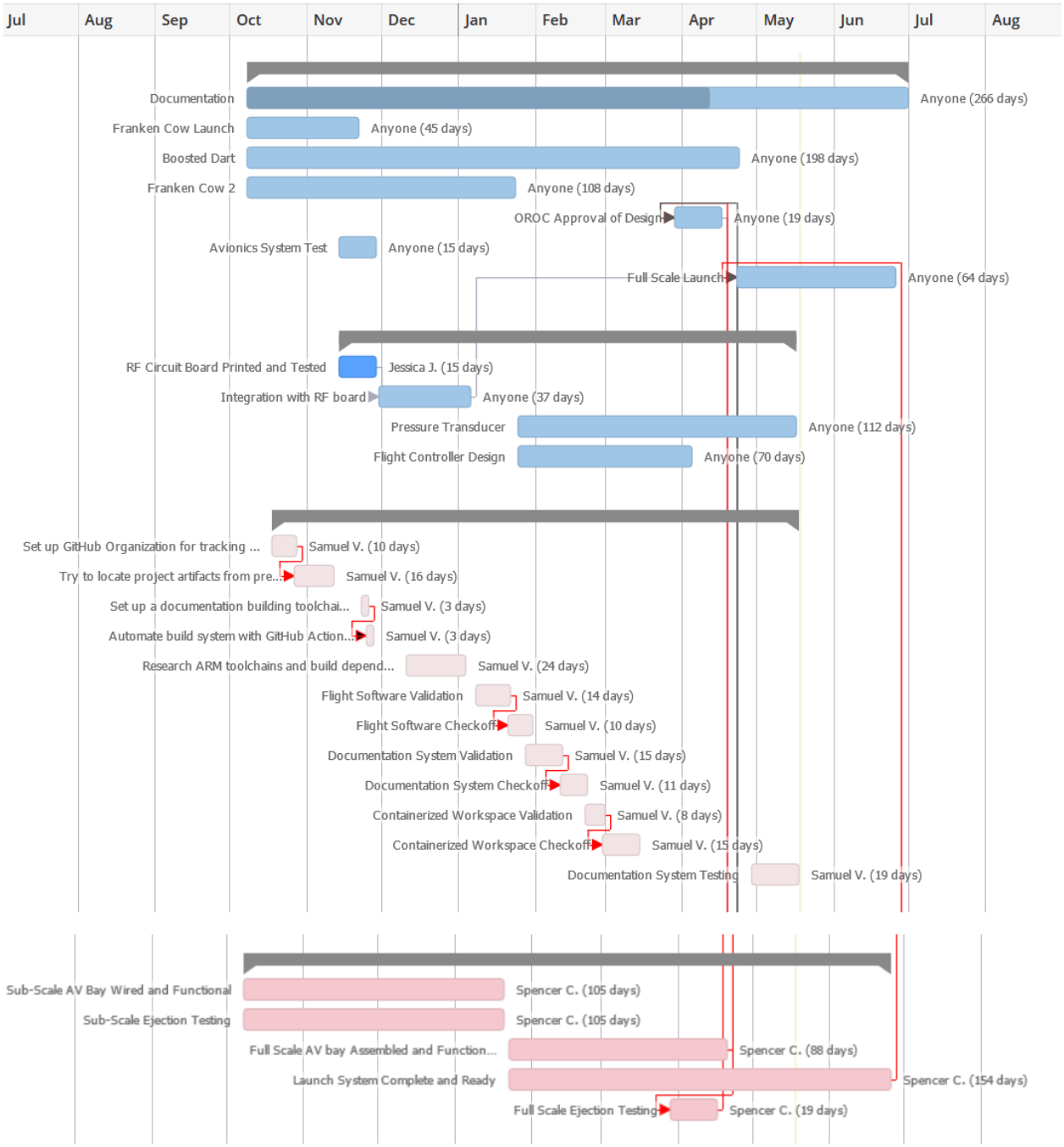
Design Impact Assessment
HART 20/21 EECS Avionics

Executive Statement

The EECS Avionics team is responsible for all electronics pertaining to the flight of a two stage high powered rocket. The work of several sub teams needs to interface seamlessly during the assembly of the rocket. In order for a successful flight to take place, there must be a system to ignite the booster from a safe distance, and an avionics system in each stage to dictate recovery and ignition events as well as transmit telemetry and track GPS location. While not mission critical, it is paramount that accurate motor performance is recorded during flight to aid in the improvement of the motor design.

The specific needs of the project were not certain at the beginning of the project as all of the teams were beginning their design process. An important part of our success was considering the needs of the project and our capabilities as a team. Narrowing the design down to systems necessary for success helped us maintain a simpler and more coherent view of the project needs. As the project evolved so did the needs of the system, but focusing on mission critical systems allowed us to ensure our team was not the weak link in the system. Once our designs had been proven in our sub-scale tests and launches, we began to refine components and conduct testing to discover all possible failure modes. Referencing flight data and testing data, subsystems were improved to account for many possible failures and manufacturing weaknesses were discovered. This practice makes for a more robust system that increases the odds of mission success.

Project Timeline



Lessons Learned

Working on an interdisciplinary team can be difficult on a complex project and comes with a learning curve. In academia, there are little opportunities to work with other disciplines in an undergraduate context. Each team has a lot of knowledge about each field but figuring out how to communicate between these two knowledge bases can make for a barrier. On a high powered rocket, the communication between teams must be concrete to not miss small details

that can result in large consequences. Frequent communication is the best way to overcome this barrier. Every individual is different and by building that familiarity it becomes easier to understand each other and share an idea when coming from different backgrounds.

Communicating with the instructors was also a key action to the success of the team. A group of only students are susceptible to overestimating their capabilities but instructors are able to provide an experienced pair of eyes and can let them know if they are reaching too far. In addition to project guidance they will assist teams in aligning project goals with capstone requirements which proved more difficult than originally thought.