Synopsys and Seattle Photonics

Advancing Complex Optics with CODE V

> “ CODE V was an instrumental part of our lens design and assembly process. One extremely useful feature of CODE V is its ability to import interference files from many commercially available metrology instruments. This capability helped us complete the project on time and according to specifications. ”

~Ned Nestorovic, President + Chief Optical Engineer, Seattle Photonics Associates

Business

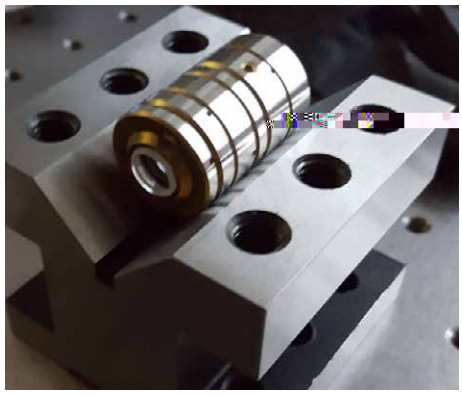
Seattle Photonics has been designing and prototyping high end, complex optical systems for a wide array of customers for over 20 years. Their expertise has been leveraged on systems that range from high volume commercial lenses to one-of-a-kind space flight hardware.

Fast, Short Focal Length Lens with a Curved Focal Plane Array Designed in CODE V

Seattle Photonics, working with the Microsoft Research Redmond lab, was tasked with designing and fabricating a prototype F/1.2, 8mm focal length lens that would couple to a curved focal plane array with a very high Nyquist spatial frequency of around 400 lp/mm. The design goal for this project was to minimize the element count within the lens by omitting the need to correct for field curvature in the system. Details on this effort can be found here https://opg.optica.org/oe/fulltext.cfm?uri=oe-25-12-13010&id=367160.

The reduced lens count forced the design form to employ multiple aspheric surfaces to achieve the desired resolution performance. The tolerance analysis performed within Synopsys CODE V indicated that the surface figure requirements of these aspheres would be tight for this system—tight enough that surface irregularity and mid-spatial frequency figure errors would need to be accounted for appropriately.

Working with fabrication vendors, the Seattle Photonics team was successfully able to measure the figure of each surface and generate interference files which they could map onto the aspheric surfaces with very high fidelity. One extremely useful feature of CODE V is its ability to import interference files from many commercially available metrology instruments. These files can be manipulated in several ways to ensure they match their intended purpose. Once these interference files were mapped onto the surfaces, the team was able to optimize the lens within CODE V by allowing the optical surfaces to clock within their mounting features, along with other compensators, to minimize the resulting wavefront of the entire system.



Aligned Lens Cells for Curved Focal Plane Array

Seattle Photonics successfully delivered four of these systems to their client and all achieved extremely good optical performance. CODE V was instrumental in several steps along the design and assembly process for this effort.

To learn more about Seattle Photonics, visit https://seattlephotonics.com
To learn more about CODE V, visit synopsys.com/optical-solutions/codev.html