

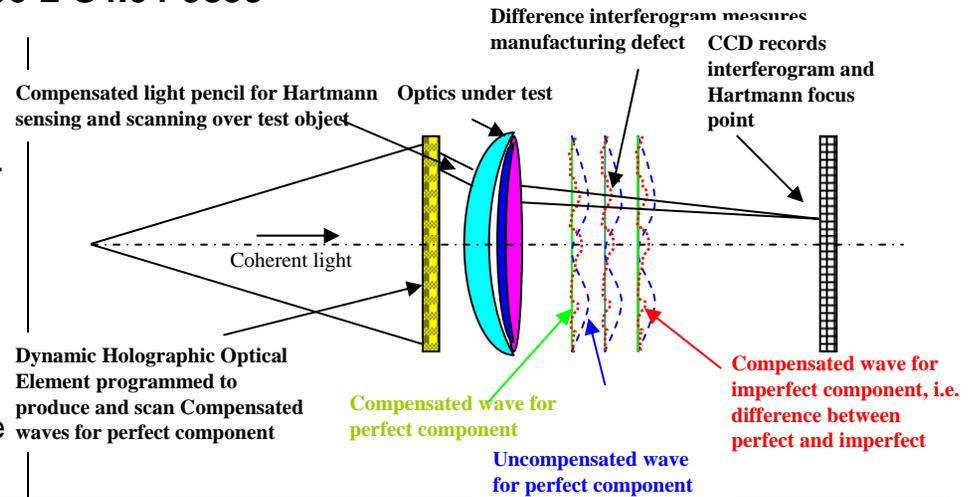
An Instrument for Inspecting Aspheric Optical Surfaces and Components

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Proposal No: 06-2-S4.04-9893

**Identification and Significance of Innovation**

- A unique combination enables integrating two powerful, null point, inspection techniques, Hartmann and digital holographic interferometry by using a dynamic holographic optical element.
- Removes existing limitations of Hartman and interferometry.
- Preconditions test wavefront for specific test article, by being programmed to compensate for predicted distortion of a perfectly manufactured part.
- Interferogram recorded and computed by digital holography measures difference between perfect and imperfect optic.
- Electronically Scanned Hartmann sensor measures difference between perfect and imperfect optics focus positions.



**Technical Objectives and Work Plan**

Evaluate the feasibility and develop hardware and procedure to produce a combined, dynamic, Hartmann/Digital Holographic interferometry inspection system for a wide range of advanced optical components including aspheric optics. The measurement will lead to the determination of wavefront error, within a fraction of the wavelength of visible light, caused by the deviation of the optical component from a perfect geometrical shape.

**NASA Applications**

- Could be extremely valuable in manufacturing and acceptance testing of a wide variety of optics.
- Can provide new standards for manufacturing and quality control.
- Can have widespread impact on the performance capabilities of the many NASA optical systems.
- Will provide substantial cost benefits compared to alternative, more complex, and expensive solutions.

**Other Applications**

- US Army and Navy-Inspecting a new generation of infrared aspherics.
- Optical systems employed in security monitoring, marine observation and metrology. **Firm Contact:** Dr. James Trolinger, 949-553-0688, ext. 225 [jtrolinger@metrolaserinc.com](mailto:jtrolinger@metrolaserinc.com)

**NON-PROPRIETARY DATA**