



## AUTOMATED HIGHWAY SYSTEM –DRIVERLESS TECHNOLOGY

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### Abstract

An automated highway system (AHS) or Smart Road is a planned intellectual transportation system technology highway system through the use of automated vehicle be in command of technology. AHS will include control problems from the vehicle level to the highway network level. This planned to offer for driverless cars on particular rights of way. Automation can reduce accidents and congestion on highways by using computers to drive vehicles. It is most frequently touted by means of traffic relief as it would considerably trim down subsequent distances and headway and thus allowing additional cars to engage a given elongated road. It is a vehicle and road based system that can drive vehicle automatically. This is finished with the help of sensors that hand out as the vehicle's eyes and decisive lane site and the speed and spot of other vehicles. The perception of an Automated Highway has been exist in the region for a extended time. But it has not been until in recent times that the technology has turn out to be accessible to construct automated highways and vehicles. The AHS program is a broad international attempt to make available the foundation for, and changeover to the after that main presentation advance of the vehicle. considerable saving of energy through power management . It reduces direct human labor costs and expenses. The first vehicle in market with adaptive cruise control was introduced in 1997.

**Keywords:** intelligent transportation system, smart highways, automated vehicles, driverless technology, platoon, hybrid systems, features, applications.

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## 1. INTRODUCTION

### 1.1. General Analysis

#### WORKING

In solitary system, the roadway has magnetized stainless-steel spikes, driven single meter at a distance from its center. The car senses the spikes to determine its speed and trace the center of the lane. In addition, the spikes can have moreover magnetic north or magnetic south facing up. The roadway thus offers minute amounts of digital information relating interchanges, suggested speeds, etc. The cars have power steering and automatic speed controls, which are secured by a computer. The cars supervise themselves into platoons of eight to twenty-five cars. The platoons steer themselves a meter away from each other, so that air opposition is reduced. The distance between platoons is the conventional braking distance. If something goes mistaken, the highest number of damage cars should be one platoon.

### 1.2 Technology behind AHS

The automated highway system is termed as a new relationship between vehicle and the highway infrastructure or may also be defined as lane or set of

lanes where particularly equipped cars, trucks and buses could travel mutually under computer command. It is one feature of intelligent transportation systems (ITS) which will be applicable on computers, electronics, and control technology mainly developed for space program, defence to the advance of highways, aviation, vehicles and public transportation.

Automated highway systems merge computers, video camera, digital radio, magnetic sensors, and display technologies, forward-looking sensors. A multiplicity of combinations of these technologies are being useful in dissimilar pilot tests.

**Networked Computers :** To categorize the run of networks small computers would be installed in vehicles along the sides of roadways traffic. The organization would not rely on a central computer to align the run of all vehicles.

**Video cameras:** It senses hazardous obstacles and other vehicles from a suitable distance in advance before damage. It can also be used as an alternative of magnets to way lane limitations.

**Digital radio:** The main purpose of digital radio apparatus is to connect car with other vehicles,

surrounding area and with supervisory computers monitoring the roadway.

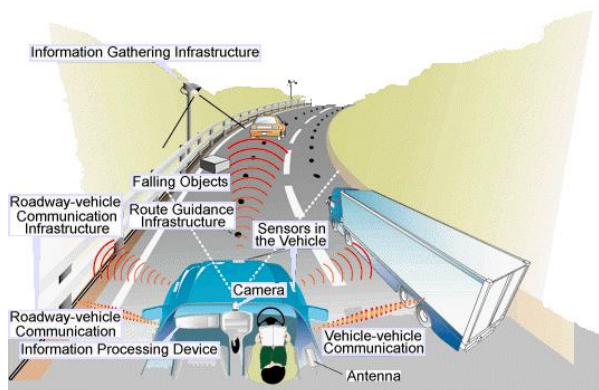
**Magnetic sensors:** Magnetic sensors are placed beside the highway lanes. Magnetic sensor consist of magnetometers which sense the magnets and automatically keep the cars in the center of the lane.

**Forward looking sensors:** Forward looking sensor would detect risky obstacles and other vehicles in advance with the help of radar or an infrared laser.

**Visual Displays:** It would offer the driver about the procedure of the vehicle.

### 1.3 Policy behind AHS

In 1991 congress approved one act known as ISTEA (Intermodal Surface Transportation Efficiency Act) has been a driving force behind the present developments in automated highway systems. ISTEA aims to progress the safety and efficiency of the alive transportation system. The act launched an plan to investigate, build up, test, and estimate highly developed electronic systems. From past 20 years the act had invested \$5billion of public money in development and transportation investigate . Features of ISTEA contain a broad program of fundamental and practical investigate on allowing technologies, over 70 working tests of technologies and services.



**Figure 1:** Automated highway system with AHS vehicle

### 1.5 Goals of AHS

1. Development of surface transportation effectiveness.
2. Achievement of national transportation security goals.
3. Safety and development of the natural atmosphere and communities affected by surface transportation.
4. Fulfill the desires of all users of surface transportation systems.
5. Progress of the Nation's ability to react to emergencies and natural disasters.

AHS is planned to cover the following features:-

1. **Affordability:** The AHS must be affordable and cost-effective to users and operators.
2. **User Desirability:** The AHS must be convenient, pleasing, and easy to use.
3. **Consistency with Surrounding Non-AHS Roadways:** AHS operation must combine with neighbouring linking non-automated traffic operations

and reliable with the sustained well-organized operation of those roadways.

**4. Dual-Mode Vehicle Instrumentation:** AHS-instrumented vehicles will be capable to work on regular roadways and use some of the AHS instrumentation for safer operation as well as accident prevention.

**5. Reliable, Modular System Technology:** The AHS must be extremely consistent and modular to accommodate progressing advances in technology.

**6. Evolvability:** The AHS will not be a standalone system and it will develop from and integrate with today's vehicle-highway system and other transportation services.

**7. Support for Various Vehicle Types:** The AHS will support all common vehicle types, including cars, buses, and trucks and others vehicles.

### 1.6 Vision of AHS

An well-organized surface transportation system is necessary for people. There is a strong demand for quality ground transportation in world. Even if there is major growth in heavy rail traffic, the automated highway system is expected to play a major role in meeting the Nation's surface transportation demand in the 21st century.

### 2. Benefits:

**1. Roadway capacity:** The number of vehicles per hour per lane can be significantly increased as traffic speeds are standardized and increased and headway distances are decreased .Hence, more vehicles can be accommodated on the highway.

**2. Safety:** Human errors reduces and 50 per improvement in safety issue than earlier.

**3. Mobility:** AHS increases mobility for people with disabilities for elders and less experienced drivers.

**4. Energy consumptions :** Fuel consumption and emissions can be reduced and hence, AHS can support future vehicle fuel design.

**5. Travel times and economic gains:** AHS restore free flow condition in urban areas from congested speed. Therefore, AHS frees up could be used for other purpose.

### CONCLUSIONS

1. The only advantage of using automation in mixed traffic is improved safety without the advantage of increased efficiency through platooning.
2. It may not be enough to justify investment though safety is an important improvement.
3. The cost per benefit ratio may be too low for government and consumers to make an investment, especially since the value of added safety is difficult to measure.
4. The driverless car technologies improves vehicles stability helps to minimize loss of control.

5. Driver less cars are designed to minimize accidents by addressing the main causes of collisions, driving error, distraction and lethargy.

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