1. Project title, names and email addresses of team members

NASA LEC Robotic Mining

Taylor Ertrachter - tertrachter2017@my.fit.edu

Bailey Hamant - bhamant2017@my.fit.edu

James Spies - jspies2017@my.fit.edu

Nathaniel Bouchie - nbouchie2017@my.fit.edu

Michael Foster - mfoster2017@my.fit.edu

Delanie Glock - dglock2017@my.fit.edu

Eric Hu - ehu2017@my.fit.edu

Kevin Landers - klanders2017@my.fit.edu

Steven Pazienza - spazienza2017@my.fit.edu

Alex Perez - aperez2017@my.fit.edu

Youpeng Xu - yxu2017@my.fit.edu

2. Faculty Advisor: name and email address

Dr. Marius Silaghi - msilaghi@fit.edu

3. Client: name and affiliation

Aerospace NASA Lunabotics Engineering Competition (LEC) and
Dr. Kimberly Demoret, FIT Aerospace Department

4. Progress of current Milestone (progress matrix)

Task	Completion %	Bailey	James	Taylor	To do
1. Investigate tools	100%	33%	33%	33%	none
2. Hello World demos	100%	25%	25%	50%	none
3. Implement, test & demo *Model is moving through use of Gazebo*	100%	25%	50%	25%	none
4. Implement, test & demo *Create a controller for the simulation so that it is controllable with buttons*	80%	20%	20%	40%	Still have to make the controls work smoothly with each other.
5. Implement, test & demo *Have full model of robot transferred to Gazebo and able to move*	50%	50%	0%	0%	Still figuring out how to transfer the correct file type into one that Gazebo accepts.

5. Discussion (at least a few sentences, ie a paragraph) of each accomplished task (and obstacles) for the current Milestone:

- Task 1: We have the model in Gazebo able to move through the use of in-program functions. We can add ‘Force’ to each wheel and have it move forward or backward. Through this method, it is not possible to turn the robot unless we use the controller to turn it.
- Task 2: We have a Python controller to manually move the robot through the use of buttons, rather than having to use Gazebo functions to add ‘Force’ to the wheels to make it move. Using buttons to add force means that the manual controller would be finished, and it would be a matter of what buttons are used. That being, a keyboard button press, or an Xbox controller button press.
- Task 3: We attempted to import the full CAD model from CREO to Gazebo so that we could manipulate it and have a more accurate simulation rather than just having a box with four wheels. Unfortunately this is a much harder process than originally thought because the version of CREO that the NASA LEC team used to create the CAD file does not have any versions it can export the model to so that it can be used in Gazebo. This is still an ongoing side task.

6. Discussion (at least a few sentences, ie a paragraph) of contribution of each team member to the current Milestone:

- Jame Spies: James finished the basic simulation robot so that it is able to move. The original shown in Milestone 1 was not set up to be able to move. Joints were added to the wheels to connect it to the main body so that when 'Force' is applied to the wheels, it pushes the entire robot and not just the individual wheel. Also wrote most of the Progress Evaluation.
- Taylor Ertrachter: Taylor created the controller for the simulation so that the robot can be controlled through pushing buttons instead of entering 'Force' values for each individual wheel. Also helped touch up the Progress evaluation and Presentation.
- Bailey Hamant: Bailey attempted to transfer the CAD model of the robot to Gazebo. Created most of the Presentation and parts of the Progress Evaluation.

7. Plan for the next Milestone (task matrix)

Task	Bailey	James	Taylor
Finish setting up the controller so that the robot can move forward, backward, smoothly.	Help where needed	Help where needed	Finish code
Start using the Zed camera to detect objects.	Learn how to use the Zed camera.	Learn how to implement the Zed camera.	Learn what code libraries can be used and how to use them.
Potentially switching milestone objectives to manipulating the arm on the robot instead of using the Zed camera.	Write code for moving arms up and down, and having the conveyor belt turn on and off.	Make an extension to the robot that has arms that hold a conveyor belt.	Write code for moving arms using a controller.

8. **Discussion (at least a few sentences, ie a paragraph) of each planned task for the next Milestone**
    - Task 1: As of right now the controller works to add 'Force' to the robot. This means that it only moves it forward and backward. It needs to be adjusted so that the simulation robot can also turn left and right as well. Taylor has been the main person working on this, so we imagine that he can continue this objective solely; however if either James or Bailey can help, we will be able to do so.
    - Task 2: Using the Zed camera to detect objects is the first step towards automation. This is important because the NASA competition relies on what parts the team has automated. We plan on first learning how to use the Zed camera, and then learning how code can be implemented to react to when the camera sees something in its field of view. We also want to see what Python libraries are available to use so that the process may become easier to understand and operate.
    - Task 3: In a past meeting, our team lead thought that it may be a better idea to work on the more physical components of the robot for right now, as the actual robot is still not fully finished. If this ends up becoming the case, we will work on operating the conveyor belt in the simulation instead. This would mean making an addition to the current simulation that has two arms holding a conveyor belt. Once that has been done, we would need to write code that controls those arms to move up and down, as well as turning the conveyor belt on and off.
9. **Date(s) of meeting(s) with Client during the current milestone**:
    - October 5th
    - October 12th
    - October 19th
10. **Client feedback on the current milestone**
    - Dr. Demoret believes our progress is good and that continuing to work on the simulation is the right play. She has been pushing for getting the physical robot up and running in the Harris Design Center so that we can start working on that soon as well.
11. **Date(s) of meeting(s) with Faculty Advisor during the current milestone:** .
    - October 23rd

12. Faculty Advisor feedback on each task for the current Milestone

- Task 1: ...
- Task 2: …
- Task 3: ...

DocuSigned by:
Marius Silaghi
4C78522EF27840A...

Faculty Advisor Signature: _____ Date: _____

DocuSigned by:
Marius Silaghi
4C78522EF27840A...

13. Evaluation by Faculty Advisor

- Faculty Advisor: detach and return this page to Dr. Chan (HC 214) or email the scores to pkc@cs.fit.edu
- Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Taylor Ertrachter	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Bailey Hamant	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
James Spies	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____ Date: _____