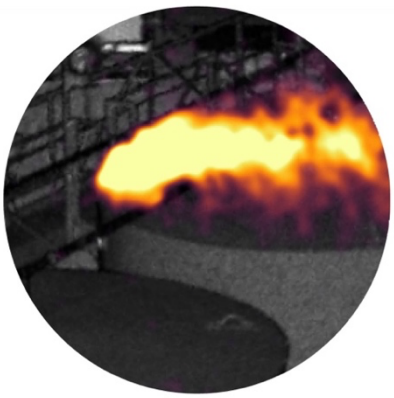
Product Brief

Continuous Emissions Monitoring and Quantification with Quantum Gas Lidar

Detect, Visualize, Locate, Quantify, and Prioritize Emission Sources

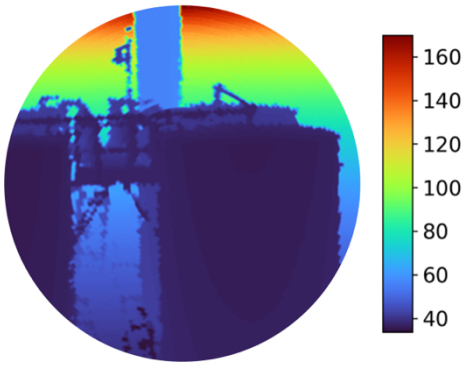
QLM has developed a new type of gas sensing lidar that combines lidar and gas absorption spectroscopy with highly-sensitive, single-photon (quantum) detection to count gas molecules. The lidar produces a three-dimensional picture of objects and gas plumes that shows the exact location of an emission source. This novel imaging technology can detect, visualize, locate and quantify plumes of gas molecules from a distance of 200m (656ft) using automated or remote manual control modes.

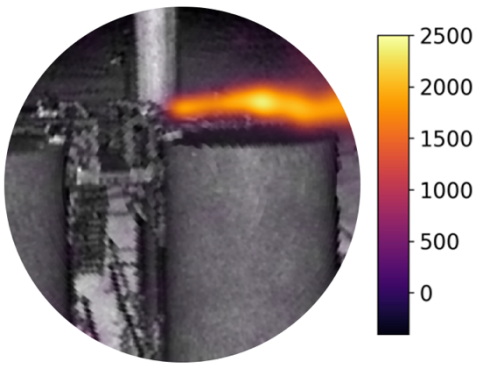


Advantages of QLM Quantum Gas vs. Traditional Optical Gas Imaging

- Accurate leak flow rate quantification
- Gas leak visualization and localization day or night and in precipitation
- Insensitive to temperatures of objects or interference from sunlight
- Methane specific – no interference from other gases or water vapor
- 3D imaging, range, and context imagery using lidar intensity
- Single-photon sensitivity: long range, low power, eye safe
- Low cost for wide deployment – site-level continuous monitoring and component-level emission pinpointing for OGMP 2.0 level 4/5

Emission source characteristics such as plume size and shape, gas emission rate, duration, location, persistence and timing/quantity patterns are measured by the system to determine the importance or urgency of the individual source. Analytics then transform these data into prioritized actions for remediation. Detected emission events are categorized, logged and digital alerts including this information sent to operators for follow-up actions.





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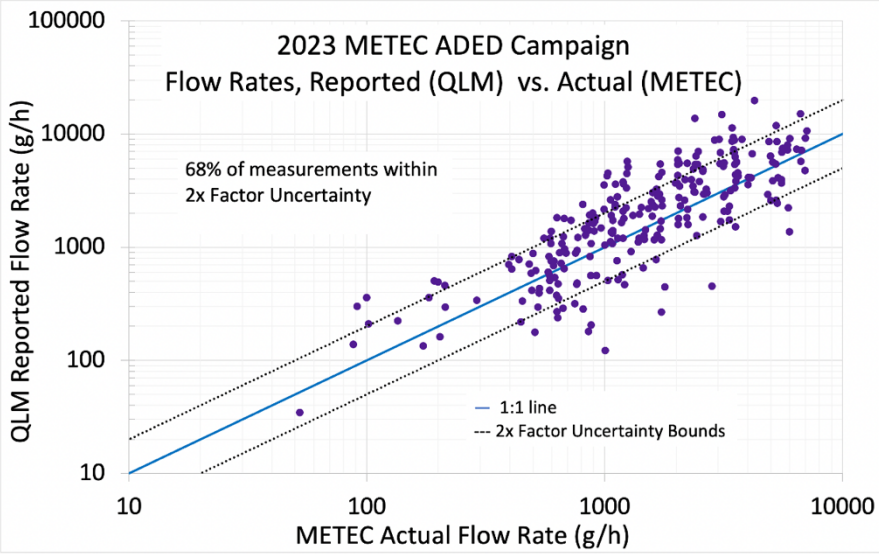
Proven Performance

The QLM solution has been independently validated at customer and third-party, blind controlled-release testing sites worldwide including at METEC with consistent results – a high degree of detection sensitivity, accurate quantification and localization, and the ability to operate at customer-configurable thresholds that eliminate false positive indications. Since the solution provides a calculated emission-based priority plus detailed visual imagery of gas plumes and context imagery of the scene (both visual camera and 3-D lidar intensity imagery), operators can easily determine which emitters warrant immediate action.



The QLM camera operates as an IoT device and is provided as a full solution through a cloud interface, allowing access to both a live GUI for camera control and visualization and to a configurable automation system that directs networked cameras to systematically and repeatedly scan assets on a site for emissions, raising alerts for events beyond set parameters.

Beyond emissions monitoring in the oil and gas infrastructure, the QLM solution is well-suited for use in other GHG-intensive applications such as biomethane production, at landfills and in agricultural and wastewater operations.

Quantum Gas Lidar Specifications

Emission Rate Quantification Accuracy	Estimates leak rate within a 2x Factor Uncertainty, 1-sigma (see plot above)
False Positives	Zero†
Laser Output	Class IM, eye safe
Environmental Conditions	Day or night, unaffected by thermal contrast, sunlight or reflections
Precipitation	Operates in moderate fog/rain/snow††
Relative Humidity	0% to 95%, noncondensing
Dimensions	43×18×18 cm (16.9×7.1×7.1 in)
Weight	8 kg (17.6 lbs), including pan and tilt mount
Ingress Protection Rating	IP67
Operating Temperature	–40 to 50 °C (–40 to 122 °F)
Communications Connection	Ethernet, WiFi, cellular
Mounting	Via bracket or mast
Power Consumption	30W, 24VDC or line power

†Using QLM processing and recommended settings of customer-configurable thresholds
†† Extreme conditions will increase limit of detection

Limits of Detection (typical, 90% PoD)

Distance	Wind Speed		
	<1 m/s	<5 m/s	<10 m/s
<100-m (<328-ft)	0.2 kg/h	1.0 kg/h	2.0 kg/h
<200-m (<656-ft)	0.4 kg/h	2.0 kg/h	4.0 kg/h