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The Global Thermal Imaging and Sensing Market 2027-2037

https://marketpublishers.com/r/G91DC5A7DBB1EN.html
Date: October 2026
Pages: 320
Price: US$ 1,500.00 (Single User License)
ID: G91DC5A7DBB1EN

Abstracts

Thermal imaging and sensing has moved from a specialist defence and inspection technology to a component built into drones, vehicles, buildings and consumer devices. The change rests on the uncooled microbolometer. It needs no cryogenic cooling and is increasingly made in wafer-level vacuum packages on 8-inch lines, which keeps lowering the cost per pixel. Pixel pitch has shrunk from 17 µm to 12 µm and now to 10 µm and below. That lets smaller, cheaper lenses deliver the same resolution, and VGA is becoming the mainstream format.

Defence and drones dominate recent developments. The war in Ukraine has made the thermal camera a consumable, fitted to FPV strike drones, reconnaissance drones and the interceptors used against Shahed-type drones at night. Ukraine aims to build millions of drones in 2026, and the US War Department has asked industry for more than 300,000. Western suppliers are adding capacity: Lynred is expanding production for the drone market, Exosens plans to triple thermal camera output, and Leonardo DRS has signed a 50,000-unit thermal camera contract. Security of supply is now a policy issue. Chinese makers such as Raytron, HIKMICRO and Guide Infrared ship most of the world’s uncooled cores at much lower prices, while export controls and sanctions push Western and Chinese supply chains further apart.

Automotive is the next large civilian opportunity. The US FMVSS 127 rule requires automatic emergency braking that works for pedestrians in darkness. That favours thermal cameras alongside visible cameras and radar, although the rule’s timing is under review. Teledyne FLIR, Magna, AdaSky, Owl Autonomous Imaging and Lynred are developing automotive-grade cores and plans to cut their cost. Below the imaging tier, thermopile and pyroelectric sensors are spreading into smart buildings, smartphones, wearables and appliances. Low-resolution arrays such as Melexis’s

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MLX90642 allow people counting and presence detection without identifying anyone. Industrial demand comes from predictive maintenance, process control, and methane leak detection with optical gas imaging as emissions rules tighten.

Up to 2037, the market will be shaped by several trends:

pixel pitch shrinking towards 8 µm and below;

wafer-level optics and chalcogenide glass replacing costly germanium;

AI processing on the camera itself;

new detector approaches, including CMOS-compatible bolometers and quantum-dot SWIR sensors.

Chinese export restrictions on germanium and gallium add materials risk. Defence will remain the largest single source of demand, but automotive, drones and smart sensing will broaden the customer base. The contest between Chinese scale and Western trusted supply will decide who wins that growth.

Thermal imaging and sensing is entering its fastest period of change since uncooled microbolometers went commercial. Drone warfare, night-time pedestrian safety rules for vehicles, smart-building sensing and industrial emissions monitoring are turning infrared detection from a niche capability into a high-volume component market. The Global Thermal Imaging and Sensing Market 2027-2037 covers the whole value chain, from detector physics and materials to cameras, modules and end systems. The report explains the technology in depth:

uncooled vanadium oxide and amorphous silicon microbolometers;

cooled MCT, InSb, T2SL and HOT detectors;

thermopile, pyroelectric and emerging CMOS-compatible sensors;

SWIR imaging with InGaAs and quantum dots.

It sets out the roadmaps for pixel pitch, resolution, wafer-level packaging and infrared

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optics, including the shift from germanium to chalcogenide glass and wafer-level lenses.

Each end market is analysed in detail. Defence and security covers soldier systems, weapon sights, vehicles and the rapid growth of thermal payloads for FPV, reconnaissance and interceptor drones. Automotive covers night vision, pedestrian automatic emergency braking under FMVSS 127, and in-cabin sensing. The report also covers industrial thermography and optical gas imaging, firefighting, medical screening, smart buildings, and consumer and mobile devices.

Forecasts for 2025-2037 are broken down by:

- technology (uncooled, cooled and non-imaging detectors);
- application;
- resolution;
- region.

They are given in revenue and in units, with average selling prices and low, base and high scenarios. The report also analyses the forces reshaping competition. These include China’s dominance of uncooled volume production, the gap in core prices between Western and Chinese suppliers, export controls and sanctions, and restrictions on germanium and gallium. It examines the race to build trusted Western supply for drones and defence. Market share analysis, a technology roadmap to 2037 and strategic recommendations support investment, sourcing and product planning.

Report contents

- Executive summary: key findings, forecasts by segment, application and region, and the outlook for the market.
- Introduction, scope, definitions and forecasting method.
- Infrared physics and thermal detection fundamentals: spectral bands, figures of merit and detection principles.
- Thermal detector technologies: comparison of uncooled, cooled and non-

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imaging detectors.

Uncooled microbolometer technology: vanadium oxide versus amorphous silicon, pixel-pitch roadmap, wafer-level vacuum packaging and readout circuits.

Cooled infrared and adjacent SWIR imaging: MCT, InSb, T2SL, HOT detectors, cryocoolers, InGaAs and quantum-dot SWIR.

Optics, materials and electronics: germanium, chalcogenide glass, wafer-level optics, metasurfaces, image processing and AI on the camera.

Defence, security and drone markets: soldier and vehicle systems, counter-drone systems, FPV and interceptor payloads, and perimeter security.

Automotive and mobility: night vision, FMVSS 127 and pedestrian automatic emergency braking, ADAS sensor fusion, in-cabin sensing and the cost-down roadmap.

Industrial, consumer, medical, building and other markets: thermography, optical gas imaging, firefighting, smartphones, wearables, presence sensing and fever screening.

Market forecasts 2025-2037: revenue, units and average selling prices by technology, application, resolution and region, with scenarios.

Supply chain, geopolitics and regulation: export controls, sanctions, critical materials and building trusted supply.

Competitive landscape, technology roadmap and outlook: market shares, strategic positioning and recommendations.

49 company profiles. Companies profiled include AdaSky, AIM Infrarot-Module, BAE Systems, Calumino, constellr, Dahua Technology, DJI, Excelitas Technologies, Exosens, Fluke, Foresight Autonomous, Heimann Sensor, HIKMICRO, Hydrosat, InfraTec, JonDeTech, L3Harris Technologies, Leonardo DRS, LightPath Technologies, Lynred, Magna International, Melexis, Meridian Innovation, Mitsubishi Electric, Murata Manufacturing, Nippon Ceramic (Nicera), Obsidian Sensors and more....

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Each company profile covers the company’s background, products and technology, recent developments from 2024 to 2026, financial information where publicly available, competitive positioning, and Future Markets’ assessment of its prospects in the thermal imaging and sensing market.

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