

Laser Communications



Space-Qualified Solutions for Laser Communications

BlueHalo's space-qualified stable platforms leverage a long heritage of Optical Inertial Reference Unit (OIRU) technology advances and multiple U.S. patents and feature our Angular Rate Sensors (ARSs) and actuators. We have delivered 16 space-qualified GEO laser communications stable platform units to a government customer and two space-qualified stable platforms to NASA's Laser Communications Relay Demonstration (LCRD) program. Additional BlueHalo space-qualified solutions include space-qualified Latch and Gimbal Assemblies (LGAs) and an advanced Optical Isolation System for NASA's LEMNOS program; GEO-to-ground laser communications optical modules; space-qualified high bandwidth Fast Steering Mirrors (FSMs) and electronics; and ARS and multi-axis ARS Dynapak.

Additional Benefits of Laser Communications

BlueHalo's laser communications terminals enable low-probability-of-intercept/low-probability-of-detection (LPI/LPD) bi-directional data transfer to and from assets deployed in areas where radio frequency (RF) communications may be undesired or unavailable. Additionally, all of our laser communications terminals incorporate advanced two-way time transfer (TWTT) technology. With near-zero overhead on the data link, our terminals measure high-precision position and timing information, enabling satellite navigation in GPS-denied environments.

Optical Inter-Satellite Links (OISLs)

BlueHalo is developing an end-to-end system of laser communications satellite terminals and ground stations. For small satellite platforms, we offer a 10-cm aperture gimbaled telescope assembly with advanced line-of-sight stabilization, pointing and tracking technologies and a back-end optics assembly that is interoperable with a variety of optical modem technologies. This terminal can support coherent, dual-polarization quadrature-phase-shift-keying (QPSK) modems for ultra-high data rates (up to 100 Gbps) and on-off-keying (OOK) and pulse-position modulation (PPM) modems compatible with the emerging SDA Tranche 1 standards. For cube-sat and UAV platforms, our low-size-weight-and-power, low-cost (low-SWaP-C) terminals feature a 1.5-cm aperture telescope and a high-photon-efficiency PPM optical modem, providing data rates of ~20 Mbps for LEO-to-GEO relay links.

