Autoliv Automated Camera Positioning System

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Autoliv

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I. Introduction

Current System:

- Two plus hours of set up time and adjustments
- Uncertainty of ±30mm

Motivation: Automated camera positioning system to increase accuracy and precision while reducing setup time

II. Design Description

The design, as shown in Figure 2, is a cart gantry system controlled by stepper motors. The cart and laser subsystems allow the user to position the cart to a location relative to the Anvil, and the gantry system allows the user to precisely position the camera relative to an airbag on the Anvil.

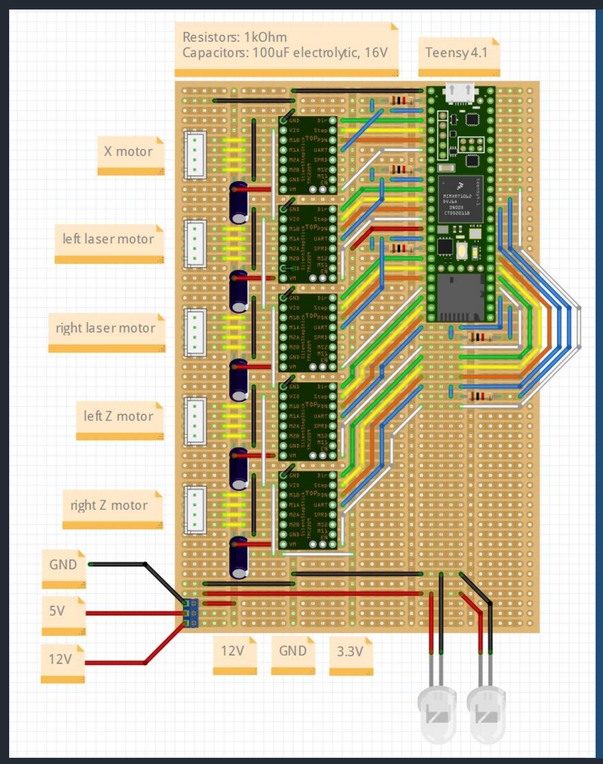

Figure 1. Electrical Diagram of Camera Positioning System

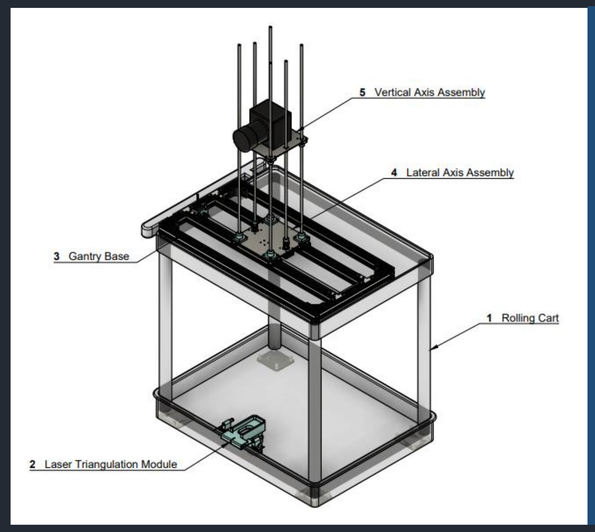

Figure 2. CAD Diagram of Camera Positioning System

Figure 3. Original Camera focus point (A) and repositioned camera focus point (B) on the Anvil

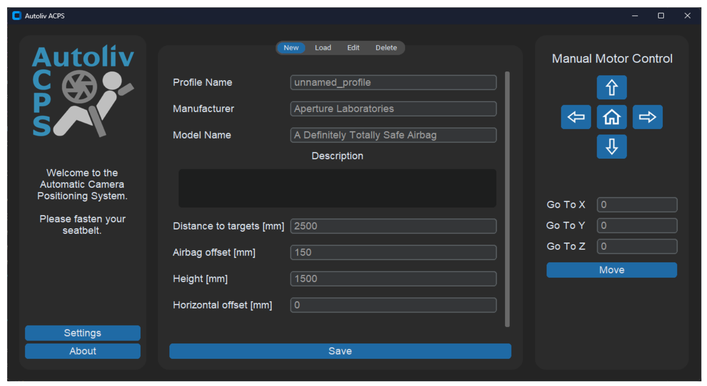

Figure 4. System GUI

III. Performance Review

Requirement/ Constraint	Target	Threshold	Predicted	Actual
Setup Time (min)	15.0	30.0	5.0	0.9
Alignment Variation (deg)	0	1	1	1
Placement Accuracy (mm)	5.0	20.0	5.0	4.6
Uncertainty (mm)	5.0	25.0	10.0	1.4
Tipping Force (Newtons)	25.0	6.4	10.0	27.5
Equipment Life (months)	60.0	24.0	36.0	70.7
System Footprint (cm^2)	3,625	7,251	5,574	5,388

IV. Conclusions

Results

- Meets desired constraints and requirements
- More testing needed due to limited functionality

Lessons Learned

- Explore alternatives before building
- Calculate theoretical results before building

Future Work

- Troubleshoot code to ensure full functionality
- Improve Laser Position System
- Explore alternatives to transfer bearings

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