

WINTERGREEN RESEARCH, INC.

**Worldwide Nanotechnology Mid IR Sensor Market Shares,
Strategies, and Forecasts, 2009 to 2015**

Mid IR Sensor Markets Set to Grow Rapidly



Picture by Susie Eustis

MOUNTAINS OF OPPORTUNITY

**WinterGreen Research, Inc.
Lexington, Massachusetts**

www.wintergreenresearch.com

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CHECK OUT THESE KEY TOPICS

MID IR SENSORS

MID-INFRARED FIBER OPTIC SENSOR

INTERBAND CASCADE (IC) LASERS

CARBON DIOXIDE SENSORS

COMFORT SENSORS

CONTROL SENSORS

ENERGY SENSORS

RESPIRATORY SENSORS

LASER ABSORPTION SPECTROSCOPY

TRACE GAS MONITORING

CAVITY RING-DOWN

MID IR EXHALED BREATH SENSORS

MID IR WEAPONS SENSORS

MID IR SENSORS EXPLOSIVES DETECTION

MID IR SENSORS BOMB DISPOSAL

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Mid IR Sensors Increase Resolution

Semiconductor lasers
Mid-infrared lasers
Interband cascade lasers –
Quantum wells –
Type-II active regions
Carbon dioxide
Building comfort sensors
Building control sensor
Energy control sensor

Building ventilation sensor
Organically modified sol-gels
In situ chemical sensor
Silver halide fibers
Nitrobenzene
Parathion

OPPORTUNITY ABOUNDS

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**Worldwide Mid IR Sensor Market Shares, Strategies, Forecasts,
2009-2015**

LEXINGTON, Massachusetts (July 16, 2009) – WinterGreen Research announces that it has a new study on Worldwide nanotechnology mid IR sensor markets. Mid IR sensors are poised to achieve significant growth as sensors become less expensive to manufacture and are smaller and portable. The ability to measure chemicals and light sources as heat is anticipated to drive market growth at a rapid pace. The study is titled Worldwide Mid IR Sensor Market Shares, Market Strategies, and Market Forecasts, 2009-2015.

Force protection addresses asymmetric threats worldwide. Military mid IR sensors are used to watch over forces worldwide. Mid IR sensors are used in long range systems, base and perimeter security imaging, vehicle vision and man-portable sensors.

Homeland security, military communications, infrared countermeasures, chemical warfare agent detection, explosives detection, medical diagnostics, industrial process controls, remote gas leak detection, pollution monitoring, and real-time combustion controls are uses for the mid IR sensors.

Mid-infrared (IR) laser sensors are able to measure change in device condition, chemistry, or temperature. The ability to measure change remotely, at an affordable price, has never been possible before. The coincident elaboration of the Internet availability on wireless devices and worldwide is creating demand for remote connectivity to sensing devices.

Infrared is a portion of the electro-magnetic spectrum that is not visible by the human eye because its wavelength is too long. Unlike visible light, infrared radiation (or heat) is emitted directly by all objects above absolute zero in temperature. The mid IR spectrum goes from 3-12 m.

The military is the only significant user of commercial mid IR sensors in 2009. The military uses mid IR sensor devices to predict whether there is enemy fire aimed at and coming toward a particular target. Firing of a rocket emits heat that is immediately detectable, long before the firing is visible via light. The mid IR sensor is able to provide early warning of a rocket or missile firing, detecting the initial flash from a large distance or underwater.

Target Acquisition Minefield Detection System (ASTAMIDS) is the latest weapon in the fight against improvised explosive devices (IED). It will provide a Unit of Action (UA) asset that can be used in Tactical Operations in day or night to detect and locate surface obstacles and recently buried minefields. ASTAMIDS is currently being tested in the MQ-8B Fire Scout unmanned aerial vehicle.

Turnkey mid-infrared laser sensor systems are based on technology that goes from 3-12 m. Others have a more narrow definition of this market. This 3 to 12 m definition is used because it captures the shift from bench type laser sensor systems to portable units that emit digital signals from remote locations. New systems open a broad opportunity for sensors based on core semiconductor Quantum Cascade and Interband Cascade laser technology. Laser systems are available in both multimode and single mode DFB versions.

Applications include process monitoring, chemical sensing, medical diagnostics and infrared counter measures. The initial markets are for military use of detection of enemy fire from a distance and night vision sensors. Commercial markets are evolving. Improved sensor detection and lower prices are meaning that commercial markets are opening up.

Markets for mid IR sensors at \$70.2 million in 2008 are anticipated to reach \$2.5 billion by 2015, growing in response to demand for remote devices that are network configurable and accessible. Lithium-ion batteries used in cell phones and PCs, are used in mid IR remote devices, giving them a long life and effectiveness that supplements manpower.

Mid IR Sensor Companies Profiled

Mid IR Sensor Market Leaders

**FLIR Systems
Hamamatsu
Li-Cor
M Squared Lasers Ltd
Maxion
Power Technology
Cascade Technologies
SenseAir
Sofrdir
Structured Materials Industries
Daylight Solutions**

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Mid IR Sensor Market Participants

Mid IR Sensor Company Profiles

AdTech Optics

Agiltron

Akers Biosciences

Consensus Business Group

Direct Vapor Technologies

Infrared Fiber Systems IFS

JonDeTech AB

Infrared Semiconductor Lasers

Mirthe

Nanophase Technologies (Nasdaq: NANX)

NovaWave Technologies

Opto Solutions

Power Technology Distributor of Sanyo Laser Diode Products

Sanyo

Texas Instruments

Tyco

Vaisala

VIASPACE

Viaspace Subsidiary Direct Methanol Fuel Cell Corporation (DMFCC)

Viaspace Subsidiary — Ionfinity LLC

Worldwide Mid IR Sensor Market Shares, Strategies, and Forecasts, 2009-2015

REPORT METHODOLOGY

THIS IS THE 408RD REPORT IN A SERIES OF MARKET RESEARCH REPORTS THAT PROVIDE FORECASTS IN COMMUNICATIONS, TELECOMMUNICATIONS, THE INTERNET, COMPUTER, SOFTWARE, TELEPHONE EQUIPMENT, HEALTH EQUIPMENT, AND ENERGY. THE PROJECT LEADERS TAKE DIRECT RESPONSIBILITY FOR WRITING AND PREPARING EACH REPORT. THEY HAVE SIGNIFICANT EXPERIENCE PREPARING INDUSTRY STUDIES. FORECASTS ARE BASED ON PRIMARY RESEARCH AND PROPRIETARY DATA BASES. FORECASTS REFLECT ANALYSIS OF THE MARKET TRENDS IN THE SEGMENT SOROF EACH MARKET PARTICIPANT IN THE SEGMENT. INSTALLED BASE ANALYSIS AND UNIT ANALYSIS IS BASED ON INTERVIEWS AND AN INFORMATION SEARCH. MARKET SHARE ANALYSIS INCLUDES CONVERSATIONS WITH KEY CUSTOMERS OF PRODUCTS, INDUSTRY SEGMENT LEADERS, MARKETING DIRECTORS, DISTRIBUTORS, LEADING MARKET PARTICIPANTS, OPINION LEADERS, AND COMPANIES SEEKING TO DEVELOP MEASURABLE MARKET SHARE. OVER 200 IN DEPTH INTERVIEWS ARE CONDUCTED FOR EACH REPORT WITH A BROAD RANGE OF KEY PARTICIPANTS AND INDUSTRY LEADERS IN THE MARKET SEGMENT. WE ESTABLISH ACCURATE MARKET FORECASTS BASED ON ECONOMIC AND MARKET CONDITIONS AS A BASE. USE INPUT/OUTPUT RATIOS, FLOW CHARTS, AND OTHER ECONOMIC METHODS TO QUANTIFY DATA. USE IN-HOUSE ANALYSTS WHO MEET STRINGENT QUALITY STANDARDS. INTERVIEWING KEY INDUSTRY PARTICIPANTS, EXPERTS AND END-USERS IS A CENTRAL PART OF THE STUDY. OUR RESEARCH INCLUDES ACCESS TO LARGE PROPRIETARY DATABASES. LITERATURE SEARCH INCLUDES ANALYSIS OF TRADE PUBLICATIONS, GOVERNMENT REPORTS, AND CORPORATE LITERATURE.

FINDINGS AND CONCLUSIONS OF THIS REPORT ARE BASED ON INFORMATION GATHERED FROM INDUSTRY SOURCES, INCLUDING MANUFACTURERS, DISTRIBUTORS, PARTNERS, OPINION LEADERS, AND USERS. INTERVIEW DATA WAS COMBINED WITH INFORMATION GATHERED THROUGH AN EXTENSIVE REVIEW OF INTERNET AND PRINTED SOURCES SUCH AS TRADE PUBLICATIONS, TRADE ASSOCIATIONS, COMPANY LITERATURE, AND ONLINE DATABASES. THE PROJECTIONS CONTAINED IN THIS REPORT ARE CHECKED FROM TOP DOWN AND BOTTOM UP ANALYSIS TO BE SURE THERE IS CONGRUENCE FROM THAT PERSPECTIVE.

THE BASE YEAR FOR ANALYSIS AND PROJECTION IS 2008. WITH 2008 AND SEVERAL YEARS PRIOR TO THAT AS A BASELINE, MARKET PROJECTIONS WERE DEVELOPED FOR 2009 THROUGH 2015. THESE PROJECTIONS ARE BASED ON A COMBINATION OF A CONSENSUS AMONG THE PRIMARY CONTACTS COMBINED WITH UNDERSTANDING OF THE KEY MARKET DRIVERS AND THEIR IMPACT FROM A HISTORICAL AND ANALYTICAL PERSPECTIVE. THE ANALYTICAL METHODOLOGIES USED TO GENERATE THE MARKET ESTIMATES ARE BASED ON PENETRATION ANALYSES, SIMILAR MARKET ANALYSES, AND DELTA CALCULATIONS TO SUPPLEMENT INDEPENDENT AND DEPENDENT VARIABLE ANALYSIS.

YOU MUST HAVE THIS STUDY

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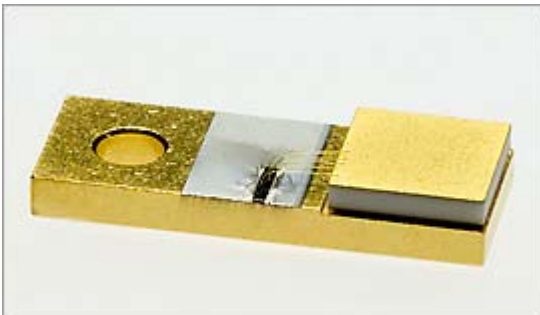


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ABOUT THE COMPANY

WINTERGREEN RESEARCH, RESEARCH STRATEGY IDENTIFIES MARKET TRENDS THROUGH READING MARKET MATERIALS AND INTERVIEWING OPINION LEADERS. **WINTERGREEN RESEARCH** TEAM WORKS TO GATHER PRIMARY INFORMATION FROM COMPANY INTERVIEWS, INDUSTRY MATERIALS, AND COMPANY DOCUMENTS TO WRITE MARKET RESEARCH STUDIES FROM AN INDEPENDENT PERSPECTIVE. THE ABILITY, TO THINK ABOUT MARKET TRENDS IS ENHANCED BY DOING IT OVER AND OVER FOR MANY DIFFERENT MARKETS. THAT IS WHAT **WINTERGREEN RESEARCH** IS ALL ABOUT: READING AND THINKING IS AN ESSENTIAL ASPECT OF COMPETITIVE ANALYSIS. TALKING TO OPINION LEADERS IS AN ESSENTIAL ASPECT OF PRODUCING GOOD, RELIABLE, INDEPENDENT DATA.

BY READING THE ELECTRONIC EQUIVALENT OF 40 FEET OF PAPER, **WINTERGREEN RESEARCH** SENIOR ANALYSTS CAN LEARN A LOT MORE ABOUT MARKETS. IDENTIFICATION OF MARKET TRENDS IS A HIGH PRIORITY AT **WINTERGREEN RESEARCH**. AS WITH THE VALUE PROPOSITION FOR COMPETITIVE ANALYSIS COMING FROM GETTING PRIMARY INPUT FROM A RANGE OF INDUSTRY PARTICIPANTS AND OBSERVERS.

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SUSAN EUSTIS, PRESIDENT, CO-FOUNDER OF WINTERGREEN RESEARCH, HAS DONE RESEARCH IN COMMUNICATIONS AND COMPUTER MARKETS AND APPLICATIONS. SHE HOLDS SEVERAL PATENTS IN MICROCOMPUTING AND PARALLEL PROCESSING. SHE HAS THE ORIGINAL PATENTS IN ELECTRONIC VOTING MACHINES. SHE HAS NEW PATENT APPLICATIONS IN FORMAT VARYING, MULTIPROCESSING, AND ELECTRONIC VOTING. SHE IS THE AUTHOR OF RECENT STUDIES OF THE SERVICES ORIENTED ARCHITECTURE, CONTENT MANAGEMENT, MID SIZE BUSINESS MIDDLEWARE, WORLDWIDE ENERGY MARKETS, SOLAR UTILITY MARKETS, SOLAR TECHNOLOGY MARKETS, THIN FILM BATTERY MARKETS, WEBCAM MARKETS, REGIONAL BELL OPERATING COMPANIES' MARKETING STRATEGIES, INTERNET EQUIPMENT, BIOMETRICS, A STUDY OF INTERNET EQUIPMENT, WORLDWIDE TELECOMMUNICATIONS EQUIPMENT, TOP TEN TELECOMMUNICATIONS, DIGITAL LOOP CARRIER, WEB HOSTING, WEB SERVICES, NANOTECHNOLOGY, AND APPLICATION INTEGRATION MARKETS. MS. EUSTIS IS A GRADUATE OF BARNARD COLLEGE.

