MBSE Avionics System Capstone

MASC

Sprint 2 Demo

Shawn
B.S. Electrical Engineering, Aerospace Systems

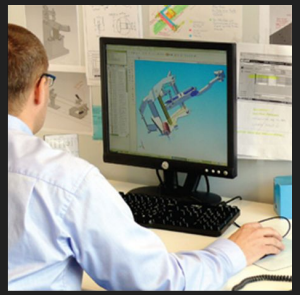
Luke
B.S. Software Engineering

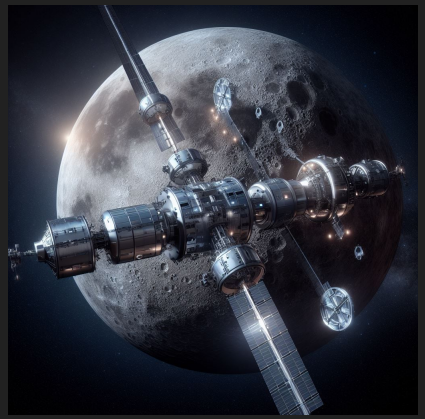
Clay
B.S. Software Engineering

Walter
B.S. Computer Science, Cybersecurity

Project and Sprint 1 Recap

- System Modelling for Crewed Cislunar Station with MagicGrid framework
- Goal to capture novel Failure Mode Effects Analysis with the system model
- Sprint 1 Accomplishments
  - Built relationships at Dassault and NASA
  - Decided on Tool and Framework
  - Acquired tool and licensing
  - Performed semester workload design





Sprint 1 Hiccups

- Trouble finding good meeting days
  - We all had different schedules
  - Communication was good, but progress required long in-person meetings
- Had to relearn how to create the models
  - SysML has a few key differences from UML
  - Only one form of documentation, and few examples
- Not provided with default stakeholder needs
  - Preliminary research was required before any progress could be made

Sprint 2 Progress

- Implemented changes to our workflow to speed up progress

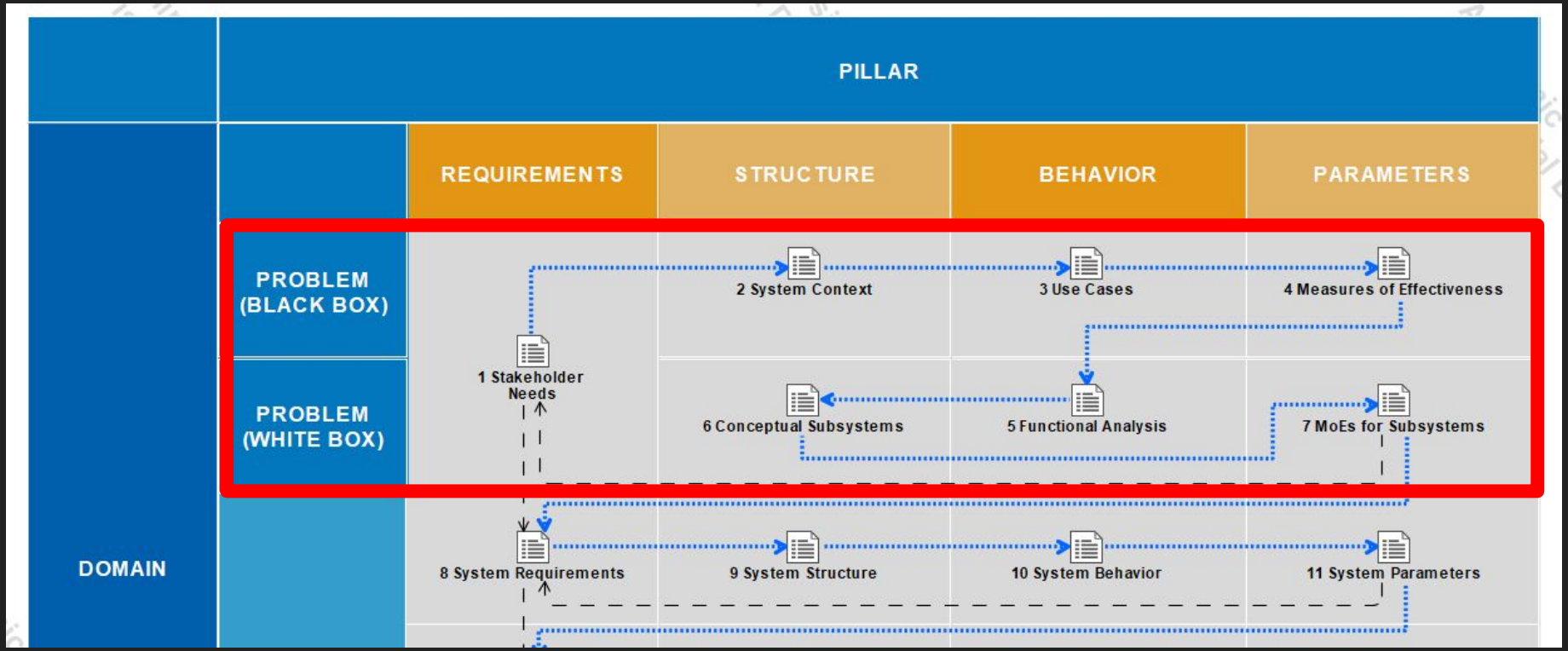
- Completed a draft of the Problem Domain Black Box
  - Generated stakeholder needs
  - Developed system context
  - Captured use case scenario (crewed operations)
  - Determined measures of effectiveness

- Solicited feedback from client regularly to iterate model further

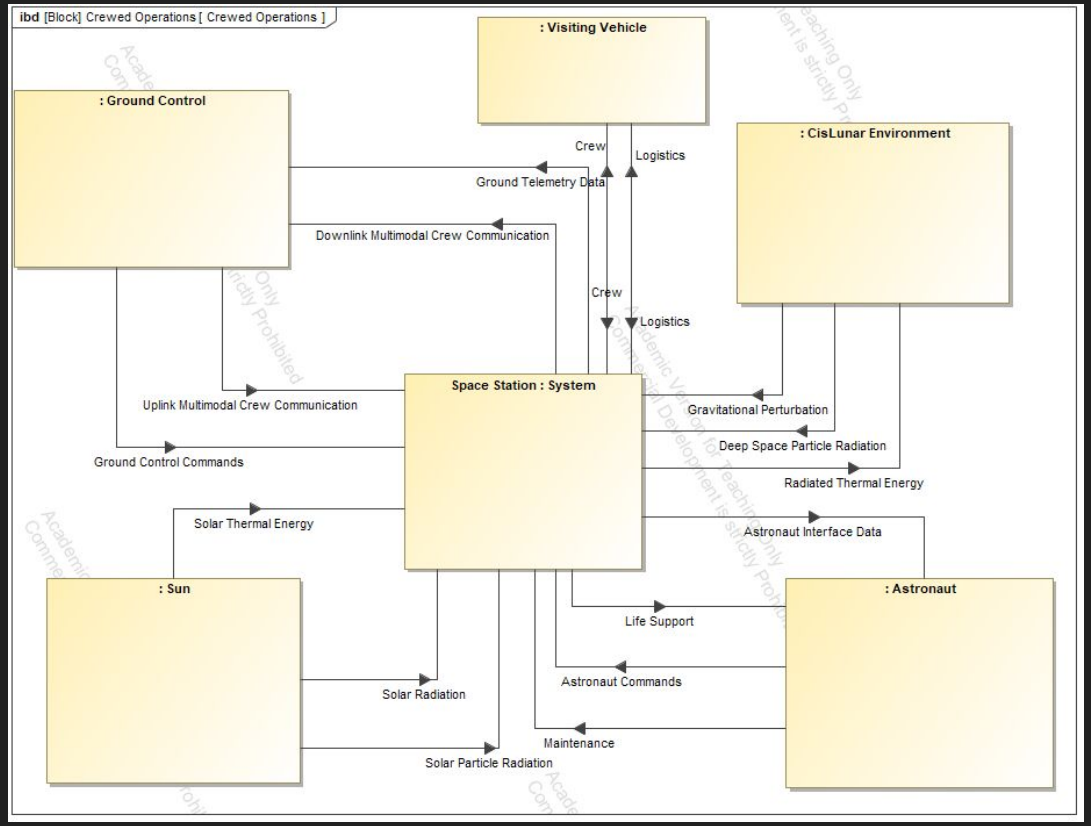
Sprint 2 Team Member Roles

- Shawn
  - External communication with stakeholders
  - Facilitate Learning MBSE and MagicGrid
- Luke
  - Scrum Master
  - Project Merge Manager
- Walter
  - Annoyed the team
  - Crungy, at every team meeting
  - Verified and Validated models
  - Organized the new meeting times
- Clay
  - Led discussion / development on model creation
  - Kept up with team deadlines, pacing semester work

Project Recap



Sprint 2 Progress

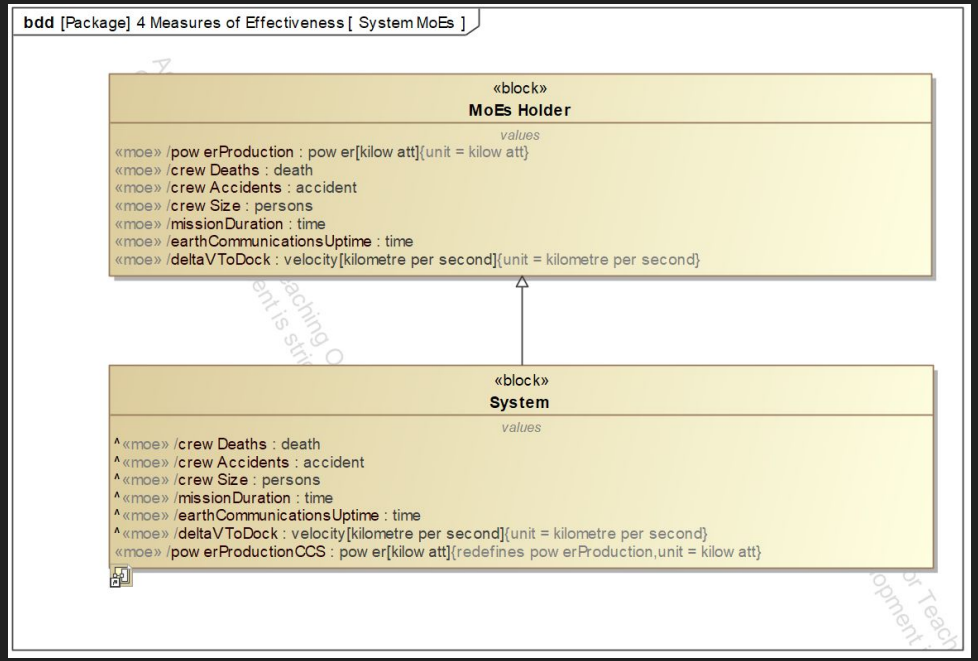


System Context

Sprint 2 Progress

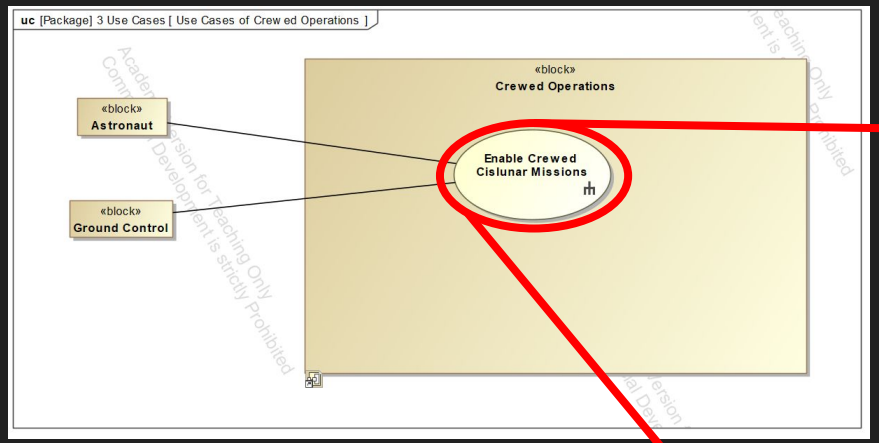
#	Name	Text	Documentation
1	SN-1 User Needs		
2	SN-1.1 Cislunar Crewed Mission	The Sol should facilitate human crewed missions to cislunar space including capabilities that enable surface missions.	Add sources in this field
3	SN-1.2 Exploration Science Mission	The Sol should provide capabilities to meet scientific requirements for lunar discovery and exploration.	Add sources in this field
4	SN-1.3 Forward Compatablility	The Sol should enable, demonstrate, and prove technologies that are enabling for deep space missions.	Add sources in this field
5	SN-1.4 Manual Flight Control	The Sol should allow for manual control of flight dynamics.	Add sources in this field
6	SN-1.5 Automatic Flight Control	The Sol should be able to maintain its orbit.	Add sources in this field
7	SN-1.6 Independent Power	The Sol should produce, store, and regulate its own power.	Add sources in this field
8	SN-1.7 Crew Safety	The Sol should keep the crew alive and safe.	Add sources in this field
9	SN-1.8 Crew Mission Extensability	The Sol should accomodate extended crew mission durations.	Add sources in this field
10	SN-1.9 Extra-Vehicular Activity	The Sol should allow crew to perform extra-vehicular activity.	Add sources in this field
11	SN-1.10 Visiting Vehicle Docking	The Sol should allow for Visiting Vehicles to dock.	Add sources in this field
12	SN-1.11 Vehicular Logistical Tranfer	The Sol should accept the transferring of crew and cargo.	Add sources in this field
13	SN-1.12 Lunar Surface Communication	The Sol should provide communication to the Lunar surface.	Add sources in this field
14	SN-2 Design Constraints		
15	SN-2.1 User Interoprability	The Sol should have to ability to support multiple self, commerical, and international partner objectives.	Add sources in this field
16	SN-2.2 Crew Size	The Sol should accomodate up to 4 crew members.	Add sources in this field
17	SN-2.3 Mission Duration	The Sol should enable 30 to 90 days of crew missions.	Add sources in this field
18	SN-2.4 Orbital Access	The Sol should be easy to access from Earth with current launch vehicles.	Add sources in this field
19	SN-2.5 Earth Communication	The Sol should have continuous communication with Earth.	Add sources in this field

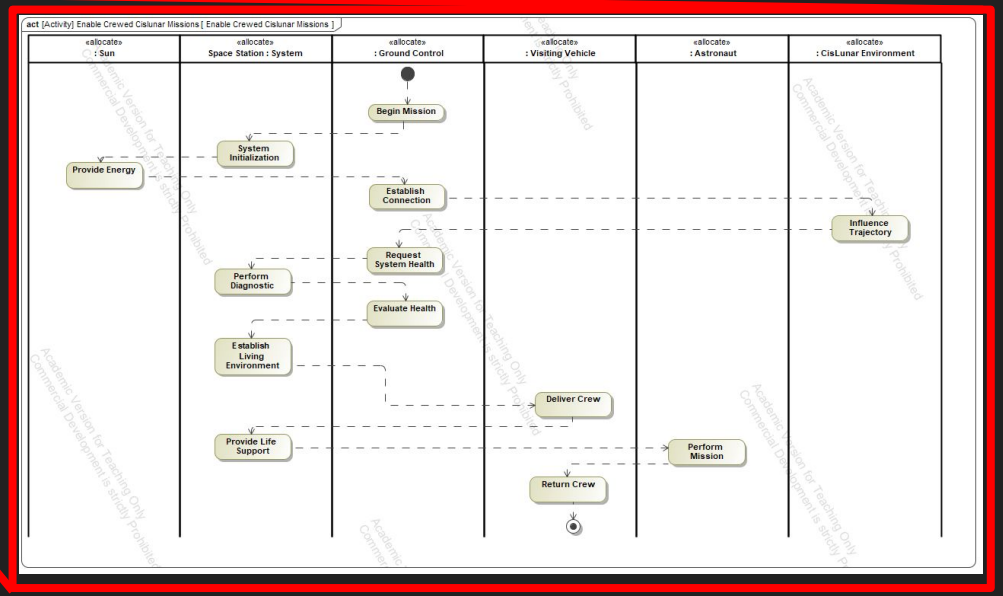
Stakeholder Needs



Measures of Effectiveness

Sprint 2 Progress

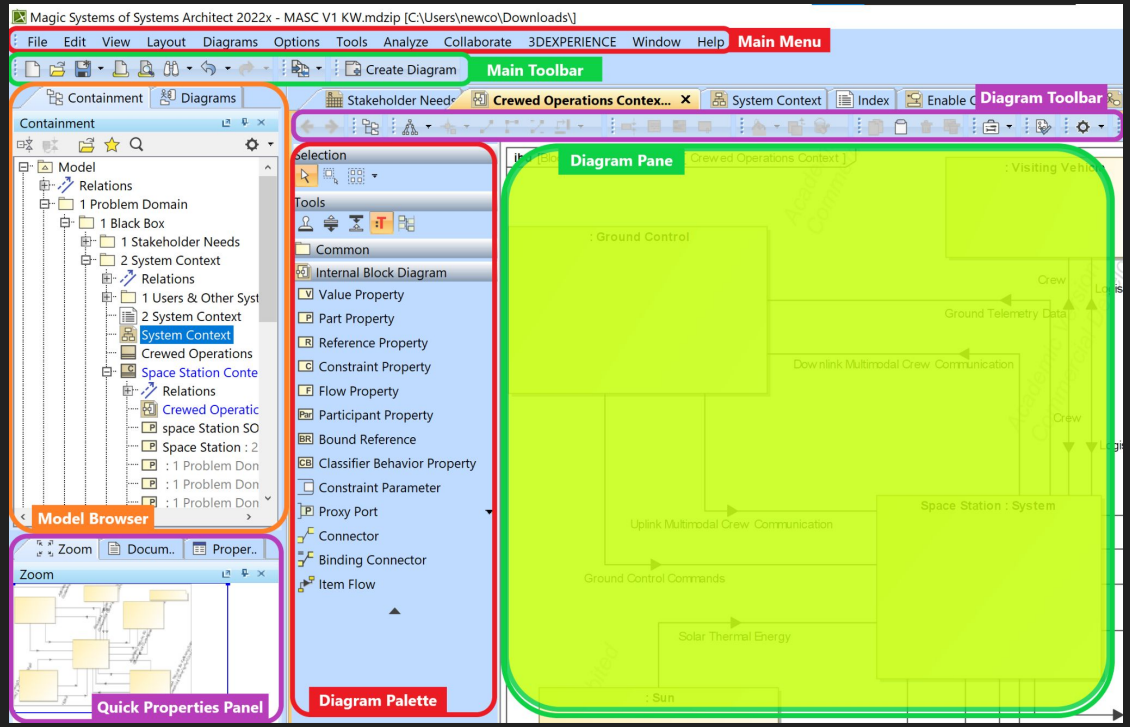




Use case decomposition

Risks and Issues

- Learning the software
  - Lots of features
  - Many tools to our disposal
- Learning the framework



Next Sprint Goals

- Complete remaining models within the Problem Domain
  - Functional Analysis
  - Conceptual Subsystems
  - MoEs for Subsystems
- Have a better understanding of the software
- Prepare for Solution Domain

Current Status

- Mad respect for System Engineers
- 4/7 models complete currently
- Meeting 3 times a week (excluding class)
  - 2-3 hours per meeting
- Demo

Any Questions?