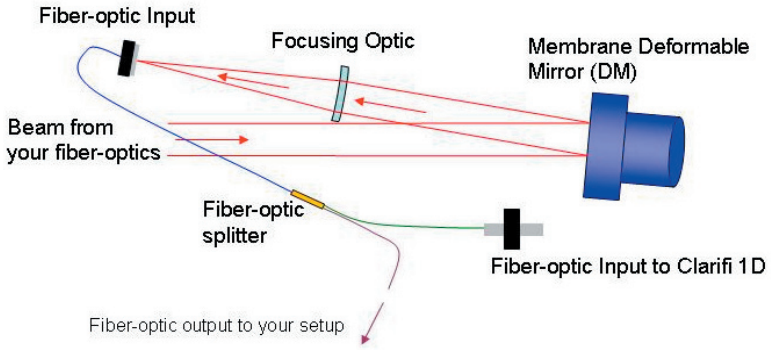
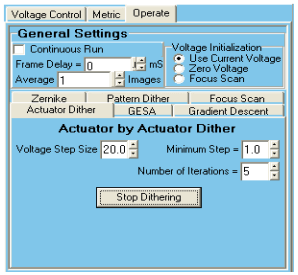
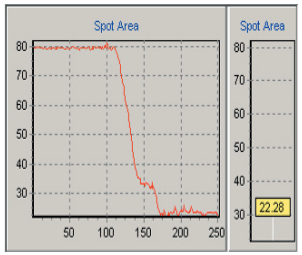
Clarifi 1D™ Hardware Setup





- **Uses a photo detector to maximize laser intensity.**

The photo detector tells Clarifi-1D how much light is entering it from the input laser beam. By maximizing the light entering the photo detector, Clarifi-1D can maximize the light transfer efficiency of your beam.



- **Choose from 6 different dithering algorithms.**

The dithering algorithms come in many different forms. One is a basic dither, where, iteratively, each actuator voltage is set, one at a time. Another is a stochastic parallel gradient descent (SPGD) algorithm, where random sets of actuator voltages are applied and then modified.

- **Diagnostic tools test your mirror and record any errors.**

Clarifi-1D comes with a pulse loop generator that iteratively activates each actuator on the mirror, one at a time, to make sure they all work properly. Clarifi-1D also contains a log file that can record any errors found while running.

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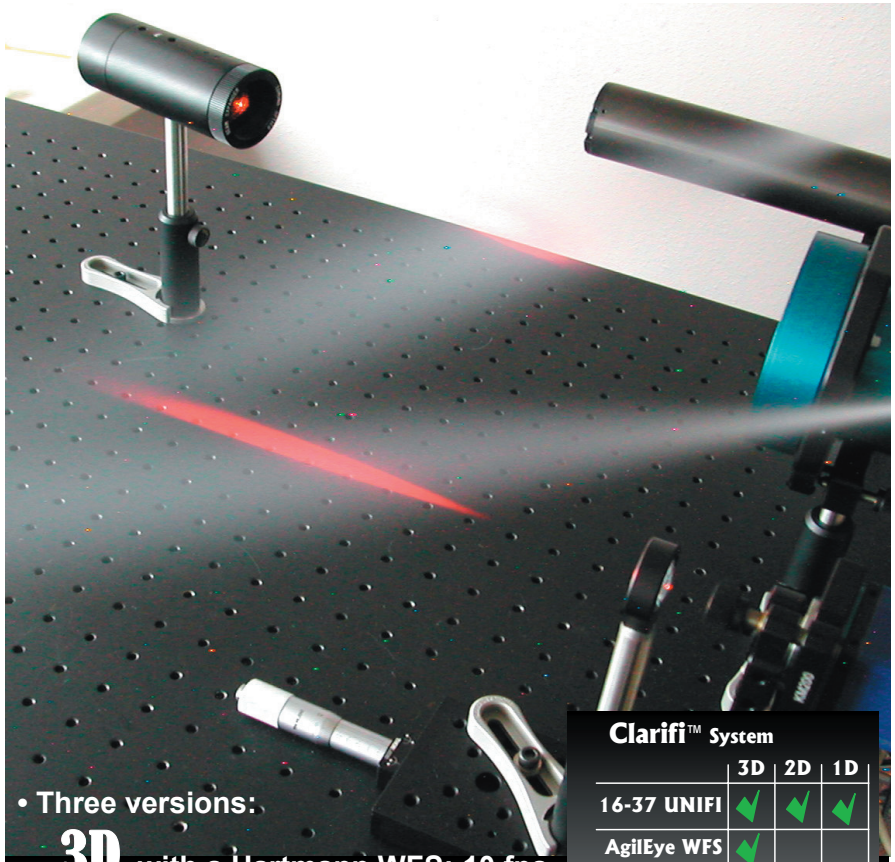
Clarifi™

Adaptive Optics Systems



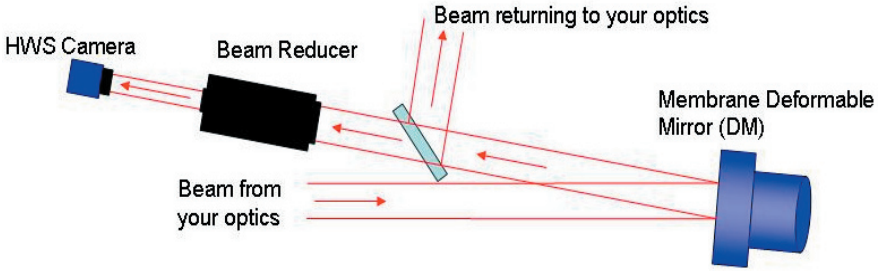
- Three versions:
  - **3D**, with a Hartmann WFS: 10 fps
  - **2D**, with a Far Field CCD: 20 fps
  - **1D**, with a photo detector: 60 fps

Clarifi™ System

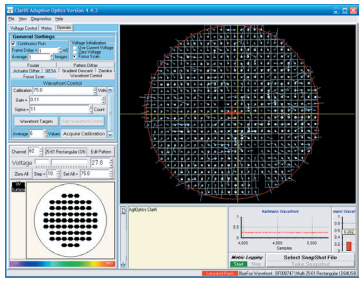
	3D	2D	1D
16-37 UNIFI	✓	✓	✓
AgilEye WFS	✓		
CCD Camera		✓	
Photo Detector			✓
Computer	✓	✓	✓
Software	✓	✓	✓

- Complete Closed-Loop Adaptive Optics Systems
- 400 to 1,064 nm Useful Range

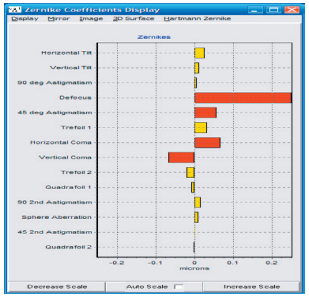
Clarifi 3D™ Hardware Setup



- **Displays the wavefront of a beam through a Hartmann Wavefront Sensor.**



Clarifi-3D's Hartmann Wavefront Sensor measures the phase of an incoming beam's wavefront. The beam is separated into many small regions called integration areas. By calculating the magnitude of the light in each integration area, Clarifi-3D can rapidly calculate what corrections need to be made to the wavefront.



- **Allows viewing of the real-time Zernike decomposition of a wavefront.**

Clarifi-3D calculates the Zernike decomposition of an incoming beam's wavefront. The first 15 Zernike values are then displayed as bars on a bar graph. The length of the Zernike bars represent the magnitude of the measured Zernikes. The direction of the Zernike bars tell whether the Zernike value is positive, or negative.

- **Fast wavefront control using the Zernike values of the current wavefront automatically corrects aberrations.**

Clarifi-3D runs a calibration loop to calculate how much each Zernike value affects an incoming beam's wavefront. By combining this information with the measured Zernikes on the current wavefront, Clarifi-3D estimates what voltage changes need to be made to the deformable mirror to correct the wavefront. It then sends the necessary changes to the mirror and measures the new wavefront.

- **Available with either Hartmann or Shack-Hartmann Wavefront Sensors.**
- **Clarifi-3D also contains all the features available in Clarifi 2D.**

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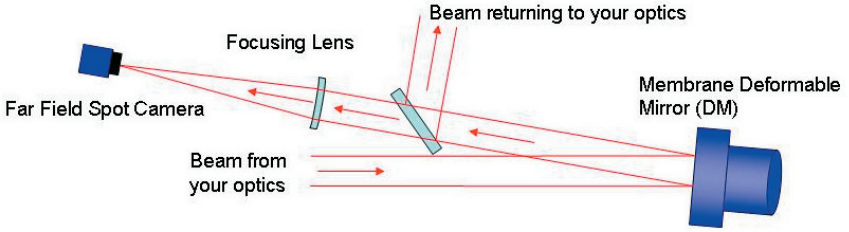
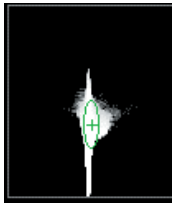
Clarifi 2D™ Hardware Setup



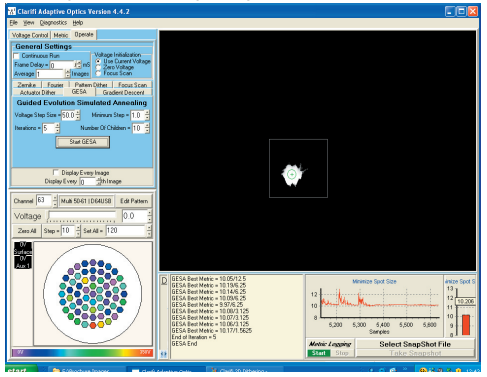
- **Utilizes a far field spot camera.**

By observing the far field spot of a beam, Clarifi-2D can directly measure and improve the beam quality of an incoming beam.



- **Applies one of 17 metrics and 6 dithering algorithms to optimize the far field spot.**

By applying a dithering algorithm, Clarifi-2D alters the voltages on the deformable mirror. The chosen metric tells the dithering algorithm how well a particular voltage alteration is doing. Depending on the metric, Clarifi-2D will maximize or minimize the metric results, thereby improving the input beam's quality.



- **Custom metrics or dithering algorithms are available**
- **Clarifi-2D also contains all the features found in Clarifi-1D.**

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