

*Organisation: Solar Boat Sealander*

*Client: Mr. R. Eijlers*

*Tutor: Mr. W. Haak*

*Date: 29-9-2020*

Demo test plan

Propulsion system simulation

Fangzhou chen Jiacong li Marco Hoogesteger Martijn Crombeen

2020

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# Aim & Hypothesis

## Aim

The aim of this test is to let the client use the simulation interface to calculate different aspects of the propulsion system.

## Hypothesis

The client can use this validated simulation to design an improved the propulsion system.

# Variables

These are the constants and variables that will be used during the test.

|  |  |
| --- | --- |
| Constant | Keep constant at... |
| Ambient temperature | Standard indoor temperature with lower and upper limits (20 ℃ ± 5℃). |
| Battery level computer | Constant power source. |
| Software Excel | Newest version. |
| All input variables | Real positive numbers & ISO-notation. |

|  |  |
| --- | --- |
| Inputs | Value |
| Motor input rotation speed | Change value |
| Motor input torque | Change value |
| Propeller shape | Change value |
| Propeller size | Change value |

|  |  |
| --- | --- |
| Outputs | Value |
| Propeller speed | Indicator |
| Propeller torque | Indicator |

# Tools

Below are the tools listed that will be used during this test.

|  |  |
| --- | --- |
| Testing tools | Demand |
| Computer | Windows 10 compatible |
| Excel | Newest version. |
| Keyboard | No limit. |
| Mouse | No limit. |

# Method

This section consists of actions that need to be performed during the test in order to conclude a result. The conditions of the constants stated in chapter: “2. Variables” have to be met before executing the simulation. To execute the simulation, follow the steps stated below.

Along with this test plan, there are videos provided which show the verification process of the simulation. These ensure that the calculations are within reasonable values and are thus validated.

**Steps:**

1. Power up the laptop and open Microsoft Excel.
2. Load in the: “Propulsion system simulation” file in Excel.
3. Modify the value of the different inputs.
4. Perform a simulation for every input value modification.
5. Compare the results of the simulations before and after the modifications to figure out their effects on the propulsion system.
6. Note the values which improve the propulsion system.
7. Print improved values.
8. Save changes to new file.
9. Close Excel.

# Expected results

The expected results of the outputs are as followed.

For the output propeller speed, we expect the value to be between 0 and 6000 rpm.

For the output propeller torque, we expect the value to be between 0 and 100 Nm.

# Conclusion

This section checks whether our design passes the test or not, by stating the expected results.

This demo will have a couple of outcomes:

When the output results are between 30% of our expected results, we consider this test as passed, because the given values can be used.

When the client enters incorrect values for the different inputs, and the output will deviate more than 30% of the expected results, the test is considered as failed.