



# Fixed Lens Wavefront Sensing

## Description

Accurate image-based wavefront sensing (WFS) requires the collection of multiple diversity defocus images, primarily by taking measurements of various camera positions. This optical design overcomes this need by introducing diversity defocus into the optical beam path by using a fixed-lens WFS technique. It incorporates a fixed or stationary lens into a converging beam ahead of the imaging focal plane and enables the creation of diversity defocus data without translating the imaging camera along the optical axis.

The linear motion traditionally required by an imaging camera is replaced by the insertion of individual lenses (corresponding to specific defocus values) into the converging beam path using the rotational motion of a filter wheel. The filter wheel positions are occupied with the diversity defocus lenses - one for each defocus position.

## Features and Benefits

- This fixed lens technique is simpler to implement than translating the imaging camera and therefore simplifies the data collection process for focus-diverse phase retrieval.
- No motion is required from the imaging camera to generate a known diversity defocus.
- The optical design is cost-effective and easily constructed using readily available catalog components and mounting hardware.

## Applications

- Interferometry
- Optical System Testing
- Iris Detection
- Retinal Imaging

## For More Information

If you are interested in more information or want to pursue transfer of this technology, GSC-14901-1, please contact:

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To view Goddard's entire portfolio of wavefront sensing technologies, please visit:  
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