

OreSat

A Tutorial for CubeSat Mission Planning with SysML in Eclipse Papyrus

Open Source CubeSat Workshop 2021

Risto Rushford

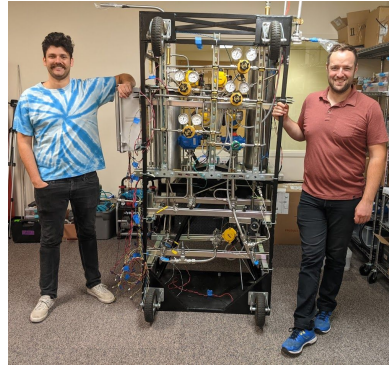
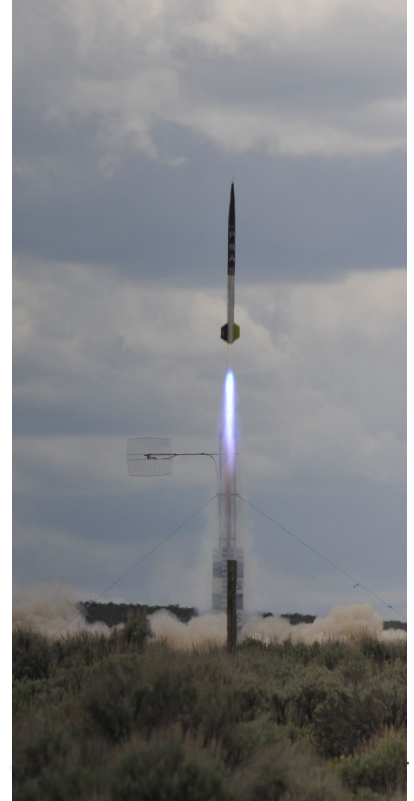
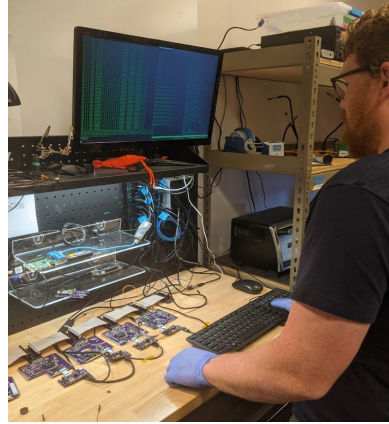
Portland State Aerospace Society at Portland State University
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Background: PSAS

Open Source Space Hipsters from Portland

- Extracurricular interdisciplinary team-based hands-on student aerospace project
- Militantly interdisciplinary
 - “Space Program” model, not a “satellite club” model (Space Business Simulator)
 - Not just ME/EE/CS; also business, math, physics, marketing, psychology
- Completely open source
- No formal funding source
 - Crowdfunding
 - NASA Oregon Space Grant Consortium grants
- We have no idea what we’re doing (just delivered our first CubeSat)

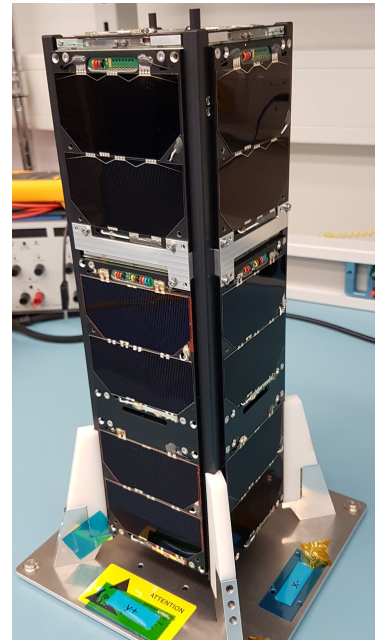
Portland State Aerospace Society



Oh hey we kinda built a nanosat



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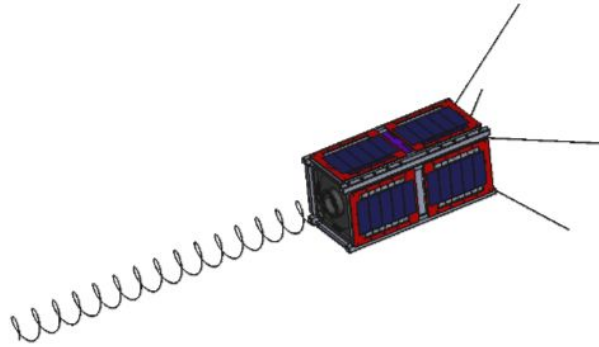


NASA CSLI Application

In Response to Solicitation NNH16ZCQ002O
For

OreSat: Oregon's First Nanosatellite

November 22, 2016



Submitted by
The Portland State Aerospace Society
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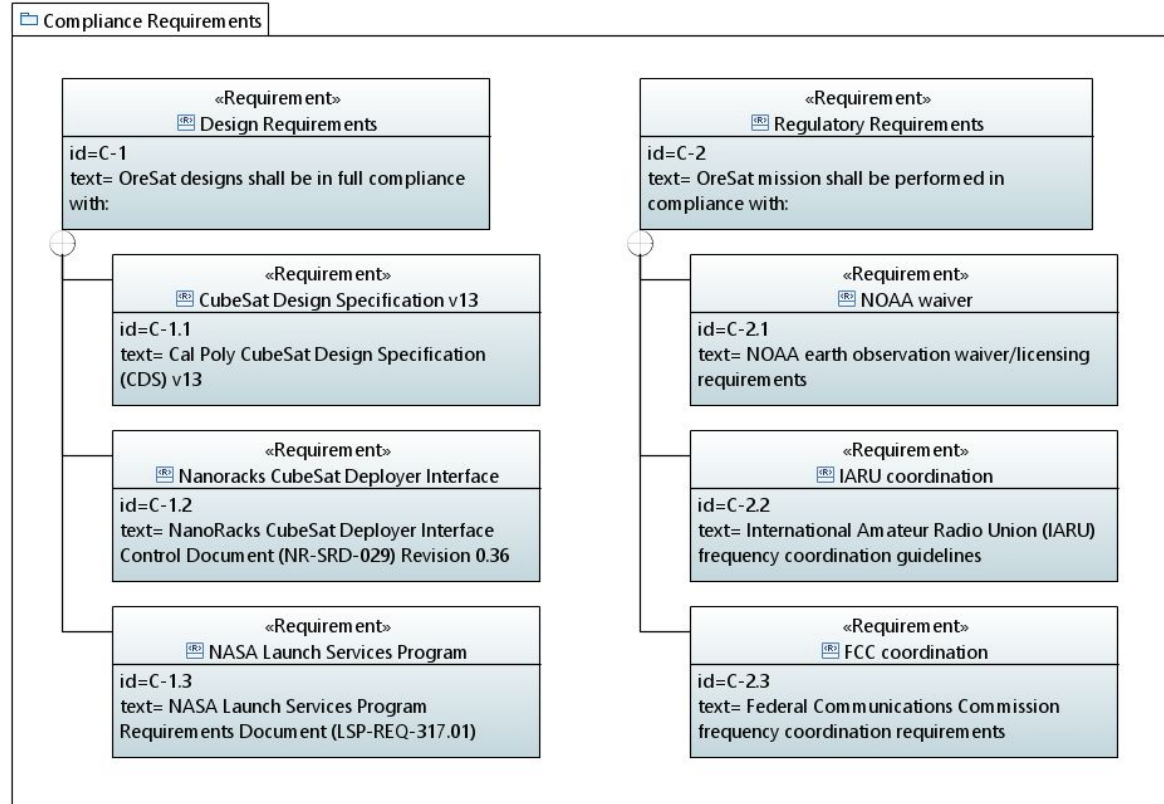
The importance of Mission Planning:

Space is Hard

...and You Can't Think of Everything

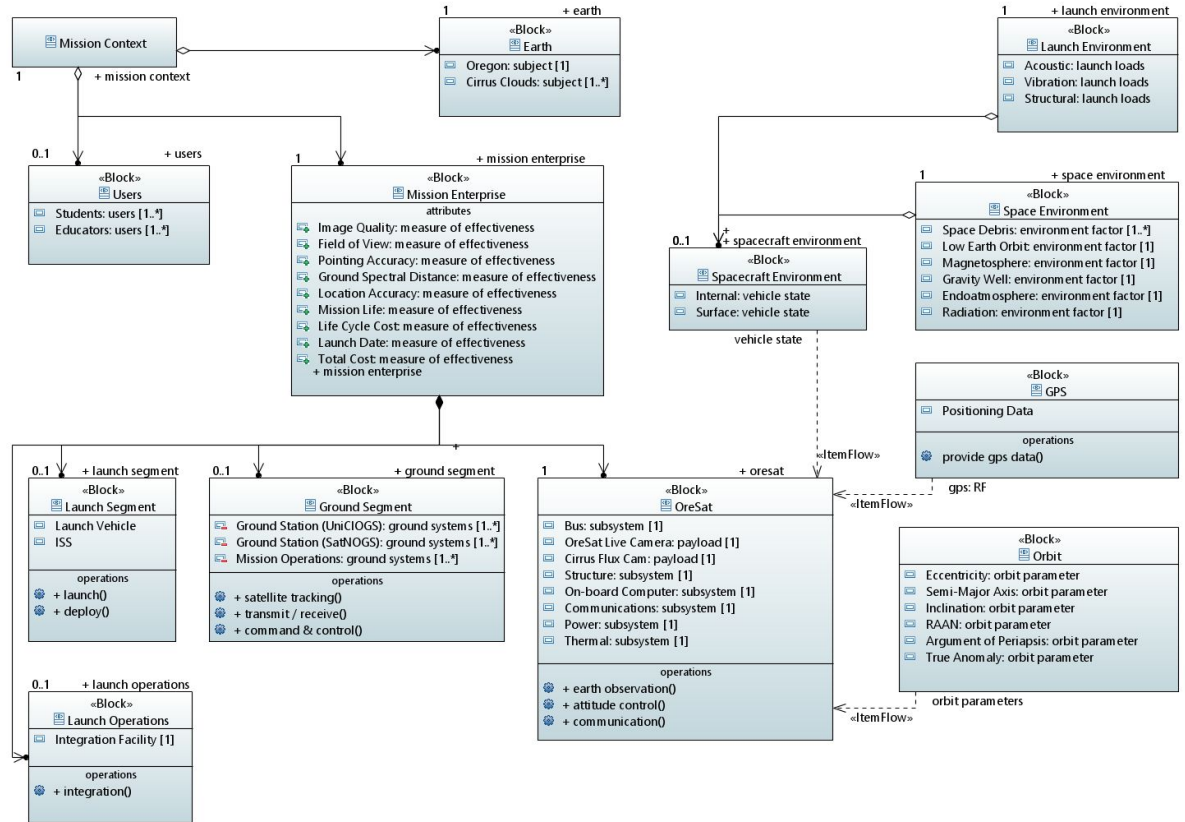
Space is hard to plan for

- So many requirements!!!



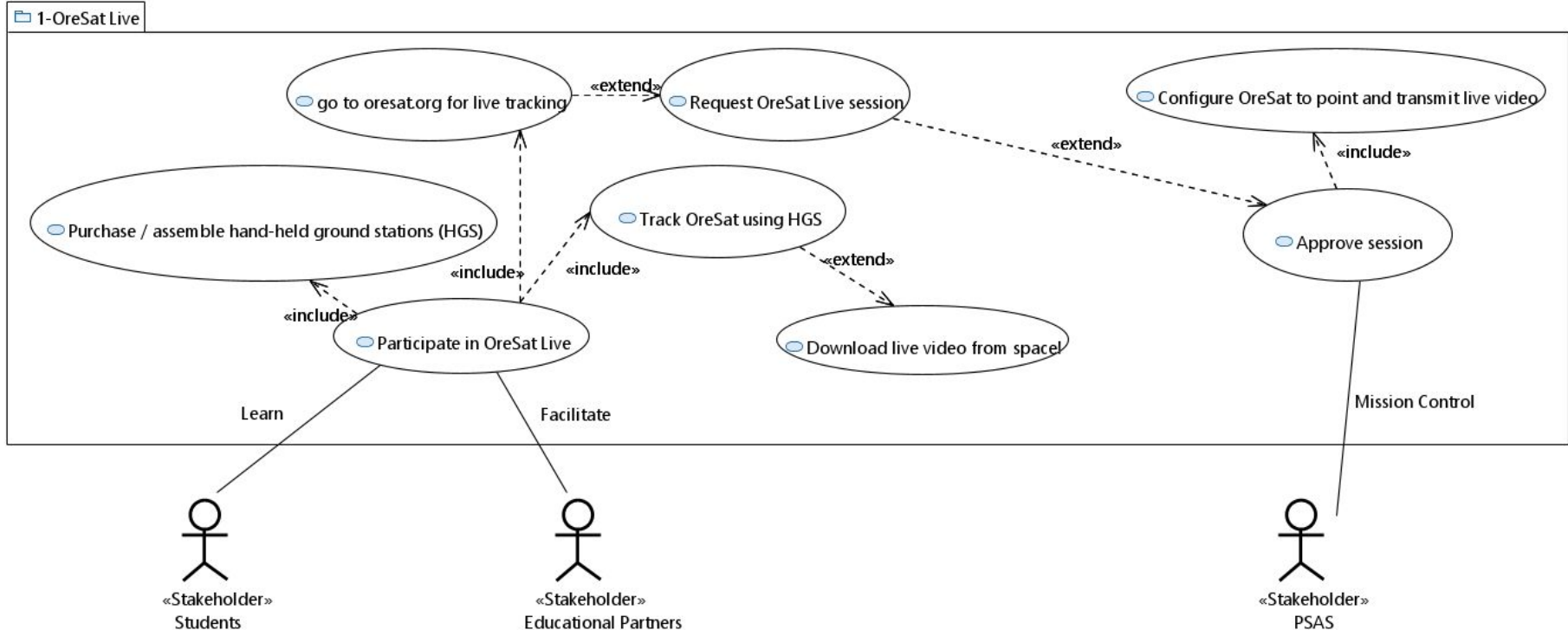
You can't think of everything

- So much context



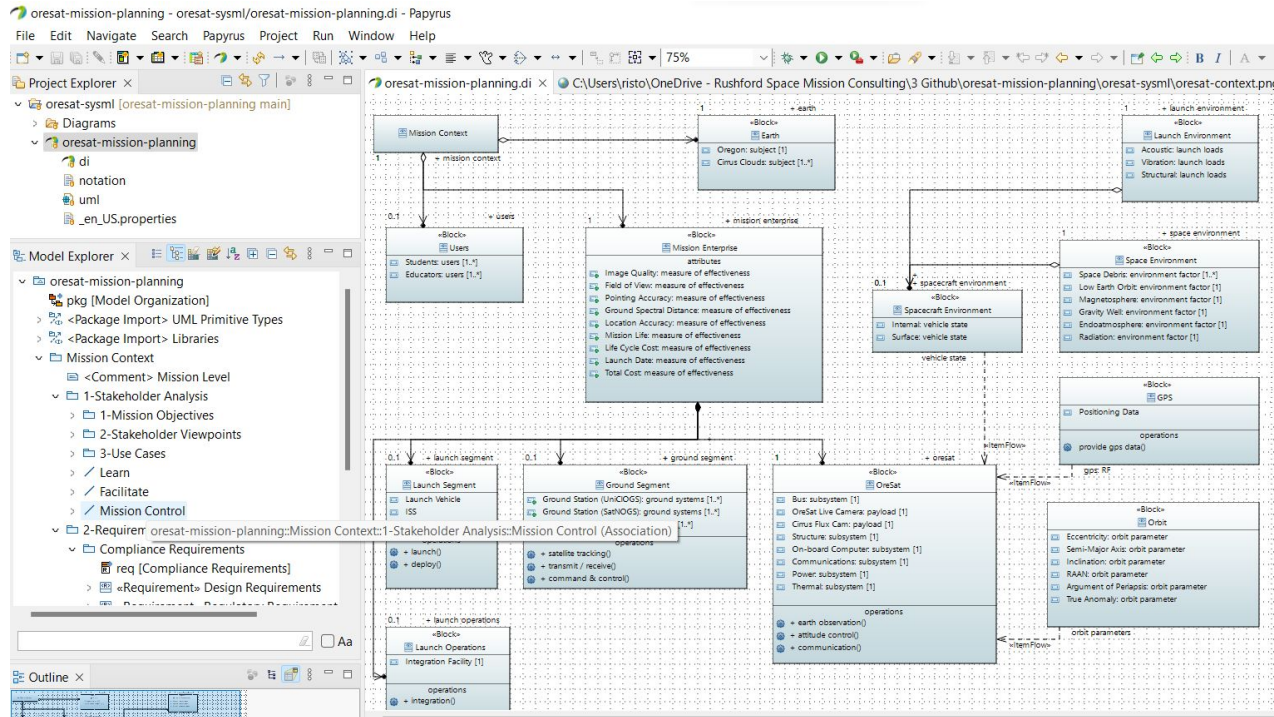
You can't think of everything

- Complex Scenarios



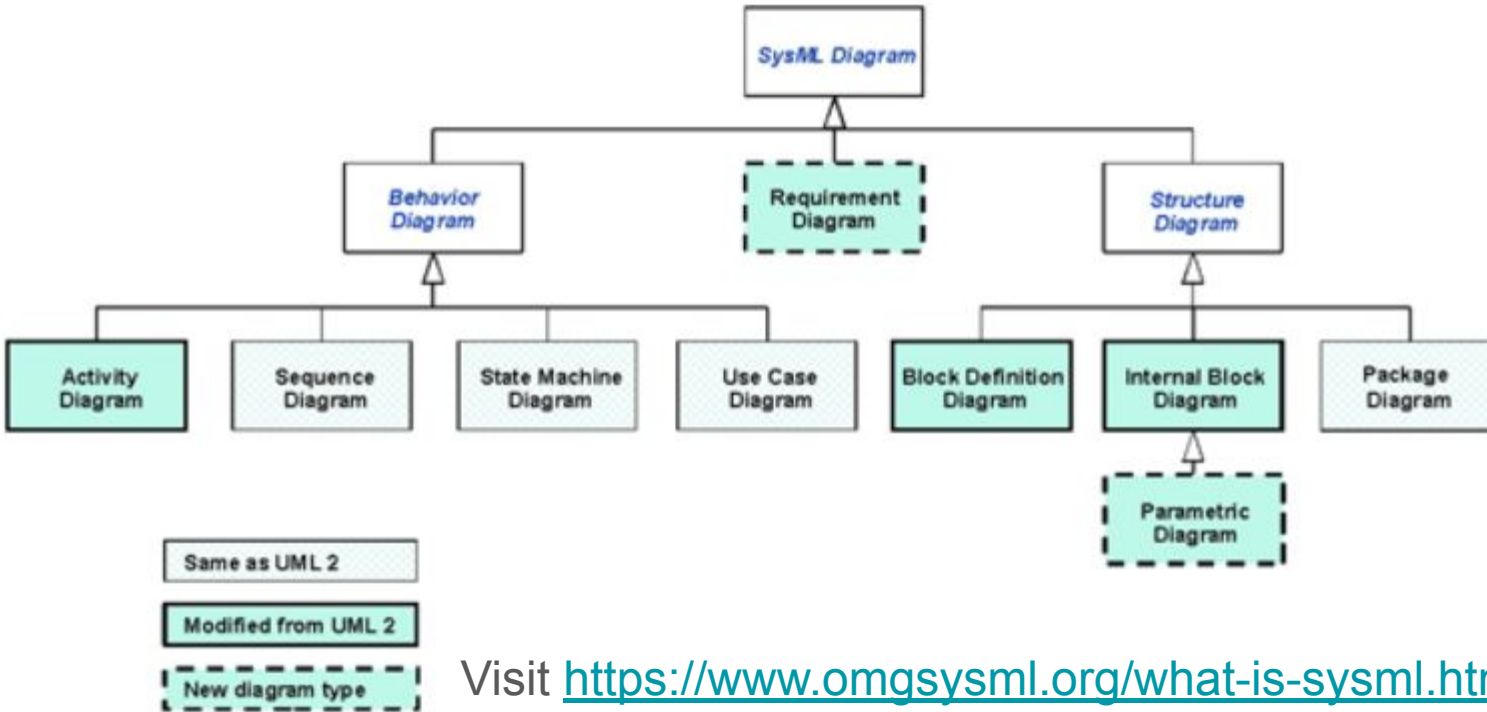
So it helps if you can track it and trace it

- Organize everything to facilitate growing the model with traceability



About SysML (Systems Modeling Language)

- Not just diagrams
- Common basis for analysis and design



Visit <https://www.omgSysml.org/what-is-sysml.htm> to learn more 12

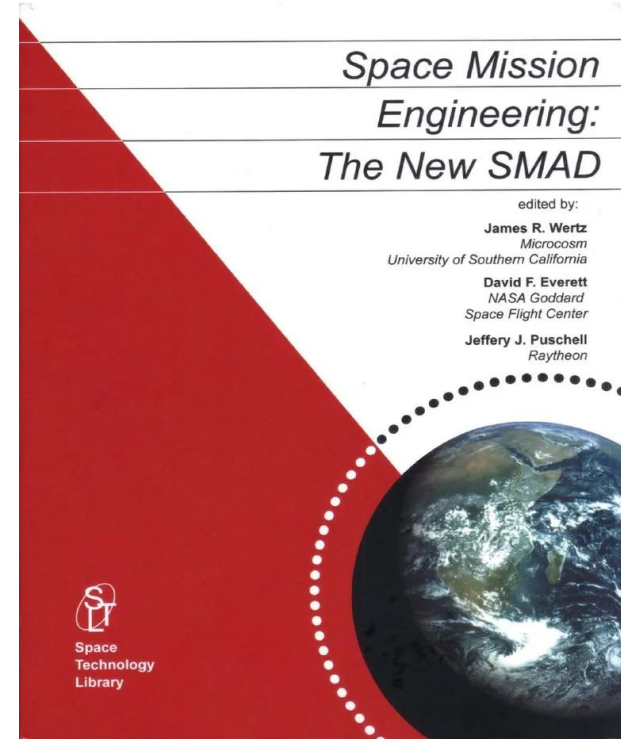
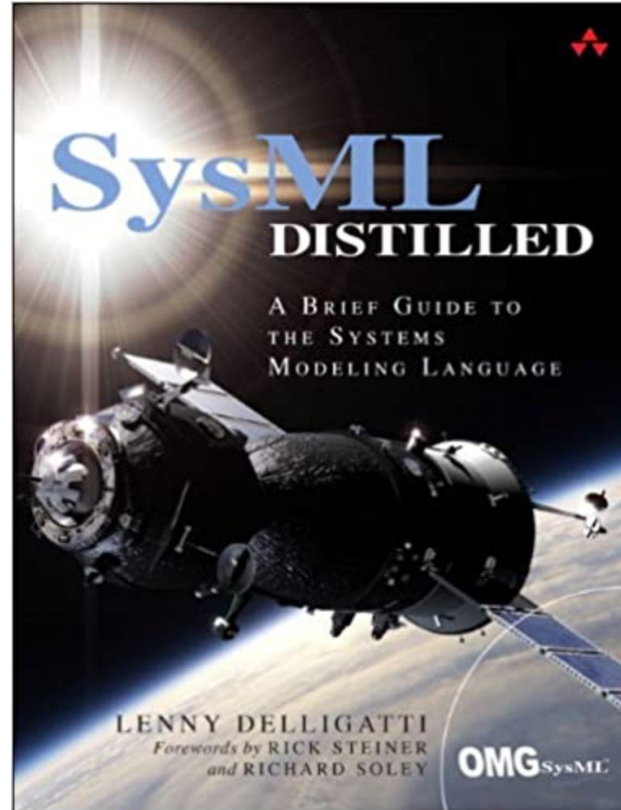
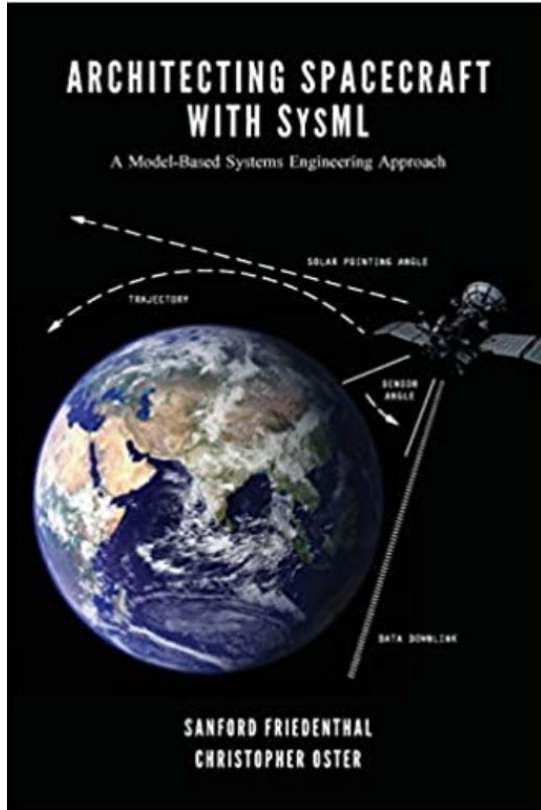
About Eclipse Papyrus

- “An open source project to provide an integrated environment for editing UML and SysML models”

Visit <https://www.eclipse.org/papyrus/> to learn more



Inspirations



Inspirations

- Great resources, but...

Hence this tutorial

- Very much a work in progress (editing existing sections, planning future ones)
- Representative, not exhaustive
- Sections so far
 - [SysML Intro and Installation](#)
 - [Starting a Project](#)

Everything is available at <https://github.com/oresat/oresat-mission-planning>

More Information/Contact

More Information

- A good place to start: <https://www.oresat.org/>
- Full OreSat source at: <https://github.com/oresat>
- More open source aerospace: <https://www.pdxaerospace.org/>
- Contact PSAS at aerospace@pdx.edu
- Contact Risto directly at risto.rushford@gmail.com

Thank you!