Contact & Meeting Information

- CSE Project Member: Liam Sapper - lsapper2020@my.fit.edu
- Faculty Advisor: Dr. Marius Silaghi - msilaghi@fit.edu
- Client: FIT's Robotic Mining Competition team (RMC), and by extension, NASA (the host of the Robotic Mining Competition).
- Head of RMC project:
  - Sidney Causey (scausey2021@my.fit.edu) - Aerospace Engineering
- Meeting Times: Wed. 4pm-5pm; Fri. 3pm-3:30pm

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Progress Matrix

TASK	COMPLETION %	TO DO
1. Code level review/language selection	100%	none
2. Small demos	100%	none
3. Requirement document	90%	Confirm specifications of navigation software/GUI
4. Design document	80%	Finalize design of navigation GUI, as well as confirm computer being used on robot
5. Testing document	100%*	*Make edits to performance test cases

Task 1

- Language selected: Python
- Why?
  - Easy to use
  - Versatile
  - Most known among group members
  - Most simulation software has Python integration

Task 2

- Demos created in Python
- Basic programs implementing manual and autonomous movement in a small robot
- Simulation software to be implemented was figured out early; 1 less task for Milestone 2

```python
# Main loop:
# - perform simulation steps until Webots is stopping the controller
while robot.step(time_step) != -1:
    # Read the sensors:
    # Enter here functions to read sensor data, like:
    #  val = ds.getValue()
    keyPress = keyboard.getKey()

    if (keyPress==ord('W')):
        fwdSwitch = 0
        leftMotor.setVelocity(max_speed)
        rightMotor.setVelocity(max_speed)
    if (keyPress==ord('S')):
        fwdSwitch = 0
        leftMotor.setVelocity(-max_speed)
        rightMotor.setVelocity(-max_speed)
    if (keyPress==ord('D')):
        fwdSwitch = 0
        leftMotor.setVelocity(max_speed)
        rightMotor.setVelocity(0)
    if (keyPress==ord('A')):
        fwdSwitch = 0
        leftMotor.setVelocity(0)
        rightMotor.setVelocity(max_speed)
    elif (keyPress==-1):
        leftMotor.setVelocity(0)
        rightMotor.setVelocity(0)


    # Process sensor data here.

    # Enter here functions to send actuator commands, like:
    #  motor.setPosition(10.0)
    pass
```

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Tasks 3, 4, & 5

- Developed in tandem with the RMC team creating their SRR (System Requirements Review) document
- T3: Reformatted tables - include i/o examples
  - Will continue talks with navigation
- T4: Component interactions, classes and functions. Graphs included.
  - Again, talk with navigation
- T5: Test cases created
  - Not great with computer networking
  - Test cases for performance reqs. to be adjusted

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Milestone 2 Plan

TASK
1. Implement a simulator - DONE
2. Design test vectors for main requirements to be verified by simulator
3. Look up documentation of involved hardware
4. Research relevant algorithms for autonomous tasks

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M2 Task 2

- What criteria does the software need to pass?
- What to think about:
    - Valid and invalid inputs
    - When the software can run
    - Time it takes software to run
    - Time it takes robot to complete action
    - If movement is done within expectations
        - Virtual environment will help with visual tests

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M2 Task 3

- Determine what is taken care of by chosen motors
- Decide on computer to use: Raspberry Pi or Arduino?
- Look up documentation on the hardware and how software is related to it; confirm language is compatible, how it can be used

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M2 Task 4

- Research possible algorithms for completing autonomous tasks
  - What would be good for movement? Do they need to be complicated? Would the same one apply for both moving and digging?
- Research will be done up until the end of the semester, even into winter break
  - Most of spring semester will be dedicated to implementing manual controls and developing autonomous functions

Thank you