Acceptance Test Cases

The test cases are broken up into two group, PLT for Platform-Robot Acceptance tests, then MDL for Model-Platform Acceptance tests, and finally MDLR for Model-Platform-Robot Acceptance tests. The information in the '<>'s are considered preliminary figures.

Platform-Robot Acceptance tests

Name: PLT-1 (Power on)

Requirements:

Preconditions:

- Robot
  - Powered off
  - connected to a Workstation via Serial
  - connected to mains or on fully charged batteries
- Workstation
  - Powered off

Steps:

1. Power on the robot

Expected Results:

- Robot to power on
- Robot to not move at all
- Robot in a mode ready to accept commands
- Robot to be ready and powered on within <5> seconds.

Name: PLT-2 (Initialize software)

Requirements:

Preconditions:

- User Stories - Starting application

Steps:

1. Load up the robot control software
2. Instruct software to connect to the robot

Expected Results:
• Robot to not move at all
• Robot and Workstation to establish connection over Serial
• Workstation sending regular heartbeat ping
  ♦ Robot replying to the heartbeat with status
  ♦ Must be able to reply with the status within <1/2> second of receiving the heartbeat ping.
  ♦ Workstation sending the heartbeat every <1> second.

Name: PLT-3 (add motor module)
Requirements:
Preconditions:

• Robot
  ♦ Powered on
  ♦ Connected to Workstation
• Workstation
  ♦ Software loaded
  ♦ Connected to Robot

Steps:
1. Instruct software to add a motor module to a bay on the robot

Expected Results:
• Robot to not move at all
• Software acknowledging the new motor module in the proper bay
• Software displaying the status on the new motor module

Name: PLT-4a (Rotating a steering motor (one))
Requirements:
Preconditions:

• Robot
  ♦ Powered on
  ♦ Connected to Workstation
  ♦ Motor module attached to one mount point
• Workstation
  ♦ Software loaded
  ♦ Connected to Robot

Steps:
1. Instruct software to rotate one motor module
2. Repeat step 1 with the following motor rotation (degrees): 0, 90, 180, 270, 360, 720
3. Repeat Step 1 to 2 with negative motor rotation (degrees)
4. Repeat step 1 to 3 with each motor mount/bay

Expected Results:
• Robot to not move at all
• Each attached motor module's steering motor to be able to rotate the wheel
  ♦ Being able to rotate the motor in the full 360 range of motion
  ♦ Being able to rotate it clockwise and counter-clockwise
  ♦ The results may depend on which bay the motor module is attached, if they share steering bay
    both motor will rotate at the same time and same degree.
• Speed of rotation
  ♦ It is expected to be able to do at-least 90 degree within <2> second, and for each additional 90
degree, its an additional <2> second.

Name: PLT-4b (Rotating a steering motor (multiple - independent))
Requirements:
Preconditions:

• Robot
  ♦ Powered on
  ♦ Connected to Workstation
  ♦ Two motor module attached to independent steering bay

• Workstation
  ♦ Software loaded
  ♦ Connected to Robot

Steps:

1. Instruct software to rotate two motor module in independent steering bays
2. Repeat step 1 with the following motor rotation (degrees): 0, 90, 180, 270, 360, 720
3. Repeat Step 1 to 2 with negative motor rotation (degrees)

Expected Results:

• Robot to not move at all
• Each attached motor module's steering motor to be able to rotate the wheel
  ♦ Being able to rotate the motor in the full 360 range of motion
  ♦ Being able to rotate it clockwise and counter-clockwise
  ♦ Both independent motor module to be able to complete the full range of motion completely
    independently of each other
• Speed of rotation
  ♦ It is expected to be able to do at-least 90 degree within <2> second, and for each additional 90
degree, its an additional <2> second.

Name: PLT-4c (Rotating a steering motor (multiple - synchronized))
Requirements:
Preconditions:

• Robot
  ♦ Powered on
  ♦ Connected to Workstation
  ♦ Two motor module attached to a synchronized steering bay

• Workstation
  ♦ Software loaded
Steps:

1. Instruct software to rotate two motor module in a synchronized bay
2. Repeat step 1 with the following motor rotation (degrees): 0, 90, 180, 270, 360, 720
3. Repeat Step 1 to 2 with negative motor rotation (degrees)

Expected Results:

- Robot to not move at all
- Each attached motor module’s steering motor to be able to rotate the wheel
  - Being able to rotate the motor in the full 360 range of motion
  - Being able to rotate it clockwise and counter-clockwise
  - Both motor module rotating at the same time and to the same angle
- Speed of rotation
  - It is expected to be able to do at-least 90 degree within <2> second, and for each additional 90 degree, its an additional <2> second.

Name: PLT-5a (Driving a drive motor (one))

Requirements:

Preconditions:

- Robot
  - Powered on
  - Connected to Workstation
  - One motor module attached to a mount point
  - Robot off the ground for this test
- Workstation
  - Software loaded
  - Connected to Robot

Steps:

1. Instruct software to set the speed of the attached motor's module drive motor
2. Repeat step 1 with the following speed/power levels: -150%, -100%, -75%, -50%, 25%, 0%, 25%, 50%, 75%, 100%, 150%

Expected Results:

- The drive motor to spin/move
- The drive motor to spin forward and backward at varying power level equivalent to 50% to 100% of the robot maximum speed
- The program to reject any speed/power level greater than 100%
- Speed of the robot/motor
  - Platform Characteristics - Rev 2
  - Expected it to ignore or max out at 100% or -100% if given values greater than +-100%
  - Expected the motor/platform to be moving at the specified speed for 25%, 50%, 75%, and 100% within 3 sec, 5 sec, 5.5 sec, 6 sec.
Name: PLT-5b (Driving a drive motor (multiple - independent))
Requirements:
Preconditions:

- Robot
  - Powered on
  - Connected to Workstation
  - Two motor module attached to independent drive bays
  - Robot off the ground for this test
- Workstation
  - Software loaded
  - Connected to Robot

Steps:

1. Instruct software to set the speed of two independent motor modules
2. Repeat step 1 with the following speed/power levels: -150%, -100%, -75%, -50%, 25%, 0%, 25%, 50%, 75%, 100%, 150%

Expected Results:

- The drive motor to spin/move
- The drive motor to spin forward and backward at varying power level equivalent to 50% to 100% of the robot maximum speed
- The program to reject any speed/power level greater than 100%
- The two independent motor bays to be able to drive both motors independently from each others at varying speeds
- Speed of the robot/motor
  - Platform Characteristics - Rev 2
  - Expected it to ignore or max out at 100% or -100% if given values greater than +-100%
  - Expected the motor/platform to be moving at the specified speed for 25%, 50%, 75%, and 100% within 3 sec, 5 sec, 5.5 sec, 6 sec.

Name: PLT-5b (Driving a drive motor (multiple - synchronized))
Requirements:
Preconditions:

- Robot
  - Powered on
  - Connected to Workstation
  - Two motor module attached to synchronized drive bays
  - Robot off the ground for this test
- Workstation
  - Software loaded
  - Connected to Robot

Steps:

1. Instruct software to set the speed of two independent motor modules
2. Repeat step 1 with the following speed/power levels: -150%, -100%, -75%, -50%, 25%, 0%, 25%, 50%, 75%, 100%, 150%
Expected Results:

- The drive motor to spin/move
- The drive motor to spin forward and backward at varying power level equivalent to 50% to 100% of the robot maximum speed
- The program to reject any speed/power level greater than 100%
- Both motor are expected to rotate in the same direction and speed at the same time.
- Speed of the robot/motor
  - Platform Characteristics - Rev 2
  - Expected it to ignore or max out at 100% or -100% if given values greater than +-100%
  - Expected the motor/platform to be moving at the specified speed for 25%, 50%, 75%, and 100% within 3 sec, 5 sec, 5.5 sec, 6 sec.

Name: PLT-6 (Drive motor acceleration)
Requirements:
Preconditions:

- Robot
  - Powered on
  - Connected to Workstation
  - One motor module
  - Robot off the ground for this test
- Workstation
  - Software loaded
  - Connected to Robot

Steps:

1. Instruct software to set the speed of a motor module
2. Repeat step 1 with the following speed/power levels: -150%, -100%, -75%, -50%, 25%, 0%, 25%, 50%, 75%, 100%, 150%

Expected Results:

- Acceleration to remain constant no matter which power level
- Speed of the robot/motor
  - Platform Characteristics - Rev 2
  - Expected it to ignore or max out at 100% or -100% if given values greater than +-100%
  - Expected the motor/platform to be moving at the specified speed for 25%, 50%, 75%, and 100% within 3 sec, 5 sec, 5.5 sec, 6 sec.

Name: PLT-7 (Drive motor deceleration and stopping)
Requirements:
Preconditions:

- Robot
  - Powered on
  - Connected to Workstation
  - One motor module
  - Robot off the ground for this test
• Workstation
  ♦ Software loaded
  ♦ Connected to Robot

Steps:

1. Instruct software to set the speed of a motor module
2. Wait until the drive motor is at the specified speed
3. Instruct software to set the speed of the motor module to zero
4. Repeat step 1 to 3 with the following speed/power levels: -100%, -50%, 50%, 100%

Expected Results:

• Deceleration to remain constant no matter what the power level is
• Speed of the robot/motor
  ♦ Platform Characteristics - Rev 1
  ♦ Assuming that the motor is just powered off, then the platform is expected to stop within <10> seconds.

Name: PLT-8 (Robot emergency stop)
Requirements:
Preconditions:

• Robot
  ♦ Powered on
  ♦ Connected to Workstation
  ♦ Motor modules attached
  ♦ Robot off the ground for this test
• Workstation
  ♦ Software loaded
  ♦ Connected to Robot

Steps:

1.

Expected Results:

• Speed of the robot/motor
  ♦ Platform Characteristics - Rev 1
  ♦ Assuming that the motor is reversed powered for a second or two, the platform is expected to stop within <4> second
• The platform to deactivate and turn itself off/reset