**CARAS IYK-OPARAODU**

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**ASSIGNMENT**

Kindly read up on the history and evolution of unmanned vehicles and robotic and autonomous systems.

**ANSWER**

An unmanned vehicle or unscrewed vehicle is a vehicle without a person on board. They can either be remote controlled or remote guided vehicles, or they can be autonomous vehicles which are capable of sensing their environment and navigating on their own.

There has been a great deal about unmanned vehicles over the last decade of the war on terror in Iraq and Afghanistan. The members of the Association for Unmanned Vehicles Systems International (AUVSI) are quick to point out that the term drone was originally coined to refer to pilotless aircraft used for target practice by the military. Unmanned Vehicles have longer operational duration and require less maintenance. These aircraft can be deployed in a variety of terrains and may not require prepared runways. Military experiences with Autonomous vehicles (AVs) have consistently demonstrated their value in a wide range of missions, and anticipated developments of AVs hold promise for increasingly significant roles in future naval operations. Post military spends will be the next industry flowing with high end opportunities in the coming years and expanding the AV market by a wide angle.

Some reasons for the rising investments in unmanned vehicles:

. Rising vehicle production: As per the Organization of Motor Vehicle Manufacturers (OICA) statistics, 70.5 million passenger vehicles were manufactured in 2018. Furthermore, shifting demand towards autonomous vehicles will boost growth of the electric vehicles market. Gyroscope sensors are being integrated in automotive systems to capture angular velocity sensing, angle sensing, and control mechanisms. Increasing automotive safety regulations have mandated automotive manufacturers to build autonomous vehicles equipped with gyroscopes sensors. Rising production in vehicles simultaneously increases scope for the gyroscope market.

. Emergence of Unmanned Aerial Vehicles (UAVs): Integration of gyroscopes improve drone flight capabilities. Globally, the military and defense sectors are using UAVs equipped with gyroscope sensors to locate enemies at cross-border regions. Drone manufacturers are using gyroscope sensors for building functionalities to measure angular velocity and linear movement. As per the American Safety and Security Department, currently about 48 countries are using 150 types of military drone systems. At least 28 countries have armed drones within their military including the U.S., Israel, the U.K., Iraq, Iran, Turkey and others. Increasing role of artificial intelligence (AI) in drones are creating trustworthy technology for the drone investors, leading to positive growth of the gyroscope market.

Unmanned vehicles that’s drones are used in situations where manned flight is considered too risky or difficult. They provide troops with a 24-hour eye in the sky, seven days a week. Each aircraft can stay aloft for up to 17hours at a time, loitering over an area and sending back real time imagery of activities on the ground and on air. Unmanned Vehicles also increase the combat effectiveness of soldiers in the battlefield.

In addition to emergency response, drones have proved useful during times of natural disaster. In the aftermath of hurricanes and earthquakes, UAVs have been used to assess damage, locate victims and deliver aid. In certain circumstances they help to prevent disasters altogether. In 2017 drones were used to help restore power to areas damaged by Hurricane Harvey, as well as survey damage to flooded areas and assist in search and rescue efforts. Demand for this type of technology is growing. In 2019, the department of defense made an official request for drones that can be deployed during a natural disaster to distribute food and water. The military UAV market is estimated to be valued at US$ 12.2 billion23 and predicted to grow to US$ 13 billion over the next six years.24Alongside signs of increased efforts at domestic production, there has been a rapid increase in the number of States acquiring armed UAV capabilities through import and leasing arrangements. China has exported armed UAVs to at least nine States, including to a number of States that have had their requests for US-made systems blocked previously by the US Congress.25 In addition to the United Arab Emirates, Egypt, Iraq, Jordan, Nigeria and Pakistan have all deployed Chinese-made systems and, in 2017, Saudi Arabia announced a US$ 65 billion agreement to begin in-country production of the CH-4 armed UAV; China having previously made similar arrangements with Myanmar and Pakistan. Chinese systems are generally cheaper up front than their US counterparts, and it has been reported that these have been exported under less restrictive export controls. In April 2018, the United States published a new export policy for unmanned aerial systems with the objective of increasing trade opportunities for US companies and to “avoid ceding export opportunities to competitors where such self-imposed restrictions are unwarranted”. Those armed UAVs capable of carrying a payload of 500kg for more than 300km are still covered by a ‘presumption of denial’ principle under the Missile Technology Control Regime (MTCR) but the United States has proposed amending the MTCR’s UAV classification so that it is more permissive. Changes in US export policies and the continued growth in Chinese armed UAV production are likely to result in an increase in armed UAV transfers in the future. The continued competition between these leading exporters should not only be seen in economic terms but also in terms of competing security priorities. Where one State may refuse an export license due to national security concerns, another may step in. Given that such developments may be a loss in economic terms, these exporters may undertake efforts to encourage allied States to import their systems and to review the national security criteria of their own export controls. As more States domestically produce armed UAVs, the dynamics of this UAV market will become increasingly complex and those States looking to import systems will have an increasing number of sources of supply. As levels of automation, informatics, robotics, sensors and mobile devices increase, it is particularly important to remember that human skills will still remain essential for many tasks, making the marriage between humans and machines critical to success. Human factors will therefore play an essential role in the future of technological advances, where people and technology are being integrated more closely and more intensively than ever before. Consequently, it is essential that we fully understand how to best design and operationalize both human and technological functions.