Viasat

Mercury and Quicksilver

Free Space Optical Communications

Resilient networking systems to support today's contested missions

Peer and near-peer adversaries have developed electronic warfare (EW) capabilities that can detect, disrupt, and degrade traditional communications networks, necessitating the development of reliable and resilient alternatives for connectivity in contested environments. Enter Free Space Optical (FSO) Communications.

FSO is an ideal technology to support the warfighter, offering wireless technology that uses lasers propagating in free space to provide faster data transmission, increased security, and lighter infrastructure.

Viasat is enhancing mission communications in these spectrum-congested and contested environments with its FSO solutions: Quicksilver and Mercury. The new terminal systems integrate technology advancements to provide a resilient networking system of modem, terminal controls, and tracking mechanisms. Enabled for multiple expeditionary communications environments, including:

- Ground-to-Ground
- Ground-to-Air
- Ship-to-Ship
- Ship-to-Shore

FSO evolves line-of-sight (LOS) and beyond-line-of-sight communications with distributed cloud access across jam resistant, high-capacity network links.

Go undetected with Mercury FSO

Viasat's Mercury FSO solution is designed to be highly mobile and simple to use on the move, making it easy for service members to deploy and for the system to stay aligned and linked to distant end terminals.

The system integrates state-of-the-art technology advancements to provide a resilient networking system. Mercury uses invisible, atmosphere resistant lasers to provide highspeed communications while maintaining a low probability of interception and detection (LPI/LPD). Additionally, the Mercury FSO system has EW resistance and a range-extendible communications system specifically tailored to operate in tactical environments at ranges beyond 50 km and throughput of up to 40 Gbps. Mercury does not rely on heavily regulated radio frequency spectrum, giving it greater regulatory flexibility.

Mercury FSO Top Level Performance

- Data rates of up to 40 Gbps bidirectional
- Operational ranges beyond 50 km for terrestrial point-to-point links
- Robust automated acquisition
- Rapid setup and teardown

Mercury specifications

Dimensions (L x W x H)	
Gimbal (inc. payload)	23.2 x 24.8 x 24.3
Payload	15.9 x 11.5 x 5.4
Baseband Kit (Rugged 4U 19 in. rack)	26.5 x 22.5 x 11.5

Weight	< 100 lbs
Power	48 VDC, 120 W nominal, 200 W peak
Data Rate	20/40 Gbps bidirectional
Range	50 km+

ENVIROMENTAL

Operating temperature	-30°C to +55°C
Enclosure	MIL-STD-810 compliant

INTERFACE

1 x 1310 nm SFP+ per 10 Gbps channel

1 x Ethernet

FSO MOUNT

FSO gimbal mount leverages high performance inertial stabilization with high resolution tracking and precision stability

Provides +/- 167.5 degrees field of view in azimuth and +/- 30 degrees in elevation
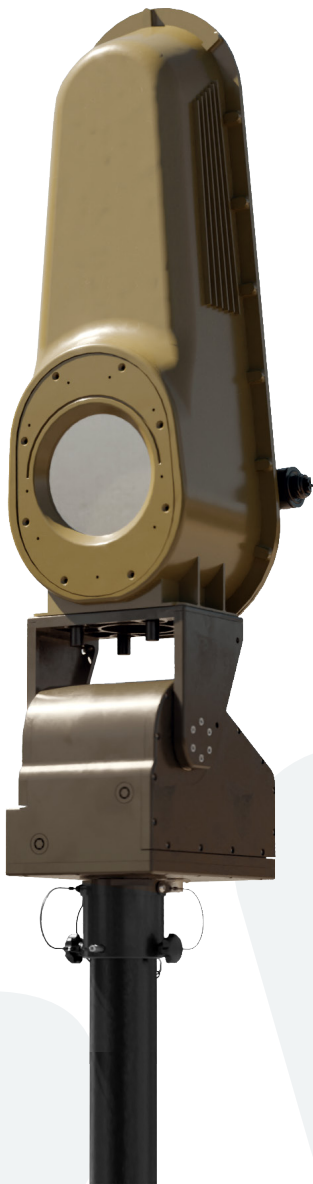
Increase survivability with Quicksilver FSO

Peer adversaries have the ability to detect and strike military units operating in a combat environment that emit radio frequency energy. Viasat's Quicksilver FSO terminal enables low-latency communications with a LPI/LPD anti-jam LOS link.

It provides customers the flexibility to rapidly deploy a high bandwidth capability on the quick halt without the restrictions and delays that come with obtaining spectrum clearances or licenses. Additionally, the Quicksilver FSO system also has EW resistance and a range-extendible communications system specifically tailored to operate in tactical environments with a range of up to 70 km in optimized conditions and throughput up to 10 Gbps.

Quicksilver FSO Top Level Performance

- Data rates of up to 10 Gbps full-duplex
- Operational ranges of 50 km typically and up to 70 km link range during optimized conditions
- Intuitive, computer-vision aided acquisition
- Automated link tracking after acquisition
- Rapid setup and teardown

Quicksilver specifications

Dimensions (L x W x H)	27.2 x 9.9 x 8.9 in.
Weight	< 50 lbs
Power	48 VDC, < 75 W nominal, 175 W peak
Data Rate	10 Gbps, full duplex
Range	50+ km

ENVIROMENTAL

Operating temperature	-30°C to +55°C
Enclosure	Waterproof, MIL-STD-810 compliant

USER INTERFACES

Terminal Setup	GbE or 1310 nm SFP
Telemetry	GbE or 1310 nm SFP
Client Data	GbE or 1310 nm SFP

FSO INTERFACES

1 x 1310 nm SMF	TFOCA-II® connector (client data)
1 x 100 BASE-T + POE	Rugged RJ-45 (positioner interface)
1 x 48 VDC + 1000 BASE-T	MIL-DTL-38999 connector (power, user interface)

MOUNTING OPTIONS

2-Axis Positioner (Mast Deployments)	+/- 220° in azimuth +/-30° in elevation 2.1˚/s slew rate Integrated power using PoE from Quicksilver terminal
Fixed Mount (Fixed Deployments)	+/- 11° in azimuth +/- 14° in elevation 10° field of regard Clamp-based mount for fixed installations