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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

If we build an user-friendly interface, the client can use this simulation to design a more efficient propulsion system.

# Variables

After the goals of the test have been determined, we define the variables that we’ll adjust to reach the goals.

|  |  |
| --- | --- |
| Limit | 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. |

|  |  |
| --- | --- |
| Property | Vary and/or measure |
| Power input variables | |
| Motor input rotation speed | Vary |
| Motor input torque | Vary |
| Power transmission variables | |
| Shaft material | Vary |
| Shaft size | Vary |
| Shaft shape | Vary |
| Shaft contact friction | Vary |
| Gear material | Vary |
| Gear size | Vary |
| Gear shape | Vary |
| Gear contact friction | Vary |
| Bearing material | Vary |
| Bearing size | Vary |
| Bearing shape | Vary |
| Bearing contact friction | Vary |
| Power output variables | |
| Propeller material | Vary |
| Propeller size | Vary |
| Propeller shape | Vary |
| Propeller surface smoothness degree (contact friction with water) | Vary |
| Propeller rotation speed | Vary |
| Propeller torque | Vary |

# Tools

We divide the tools into two types. The first one is “testing tools” which are the tools requires to perform the test. The second one is “measuring tools”, which are the tools required to measure the given limits and properties.

|  |  |
| --- | --- |
| 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 limits stated in chapter: “2. Variables” have to be met before executing the simulation. To execute the simulation, follow the steps stated below.

1. Power up laptop and open Excel.
2. Load in the: “Propulsion system simulation” file in Excel.
3. Type in current values to simulate the present propulsion system.
4. Modify the value of the desired properties.
5. Perform a simulation for every property value modification
6. Compare the results of simulations before and after the modification to figure out their effects on propulsion system.
7. Keep the values which improves the propulsion system.
8. Print improved values.
9. Save changes to new file.
10. Close Excel.

# Expected results

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

This demo will have a couple of outcomes:

* The expected result is the first situation, where the client is happy with the simulation and can use this for all his intended uses.
* Secondly, the client could be not satisfied with the simulation and cannot use it how he intends to.
* Lastly, the client could be somewhat satisfied with the simulation but his usage is limited.

If the outcome of this test does not equal the stated expected result, the test is considered as failed. When the user’s input variables do not meet the stated limits, the program should notify the user.