National Aeronautics and Space Administration

wavefront sensing markets and applications

Ocular Imaging:

Optometry, Ophthalmology, Iris Recognition

Description

The Goddard Space Flight Center has developed a wealth of wavefront sensing technologies, algorithms, optical components and design, test and simulation tools useful in a wide range of diagnostic and therapeutic eye applications as well as iris detection fields of use. These technologies have been utilized on a number of NASA missions and development programs including the James Webb Space Telescope (JWST). Although originally designed for use in space-based adaptive optics applications, these technologies are highly applicable to the challenges of identifying distinct iris characteristics, or diagnosing and treating various diseases through the use of enhanced wavefront sensing algorithms, components and tools to better account for aberrations in the eye to greatly improve imaging capabilities and develop customized and tailored solutions.

Markets & Applications

Optometry & Ophthalmology

- Refractive Surgery
- Wavefront-guided LASIK
- Eye Diagnostics
- Custom Eyewear Development
- Pre-operative Vision Correction Simulation

Iris Recognition

- Sensitive Facility Security
- Airport Customs & Screening
- Intelligence for Combat Environments
- Police Intelligence & Monitoring

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GSFC Technologies Available for License

Wavefront Detection Algorithms:

- **GSC-14879-1**, Iterative-Transform Phase-Retrieval Utilizing Adaptive Diversity
- **GSC-14899-1**, Broadband Phase-Retrieval for Image-Based Wavefront Sensing
- **GSC-14900-1**, Filter Function For Wavefront Sensing & Control Over An Extended Field Of View
- **GSC-15208-1**, Direct Solve Image Based Wavefront Sensing
- **GSC-15464-1**, PseudoDiversity - Direct Wavefront Control and Image Restoration at High Bandwidth
- **GSC-15963-1**, Iterative Transform Phase Diversity

System Operating Software:

- **GSC-14725-1**, Wavefront Sensing And Optical Control Software (WSOC)

Lenses, Gratings & Mirrors:

- **GSC-14901-1**, Fixed Lens Wavefront Sensing
- **GSC-16008-1**, Phase controlled magnetic mirror for wavefront correction

System Design Simulation & Testing Tools:

- **GSC-15138-1**, Matlab-OSLO Toolkit
- **GSC-15151-1**, Matlab-Zemax Toolkit
- **GSC-15567-1**, Wavefront Control and Optimization Toolbox
- **GSC-15676-1**, Computer Generated Hologram System for Wavefront Measurement System Calibration

For More Information

If you are interested in more information or want to pursue transfer of technologies suited to this market, please contact:

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To view Goddard's entire portfolio of wavefront sensing technologies, please visit:
http://ipp.gsfc.nasa.gov/wavefront