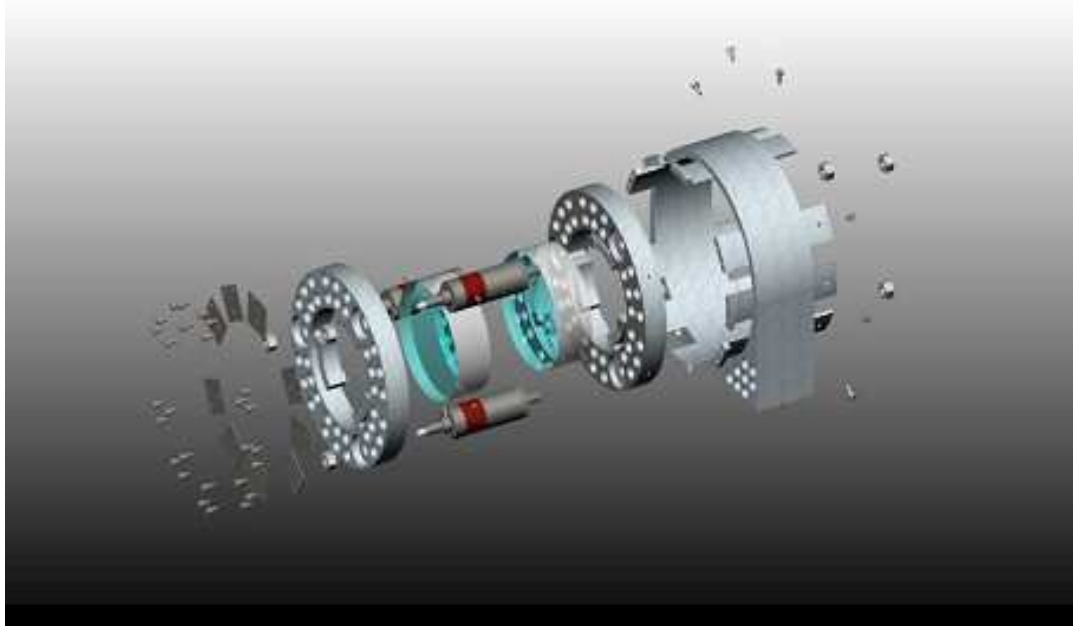
Etalon Specifications

Interferometer Specifications		
Etalon Clear Aperture	60 mm standard	Unobstructed aperture 50 mm 25-140 mm available
Etalon Gap	0.05 mm - 15 cm	
Surface Quality	Standard: lambda / 100 (lambda = 633nm)	Better flatness may be available depending on wavelength and clear aperture
Wedge Angle	5 arcmin	
Cavity Tuning Range	3 microns	
Drift	+/- 0.5 angstrom	
Controller Resolution	16 - 20 bits	
Controller Frequency Response	100 Hz	
Piezoelectric Drive Voltage	0- 900 V	
Controller Operating Temperature Range	0-30 C ambient	
Controller Size	Height: 3U rack mount case	Depth: 17.1”
Controller Interface	RS-232	Uses either API or MAC Windows Control Program

Etalon Design Features

The Michigan Aerospace etalon mount that is being offered is the result of many design iterations for applications that have been used in both the laboratory and in space. Although most of the hardware that Michigan Aerospace Corporation builds is not spaceflight qualified, all hardware that we build is built with the same basic designs, guaranteeing the highest degree of performance in the smallest and most elegant package available. The key to achieving high finesse with the degree of robustness required for spaceflight lies in the manner in which the etalon plates are mounted. The Michigan Aerospace design uses invar rings that are designed to minimize bending loads on the etalon plates while providing a high-rigidity, thermally stable mounting mechanism. The piezoelectric Motors that are used in our etalons are fabricated from a highly robust design that does not subject the piezoelectric element to the structural loads of the etalon mount, resulting in a design that delivers exceptional thermal stability and vibration performance. Feedback control for the etalon tuning is provided by a series of three capacitors which directly measure the dynamics of the optical gap. The feedback capacitors are fabricated using gold coated zerodur blocks which provide exceptional robustness and thermal stability for both laboratory and dynamic conditions.



Exploded View of the Etalon

Vibrational Stability

Michigan Aerospace's etalons have been successfully vibe tested to survive a Delta II launch vehicle environment. Vibrational stability of the etalon was a key driver in its design and therefore necessitated a thorough vibration analysis to be performed. For an etalon to withstand a launch, its normal mode frequencies must be well above (or below) the highest frequencies of the vibrational power spectrum of a launch. This means that in the case of the Delta II launch vehicle, the resonant frequencies must be about 90 Hz, but preferably should be above 800 Hz, as that is where the majority of the kinetic power lies. There are trades between thermal stability, natural frequency and mass of an etalon. As the mass is reduced, the thermal stability improves (through improved tolerance in deformability), but the natural frequency is reduced. These trades can be optimized for varied etalon designs, based upon the custom requirements necessary for other applications.

Our etalon was vibration tested to ensure that it would survive without a degradation in finesse, a change in feedback capacitance, or a catastrophic failure of a structural component or epoxy bond. The etalon was subjected to the GEVS specification of 13.5 Grms for one minute per axis. The etalon survived this vibe test with great success.