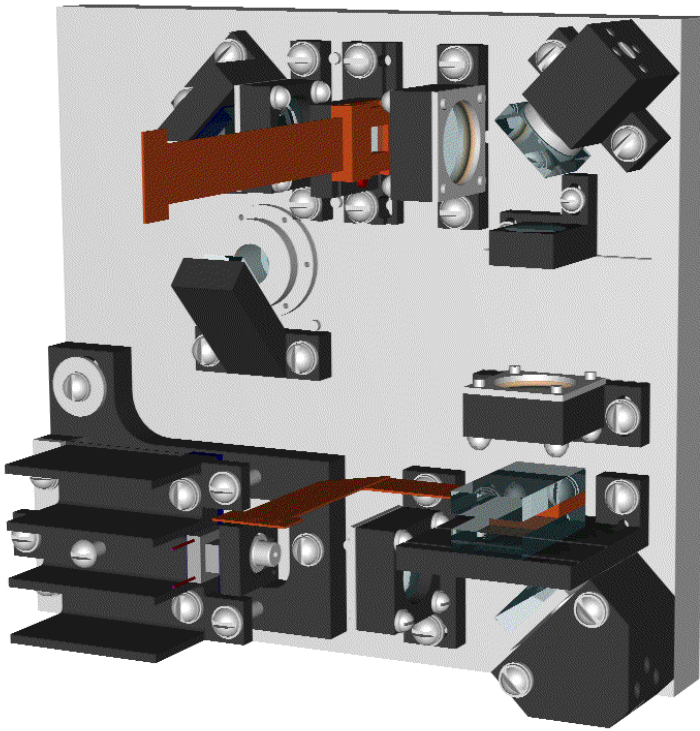


Airborne Optical Image Correlator

AEH designed the optical head for an airborne optical image correlator. These kinds of optical instruments are particularly difficult because they require the registration of two optical images and two diffraction patterns for their operation. Alignment of the optical elements for best performance can be very time consuming because of the number of optical elements and their differing influences on the images and the diffraction patterns and they need to be aligned in rotation, translation and size to sub-pixel accuracy.

The optical system was first modeled using **Optomechanical Constraint Equations™** to establish the registration sensitivities of each of the optical elements from the light source to the CCD (including the positioning of the “scene” and the “filter”). These equations were used to establish the tolerances on all pieceparts in the optical head including the focal lengths and diameters of the optical elements, select the alignment degrees of freedom, estimate the range of motions each would require for optimal alignment and select materials of construction that would provide superior thermal and structural-dynamic stability.



Performance was enhanced by the use of two **Diamond Precision™** mirror mounts that provide sub-microradian registration accuracy and stability. Because of the alignment accuracy and stability the performance was improved by six dB.

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