Claims

1. A virtual radar system comprising:

a vehicle-based subsystem, said vehicle-based subsystem located in a vehicle, said vehicle-based subsystem comprising:

a GNSS receiver to generate a position location for said vehicle;

a vehicle subsystem processor in communication with said GNSS receiver;

a vehicle-based human interface subsystem comprising a display and a data input unit in communication with the vehicle subsystem processor; and

a vehicle-based network modem in communication with the vehicle subsystem processor;

a control station subsystem, said control station subsystem comprising:

a control station subsystem processor;

a control station subsystem-based human interface subsystem comprising a control system-based display and a control system-based data input unit, said control station subsystem-based human interface subsystem in communication with said control station subsystem processor; and

a control station subsystem network modem in communication with the control station subsystem processor; and

a cloud-based data subsystem comprising:

a cloud-based database for holding data comprising a plurality of locations of a plurality of vehicles;

a plurality of cloud transaction processors in communication with the cloud-based database; and

a cloud-based network modem in communication with the plurality of transaction processors, the control station subsystem network modem, and the vehicle-based network modem,

wherein said cloud transaction processors calculate the position of the vehicle, its trajectory, and the probability of there being a collision between the vehicle and another object and issues a warning to the vehicle and the control station subsystem in response thereto and wherein the control station subsystem provides other information to the vehicle.

2. The virtual radar system of claim 1 wherein both the vehicle-based subsystem and the control station subsystem further each comprise a cryptographic engine in communication between their respective network modem and their respective processor.

3. The virtual radar system of claim 1 wherein the cloud transaction processors comprise:

a position processing engine;

an AI engine;

a black box storage database;

a transient database in communication with the position processing engine and the AI engine; and

an AI database in communication with the position processing engine and the AI engine.

4. The virtual radar system of claim 2 wherein the AI engine comprises:

a path prediction engine;

a collision prediction engine; and

a machine learning engine.

5. The virtual radar system of claim 4 wherein the collision prediction engine issues a collision alert in response to predicted path data from the path prediction engine.

6. A virtual radar system vehicle-based subsystem comprising:

a CPU;

a modem comprising a first GNSS receiver in communication with the CPU;

and

an audio codec in communication with the CPU,

wherein the first GNSS receiver provides position data to the CPU, and

wherein the CPU transmits the GNSS position data to a cloud transaction server for collision prediction, and

wherein the vehicle-based subsystem is in communication with a control station subsystem, said control station subsystem comprising:

a control station subsystem processor;

a control station subsystem-based human interface subsystem comprising a control system-based display and a control system-based data input unit, said control station subsystem-based human interface subsystem in communication with said control station subsystem processor; and

a control station subsystem network modem in communication with the control station subsystem processor and in communication with the audio codec of the vehicle to permit other information from the control station human interface subsystem and control station subsystem processor to vehicle based subsystem.

7. The virtual radar system vehicle-based subsystem of claim 6 further comprising a second GNSS receiver in communication with the CPU, the second GNSS receiver providing position data to the CPU.

8. The virtual radar vehicle-based subsystem of claim 7 wherein the CPU generates an error warning if the position data indicated by the first and second GNSS receivers differ by more than a predetermined amount.

9. The virtual radar system vehicle-based subsystem of claim 6 further comprising a Bluetooth modem in communication with the CPU.

10. The virtual radar system vehicle-based subsystem of claim 6 further comprising a plurality of vehicle system sensors and external sensors in communication with the CPU.

11. A method of operating a virtual radar system comprising a server, a plurality of vehicle-based subsystems, a control station subsystem in communication with the plurality of vehicle-based subsystems, and a cloud-based data subsystem comprising a plurality of databases in communication with the plurality of vehicle-based subsystems and the control station subsystem, the method comprising the steps of:

registering each of the vehicle-based subsystems with the cloud-based data subsystem;

creating a record for each of the plurality of the vehicle-based subsystems in one of the plurality of databases in the cloud-based data subsystem;

receiving, by the server, a respective position message from each of the plurality of vehicle-based subsystems and storing it in a position database in the cloud-based data subsystem;

receiving, by the server, a subsequent position message from each of the plurality of the vehicle-based subsystems and storing it in the position database in the cloud-based data subsystem;

calculating, by the server, a trajectory for each of the plurality of the vehicle-based subsystems;

calculating, by the server, the distance between each of the plurality of vehicle-based subsystems based on their respective trajectories;

issuing by the server, a collision warning to the control station subsystem and each of the vehicle-based subsystems whose trajectories will pass within a predetermined volume of space of each other at a specific point in time; and

issuing by the control station subsystem additional safety information or environmental information to each vehicle.

12. The method of operating the virtual radar system of claim 11 wherein the predetermined volume of space is determined by an AI engine in response to the positions of each of the vehicle-based subsystems.

13. The method of operating the virtual radar system of claim 11 further comprising the step of deregistering a vehicle-based subsystem that is no longer active.

14. The method of operating the virtual radar system of claim 13 further comprising the step of closing the record of the inactive vehicle-based subsystem.

15. The method of operating the virtual radar system of claim 13 further comprising the step of maintaining the record of the inactive vehicle-based subsystem in a black box database.

16. The method of claim 11, wherein the data transmitted from the control station subsystem comprises at least one of: collision warning, position updates, safety information, emergency conditions, weather information, and airport information.