PhaseCam 6100

**Instantaneous Acquisition**
The PhaseCam® 6100 is a highly compact, dynamic laser interferometer with a 4MP camera and fully motorized controls for measurement of optics and optical systems. Operating at a wavelength of 633 nm the PhaseCam 6100 is ideal for long optical path-length measurement of large focal optical systems such as concave telescope mirrors and lens systems, and for testing small aperture afocal components such as flat mirrors and collimators.

The PhaseCam 6100 incorporates Dynamic Interferometry® technology, using a single camera, high-speed optical phase sensor to make wavefront measurements in less than 30 microseconds—over 5000 times faster than a temporal phase shifting interferometer. Because acquisition time is so short, the PhaseCam can be used under almost any conditions, without vibration isolation. This insensitivity to environmental factors makes the PhaseCam ideally suited for use on the production floor, in clean rooms and in environmental test chambers.

Compact and lightweight, the PhaseCam 6100 was designed with performance and remote measurement in mind. Moving the system to reconfigure a test set is simple and easy, and isolation equipment is not required. Fully motorized controls make it easy to operate the system in remote locations.

**Complete Measurement System**
The PhaseCam 6100 is a turnkey instrument that includes the interferometer, 4Sight™ advanced wavefront analysis software, and complete computer system. Samples with reflectivity from 1% to 100% can be measured with a simple adjustment. The diffraction-limited, custom-designed optical system maximizes sampling of the full aperture of the test part. The easy to use, vibration insensitive PhaseCam 6100 ensures rapid and accurate data acquisition.

**Industry Leading Analysis, Standard**
4Sight wavefront analysis software features a user-friendly interface with unmatched simplicity, analysis features and graphical displays. The Measurement Screen aids alignment and execution of single, averaged, burst or continuous data acquisition. The Measurement Flow interface lets you visualize the entire measurement process, from raw acquisition through masking, reference subtraction, terms removal, etc. Zernike, Seidel, geometric and diffraction analyses are easy to perform. Comprehensive data sharing capabilities let you read, write, save and print from most file types, including MetroPro IDL®, MatLab®, Opticode®, Vision®, HDF5® and CodeV®. Generating phase movies to characterize deforming surfaces and moving parts is simple and straightforward.

**FEATURES**
- Vibration Insensitive Dynamic Operation
- 4MP Resolution Camera
- 30 μsec Data Acquisition Time
- 633 nm Wavelength Source
- Easy Sample Reflectivity Adjustment
- Outstanding Data Analysis and Visualization Software

**APPLICATIONS**
- Meter-Class Telescope Optics
- Quality Verification of Optical Components
- Vacuum and Environmental Chamber Testing
- Production Floor Quality Control
# Specifications

**Configuration**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Model 6100 633 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Vibration insensitive dynamic Twyman-Green interferometer</td>
</tr>
<tr>
<td><strong>Acquisition Mode</strong></td>
<td>Single camera, high-speed optical phase sensor</td>
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<tr>
<td><strong>Optical Path</strong></td>
<td>Fiber-coupled head and laser source module; 5 m fiber length</td>
</tr>
<tr>
<td><strong>Laser Source</strong></td>
<td>Stabilized HeNe source @ 632.8 nm</td>
</tr>
<tr>
<td><strong>Maximum Output</strong></td>
<td>&lt; 5mW</td>
</tr>
<tr>
<td><strong>Maximum Cavity Length</strong></td>
<td>&gt; 60 m</td>
</tr>
<tr>
<td><strong>Beam Diameter</strong></td>
<td>9 mm FWHM</td>
</tr>
<tr>
<td><strong>Polarization</strong></td>
<td>Circular</td>
</tr>
<tr>
<td><strong>Field of View</strong></td>
<td>±12.5 mm, optical magnification dependent</td>
</tr>
<tr>
<td><strong>Focus Range</strong></td>
<td>1X fixed</td>
</tr>
<tr>
<td><strong>Fringe Contrast</strong></td>
<td>User adjustable for reflectivity from 1–100%</td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td>4 MPx, 12-bit standard</td>
</tr>
<tr>
<td><strong>Data Array</strong></td>
<td>User selectable full, half, quarter data arrays</td>
</tr>
<tr>
<td><strong>Motorized Controls</strong></td>
<td>Focus, reference beam block, aperture block, contrast adjustment</td>
</tr>
<tr>
<td><strong>Computer System</strong></td>
<td>High performance PC</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Windows®</td>
</tr>
<tr>
<td><strong>System Software</strong></td>
<td>4Sight™ Analysis Software</td>
</tr>
</tbody>
</table>

- Instantaneous Phase Shifting data acquisition
- Reference generation, subtraction, data averaging, masking
- 2D and 3D surface maps
- Zernike / Seidel / Stope / Geometric / Fourier Analysis
- Fiducial aided data set mapping
- HDF4 / HDF5 data format standard, others supported
- Absolute sphere, prism & corner cube analysis
- Multiple sub-aperture analysis
- Upgrades free during warranty period

**Physical Envelope**

- **Measurement Head:** < 38.9 x 15.7 x 9.1 cm (15.3 x 6.2 x 3.6 in)
- **Laser Source:** 48.3 x 20.3 x 11.9 cm (19 x 8.0 x 4.7 in)

**Weight**

- **Measurement Head:** < 4.3 kg (9.5 lbs)
- **Laser Source:** < 8.2 kg (18.0 lbs)

**Power consumption**

- < 750 Watts with computer

**Temperature Range**

- Operational: 16–27° C (60–80° F), non-condensing
- Storage: -1–38° C (30–100° F), non-condensing

**Options**

- **Diversers**
- Range of lenses from f/1 to f/32

**System Performance**

- **Acquisition Rate**
  - ≥ 12 frames/sec live video
  - ≥ 12 frames/sec acquisition with post processing
- **Minimum Exposure**
  - 30 μsec
- **Sample Reflectivity**
  - 1–100%
- **RMS Repeatability**
  - < 0.001 wave**
- **RMS Precision**
  - < 0.002 wave***

**Warranty**

- One Year, limited, on-site system installation and operator training

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* 7 mm when used with diverging lens.

** One sigma for RMS of 10 data sets of calibration mirror, each data set being an average of 16 measurements.

***Average RMS of the pixel by pixel difference of 10 data sets between measured surface and the calibrated surface. Each data set is an average of 16 measurements. Calibrated surface is the average of all 160 measurements.

Patent 7,230,717. Other patents may apply.

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All specifications subject to change without notice.