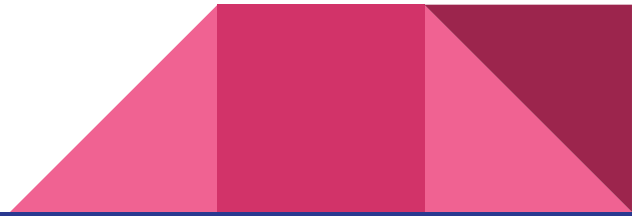
MBSE Avionics System Capstone

Semester 2, Sprint 1 Presentation

Current Team Member Roles

- Walter
  - Scrum master
  - FMEA researcher
- Luke
  - Lead modeler
- Shawn
  - Lead FMEA researcher
  - Customer point of contact
- Clay
  - Modeler

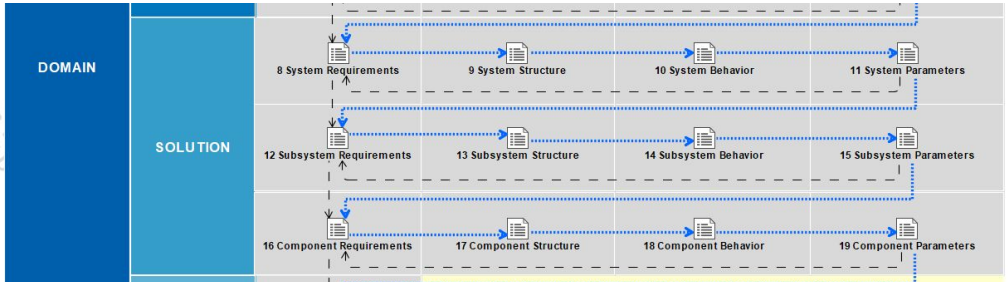


Semester 1 Recap

- Got exposure to the SysML modeling language
- Introduction to the MagicGrid MBSE methodology
- New way to approach large scale design challenges
- Black-Box analysis of a new domain (Problem Domain)
- Methods of scoping down our design to singular subsystem
- Used the holy modeling tool: MagicDraw

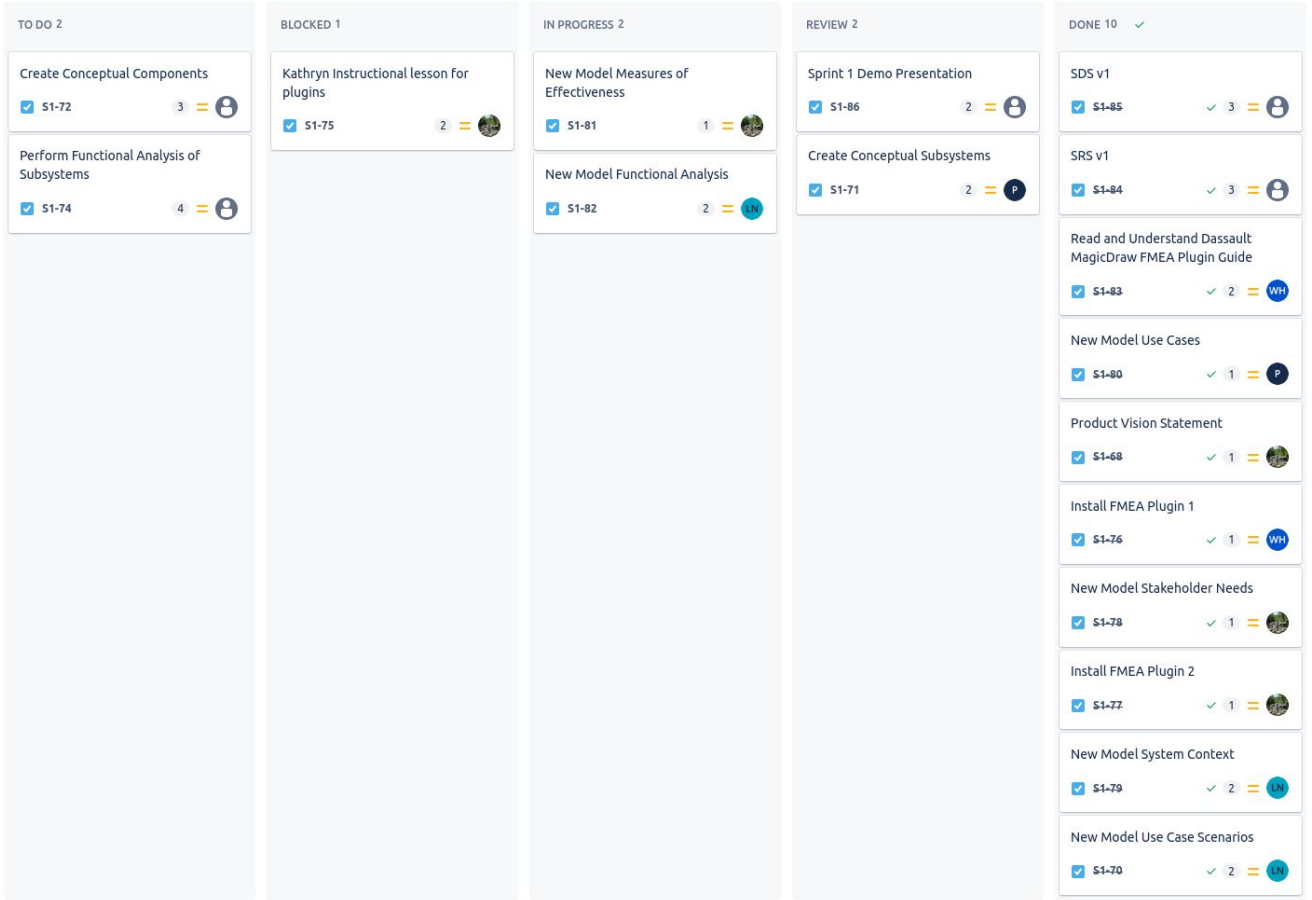
Semester 2 Overall Goals & Deliverables

- Work on refactoring the current models in problem domain
- Work on select parts of the solution domain



- Failure Mode and Effects Analysis (FMEA)
  - Identify possible risks given previous similar systems
  - Capture faults from well-defined requirements

Sprint 1 Backlog



Our Progress for Sprint 1

- Rework on previous Models :(
  - Customer roasted our deliverables (Nicely)
  - Modified more than half of our models (only 2 remaining)
- Installed and setup the FMEA Plugin in MagicDraw
  - Learn more about FMEA procedures
  - Modified a plan to identify FMEAs in our existing models
  - Created a structure/standard for team to follow
- More Literature Reviews
  - Searching for other examples of similar systems in related modeling tools

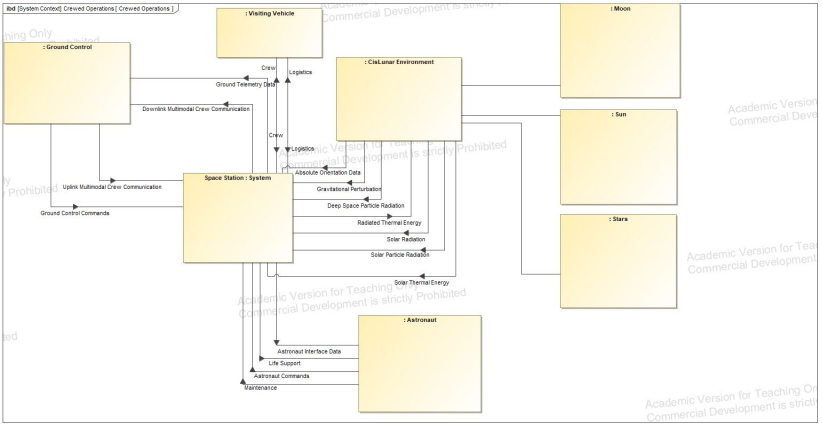
FMEA Risk Assessment Matrix

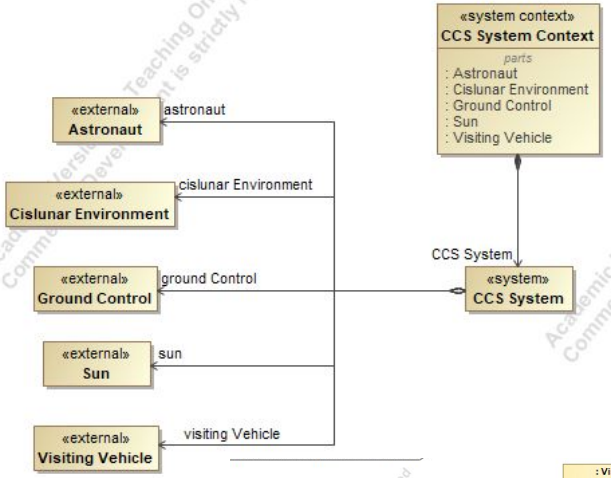
Severity Probability	1	2	3	4	5
1	Low	Low	Low	Low	Moderate
2	Low	Low	Low	Moderate	High
3	Low	Low	Moderate	Moderate	High
4	Low	Moderate	Moderate	High	Unacceptable
5	Moderate	Moderate	High	Unacceptable	Unacceptable

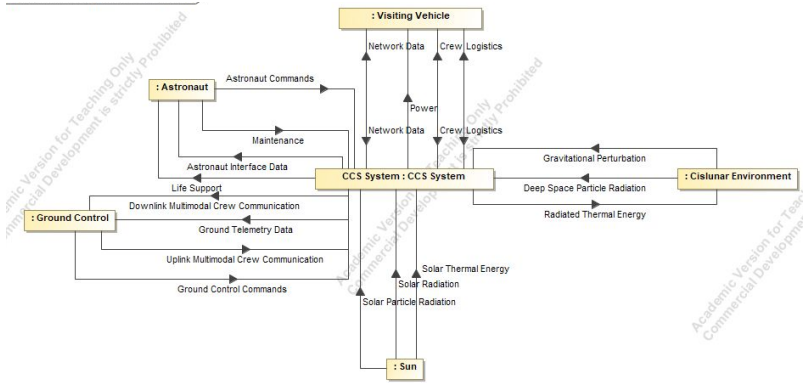
MagicDraw FMEA Table

#	Id	Name	Classification	Item	Subsystem	Failure Mode	Local Effect Of Failure	Final Effect Of Failure
1	F-1	F1	electrical	battery : Design::...	Pump	Unable to be charged		Underdose or overdose
2	F-2	F2	electrical	battery : Design::...	Pump	Voltage error		Therapy delay
3	F-7	F2 clone	electrical	battery : Design::...	Pump	Voltage error		Therapy delay
4	F-3	F3	electrical	battery : Design::...	Pump	Unable to be charged		Therapy delay
5	F-4	F4	electrical	dispenser : Desig...	Pump	Pumps inaccurate size...	Air in line	
6	F-8	F4 clone	electrical	dispenser : Desig...	Pump	Pumps inaccurate size...	Air in line	
7	F-5	F5	electrical	display : Design::...	Pump	Broken keypad		Therapy delay
8	F-9	F5 clone	electrical	display : Design::...	Pump	Broken keypad		Therapy delay
9	F-6	F6	electrical	sensor : Design::...	Pump	Drop in sensitivity	High glucose-level undetected Low glucose-level undetected	

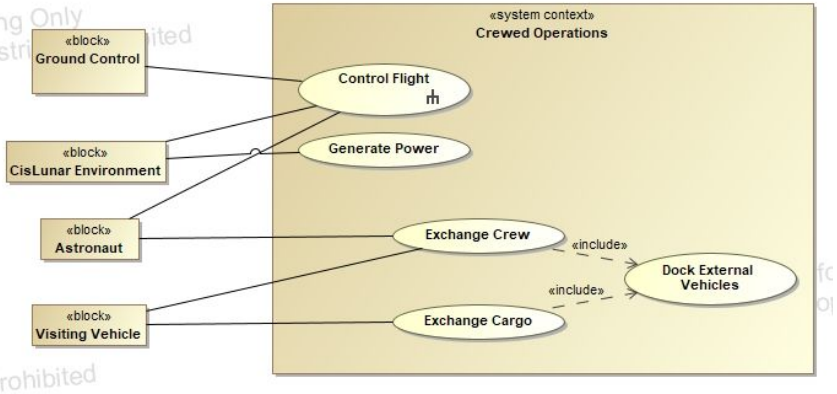
Model Reworks

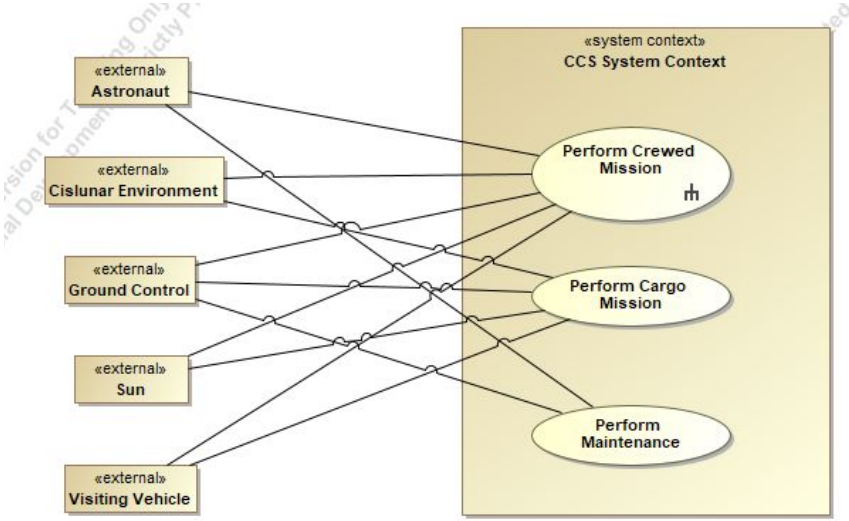




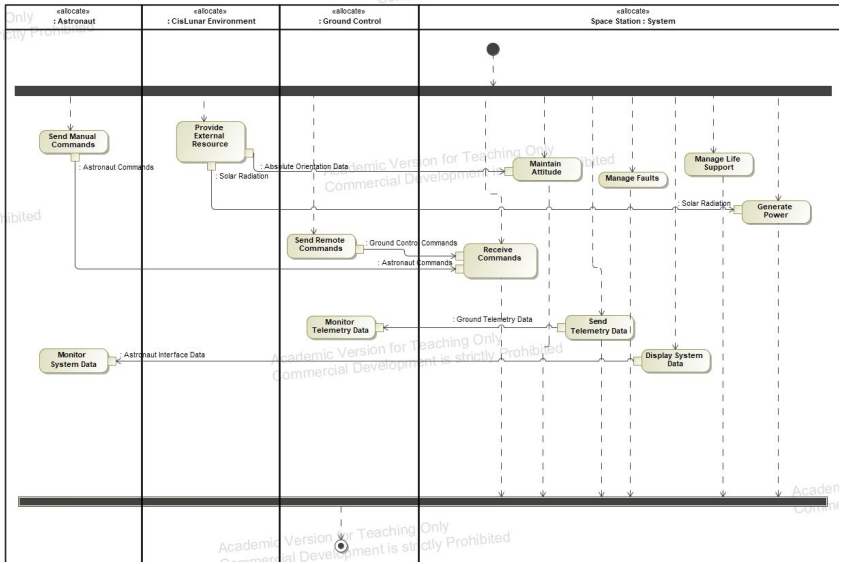


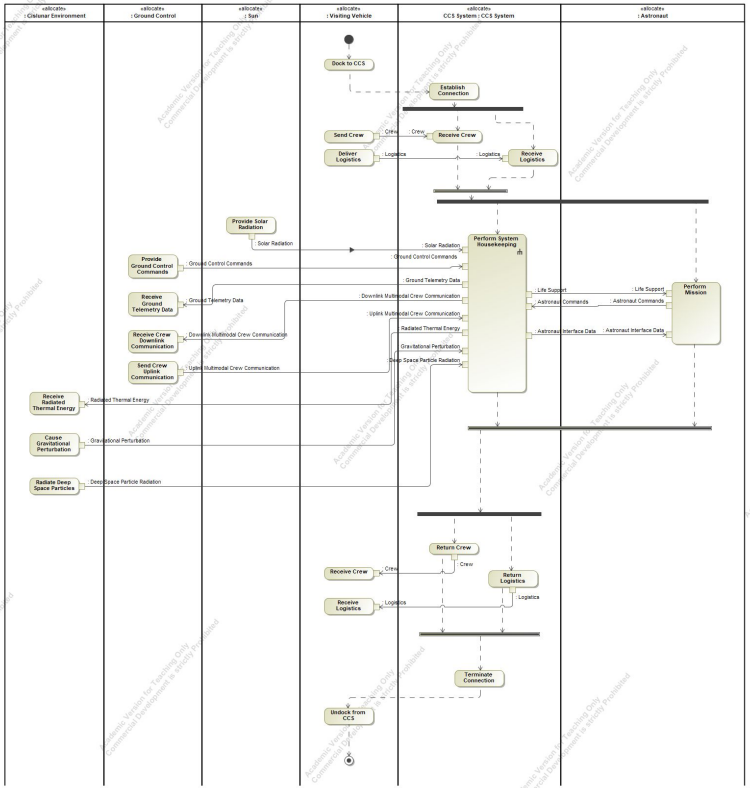
Model Reworks





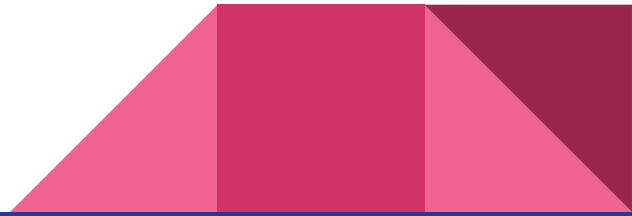
Model Reworks





Blockers / Risks

- Not being able validate our model with the customer
  - Customer on vacation + time coordination issues
- Learning the FMEA plugin takes time
  - The documentation exists, but has the same problems as the MagicDraw guide



Sprint 2 Goals

- Get models approved by customer (hopefully)
  - Finish the rework of remaining models
- Generate FMEA items for model components
  - Aiming for 20-30 FMEA items
  - Accurately identify the risk levels of each item
  - Get customer approval
- Document our modeling process
  - Potentially make our own personalized MagicGrid Guide
  - Aiming to set a standard for potential future projects within our school

Questions?