

Project #	Project Name	Project Track	Project Family
P09701	Corning Tropel LightGage Metrology System	Equipment Development	N/A
Start Term	Team Guide	Project Sponsor	Doc. Revision
200802	Dr. Alan Raisanen	Corning Tropel Corp.	Rev. A.1 (12/17/08)

Project Description

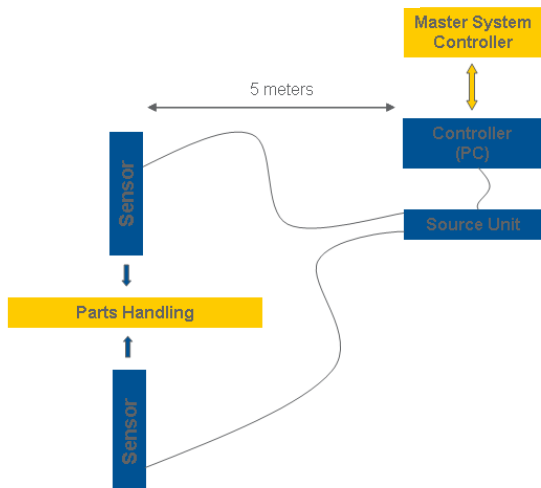
Project Background:

The LightGage is an advanced, full surface interferometer used to measure flatness, parallelism, and feature depth of parts with a maximum diameter of 40mm. Corning Tropel's first generation LightGage system can measure and characterize the bottom of a part's surface, *but cannot characterize the top surface or the part thickness without the user physically flipping the part.*

Problem Statement:

The goal is for this Design Team to develop a system around **two LightGage sensors that will allow for both sides of an object to be measured simultaneously.** In order to achieve this, two "heads" will be aimed at one another (see figure 1). The team will need to develop a fixture capable of supporting the two heads as well as the part being measured.

Figure 1 - Project Description



Objectives/Scope:

- ▶ Measure Both Sides of Part
- ▶ Accommodate part thicknesses between 1mm and 100mm, max. 40mm diameter
- ▶ Motorized head positioning (vertical, tip/tilt)
- ▶ Environmental Isolation (thermal, vibration, optical)

Deliverables:

- ▶ LightGage System capable of measuring both sides of part—fully integrated with TMS software (Week 22)
- ▶ Complete build/setup/system operation documentation (Week 22)
- ▶ Complete BOM and manufacturing drawing packages (Week 11)
- ▶ Demonstrate Accurate, Repeatable Measurements to Corning Standards

Expected Project Benefits:

- ▶ Marketable product for Corning Tropel
- ▶ Research tool for RIT students
- ▶ Promising foundation for future LightGage-based projects
- ▶ Experience in designing a product for actual sale to industry

Core Team Members:

- ▶ Benjamin Arkin (Electrical Engineering)
- ▶ Matthew Bradley (PM, Mechanical Engineering)
- ▶ Cara Portka (Industrial & Systems Engineering)
- ▶ Nicholas Schneider (Mechanical Engineering)

Strategy & Approach

Assumptions & Constraints:

1. Initial budget of \$5,000
2. Simple USB motion control-to-PC interface
3. Must design within basic LightGage operating constraints (vibration, polarization, mechanical loop specs.)
4. COTS parts are highly recommended wherever possible

Issues & Risks:

- ▶ Budget may be too small for scope of project
 - ✓ Use salvaged parts
- ▶ Vibration, thermal isolation may be too hard to control in this iteration of the project
- ▶ Project schedule prevents maximum design refinement and user-friendliness
 - ✓ Must balance accuracy with ease-of-use
- ▶ Hardware/Software integration *may* require a substantial amount of outside help (Corning Tropel Engineering)
 - ✓ Use simple COTS motors, controllers