WIRELESS COMMUNICATION PATENT SUMMARY 2021

Kim Rubin, Inventor and Patent Agent. 650 799-0059. xrubin@gmail.com

Docket No.	Application No.	Title	Status	Publication No.	Patent No.	Issue Date	Summary
502-P	61/637,588	VEHICLE-TO-VEHICLE ANTI-COLLISIONS SYSTEM					
502-02	13/557,711	TIME-SLOT-BASED SYSTEM AND METHOD OF INTER-VEHICLE COMMUNICATION	Issued	US-2013-0278443-A1	US 8,520,695 B1	27-Aug-13	Basic concept with message classes; message collisions and notification; short intermessage time gaps.
502-04	13/559,452	RISK MANAGEMENT IN A VEHICLE ANTI-COLLISION SYSTEM	Issued	US-2013-0278442-A1	US 8,860,564 B2	14-Oct-14	Each vehicle computes risk for the entire region and situation(s) within its technical scope, and transmits this risk to all vehicles. A primary distinction over prior art is that each vehicle computes the aggregate (or worst case) risk for all vehicles, and lets all vehicles know of this risk, as compared to responding to basic facts transmitted (location, speed, direction) by other vehicles and then computing only risk to itself. Another novelty is the idea that "risk" is a range, including no, low, and moderate risk, which suggests possible risk mitigation or behavior changes to other vehicles. Prior art focused on a single value, "imminent collision" and thus had a lower total benefit to other drivers in terms of lowering aggregate risk and generally improving safety for everyone. A benefit of this approach is that vehicles inherently "see around corners," because any vehicle that is able to determine a possible collision, such as a broadside in a blind intersection, then notifies all vehicles within communication range, even if itself would not be involved in the possible collision. This patent also discusses the message structure of including a variety of message types in each transmission, each message type including a specific sub-type-code and implied sub-message length. This structure provides for flexible and responsive data transmission in a highly compressed format for bandwidth and processing efficiency.
502-09	13/559,536	LANE MAPPING IN A VEHICLE-TO-VEHICLE COMMUNICATION SYSTEM	Issued	US-2013-0278443-A1	US 8,884,782 B2	11-Nov-14	• Lane map creation algorithms. • Data structures for lane maps. • Lane map sharing. • Lane map updating between vehicles. • Lane map updating due to road changes.
502-05	13/559,493	GENERATING A LOCATION IN A VEHICLE-TO-VEHICLE COMMUNICATION SYSTEM	Issued	US-2013-0282277-A1	US 8,935,094 B2	13-Jan-15	It is a particularly important patent in the portfolio as this is the one where dynamically and interactively generated "consensus" produces highly accurate relative locations between vehicles.
502-07	13/559,519	EXTRA-VEHICULAR ANTI-COLLISION SYSTEM	Issued	US-2013-0282267-A1	US 9,008,958	14-Apr-15	Gateways to other protocols, such as WiFi; validation of gateway inputs; cellphones receiving V2V safety data; phone app runs full-time in the background; app considers motion of phone (e.g. pedestrian walking); risk computation; risk reporting.
502-11C	13/936,326	OPERATIONAL EFFICIENCY IN A VEHICLE-TO-VEHICLE COMMUNICATION SYSTEM	Issued	US-2013-0293394-A1	US 9,031,089	12-May-15	The patent contains several useful ideas. One group deals with efficient coding and transmission of parking lot data, including handling "blocks" of parking spaces, encryption of parking data (so that subscriptions or memberships can be sold), including key vehicle shape information in a "parking lot" message type to aid in accurate computation for close-quarter parking, and lower broadcast rates in parking lots to both save power and permit many more vehicles to share a spectrum.
502-15	13/852,176	HYBRID PROTOCOL TRANSCEIVER FOR V2V COMMUNICATION	Issued	US-2013-0279491-A1	US 9,129,532	8-Sep-15	Hybrid CSMA and TDMA protocol.
502-14	13/852,153	VEHICLE-TO-VEHICLE SAFETY TRANSCEIVER USING TIME SLOTS	Issued	US-2013-0279392-A1	US 9,253,753	2-Feb-16	Time slots; messages classes; time slot selection; re-evaluation interval; probability in selection; responsive selection
502-16	13/852,200	DEVICE FOR SYNCHRONIZING A TIME BASE FOR V2V COMMUNICATION	Issued	US-2013-0279393-A1	US 9,300,423	29-Mar-16	Common time base using converged timing; priority regions; limited correction slew rate.
571-04	14/395,770	V2V SAFETY SYSTEM USING SELF-GENERATED LANE MAPS	Issued	US-2015-0077270 A1	US 9,305,462	5-Apr-16	• Lane map creation algorithms. • Data structures for lane maps — point store and lane records store • Lane map sharing. • Lane map updating between vehicles. • Lane map updating due to road changes.

571-03	14/395,764	V2V SAFETY SYSTEM USING CONSENSUS	Issued	US-2015-0146605 A1	US 9,355,561		31-May-16	Consensus set algorithms, generally; consensus used for location; power-level messages; power-level set by class; conssensus for elevation.
571-02	14/395,760	V2V SAFETY SYSTEM USING VEHICLE LOCATION AS VEHICLE IDENTIFICATION	Issued	US-2015-0081201 A1	US 9,449,515		20-Sep-16	• Vehicle ID is the vehicle location. • Hybrid TDMA and CSMA physical layer. • Location is coded by an offset from a geographical grid. • Elevation is coded as an offset from an elevation rulings table. • Proxying of non-equipped vehicles. • Proxy messages are essentially the same as non-proxy messages.
571-01	14/395,753	V2V SYSTEM WITH A HYBRID PHYSICAL LAYER	Issued	US 2015-0131637 A1	US 9,552,727		24-Jan-17	• Physical layer includes hybrid TDMA and CSMA. • Size of priority transmit zones varies by demand. • Three transmit zones: priority, non-priority, and emergency. • Physical layer includes hybrid TDMA and CSMA. • Transponders keep same, self-assigned time slot. • Interframe gap size varies by priority zone. • Messages are free of MAC and IP addresses. • Message validity is determined by triangulation of multiple receivers.
502-17	15/011,826	V2V TRANSPONDER	Issued		US 10,231,187		12-Mar-19	CON for Intelligent power and communications management when there are a large number of vehicles in proximity.
502-18	15/584,757	V2V SAFETY SYSTEM USING LEARNED SIGNAL TIMING	Issued	US-2017-0243485-A1	US 10,292,136		14-May-19	CON with more signal timing, sensors, data and recommendations. Submessages with length. Final, forward, and proxy bits. Multiple distance axes with location as a grid point offset. Asymetrical coding. Elevation.
502-13	13/633,657	ANTI-COLLISION SYSTEM AND METHOD USING MESSAGE FORMATS CONTAINING DISTANCES	Issued	US-2013-0278440-A1	US 8,922,391 B2		30-Dec-14	Protocol features: sub-messages; variable length; location on a road axis (v. N-S/E-W); use of geo-grid to shorten messages; risk values; elevation; multiple data data-compression techniques.
502-08	13/559,525	SECURE VEHICLE-TO-VEHICLE COMMUNICATION SYSTEM	Issued	US-2013-0279695-A1	US 8,995,662		31-Mar-15	• At least one potential buyer indicated that this technology was the most interesting; • this technology is independent of current standards and approaches; • Uses PKI for encrpytion and signing. • I cannot picture how a V2V safety communication system could be effective without assured information quality. • Hacking detection. • Warning messages. • Take photos of suspect source.
502-10	13/559,542	ROUTE GUIDANCE SYSTEM AND METHOD	Issued	US-2013-0282271-A1	US 9,105,189		11-Aug-15	Learns traffic light timing including location and phasing,considers traffic conditions between self and signal; provides recommendations for driver based on same; records and transmits street safety to constructe street and intersection safety profile; computes best lane for driver based on speed, safety or mileage,
502-19	16/351,089	RISK MANAGEMENT IN A VEHICLE-TO-VEHICLE SAFETY SYSTEM	Issued	US-2019-0342859-A1	US 10,631,269		6-Apr-20	Fowarding of risk messages. Published. Allowed
502-20	16/828,142	LANE DATA SHARING IN A VEHICLE-TO-VEHICLE SAFETY SYSTEM	Issued	US-2020-0229137-A1	US 11,172,467		9-Nov-21	Algorithm for sharing lane data.