WILLIAM E. BOEING DEPARTMENT OF
AERONAUTICS & ASTRONAUTICS
College of Engineering

AA421
SoftwareTest Procedure

<Team Name>

Date: __________ / _____ / _____
yyyy mm dd

Part Number: ____________________

Initials: _______, _______, _______, _______

Test Result: ____________________

Test Objective

The main aim of this test is to validate the precision of the PPT in computing the calibration constant, ensuring compliance with requirements Da.1 and Da.2 of our software system and Da-3 and Da.4 of the GUI. The software will capture raw deflection data from the rangefinder at a sampling rate ranging from 100 to 1000 Hz and convert the deflection measurements to impulse measurements, along with associated uncertainties within ±1.125 µlbfs (5 µNs) for impulse and ±11.2 µlbf (0.05 mN) for steady state. This is also to ensure the leveling system GUI interface is reliable and accurate.

Equipment Required

Qty	Description	Specs/Calibration	Check

1	*Computer*		
1	*USB Connection*		
1	*Python software*	*3.11 (or latest update)*	
1	*Arduino software*	*Latest update*	
1	*Oscilloscope*	*Supplied by SPACE Lab*	
3-4	*Data .csv files*		

Test Procedure

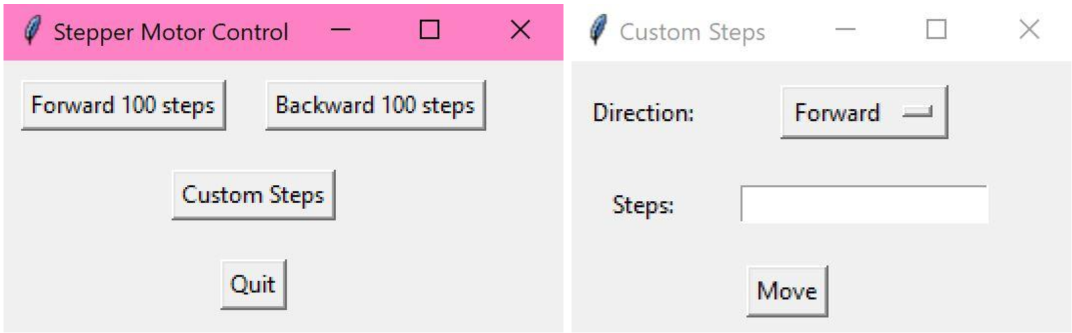
1 Setup

Connect the computer to the arduino leveling system using a USB connection. OK?________

Load the Arduino leveling system code followed by uploading it to the Arduino Uno portal.
OK?________

2 Test

Load and run the leveling system Python code along with the graphical user interface (GUI).
OK?________



Verify the functionality of the leveling system's Step-up & Step-down buttons to ensure they respond correctly to commands. OK?________

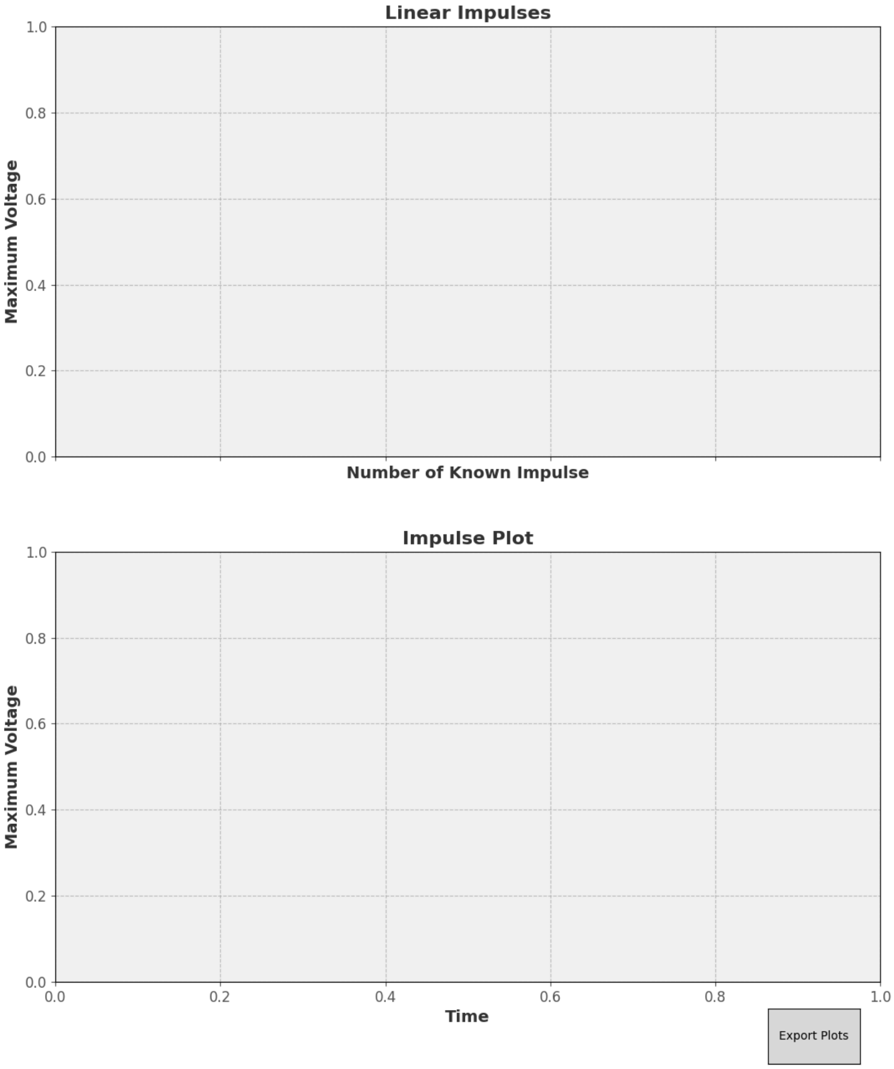
Verify that the displacement display on the GUI accurately represents the physical displacement of the leveling system. OK?________

Use these to adjust as needed as you are testing. OK?________

3 Post Test

Load and run the calibration and data analysis Python code on the computer. OK?________

Verify that the Python code GUI appears correctly and is functional. OK?________



Verify that the code correctly identifies the raw deflection data stored in a .csv file format for the known impulse provided by the graduate student in the Space Lab. OK?________

Verify that the code accurately identifies the V_{max} corresponding to the applied impulse values.
OK?________

Verify that the code accurately identifies Calibration Constant C in the Python Terminal.
OK?________

Verify that the code accurately plotted Linear Impulse. OK?________

Export Plot: Linear Impulse in a .png and name PPT_LinearIm_## OK?________

Repeat the calibration constant calculation for the last data collected to ensure consistency in the testing. OK?________

Verify that the code correctly identifies the raw deflection data stored in a .csv file format for the test runs collected. OK?________

Select ’Plot: Thruster Impulse’ for the Thruster Impulse plot. OK?________

Repeat the previous step for as many data .csv files as desired. OK?________

Export calibration plots in a .png and name CaliC_End/Begin_## OK?________

Change Log

Ver	Date	By	E-mail	Change
1.0	5/2/2024	Felicity Cundiff	fcundiff@uw.edu	Initial release
2.0	5/19/2024	Felicity Cundiff	fcundiff@uw.edu	Revised after Initial release