

## **THE LASERCOM OPTICAL GROUND STATION**

X-lumin's Lasercom Optical Ground Station (OGS) is a comprehensive, commercially available, laser communication solution that provides superior quality ground-to-space Optical communications from anywhere in the world. Our fully integrated Lasercom OGS is managed by the X-lumin Operating System (XOS) through a single user interface while offering remote capabilities. XOS seamlessly automates user-specified parameters for calibration and alignment, target acquisition, quality of service, and laser safety. Anticipating atmospheric impediments, XOS effectively and intelligently moves OGS data using free space optics (FSO) with extended ranges. Our OGS functions as a ground terminal for laser communication networks providing bi-directional links to LEO, MEO and GEO satellites.

One of the first commercial systems to offer full optimization of spectrum, capacity, speed and safety all in one place, the X-lumin Lasercom OGS leads in nextgen capabilities. Uniquely designed for reliability, flexibility and cost effectiveness, we create lasercom systems specific to client requirements.



The X-lumin Lasercom Optical Ground Station

## NETWORKED OR STAND-ALONE OPTICAL GROUND STATION (OGS)

The flexible and adaptable single-user interface provided by XOS in the networked Optical Ground Station allows for state-of-the-art pointing and tracking capabilities, such as: manual and automatic guiding; remote control; motion stabilization; video tracking; calibration & alignment; target acquisition; and a highly configurable control interface. As a “Stand-Alone” system, XOS provides comprehensive management and control of a single OGS. Optimizing detection, tracking, and characterizing near-Earth space objects, the software creates an ideal system for conducting free space optical communications research demonstrations. XOS can also be integrated into networked architecture to control multiple OGS’ from a single client interface.



## DESIGNED FOR MULTI-FUNCTIONALITY

XOS enables users to gain multi-functionality from their investment. Whether allowing OGS built for Lasercom to utilize an astronomical Optical Telescope Assembly (OTA) as a stand-alone feature, or incorporate the OTA into a larger network, or visa-versa, XOS provides options for future add-on features and capabilities to allow multiple uses of expensive gimbal and telescope assemblies. For example, Space Situation Awareness (SSA) or Tracking and Imaging, can be added to an existing laser communication ground station, helping to manage costs over time.

## XOS WARRANTY, SUPPORT, & LICENSING

XOS comes with a 90-day manufacturer’s warranty from the date of acceptance. XOS is offered on an annual licensing basis with Customer Support. A minimum one-year contract is required with all purchases; additional 3 to 5-year renewal periods can be purchased for a discounted price with the initial contract.



## ADVANTAGES & CAPABILITIES OF THE X-LUMIN LASERCOM OGS



**Integration.** The XOS brings the OGS a single point of access and easy-to-use interface where users can control OTA, gimbal, benches, pointing, tracking, and the capability to link to moving platforms.



**Communication.** XOS can communicate via remote control GUI and allows for both remote and local scripting with Python.



**Automation.** XOS can be pre-programmed with user-specified parameters for calibration & alignment, acquisition, quality of service and diagnostics, laser safety, data analytics, etc.



**Collection Options.** Can collect data from fixed and mobile platforms; moving platforms; and remotely across platforms from a single interface.



**Data Logging.** Data can be logged for performance troubleshooting and analysis.



**Remote Control.** A single interface allows for remotely managed operations of all system hardware components, including acquisition sensors, gimbals, and lasers, through single interface.



**Hardware Agnostic.** XOS is designed to operate across a wide variety of hardware vendors, offering unparalleled flexibility for meeting current needs while allowing for future capability expansion.



**Quality of Service.** Enhanced service quality and reliability obtained from automated optimization of bandwidth and hardware utilization as well as access to real-time comprehensive diagnostics; video tracking available.



**Day and Night Operations.** Can be programmed for uninterrupted tracking and data collection - 24/7, 365.



**Cross-Platform Availability.** XOS operates on multiple platforms including Windows, Linux, Mac, Android and IOS.



**Integrated Laser Safety.** The X-LSS accommodates multiple client platforms while ensuring unintentional illumination of satellites, aircraft, vehicles, equipment, people, and wildlife while optimizing lasing opportunities.

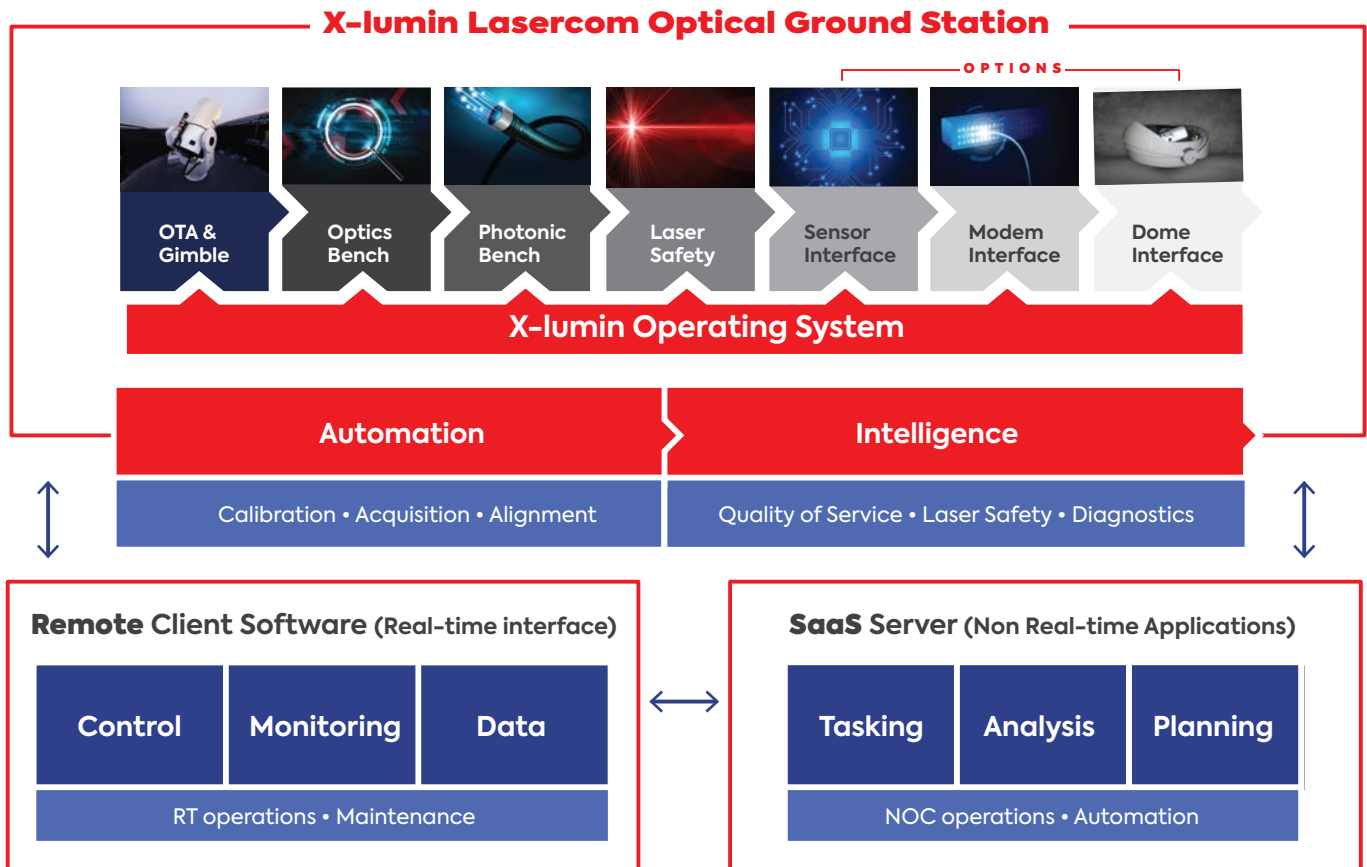
### OPTIONAL FEATURES

- Integrated video recording & tracking
- Motion stabilization & inertial referencing
- Dome and Weatherization packages available



## TECHNICAL HIGHLIGHTS OF THE X-LUMIN LASERCOM OGS

FEATURES	ITEM	DESCRIPTION
XOS	Remote capability	Allows user to control multiple locations, from a single-user, configurable interface
	Platform Type	Client interface operates on multiple platforms including Windows, Linux, Mac, Android and IOS
	Web-based	Standard, web-based network interface that allows 3rd party integration software with XOS
	Hardware Agnostic	Operates across a wide variety of hardware vendors; does not require specific vendors or components
	Real-time Control & Management	Real-time state-of-the-art pointing & tracking capabilities, such as: manual and automatic guiding; motion stabilization; video tracking; calibration & alignment; target acquisition
Pointing & Tracking	Mount calibration	System provides self-reference for location and pointing using celestial sources and/or GPS
	Lasercom Performance	Capable of maintaining point and track requirements to meet the performance measures of client-provided link budget
	Timing	Timing is referenced to Universal Time Coordinated (UTC) time scale
	Tracking Subsystem	Tracking subsystem is an optical telescope, tracking mechanism, and controller
	Acquisition and Tracking	<10 arcsecond RMS pointing accuracy < 0.3 arcsecond error over a 5-minute period tracking accuracy
Downlinks	Telescope design	Use of commercially available telescopes - client specified
	Wavelength	Optical bench is designed for 1550nm band, and can be extended to support other wavelength bands
	Tip/Tilt	Supports future addition of steering and adaptive optical approaches to correct for both tip/tilt and higher order wave-front errors
Uplinks	Beacons	Beacon subsystem consists of high-power modulated laser source & collimator to align the optical beam. The beacon(s) will attach to telescope structure & align within the pointing accuracy specification
	Link budget	Optical solution to match client-provided link budgets for data transmissions to space
	Wavelength	Wavelength: NIR and SWIR possible. Optical Power: 5W. Divergence: 0.8mrad; Modulation: 10 to 50 KHz
Laser Safety	Built-in Deconfliction	Deconflicts laser operations with static constraints like 2D (azimuth & elevation) and 3D (latlong-alt), keep-out areas, and dynamic events with automated reacquisition
	Real-time Monitoring	Temporary pause when potential safety event occurs
	Safety Zones	Mechanical drawings to indicate all safety-related keep out zones and articulating cables
	Code compliance	Designed to meet site-specific code compliance and safety regulations
Environment	Temperature	Built to withstand extreme temperature fluctuations - both heat and cold
	Humidity	The system will withstand & operate at 95% relative humidity
	Precipitation	Sealed from detectable precipitation. Will withstand incidental exposure to precipitation and be sealed for general outdoor exposure
	Wind	Designed for an operational constant wind load 35mph, with gusts up to 50mph.
	Sun	Operates 24/7, 365, in full daylight and nighttime conditions



**ABOUT X-LUMIN**

X-lumin is on a quest to build an effective and efficient bridge between existing optical communications technology and the need for a high-speed data highway to meet exploding IoT demands. Our innovative and cutting-edge solutions incorporate state-of-the-art optical and photonic components which comes from over 25 years of experience in the design, development and integration of optical technologies and solutions, laser systems, tracking and surveillance, atmospheric propagation, and video and image processing. While the early foundations of our products and solutions focused on universities and government agencies, our solutions today allow us to bring these leading-edge solutions to the commercial marketplace which create new standards and solutions that have broader impact.

For more info, contact us at:  
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