# Contextualization /Design Check-In

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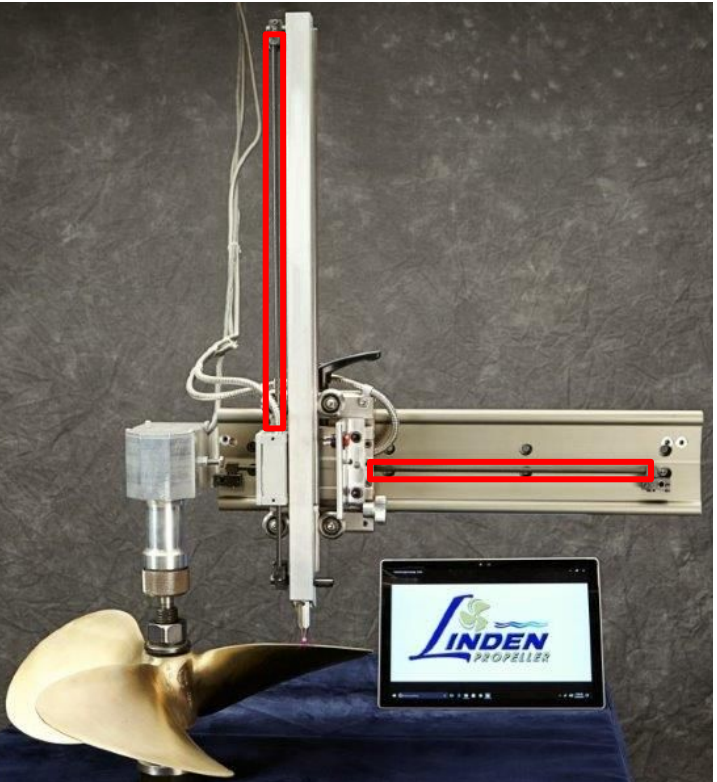
Project: Laser Scan Readings for Propeller Measurement

Group: sdmay25-34

# Project Overview




Project Name: Laser Scan Readings for Propeller Measurement

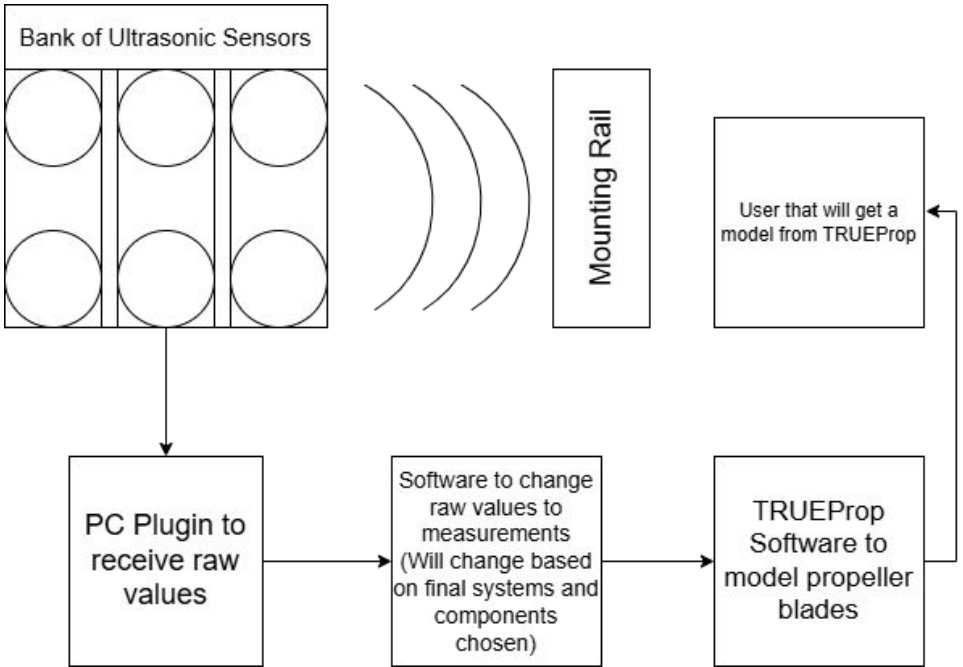
Goal: Replacing propeller measurement system of Linden Propeller

Reason for change:

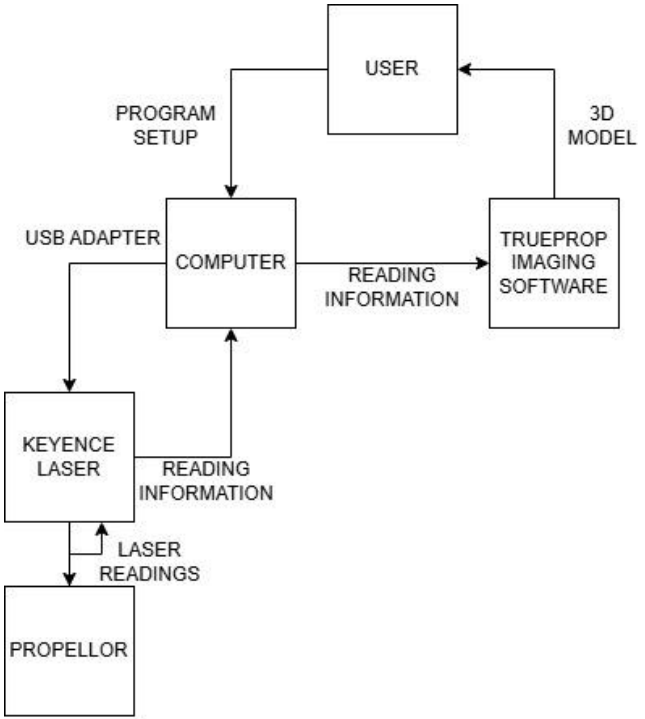
- Carbon fiber rods attached to scales are brittle
- Expensive to replace/repair
- Extended lead times

# Current Design

Data Fusion Design




KEYENCE Design



# Artifacts

| **Product Services and Design** *What is the product?* | **Unique Value Proposition** *What makes this product unique?* | **Product Advantages** *What are the things that provide a leg up?* | **Product Disadvantages** *Where might drawbacks exist?* | **User Pros** *What do users like about the product?* | **User Cons** *What do users NOT like about the product?* |
|---|---|---|---|---|---|
|  Creaform HandySCAN 3D | It's very fast and accurate as well as portable. The website says it can run at 1.3 million measurements per second. | It is faster and more accurate than most scanners. For someone measuring many different things, it is good that it is portable. | Very expensive and does not have a mount to set it up for constant use. | The accuracy of the scanning is desirable for most uses, but for extremely precise work, 0.025 mm is not accurate enough | It's not accurate enough; it needs some sort of tripod or mount, and for the price of about $17500, the device is not worth it. |
|  ModelMaker H120 and MCAx S System | It is well suited to scanning complex objects and can handle molding sections. It comes mounted on a flexible arm so that users can move it around and easily scan objects | It comes with a mount included and can deal with sheet metal, which means that reflective surfaces are not a problem. | It is only accurate up to 7 micrometers, which is very good but not good enough for certain projects. | Good accuracy, already mounted on a durable and flexible arm. Can deal with reflective surfaces. | Very expensive. We could not find an exact price, but we estimate roughly $15000 in cost due to the mount. It might also be slower than current systems |

# Artifacts cont.

| | | | | | |
|---|---|---|---|---|---|
|  Magnescale BS78 | This laser scale is highly accurate and comes with a mounting rail which provides stability and strength. | Much more accurate than other systems while also coming with its own setup. It also happens to be cheaper than other systems | Limited range for maximum accuracy. Small rail so adjustments might be necessary | The accuracy and the cheaper price tag are big bonuses | The fact that it comes on a mounted rail that is relatively small is a drawback. |
|  KEYENCE LK-G5000 Series | This laser sensor has a resolution of 5 nm, and an accuracy tolerance of 0.02%. | This sensor is the cheapest amongst the other options we've looked at, with more sufficient accuracy and durability. | Must download software to utilize the products. | Cheaper than alternatives and high accuracy. | Users must download separate software. |

# Human

| User Needs | KEYENCE Design | Data Fusion Design |
| --- | --- | --- |
| • Affordable: under $1000<br>• Durable: Able to withstand a shop environment<br>• Accurate: Measure up to 5 micrometers<br>• Adaptable: Needs to measure propeller blades with or without overlap | • Affordable: Currently estimated at $2500<br>• Durable: Very durable, designed for use in shop environments<br>• Accurate: Extremely accurate, well past 5 micrometers<br>• Adaptable: Can easily be repositioned to measure overlap | • Affordable: Currently estimated at around $1000<br>• Durable: Fairly durable, but multiple sensors leaves more room for damages<br>• Accurate: Unsure about accuracy currently<br>• Adaptable: Would only be used for x-axis measurements |

# Economic

## Improvements

- More durable: can withstand a shop environment and has a smaller surface area
- Area: A smaller device means the current setup can be made smaller, which saves on cost
- Long term saving: with less repairs needed, less money is spent
- Production time: with less repairs needed, more time is spent in production

## Drawbacks

- Initial cost: More expensive than current set up initially, requires a larger sum of money up front. This is justified because it saves much more money long-term
- Software: outside software may be required, resulting in workers needing to be taught. This is justified as it is simple software that allows for extreme accuracy

# Technical

## Internal

- No internal parts have been our design, any code will be relatively simple, just exporting numbers/measurements
- Internal software may be specific to a sensor, which we will be able to explain how it works with help from the sensors producer

## External

- Simple setup with sensor(s), connection wires, and a computer
- Needs to be simple, as Mr. Linden sells this device to other shops and needs to explain how it works and how to use it

# Conclusions

- Our current design(s) may not meet all specifications, but they meet the majority
- Any issues are currently being discussed and researched
- We are making good progress according to our schedule