

Individual Lab Report #03

Progress Review

March 5th, 2020

Alex Withers

Pit Navigator

Team G: The Pit Crew: Awadhut Thube, Justin Morris, Alex Withers

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Individual Progress

Pit Navigator

Simulator Update

For the Pit Navigator project, I have adopted the WeBots simulator from HASH Robotics for use to test our software. The simulator can communicate with ROS, has a dedicated discord server, and decent tutorials online. We had considered removing the Webots sim as we were told that there would be no better pit model in the sim other than the dropped floor, and overall difficulty of building the sim on our own machine. I discovered a path to import a pit model as an object. I took a .ply file and imported it into Meshroom and 'downsampled' the model to sub 500K triangular faces. I then exported the model as an .off file which saves the points and face indexes. I wrote a python script to extract the points and faces into separate files. I was then able to build a VRML file using these created geometry text files by copying and pasting the arrays contained within the files. Then after creating the VMRL file, I added the object to the .wrl file that is the world the webots sim takes place in.

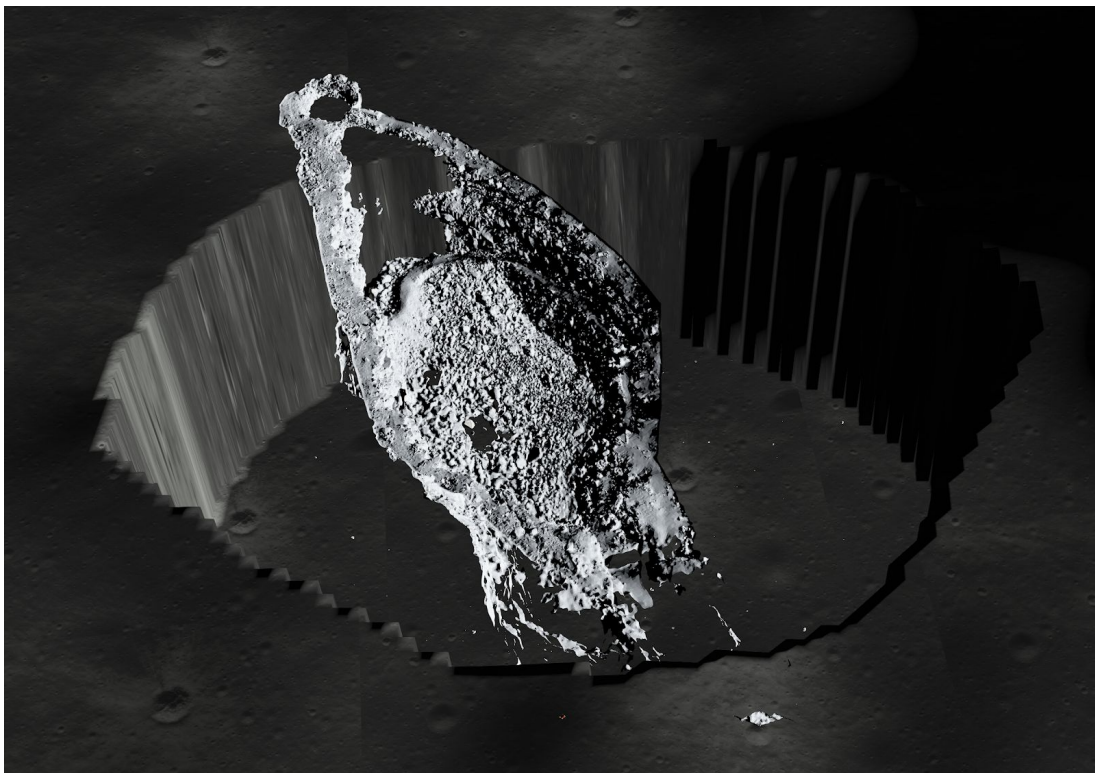


Figure 1: Kingsbowl pit is in Simulation

Testing Site

The process for gaining a pass to Gascola is complete and I have obtained it.

Challenges

Pit Navigator

Time Management

The amount of work this semester is significantly more than the previous semester. Between Cv, Autonomy, business, and extra assignments in the project course, there is very little time left for the actual project, or applying for internships. It seems that some groups are handling this by having not every member work on each extra assignment, which is not a luxury that we seem to have.

Simulation

We have the most information on the previous team's simulation and it seems to have the most out of box potential, so I am doing my best to get that sim to build and run on our machine, however it has been quite the challenge to find and install all the hidden dependencies and file locations that need to be moved. In order to make progress we have temporarily put aside the idea of building it on our own machine. This increases the risk of not being able to access the sim at any time we need as we are sharing the computer with Team Stars.

Teamwork

Pit Navigator

Individual	Main	Sub	Description
Alex W.	Simulation	Getting Resources	I have been responsible for gathering all the resources at our disposal and getting the simulation up and running.
Awadhut T.	Connecting Our code to Neils	Purchasing	Getting stereo matching point cloud into brinksmanship code, purchasing parts.
Justin M.	Build Blue	Robot control	Understanding the hooks of blue and building blue 2.

Plans

Pit Navigator

Simulation

I will run the local planning from the previous team in a demo to navigate around the pit with some rocks in the way. I will also improve how the pit looks in the sim, and remove the previous teams pit. I will investigate different methods of introducing shadows into the sim to have a more lifelike stereo matching problem.