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Global Automotive Sensors Market with Special Focus on MEMS Sensors

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Abstracts

Automotive Sensors are vital components of automotive electronic systems, as modern vehicles rely on these electronic systems to make sure vehicles meet efficiency and security standards as well as environmental regulations. Driven by government regulations of safety and emissions, introduction of high-end options in modern vehicles by major automobile manufacturers and consumer demand for safety, comfort, infotainment applications and fuel efficiency, automotive electronics content per vehicle is on the rise. As the electronics content is increasing in automobiles, the number of automotive sensors used in vehicles is also increasing.

Primarily, the government regulations in North America, Europe, Japan, China and South Korea, driving demand for automobile safety features that ranges from passive to integrated active and passive safety systems. These developments are driving increased demand for applications such as tire pressure monitoring, electronic stability control, occupant detection and advanced driver assistant systems. Also, the number of electronic components in engine management, fuel efficiency, occupant comfort & convenience applications and infotainment systems are increasing. In addition, the use of networking in automotive applications continues to increase as various subsystems communicate within vehicle and with the external devices and networks. Driven by these advancements in automotive industry, the global market for automotive electronics, estimated at US$191.3 billion in 2013, is further projected to reach US$314.4 billion1 by 2020, thereby maintaining a CAGR of 7.3% between 2012 and 2020.

Overall, the major driving forces for increased demand for automotive sensors in vehicles include regulatory mandates for improving fuel economy and stringent emission standards as well as requirements for advanced safety systems. The growth is

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also attributed by consumer demand for safety & security, comfort & convenience features and the growth of hybrid and electric vehicles which is creating enormous opportunities for new types of sensors in automobile industry. Automotive Sensors market worldwide, standing at US$16.2 billion in 2012, estimated to be US$17.4 billion in 2013 and forecast at US$18.8 billion in 2014, is further projected to reach US$30.3 billion by 2020, thereby posting a CAGR Of 8.2% between 2012 and 2020. Estimated to be US$2.6 billion in 2013, demand for Automotive MEMS Sensors globally is projected to reach US$4.7 billion by 2020.

Automotive sensor product segments analyzed in this study include position sensors, pressure sensors, speed sensors, oxygen sensors, accelerometers, rollover sensors, yaw rate sensors, temperature sensors, mass airflow sensors and other automotive sensors. Automotive sensors market is also analyzed by automotive end-use application area including powertrain, chassis, safety & security, body, communication & navigation and other automotive applications. Further, this report also focuses on automotive MEMS sensors market analyzed by product segments including MEMS pressure sensors, MEMS accelerometers, MEMS gyroscopes, MEMS flow sensors and other MEMS sensors; and by end-use applications comprising powertrain, chassis, safety & security and other applications.

The report reviews, analyses and projects the automotive sensors market for global and the regional markets including North America, Europe, Japan, Asia and Rest of World. The regional markets further analyzed for 14 independent countries across North America – The United States, Canada and Mexico; Europe – France, Germany, Italy, Spain and The United Kingdom; Japan; Asia – China, India and South Korea; Rest of World – Brazil and Turkey.

This 448 page global market report includes 206 charts (includes a data table and graphical representation for each chart), supported with meaningful and easy to understand graphical presentation, of market numbers. The statistical tables represent the data for the global market value in US$ by geographic region, product segment and end-use application. This report profiles 49 key global players and 97 major players across North America – 39; Europe – 35; Japan – 16; Asia – 5 and Rest of World - 2. The research also provides the listing of the companies engaged in manufacturing and supply of automotive sensors. The global list of companies covers addresses, contact numbers and the website addresses of 200 companies.

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About

Automotive Sensors Defined

The avant-garde automobile of today comprises a complex combination of electronics and computerized systems that facilitate its smooth and trouble-free functioning, in addition to ensuring its eco-friendliness. To this end, sensors play a crucial role in ensuring that the electronic control systems (ECUs) in a vehicle function perfectly without any glitches. Sensors can be defined as devices that enable in transforming or transducing physical quantities such as pressure or acceleration, also known as measurands, into electrical output signals that act as inputs for control systems.

These electronic devices are utilized for measuring physical and chemical quantities of substances and converting the same into electronic signals for the ECU to read. Sensors are very much essential in automobiles for collecting data from various electromechanical devices and transmitting the same to the ECU for facilitating vehicle control, driver safety, comfort and information and emission control. Virtually all the modern automotive systems, such as fuel supply, engine cooling, lubrication, exhaust, air conditioning, ignition and steering and suspension function on the basis of sensors, and the vehicles of today incorporate a gamut of microcontroller-based ECUs, thereby enhancing the significance of sensors. A few of the primary specifications of sensors include precision, resolution, sensitivity and repeatability.

The functioning of different sensors is based on various principles that include electromagnetism, electro-optics and piezoelectricity, and have also been characterized as MEMS or micro-electromechanical systems, with their range of applications comprising automotive electronic stability control, lane departure warning and blind spot detection systems, to name a few. MEMS and micromachining have turned out to be significant developments in the field of automotive sensor technology.

ESC to the Rescue

The global automotive industry has been grappling with the crucial issues of environmental obligations and safety requirements for some time now. Also known as electronic stability program (ESP) or dynamic stability control (DSC), electronic stability control (ESC) is a computer-based technology used for enhancing the safety of a vehicle's stability through the detection and reduction of loss of traction or skidding. Upon detecting loss of steering control, ESC automatically applies the brakes in to

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enable steering the vehicle in the direction intended by the driver. Brake application to individual wheels is automatic, as in the case of the outer front wheel in offsetting oversteering or the inner rear wheel in offsetting understeering. A few ESC systems can also cut down engine power till the time vehicle control is regained. While ESC lacks in enhancing the cornering performance of a vehicle, it can operate for reducing loss of control.

The United States mandated the use of ESC in all passenger vehicles under 10,000 pounds (4536 kg) in a phased manner, which started with 55% of 2009 models (effective 1 September 2008), 75% of 2010 models, 95% of 2011 models, and all 2012 models. Forming part of an all-inclusive proposal to reduce the severe danger of rollover crashes, in addition to the hazard of death and serious injury due to such accidents, this rule establishes Federal Motor Vehicle Safety Standard (FMVSS) No. 126 in requiring electronic stability control (ESC) systems on passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 Kg (10,000 pounds) or less. The US National Highway Traffic Safety Administration (NHTSA) has estimated that deployment of ESC would help in reducing passenger car single-vehicle crashes by 34% and sport utility vehicle (SUV) single-vehicle crashes by 59%, with rollover crashes being reduced by an even greater proportion. As a consequence, on an annual basis, between 5,000 and 9,000 lives could be saved and between 155,000 and 240,000 injuries prevented in all categories of accidents if all light vehicles on the roads in the US are fitted with ESC systems.

The European Parliament has also initiated moves aimed at expediting the implementation of ESC systems, reaching a consensus on March 10, 2009 that mandated the use of these systems in all new vehicles. From November 2011, this regulation requires all new passenger car and commercial vehicle models registered in the European Union to be equipped with electronic stability program (ESP) active safety systems, with application for all new vehicles set for November 2014. Research on accidents has concluded that skidding is the primary cause of fatalities in accidents, and use of ESP can help in preventing about 80% of all crashes resulting from skidding.

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