

INERTIAL NAVIGATION SYSTEM MARKET

By Product (Marine grade, Navigation grade, Tactical grade, and Commercial grade), **By Technology** (Mechanical, Fiber optic gyro (FOG), Ring laser gyro (RLG), Micro-Electro-Mechanical Systems (MEMS), Hemispherical Resonator gyro (HRG), and Vibrating gyro), **By Application** (Air, Land, and Naval Platforms)

-FORECAST & ANALYSIS TO 2014 - 2019



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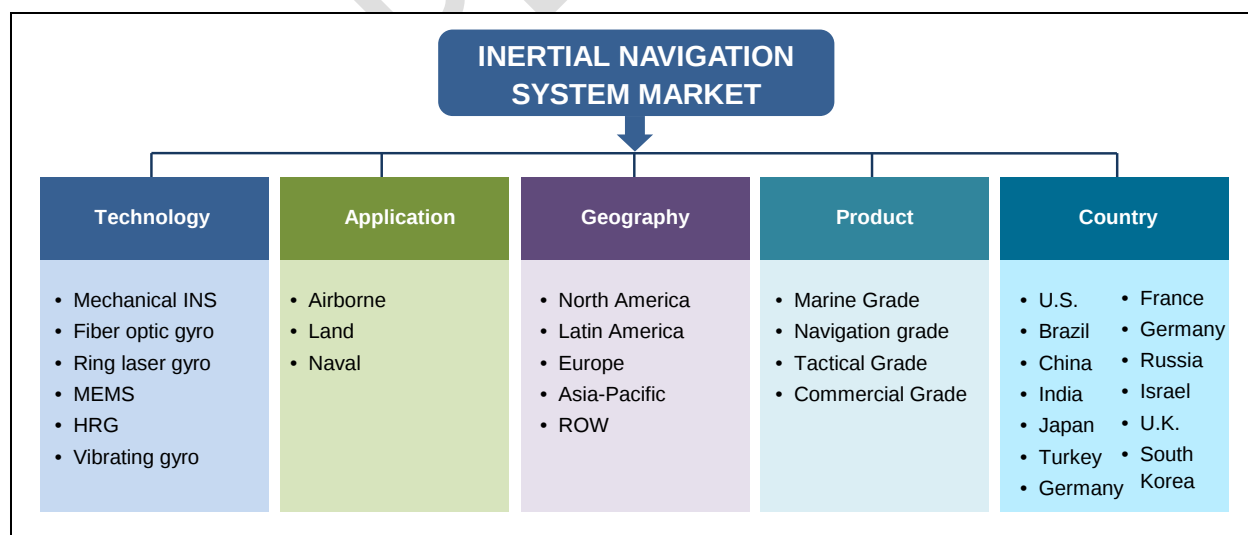
1 INTRODUCTION

1.1 REPORT DESCRIPTION

The report deals with the inertial navigation system which uses a self-contained navigation technique to track the position and orientation of an object relative to a known starting point, orientation and velocity. Inertial navigation is used in a wide range of applications, including the navigation of aircraft, tactical and strategic missiles, spacecraft, submarines and ships. This report presents a complete analysis of inertial navigation system market for the next five years. It analyzes the factors that drive the market, challenges faced by the industry, and the factors that restrain growth. It segments the inertial navigation system market by application, technology and geography. An in depth analysis and forecast for the period from 2013 to 2018 by each segment has been provided in the report. It also presents a complete overview of the technology road map, covering the latest technological advancement in the field of inertial navigation. Analysis of major competitors including their recent financials, key developments, and complete overview is also covered in the report.

1.2 MARKETS COVERED

The chart below shows the various markets covered in the study.



Sources: MarketsandMarkets Analysis

2 EXECUTIVE SUMMARY

Inertial navigation system uses a self-contained navigation technique to track the position and orientation of an object relative to a known starting point, orientation and velocity. Inertial navigation is used in a wide range of applications, including the navigation of aircraft, tactical and strategic missiles, spacecraft, submarines, and ships.

A wide range of forces such as increasing demand for accuracy in navigation, growing aerospace and defense market and high availability of small and robust components will pave the way for INS market to rise significantly in future. Recent advance in micro electromechanical system (MEMS) technology have made it possible to manufacture small, light and low cost inertial navigation systems. The increased use of satellite navigation for commercial application will also fuel growth of the INS market in future. System initialization and error propagation are some of the challenges which are faced by the INS market.

The INS market size is estimated to be XX in 2014 and is projected to register a CAGR of XX to reach XX billion by 2019. Though North America and Europe have the largest market for INS in terms of commercial aviation, defense aviation, military, and naval applications, lot of programs have been launched in Asia-Pacific and Middle East region for INS development. Rockwell Collins, Northrop Grumman, Sagem, Systron Donner Inertial and Thales are some of the INS providers that capture the INS market size in different segment.

The market will observe a tremendous growth in future across countries in Asia-Pacific and the Middle East region. The increase in defense budget of the countries like China, India and South Korea will fuel the growth of the INS market in the defense segment.

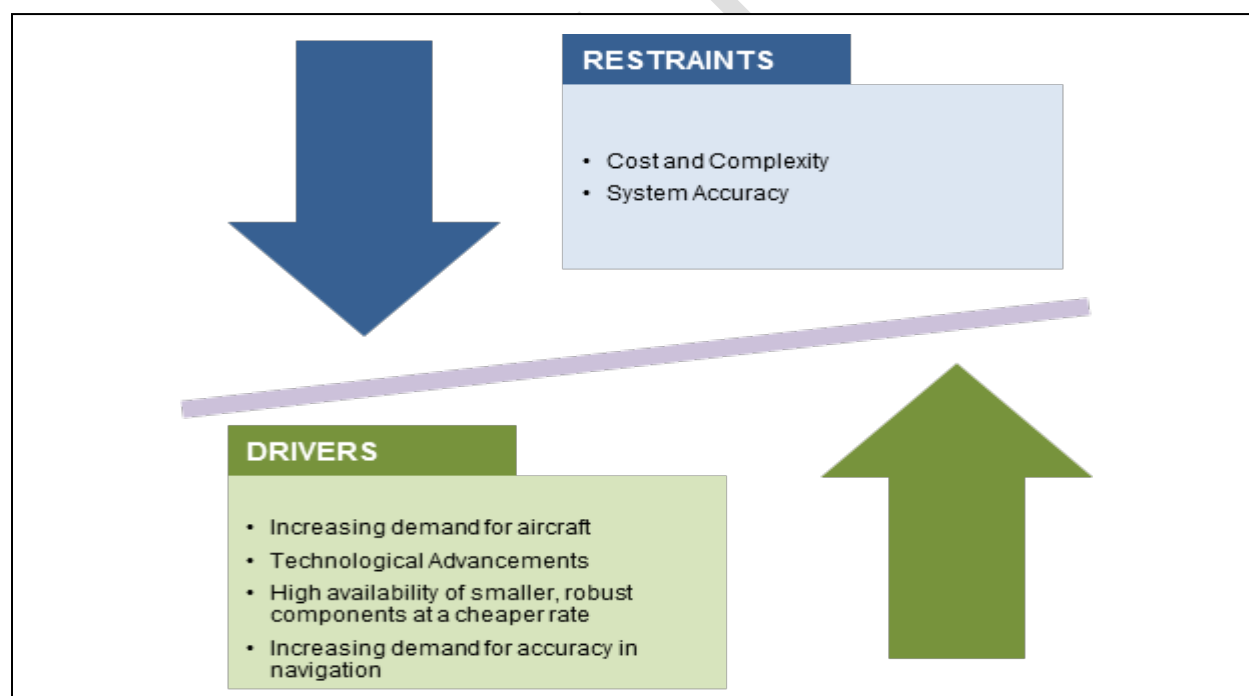
Many countries are investing heavily to strengthen their naval defense. There are tremendous growth opportunities for the INS market in unmanned vehicles. The increasing demand of unmanned aerial vehicle (UAV), remotely operated underwater vehicle (ROV), and autonomous underwater vehicle (AUV) will lead to a significant rise in the INS market in future.

3 MARKET OVERVIEW

3.1 MARKET DEFINITION

This report discusses the market opportunities present in the inertial navigation system market. This market has huge potential due to its various applications in the commercial and defense segments. INS is used in aircraft, spacecraft, submarines, guided missiles, smart bombs, helicopters, and unmanned vehicles. The major advantage of INS is that it does not require any external references for calculating the position, velocity, direction of movement, and orientation of the moving object. It can operate in extreme environmental conditions including tunnels, heavy buildings, underwater and even in places where limited or no GPS access is present.

3.2 MARKET DYNAMICS



Source: MarketsandMarkets Analysis

4 PRODUCT MARKET

The inertial navigation system market is expected to be XX billion in 2014 and is expected to reach XX billion by 2019. The reason for this increase in the INS market is due to increasing demand for aircraft in the commercial and defense sector. In the commercial market, the increase in passenger travel demand in regions like India, China, the Middle East, and other Asia-Pacific region countries has led to growth in aircraft market. Since INS is among the necessities in every aircraft for efficient navigation; its market is growing with the aircraft market. The demand for INS is also increasing since advancement in technology and high availability of low cost MEMS gyros have made it cheaper, compact, and affordable. The integration of GPS and INS has become much more prominent in aviation.

Inertial navigation system can be segmented on the basis of their performance characteristics. These performance characteristics depend upon the accuracy of the accelerometer and gyroscope, used in INS. Typically an INS consists of three accelerometers and three gyroscopes combined together in an Inertial Measurement Unit (IMU). The accelerometer measures the linear acceleration and gyroscope measures the angular velocity which is expressed in degree per second ($^{\circ}/\text{sec}$). INS uses the measurement provided by these devices for tracking the position and orientation of an object relative to a known starting point, orientation and velocity.

TABLE 1

**INS MARKET VALUE, BY MARINE GRADE,
2014-2019 (\$MILLION)**

Particular	2014	2015	2016	2017	2018	2019	CAGR % (2014-2020)
Marine Grade	XX	XX	XX	XX	XX	XX	XX

Source: MarketsandMarkets Analysis

5 TECHNOLOGY MARKET

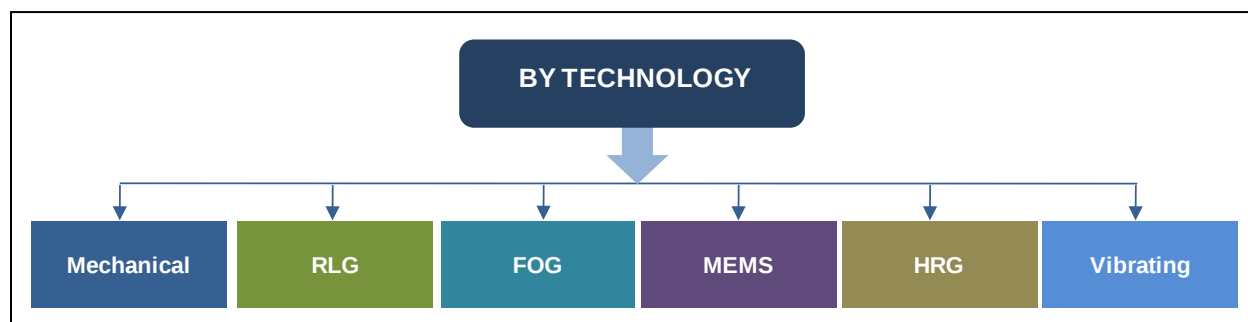
5.1 INTRODUCTION

The inertial navigation system technology market is segmented according to the type of gyroscope used in these systems. For many navigation applications, meeting the performance and accuracy is important but reduced cost and size is also very important. The major technologies that have enabled advances in military, aircraft, and marine capabilities are ring laser gyro (RLG), fiber optic gyro (FOG), and micro-electro-mechanical system (MEMS). Coriolis vibrating gyro and hemispherical resonator gyro are emerging technologies in the field of inertial navigation. Advancement in MEMS such as their improved capabilities at a much reduced cost have made them eligible for replacing FOG in many applications. The inertial navigation systems that are developed today for various applications are aided with global positioning systems (GPS) or with other integrated technology like global satellite navigation systems (GNSS) for providing efficient navigation solutions.

Gimballed and Strapdown are the two primary types of inertial navigation systems. Gimballed systems have a platform in the device that is mounted on gimbals. This device has two or more mechanical gyroscopes that keep this platform level. In case of strapdown systems, all their sensors are mounted on a platform that changes orientation like the plane. Instead of mechanical gyros to hold it level, it has three more accurate gyros that sense the orientation of the system. The gimballed system senses the orientation of the platform to get the aircraft's attitude, the strapdown systems have three gyroscopes that sense the rate of roll, pitch, and yaw. It integrates them to get the orientation, and then calculates the acceleration in each of the same axes as the gimballed system. Strapdown systems have fewer moving parts, and hence it is more reliable and simpler than other systems. Strapdown systems are used in most applications today.

FIGURE 1

INERTIAL NAVIGATION SYSTEM SEGMENTATION, BY TECHNOLOGY



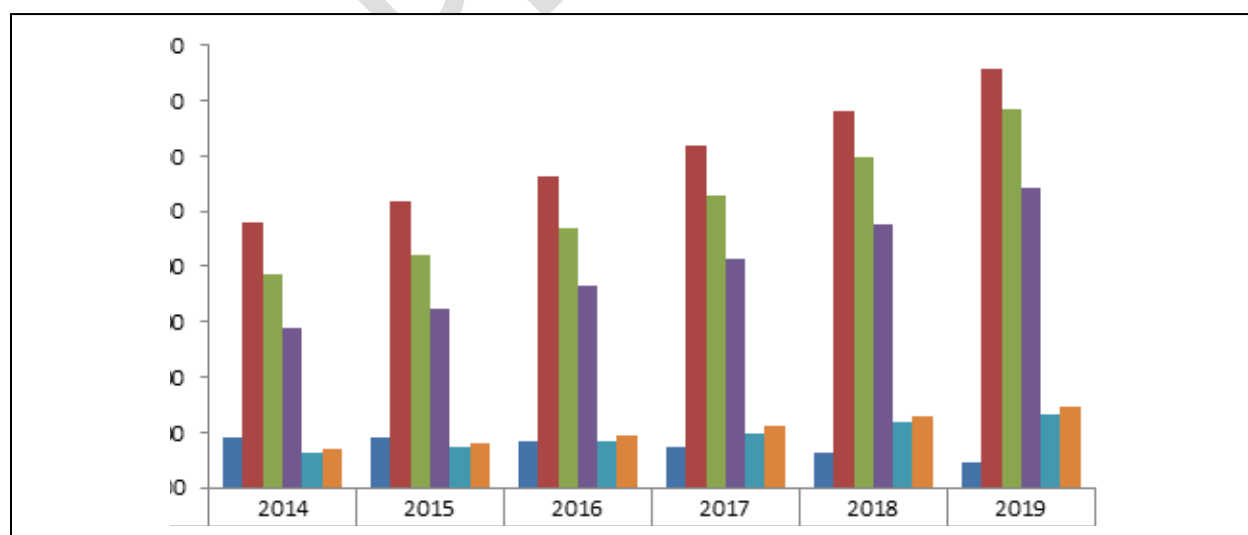
Sources: MarketsandMarkets Analysis

The above figure illustrates the segmentation of INS with respect to technology.

5.2 INS MARKET, BY TECHNOLOGY

FIGURE 2

INS MARKET VALUE, BY TECHNOLOGY, 2014-2019 (\$MILLION)



Source: MarketsandMarkets Analysis

The above figure illustrates the INS market value by technology for the period from 2014 to 2019. Mechanical gyro technology is estimated at XX in 2014 and is expected to decline to XX by 2019. Ring laser gyro (RLG) technology is estimated at XX in 2014 and is expected to reach XX million by 2019. Fiber optic gyro (FOG) technology is estimated at XX in 2014 and is expected to reach XX by 2019. Micro electro mechanical system technology is estimated at XX in 2014 and is expected to reach XX by 2019. Hemispherical resonator gyro (HRG) technology is estimated at XX in 2014 and is expected to reach XX by 2019. Vibrating gyro technology is estimated at XX in 2014 and is expected to reach XX by 2019. It is estimated that HRG and vibrating gyro technology will have the maximum CAGR of XX and XX respectively. This is due to recent advancements in these technologies along with improving performance and cost reduction.

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