Automotive Infrared Night Vision System Research Report, 2019-2020

June 2020

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STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES

- To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- To help company to succeed in a competitive market, and

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

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Abstract

Automotive Infrared Night Vision Research: Infrared Thermal Imaging May Handle Extreme Cases Well
Infrared radiation consists of electromagnetic waves in the wavelength region from 0.75 μm to 1,000 μm, lying between visible light and microwave light. The corresponding energy ranges from 0.1eV to 1.0eV, within which all the physicochemical effects can be used for infrared detection. A myriad of detectors have been developed, which can be divided into cooled detectors and uncooled detectors by the operating temperature.

Cadillac equipped its sedans with night vision systems early in 2000, being the world's first to pioneer such system. Mercedes-Benz, BMW, Audi, etc. followed suit. By 2013, a dozen OEMs had installed night vision systems on their top-of-the-range models but having sold not so well to this day due to the costliness of the night vision system.

4,609 new passenger cars carrying night vision systems were sold in China in 2019, an annualized spurt of 65.6% thanks to the sales growth of Cadillac XT5, Cadillac XT6 and Hongqi H7, according to ResearchInChina.

Now, there is growing concern about safety issues amid strides in ADAS and autonomous vehicle. A controversy arises in the industry particularly after a fatality in Uber's self-driving road test, about whether infrared night vision can be used for autonomous driving to prevent accidents like Uber's incident. Infrared night vision system may be an important option for addressing the safety concern of self-driving in critical situations.

Veoneer is a typical trailblazer that has spawned infrared night vision systems in the world, and its products have experienced four generations. Its 4th-Gen night vision system, expected in June 2020, will have improved field of view and detection distances, reduction in size, weight and cost featuring enhanced algorithms for pedestrian, animal and vehicle detection as well as supporting night time automatic emergency braking (AEB) solutions.

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Boson-based thermal sensing technology from FLIR Systems has been adopted by Veoneer for its L4 autonomous vehicle production contract, planned for 2021 with a “top global automaker”. Veoneer’s system will include multiple thermal sensing cameras that provide both narrow and wide field-of-view capabilities to enhance the safety of self-driving vehicles, and that help detect and classify a broad range of common roadway objects and are especially adept at detecting people and other living things.

Comparison of Veoneer’s Automotive Infrared Night Vision Products

Products	NV1	NV2	NV3	NV4
Detector	Uncooled vanadium oxide (VOx)			
Pixel	324x256	336x256	336x256	320x256 and 640x512
Element spacing (μm)	38	17	17	12
Field of view (°)	36 ° x27 °	24 ° x18 °	24 ° x18 °	50 ° x39 °
Pedestrian recognition system	N/A	Available	Available	Available
Dimensions (mm)	57x56x71	60x86x82	60x86x82	35x40x47

Source: IRay

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Hongqi H7 is provided with an advanced active night vision (ANV) system, which uses the infrared transmitter on the headlights and the camera on the front windshield to simultaneously monitor the area ahead of the vehicle, so that the driver can get clear road conditions at any time.

The near infrared (NIR) night vision system exploited by Hongqi H7 is worth thousands of yuan. Only far infrared thermal imaging technology can see the distance beyond 300 meters.

FLIR has been sparing no effort in the availability of infrared thermal imaging technology in automobiles. In August 2019, FLIR announced its next-generation thermal vision Automotive Development Kit (ADK?) featuring the high-resolution FLIR Boson? thermal camera core with a resolution of 640 × 512 for the development of self-driving cars.

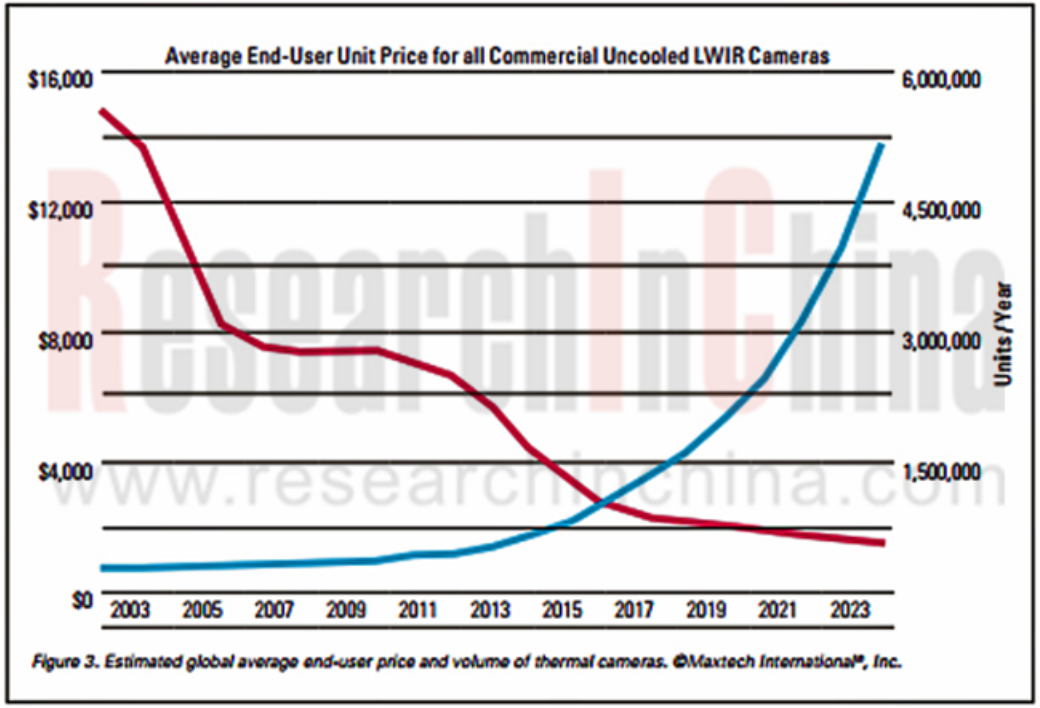

Figure 3. Estimated global average end-user price and volume of thermal cameras. ©Maxtech International®, Inc.

Source: Maxtech

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Uncooled infrared imagers and detector technology remain hot in research to date In August 2019, IRay Technology released a 10-μm 1280 × 1024 uncooled infrared focal plane detector. Maxtech predicts that the unit price of uncooled thermal imaging cameras will be below $2,000 after 2021, and the sales will outnumber 3 million units.

Still, infrared cameras are too expensive for automotive use. Israel-based ADASKY, China's Dali Technology, Guide Infrared and North Guangwei Technology are working on the development and mass production of low-cost infrared thermal imagers.

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