Laser Scan Readings for Propeller Measurement:

Product Research

Group 25-34

Project Overview

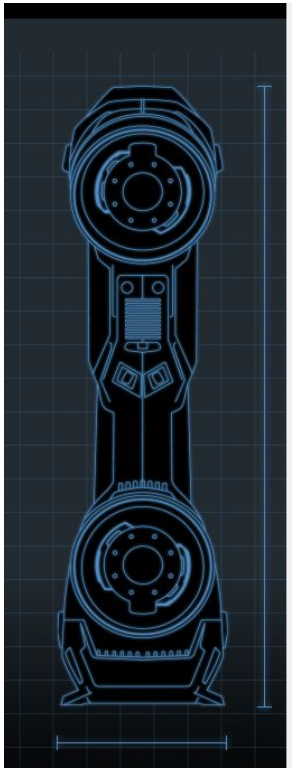
- Client would like to convert their current scan arm from digital analog reader head and scales to laser beam technology.
- They currently use Newall scales that are easily susceptible to damage while in a shop environment.
- The industry is moving towards 3D scanning devices which makes their current system less desirable.

Problem Statement

- A major design constraint would be measuring overlapping blade sections with a laser beam. The client is able to measure those propellers with a special adapter mounted to the drop probe.
- The other major constraint is that the client needs measurements accurate to 5 micrometers, which rules out most cheap options.

Creaform HandySCAN 3D

- Very fast and accurate handheld scanning device
- Can run 1.3 million measurements per second
- Lightweight
- Provides .025mm resolution
- Priced around $17,500



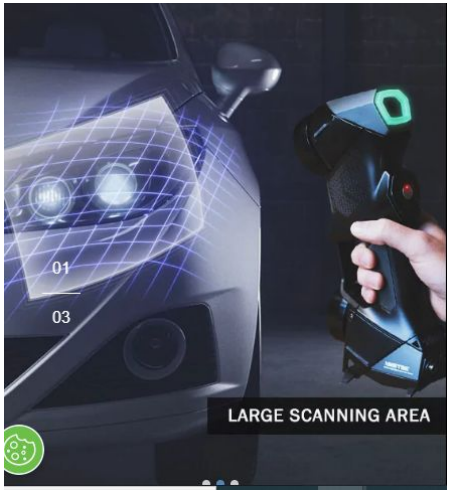
Creaform HandySCAN 3D

Pros:

- Scanning rate
- Size and portability
- Relative accuracy given handheld device

Cons:

- The .025 mm resolution not accurate enough
- Needs some sort of tripod or mount
- Price



ModelMaker H120 and MCAx S System

- Can scan complex objects and molded sections
- Comes mounted to a tripod
- Flexible arm allow for easy use
- Accurate up to 7 micrometers
- Estimated at $15000-$17000

ModelMaker H120 and MCAx S System

Pros

- Comes with a mount
- Can deal with reflective surfaces
- Highly accurate

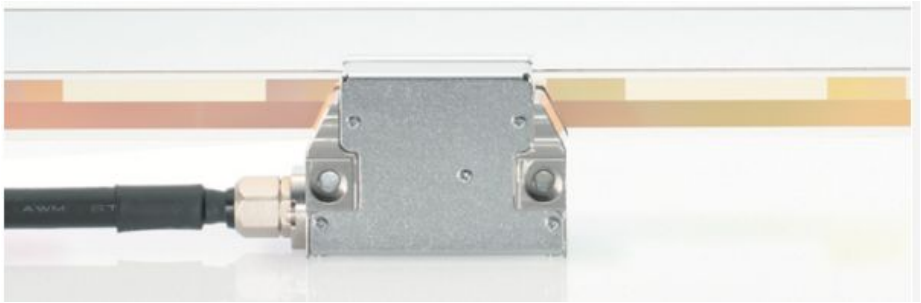
Cons

- Not accurate enough for certain projects
- Very expensive, not worth it for smaller businesses
- Potentially slower than current processes

Magnescale BS78

- Comes with mounting rail.
- Very stable setup which mitigates signal noise.
- Reference accuracy 1 microns
- Roughly $5,250

Magnescale BS78



Pros:

- It meets measurement specifications
- Model stability
- Durable

Cons:

- $5,250 is out of the price range for small businesses
- Mounting rail hinders applicational use.

KEYENCE LK-G5000 Series

- High resolution of 5 nm
- Accuracy tolerance of 0.02%
- Roughly $4,000 (third-party sites)
- Durable for machine shop settings

KEYENCE LK-G5000 Series

Pros

- Extremely accurate
- High resolution
- Much cheaper than alternatives

Cons

- Needs separate software
- Hard to integrate into current setups

Market Gap

Current devices that use laser or IR sensors are either too expensive or not accurate enough for business needs. Other issues include mounts, speed, and ease of use, though these vary from product to product.

New Ideas

- Mounting IR sensors directly to existing setups or mounts can improve ease of use.
- Having several cheap sensors in use and modulating/filtering the data to get a more accurate value could provide higher accuracy for a lower price.
- Ultrasonic sensors could be a cheaper option for specific applications.

Conclusion

We are still looking for solutions that will meet the client's performance specifications and be within budget. Our current ideas have not been thoroughly tested, therefore we cannot give a definitive solution to this problem.