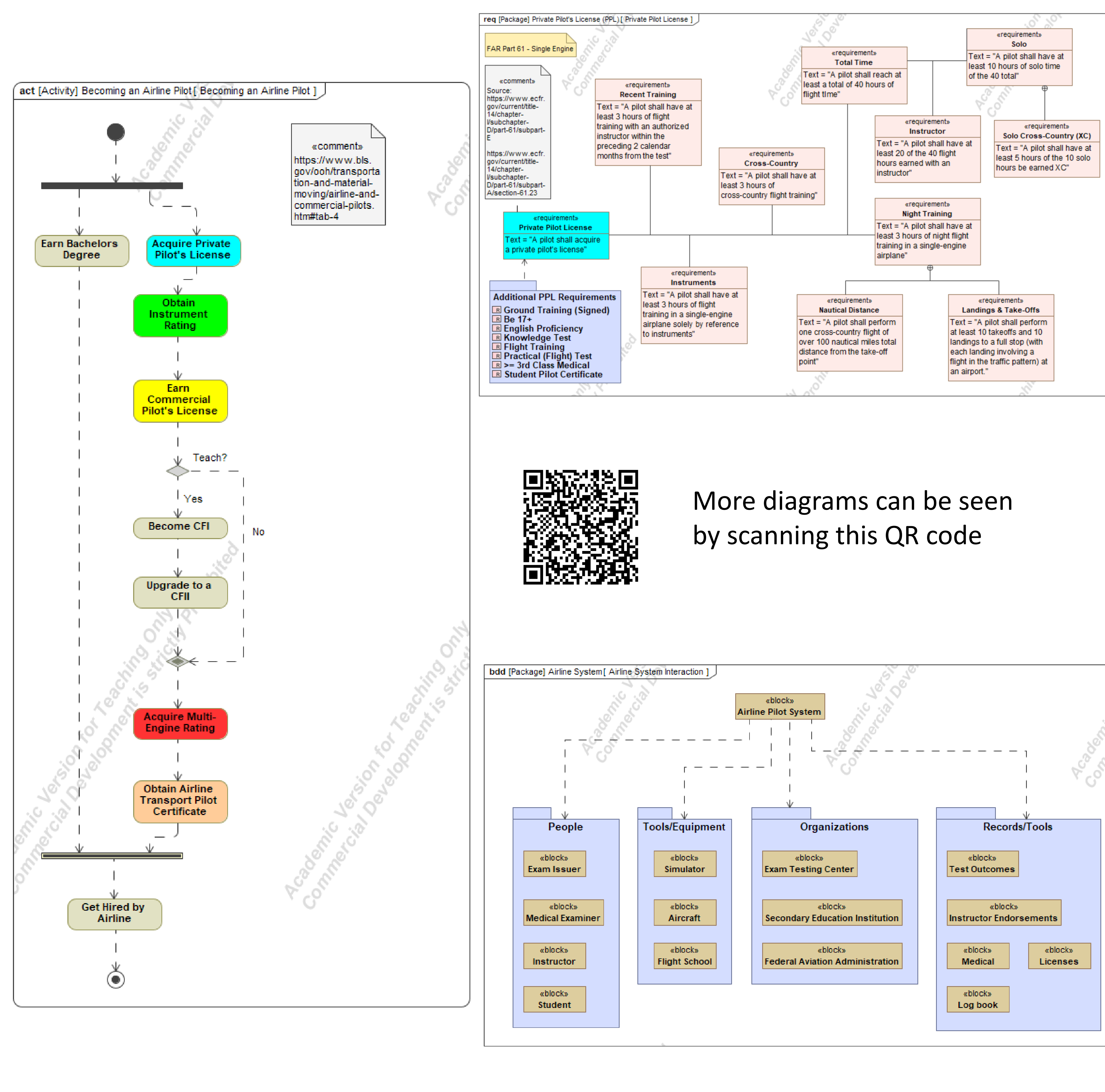
- An activity diagram depicting the subsystems and overall pathway
- A requirement diagram depicting the first subsystem (Private Pilot's License)
- The structure diagram showing the participants and components of the system.

## Methods

In my opinion, the best way to start for a project like this is to:

- Select topic  
The topic should be something you're interested in and something that is important.
- Choose Model type  
Different model types convey information in separate ways, choosing the right model ensures the right impression is taken from the viewer.
- Collect areas of the topic  
The areas of the topic must be relevant to the goal you're aiming to explain, otherwise they take up too much space.
- Facilitate the explanation  
This is the entire purpose of a model, to easily explain something to a large amount of people.

## Results



## Conclusion

Creating a MBSE model is essentially a visual version of a document, it is vital for comprehension and can be very useful in showing relationships in ways a sentence cannot. The break in my activity diagram shows that a person must follow both paths, without choice, whereas the decision node shows there is. These diagrams show the elaborate requirements that shall be met for a license to be issued, specifically, the ones necessary for an airline pilot to have.

From here, the diagrams can be updated when new regulations are released, and a different type of diagram can be made to convey a separate position in aviation; such as the Part 141 pathway or rotorcraft licenses.

## References & Acknowledgements

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*CERTIFICATION: PILOTS, FLIGHT INSTRUCTORS, and GROUND INSTRUCTORS.* National Archives, 4 Apr. 1997, [www.ecfr.gov/current/title-14/part-61](http://www.ecfr.gov/current/title-14/part-61). Accessed 23 Apr. 2026.

Friedenthal, Sanford, et al. *A Practical Guide to SysML: The Systems Modeling Language.* Elsevier Science, 2008. Accessed 23 Apr. 2026.

## Benefits gained from SURE

My experience with SURE introduced me to systems engineering; from it I have learned to breakdown complex ideas into smaller pieces (primarily in a sharable form), find correlations of different areas and the interactions, and create informational models to share insight of real-world engineering applications. I've also acquired extensive knowledge about the aviation industry and the certifications, licenses, requirements, etc..

## Applying what I've learned from SURE

I intend to become an airline pilot, so this project has extensively prepared me for that career. I have learned the pros and cons of the licenses, the order at which they are acquired, how to gain them, and what can set me ahead. I can also apply my STEM skills from this experience in future assignments and projects, in internships and research, along with sharing these skills with peers.