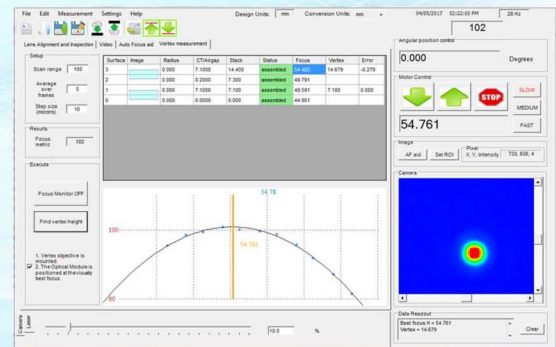


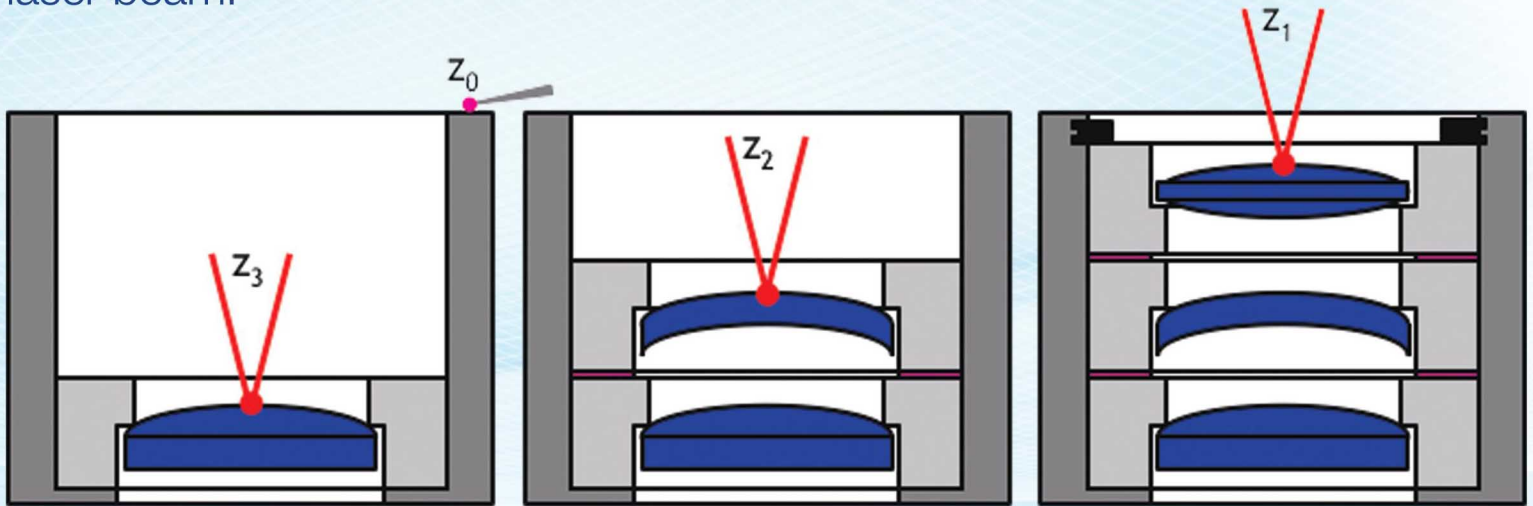


LAS-Vertex/ROC™ Application **Control Airgaps and Measure Lens CT During Assembly** **and Qualify Single Lens Radius of Curvature (ROC)**

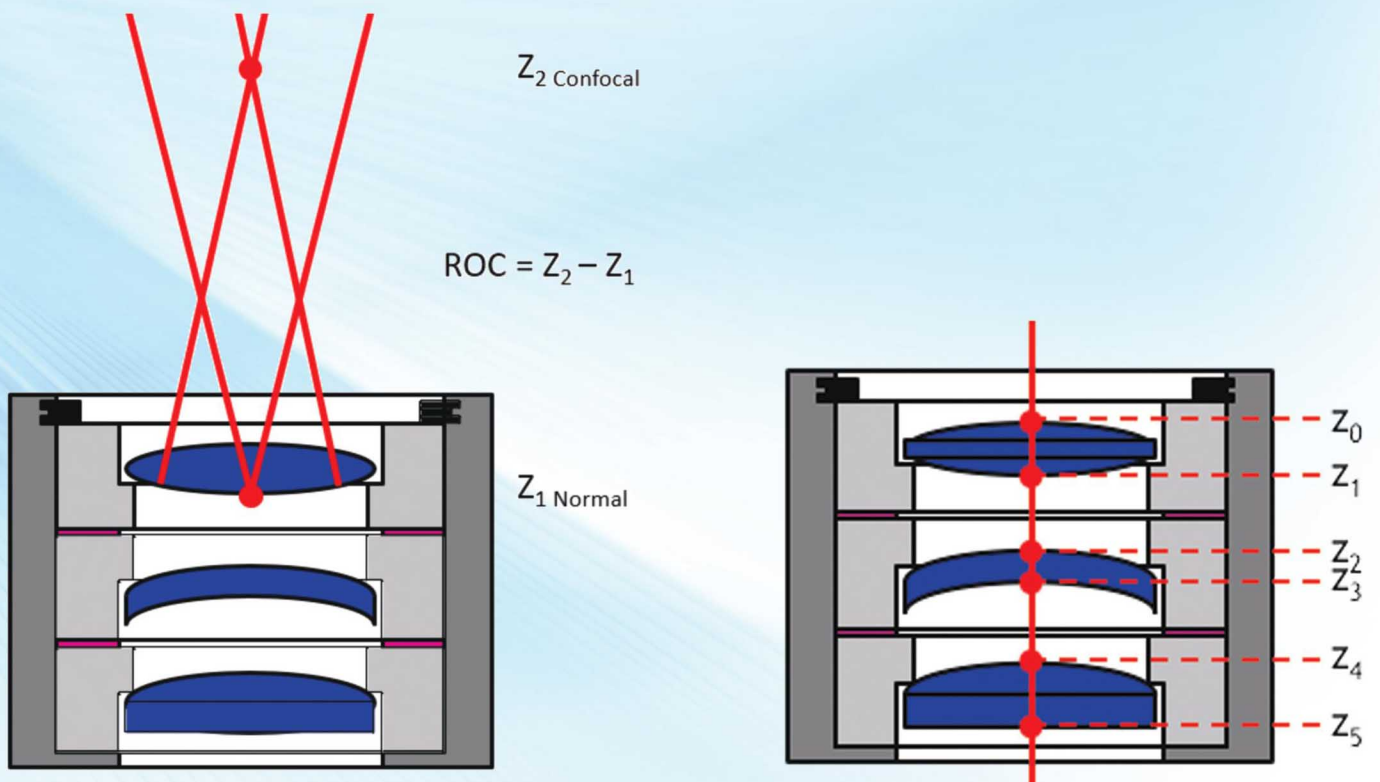
- Extends alignment capability of latest generation LAS to precise height (z-axis) measurement
- Lens-to-Lens vertex height measurement during assembly over entire travel of vertical stage (accuracy : $\pm 2.5\mu\text{m}$)
- Lens CT and air gap measurement of air-spaced doublets/triplets (< 50mm stack height)
- Radius of Curvature (ROC) measurement of single lenses (accuracy : 0.05%)
- Ultra-precise autofocus algorithm with custom high-NA objective
- Micron accuracy with error mapped high precision optical encoders
- Powerful addition to the LAS for Lens Manufacturing and Assembly Process Control



The LAS-Vertex/ROC™ accessory measures lens center thickness (CT), air gap, vertex height, and ROC relative to a predefined reference surface during assembly on the Laser Alignment & Assembly Station™ (LAS™) using a custom high-NA Vertex Measurement Objective (VMO) and accompanying CalcuLens™ Vertex Measurement software module. During assembly, the VMO allows operators to accurately measure the z-position of the lens vertex within $\pm 2.5 \mu\text{m}$ by automatically finding the sharpest focus of the reflected laser beam.



Vertex Height Measurement



z_2 Confocal

$$\text{ROC} = z_2 - z_1$$

z_1 Normal

z_0

z_1

z_2

z_3

z_4

z_5

Surface ROC Measurement

Lens CT & Air Gap Measurement