

55 mm Space-Qualified Fast Steering Mirror (FSM)





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BlueHalo has been developing and delivering custom high performance fast steering mirrors (FSMs) for ground-based, airborne, and space-qualified applications for over ten years. Our FSMs are used to reduce jitter and provide pointing accuracy in Directed Energy Weapon (DEW) systems, long range laser communications, and other optical imaging and scanning systems. BlueHalo's 55 mm FSM is delivered on a Firm-Fixed Price (FFP) contract with a set delivery schedule and no non-recurring engineering (NRE).

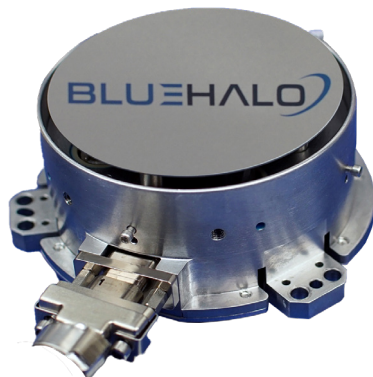
The space qualified 55mm FSM consists of a FSM mechanism, position feedback electronics, and control electronics. The components have been qualified for a LEO space environment. BlueHalo can evaluate environmental specifications on a case by case basis and recommend additional qualification testing, screening, or parts changes if necessary. The FSM is delivered with documentation typically required for space hardware.

Features

BlueHalo FSMs use silicon carbide, single crystal silicon or metal (aluminum or beryllium) substrates depending on the specific requirements of the application. We can provide mirrors with virtually any coating requirement from basic metal coatings to high reflectivity dielectric coatings designed for high energy laser (HEL) applications. BlueHalo's 55 mm FSM provides high acceleration ($>1,000$ radians/sec²), high bandwidth (>800 Hz), and extremely low jitter (<1 μ rad, 1-1,000 Hz). All FSMs come with a digital controller.

Benefits

BlueHalo FSMs are competitively priced to reduce program costs. Our mechanism designs are scalable, which minimizes NRE. Different mirror substrates and coatings provide customers the flexibility to tailor their FSM to specific program requirements. High acceleration provides greater torque authority enabling high bandwidth and providing rapid scanning capability. High bandwidth enables accurate jitter rejection from base motion and atmospheric turbulence in tip/tilt. Many of the performance specifications below can be customized within reasonable limitations with minimal or no NRE. Contact BlueHalo with specific technical specifications.



Specifications for the 55 mm Space-Qualified FSM

Optical	
Mirror Size	55 mm
Clear Aperture	48 mm
Mirror Substrate	Silicon Carbide (SiC)
Surface Flatness	<10 nm RMS
Reflectivity (% Rav-avg)	>98% (Depending on coating requirements)
Performance	
Angular Range (Mechanical)	±5 mrad
Acceleration	>1000 rad/sec ²
Bandwidth (Closed-Loop, 3 dB Point)	>800 Hz
Jitter (1-1000 Hz)	<1 µrad
Accuracy	<10 µrad/mrad
Mechanical/Electrical	
Mechanism Size	76.2 mm diameter x 33.78 mm high cylinder
Mechanism Mass	0.8 lb.
Digital Controller Size	172.72 mm x 66.04 mm x 105.41 mm
Digital Controller Mass	5 lbs.
External Command/Status Interface	RS422/LVDS
Input Voltage	28 VDC
Peak Power	<15 W
Cable Length	3 meters
Environmental	
Environment	Low-Earth Orbit
Temperature Range (Operating)	-20°C to +55°C
Temperature Range (Survival)	-30°C to +65°C
Humidity (Operating)	0 to 80% (non-condensing)
Vibration (Non-operating)	10 gRMS
Radiation	40 kRad

Specifications subject to change without notice.