

**THERMAL
SENSOR
TECHNOLOGIES
FOR OPTICAL GAS
IMAGING (OGI)**

OVERVIEW OF THE MARKET

SEGMENTS & APPLICATIONS

Methane is the second most important greenhouse gas after carbon dioxide (CO₂) and has accounted for approximately 30% of global warming. Methane concentrations have surged to record-breaking levels in recent years, meaning that emissions must be curbed to achieve the 2050 climate objectives.

Concerted efforts across the international community to take action now.

Governments and regulatory bodies worldwide are tightening controls on methane emissions, compelling industries to adopt better Leak Detection and Repair (LDAR) practices.

The European Union has rolled out an ambitious strategy to cut methane emissions. The new regulation (EU/2024/1787) mandates companies in the fossil energy sector to actively monitor and minimize methane leaks, helping reduce their environmental footprint.

In the United States, the Environmental Protection Agency (EPA) is introducing stringent methane emissions guidelines for the oil and gas sector (Subparts OOOOa/b/c – 40 CFR Part 60, Appendix K) with enhanced monitoring and maintenance requirements for industrial equipment and facilities.

Both regulations explicitly suggest the use of efficient solutions, such as Optical Gas Imaging (OGI), as an efficient and reliable method for improving LDAR (Leak Detection and Repair) programs.

Optical Gas Imaging (OGI) is a powerful technology that enables real-time visualization of gas leaks using advanced infrared cameras. This non-intrusive solution is highly effective for detecting hydrocarbon gases such as methane. OGI makes it easier for operators to identify and quantify leaks quickly, even from a distance, offering significant advantages over traditional detection methods.

Adopting OGI as part of an LDAR strategy helps companies:

- Ensure compliance with increasingly stringent regulations
- Reduce their environmental impact by cutting fugitive emissions
- Improve safety and operational efficiency
- Reduce financial leaks

The detection process can be divided into 3 scales:

1 Very long-distance surveillance (space):

This scale is used to keep a close eye on vast areas from space with satellites featuring on-board detectors. These solutions help operators track global methane emissions, identify major sources, and follow trends over time.

2 Long-distance surveillance (monitoring):

Drones and fixed monitoring stations provide continuous surveillance of specific areas, such as industrial sites, in order to trigger the need for maintenance.

3 Short-distance measurements (inspection):

At this scale, facilities are examined on-site with highly sensitive advanced technologies. This approach allows clear pinpointing of any local methane leaks, so the necessary corrective action can be taken.

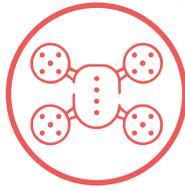
Implementing OGI helps industries meet their regulatory obligations while actively contributing to environmental protection and achieving their climate objectives.

Optical Gas Imaging (OGI) technology enables precise detection of greenhouse gases such as Methane, SF₆ or Refrigerant gases. These solutions, designed for industrial applications, provide fast and reliable detection, crucial for taking effective corrective actions.

LYNRED leverages its expertise in OGI technology to offer high-performance thermal detectors operating in all IR spectral bands. Using either narrow-band or broad-band filters, these detectors identify gases based on their absorption spectra. LYNRED's cooled and uncooled detectors ensure high sensitivity, providing an accurate and reliable solution for gas leak detection in industrial environments.



HANDHELD



DRONES



FIXED CAMERAS



SATELLITES

Use cases:

Detecting gas leaks to improve safety, protect the environment and reduce financial losses at every stage in the oil and gas cycle, from exploration through to distribution:

- **Exploration:** Oil and gas facilities (*natural gas treatment and gathering lines, underground natural gas storage installations, etc.*)
- **Production:** Industrial sites (*natural gas treatment plants, oil refineries, etc.*)
- **Storage / distribution:** petrochemical facilities (*wells, transmission, storage and distribution pipelines, storage tanks, etc.*)
- **Satellite-based observation of the Earth and environment**



CHALLENGES

The key factors for these missions include:

- **COMPLY WITH INCREASINGLY STRINGENT LEGISLATION**



EPA 0000,a,b,c (APPENDIX K)



REGULATION (EU) 2024/1787

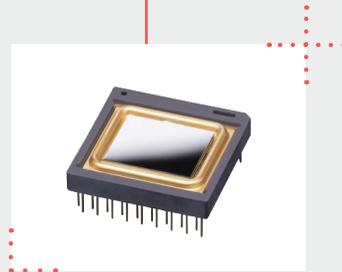
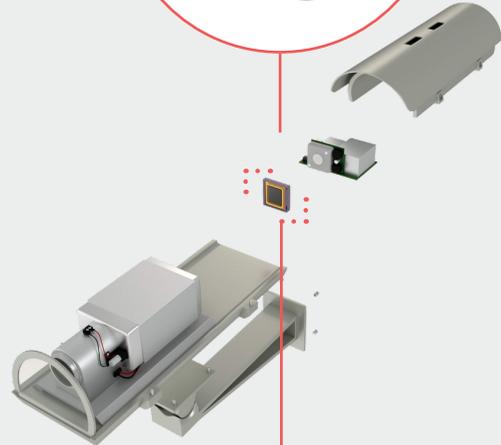
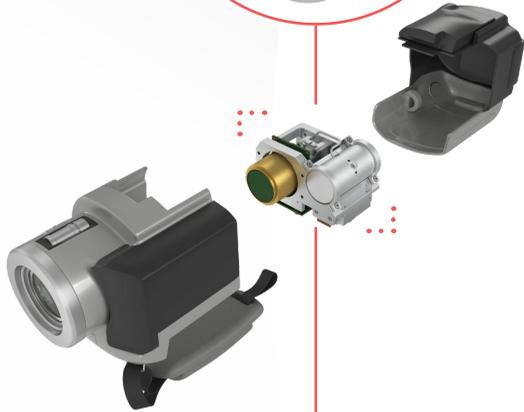
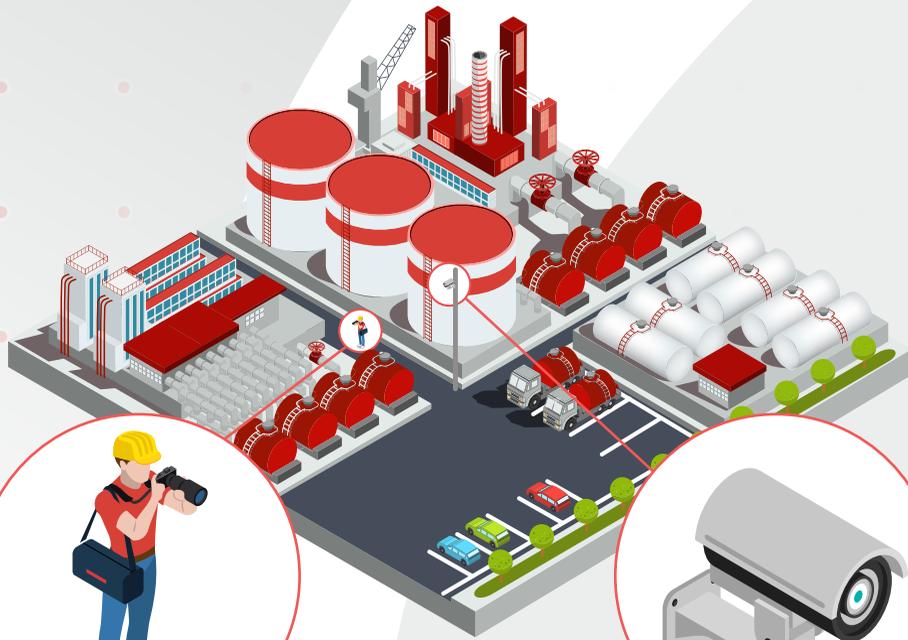
- **BRING A PRODUCT TO MARKET OFFERING GREATER RESOLUTION, PERFORMANCE AND SENSITIVITY**
- **SATISFY THE NEEDS OF NEW PLATFORMS (UAVS, FIXED, HANDHELD)**
- **SIMPLIFY USE THROUGH STANDARDIZED INTERFACES (PLUGUP)**

LYNRED: the partner you can rely on

- **Independent supplier** located in Europe
- Supplies thermal imaging only, with no competition for the final product
- **Over 30 years' experience in producing high-performance infrared detectors** (high sensitivity, high frame rate, high uniformity, etc.)
- **Extensive range of cooled and uncooled thermal detectors** covering the entire infrared spectrum (from SWIR to VLWIR)
- A **dedicated customer care team** focused on providing assistance and technical support. We take a proactive approach to responding to your questions and needs. Our engineers possess the skills to work efficiently with your people, from R&D through to engineering. Our customer care services are fully integrated into our product lineup, with personalized support available to all our customers. Our mission is to help boost your technical capabilities and inject even greater efficiency into your infrared solution development processes, while shortening the time to market.



2 million detectors
delivered since 2016

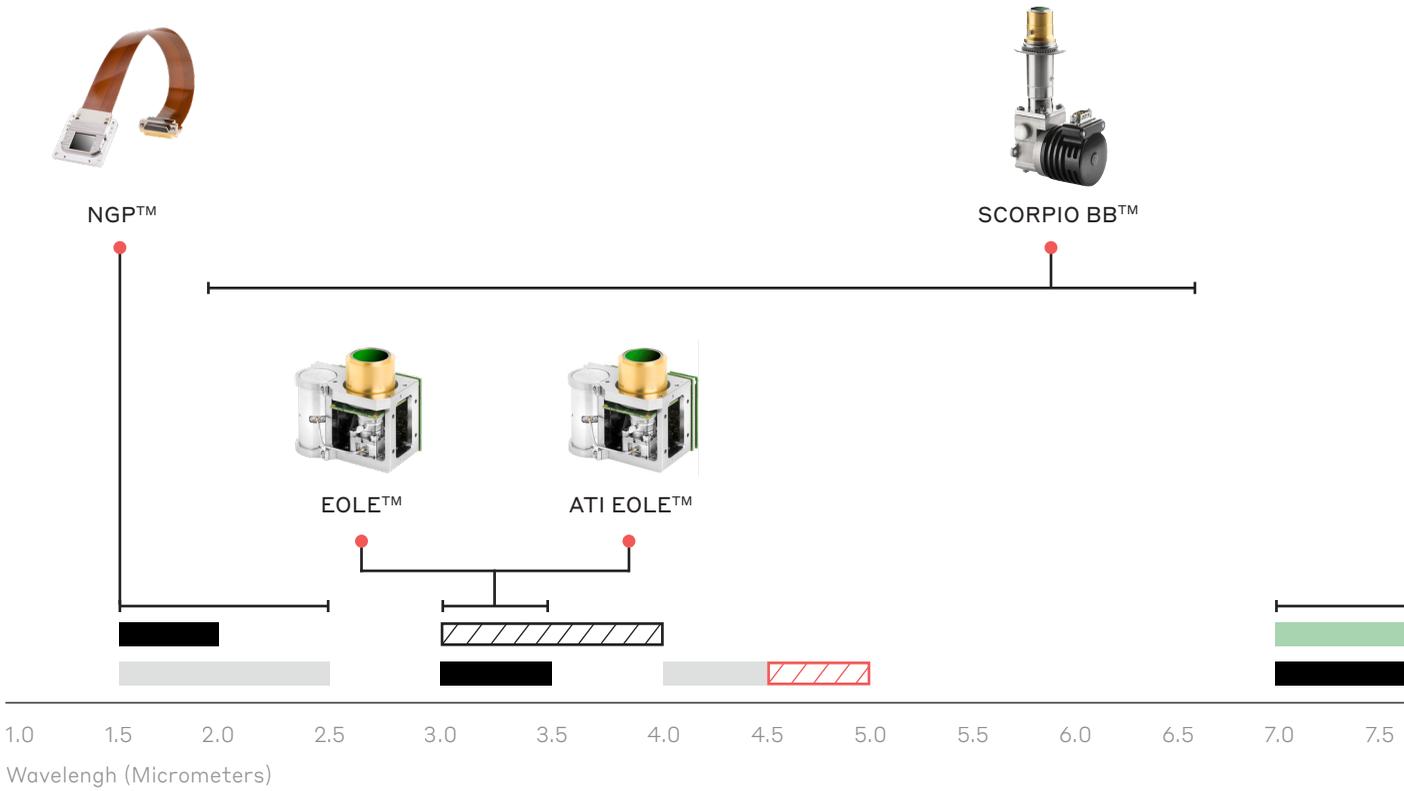


Cooled detectors: delivering superior performance for inspections and complying with new legislation (corrective activities)

Microbolometer detectors: space-saving, cost-effective solutions for meeting monitoring needs (24/7) (preventive activities)

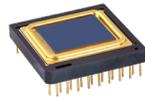
LYNRED infrared sensors
bring your thermal systems to life

MAIN LYNRED PRODUCT RANGE

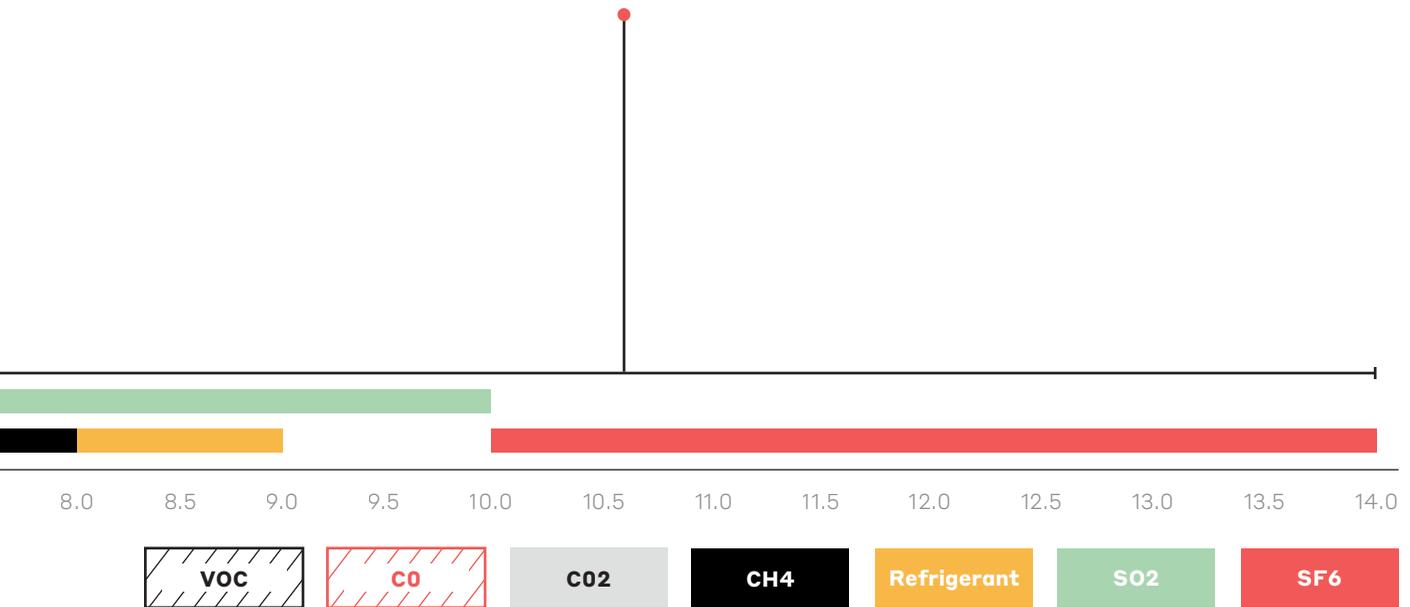


	PRODUCT	TECHNO	FORMAT & PIXEL PITCH
SPACE 	NGP™	Cooled	1024 x 1024, 15µm
MONITORING 	PICO640S BB 7-14™ NEW	Uncooled	640 x 480, 17µm
INSPECTION 	SCORPIO BB™	Cooled	640 x 512, 15µm
	EOLE™	Cooled	640 x 512, 15µm

Discover all our
OGI products



PICO640S BB 7-14™



SPECTRAL BAND	QUANTUM EFFICIENCY	POWER CONSUMPTION	DARK CURRENT	READOUT NOISE
0.8 - 2.5µm	80%	< 130 mW	< 0.5 fA	< 140 e-

SPECTRAL BAND	NETD	POWER CONSUMPTION	PHYSICAL CHARACTERISTICS	EMBEDDED ALGORITHMS
7 - 14µm	30 mK (30 Hz, F/1, 300 K)	< 130 mW	< 24.4 x 24.4 x 4.7 mm	N/A

SPECTRAL BAND	NETD	POWER CONSUMPTION	PHYSICAL CHARACTERISTICS	EMBEDDED ALGORITHMS
1.5 - 6µm	22 mK (293 K, 50% well fill, F/3, 100 Hz)	< 7.0 Wdc	∅ 46 x 71 mm 570 g	N/A
3.2 - 3.55µm	20 mK (300 K, 50% well fill, F/1.3, 25 Hz)	< 3.4 Wdc	56 x 77 x 72.5 mm 365 g	Available with ATI EOLE™ NEW



35 years

of experience

80%

exports

1,000

employees

15%

revenue
invested in R&D

LYNRED,
a merger between Sofradir and
ULIS, designs infrared sensors
to meet the needs in a wide range
of markets.

Our infrared sensor lineup covers the entire infrared spectrum from SWIR through to VLWIR. Our products are capable of satisfying the demanding requirements of a variety of industries.

They are reliable and rugged enough for defense applications, compact and powerful enough for surveillance applications, and stable and sensitive enough for thermography, industrial systems, firefighting and search & rescue applications.

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