



AT-ST Project Specific Requirements and Objective

By Intiser Kabir (Project Manager)

Introduction

The Level 1 and Level 2 requirements follow both the S'18 Project and Mission Objectives and EE400D S'18 Project and Mission Objectives documents. Also what our team is hoping to accomplish by the deadline May 15. Level 1 is for general requirements that the AT-ST is hoping to achieve. Level 2 requirements goes to down to specific requirements for each member hoping to accomplish.

Level 1 Requirements: assigned to all Members

1. AT-ST shall walk on a level surface
2. AT-ST shall use Theo Jansen leg design
3. AT-ST shall look like an AT-ST Walker from Star Wars
4. AT-ST shall turn left, right or turn around
5. AT-ST shall support its own weight
6. AT-ST shall not exceed pass the size of 6"x 6"
7. AT-ST shall not walk through walls
8. AT-ST should walk backwards
9. AT-ST should have dynamic walk
10. AT-ST should jump.

Level 2 - MST System/Subsystem Requirements: Assigned to Joseph Cho (MST)

1. AT-ST shall use Gyro to obtain information for calculating the center of gravity.
2. The 3DoT Board shall receive commands from the Arxterra app via Bluetooth Transceiver. It will decode and transmit data to servos, PCB and other components of the robot.
3. The power source shall be able to fit inside our robot and must be integrated into the AT-ST such that it doesn't conflict with the functionality of the robot.

Level 2 - Electronics & Control Requirements: Assigned to Shweta Hebbalkar (Hardware) and Samuel Yoo (Software)

1. AT-ST shall use 2 DC Motor to move the legs (1 per leg).
2. AT-ST shall use a Servo Motor to adjust the center of gravity of the robot so it can turn
3. The Battery's duration shall last up to an hour.
4. AT-ST shall use 2 shaft encoder to keep track of the leg motion
5. AT-ST shall utilize 2 Lithium Ion Battery - 2Ah for its power supply.
6. AT-ST shall use a ultrasonic sensor to sense other robots within 0.5 meter radius (link to L1 #7)
7. AT-ST shall use UV sensor to navigate through the maze.

Level 2 - Manufacturing Requirements: Assigned to Danny Pham (Manufacturing)

1. AT-ST shall have total weight of 600 g and weight will be properly distributed to the body and legs to support its own weight while walking.
2. AT-ST shall not exceed dimensions of 6" x 6" in order to fit in maze and walk and properly turn without hitting the walls in maze.
3. AT-ST shall have its body 3D printed (ABS)
4. AT-ST shall have legs 3D printed (ABS)

Conclusion

The Specific Requirements and Objectives help incorporate design ideas and ways we can make our robot function. It will also help us understand our restrictions regarding features and objectives the robot can successfully do. We incorporate ideas used in the previous Velociraptor for our AT-ST Walker because they have similar ideas that we want to use. We also try to understand why they didn't work in the past and want to fix issues regarding the Velociraptors for our design. We are basically like the Velociraptor without the head and tail, and the BiPed without servos to control the leg movements.

Reference

S'18 Project and Mission Objectives:

https://docs.google.com/document/d/1cyjXSxK7dr--Xwo8d_XS3zJ5vIeamPyu2YjNbjs5Hzw/edit#heading=h.ieqe41766sxa

EE400D S'18 Project and Mission Objectives:

<https://docs.google.com/document/d/1kwObe9HkGBcJMYAETA5GiChyxhY1o6bpcmhWKbNFv8/edit>

Velociraptor Spring 2017:

<https://www.arxterra.com/spring-2017-velociraptor-preliminary-design-documentation/>