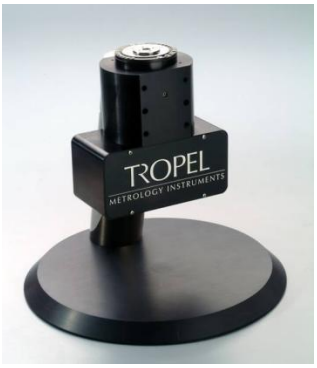
Project Summary (Final)

The mission of the Design Team assigned to P09701 is to design, build, and test a working prototype of a second generation Corning Tropel LightGage metrology tool.

The LightGage is an advanced, full surface interferometer used to measure flatness, parallelism, and feature depth of parts with a maximum diameter of 40mm. The system uses a tunable near-infrared laser, a digital camera, and computer algorithms to capture with sub-micron accuracy the surface features of a part. The user then extracts the desired measurements of the part's surface features from the collected data. 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.*



The goal—for the next 22 weeks—is for this Design Team in collaboration with the IT Collaboratory at RIT to develop a system around two LightGage sensors that will allow for both sides of an object to be measured simultaneously and reliably. In order to achieve this, two “heads” (pictured, right) will be aimed at one another. The team will need to develop a fixture capable of supporting the two heads as well as the part being measured.

Major design considerations and business goals of this project include:

- Manufacturable and Cost Effective
  - ✓ Use of COTS parts where possible
  - ✓ Complete documentation for manufacturing and setup to Corning standards
- High Efficiency/Throughput
  - ✓ Motorized height and tip/tilt adjustment for top LightGage head
  - ✓ User can switch between parts in a matter of seconds
- Part Measurement
  - ✓ Measure Both Sides of Part
    - Must accommodate part thicknesses between 1mm and 100mm
  - ✓ Balance Accuracy & Ease of Use
  - ✓ Demonstrate Accurate, Repeatable Measurements to Corning Standards
    - Environmental Isolation
    - Part Manipulation—Repeatable and Reproduceable

Corning Tropel has received many requests from customers for a tool that has the ability to measure the coplanarity of datum points on both sides of a precision part for quality and process control. The primary market for this product is manufacturers of small, high precision parts. Applications include fuel injectors and automotive engine components, electronics (hard drives), watch parts, and other parts manufactured to very tight tolerances and quality standards.

This project will operate on an initial budget of $5,000. However, the customer has made it clear that more funds may become available if necessary for successful completion of the project. Corning Tropel along with the IT Collaboratory will provide work space, technical advising, as well as all necessary parts and materials.