

# THERMAL COMPENSATING OPTICS HOUSING

Patent Pending

Technology Readiness Level: 4

*Basic technological components have been integrated to establish that the pieces will work together*

## TECHNOLOGY DESCRIPTION

Engineers at Sandia National Labs have designed thermal compensating optics housing capable of protecting the fragile optical materials in systems that see large thermal variations such as satellites and aircrafts. All existing mounts sandwich the optic axially between two metal components, which can lead to optical surface damage and misalignment when exposed to fluctuating temperatures. Sandia's optic housing is designed to allow the optic to "float" inside radially compressive housing. The resulting optics housing is more robust in maintaining optical alignment and protecting delicate optical material through various thermal environments than those currently available on the commercial market.



*Prototype of Sandia's thermal compensating optics housing*

Sandia's thermal compensating optics housing utilizes flexure arms that are arranged to apply radial contact force in three locations 120° apart. The specific shape and size of the sliding flexures are entirely customizable to any given design requirement. As the thermal environment changes, the optic and housing material grow at different rates. This growth/shrinkage is accommodated by the flexure bending at the radial point of contact on the optic. The geometric symmetry of the flexures ensures each contact point applies the same amount of radial load, thus forcing the optic to remain at the geometric center of the assembly while the external housing grows/shrinks with the thermal environment. The housing sliding flexures and axial flexures work together to maintain the position of the optic throughout mechanical and thermal environments. This design also accommodates shock and vibration by dampening the input to the optic held in the mounting unit, ensuring performance in the harshest conditions.

## TECHNOLOGICAL BENEFITS

- Accommodates mounting of delicate optical materials
- Durable—designed to withstand shock and vibration
- Wide range of thermal compensation
- Variable shape and size
- Uses existing manufacturing methods
- Easy to integrate into existing systems

## POTENTIAL APPLICATIONS

- Useful to any company in need of tight positional control of components through thermal environments
- Satellites
- Aerospace/UAVs
- Interferometers
- Laser systems

## CONTACT US

For more information,  
please contact:  
**Sandia National Laboratories**  
ip@sandia.gov  
Refer to SD#12920  
Or to learn more,  
please visit our website at:  
<https://ip.sandia.gov>