

Project Brief for Industrial Consultant Update

Team 25: The Medusa

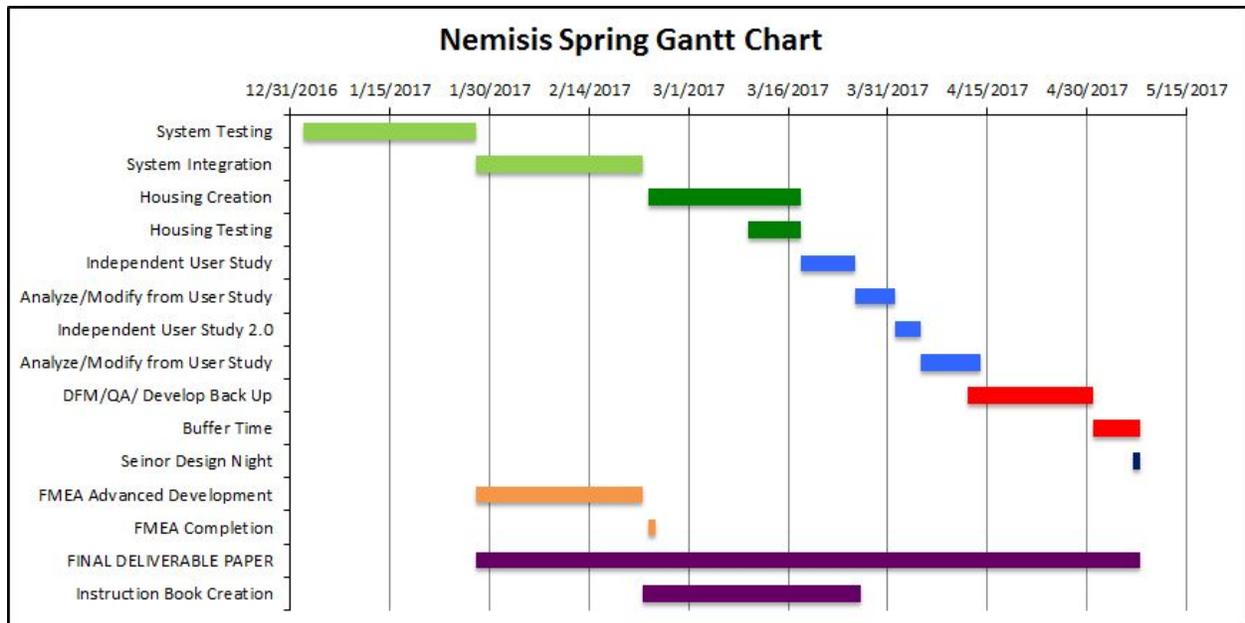
Scott Bokach, Ian McClaskie, Scott Stamper, Nate Zylstra

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Current Status

The team is well within the scheduling parameters it has set for itself. It was determined that by February 22, system integration between the electronics and the firing mechanism would be accomplished, and that has successfully been done. The team has also decided to develop “daughter” systems that hard line into the main apparatus: two additional firing systems, made with identical PVC and QEV components as the original Medusa, are under construction. These two daughter systems can be connected to the original electronic controls and air distribution system, so that they can be primed simultaneously and with the same fill as the parent system. These new additions will increase the Medusa’s firing capacity by 200%.

Schedule



Accomplishments

The team can proudly say that the necessary controlling electronics have been configured and wired together, the final design for the air distribution and firing system has been assembled, and those two systems have been combined into one cohesive design. This goal was achieved on time, as was set out in the team’s spring gantt chart. A vibrational study was also performed on the onboard air compressor, which will be used to dampen the machinery when the entire system is confined in its housing. Lastly, the team has been in contact with Jessica Zylstra, an art major at Calvin who is collaborating with the team in creating concept

sketches for what the final product may look like. The team is greatly appreciative of her work, willingness to help, and are amazed by her initial sketches. In addition, the team has also been in contact with Kirk Driesenga, a student at Compass Academy studying film production who is collaborating with the team for product promotional videos.

Issues and Concerns

In developing the first daughter system, it was found that all four of the new QEVs leak air significantly. This can be attributed to manufacturing errors, as they were all ordered cheaply online from a foreign distributor. Modifications are underway, which include the use of epoxy and teflon tape to better seal connections, in order to address the leaking. Another batch of QEVs are on the way, which, hopefully, will not have the same problem, but if so a similar approach will be taken to ensure their functionality.

Another issue arose when the Mega control board in the electronic components unexpectedly failed. It was found that the code programmed into it ran just fine; somehow, the hardware just failed completely. This was worked around by using a spare, albeit smaller, arduino board, it has since been rigorously tested and no sign of failure has occurred and in the event of another board failure another backup board is in hand and can be easily swapped out for the broken component.

Lastly, a concern that has yet to be addressed is potential compressor noise when the product is in use. Given that the team's proof of concept uses a cheap compressor that was readily available to do the job required, there is not a significant amount of noise dampening built into the pre-existing machine. When the housing for all components is constructed, the team will look into reducing the noise and vibration of the compressor further.

Upcoming Work

The next significant undertaking for the Medusa will be construction of housing for the components. This housing will need to be sturdy enough to protect the sensitive electronics encased within, hold the PVC components in place while it is firing, but also be light enough and portable enough for a child to carry during play.

The team will also be developing an instruction manual, detailing system operation and handling instructions, including safety precautions. This will be included when the team moves on to external beta testing, passing the system off to outside parties in order to gain feedback from independent users and make necessary adjustments.

Documentation and the final report for the end of the semester also need to be completed.

Lastly, final artwork and media will be considered moving forward. Jessica Zylstra is continuing to work with the team on aesthetics, and the team also desired to work with AV contact Kirk Driesenga to potentially create a video presentation for marketing the final product. The extent and theme of which is still under working considerations.