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Demo test plan

Propulsion system simulation

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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. |

**Common situation**

|  |  |
| --- | --- |
| Inputs | Value |
| Motor input rotation speed | Change value between 600 and 3000 rpm |
| Motor input torque | Change value between 6 and 30 Nm |
| Propeller blade count | Change value between 2 and 6 |
| Propeller size (diameter) | Change value between 10 and 50 cm |

**Uncommon situation**

|  |  |
| --- | --- |
| Inputs | Value |
| Motor input rotation speed | Input the letter ‘h’ |
| Motor input torque | -100000 |
| Propeller blade count | 0 |
| Propeller size (diameter) | 200 |

|  |  |
| --- | --- |
| 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.

When the input values are being changed, the output values will change accordingly.

# 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:

If the output values change, the test is considered as passed.

If the program can’t execute the simulation without giving a warning, the test is considered as failed.