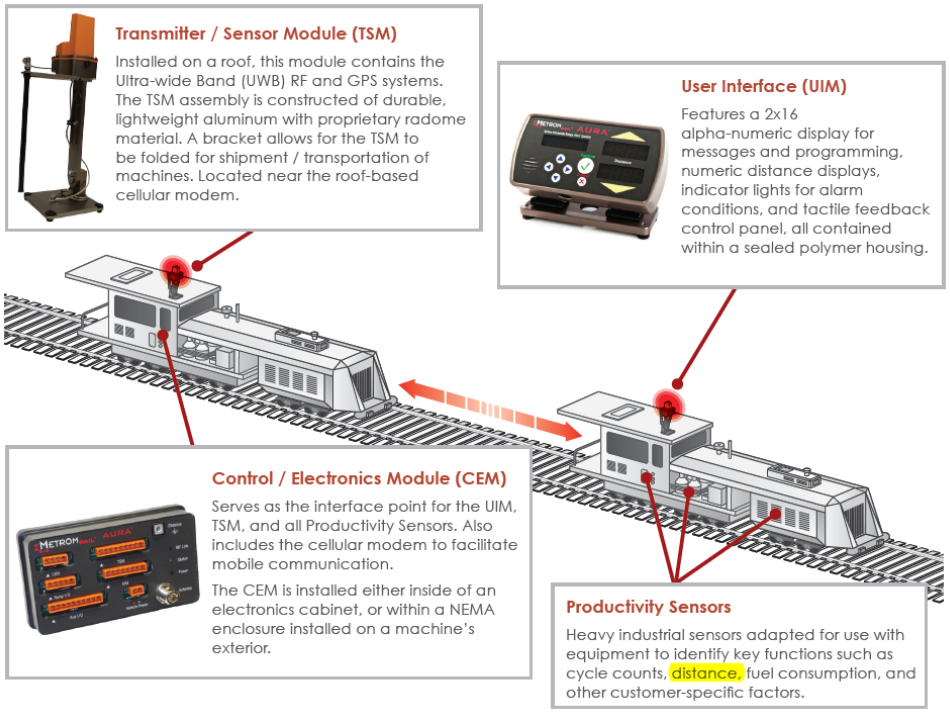
Claim Chart for Claims 1 & 7 of U.S. Patent No. 9,043,131

Claims 1 and 17	AURA Collision Avoidance System
1. A collision avoidance system	The AURA Maintenance of Way Utility (MU) combines the field-proven capabilities of the Metrom Rail Collision Avoidance System with a comprehensive productivity suite, providing customers with an industry-leading safety and efficiency platform. 

Claims 1 and 17	**AURA Collision Avoidance System**
1.A first vehicle mounted module mounted on a first rail vehicle, the first vehicle mounted module comprising: A first transponder sensor module operable to send and receive data wirelessly, the first transponder sensor module comprising a first radio communication unit and a first antenna;	 **Transmitter / Sensor Module (TSM)** Installed on a roof, this module contains the Ultra-wide Band (UWB) RF and GPS systems. The TSM assembly is constructed of durable, lightweight aluminum with proprietary radome material. A bracket allows for the TSM to be folded for shipment / transportation of machines. Located near the roof-based cellular modem.
a first control electronics module comprising a first processor in communication with at least the first transponder sensor module; and	 **Control / Electronics Module (CEM)** Serves as the interface point for the UIM, TSM, and all Productivity Sensors. Also includes the cellular modem to facilitate mobile communication. The CEM is installed either inside of an electronics cabinet, or within a NEMA enclosure installed on a machine's exterior.

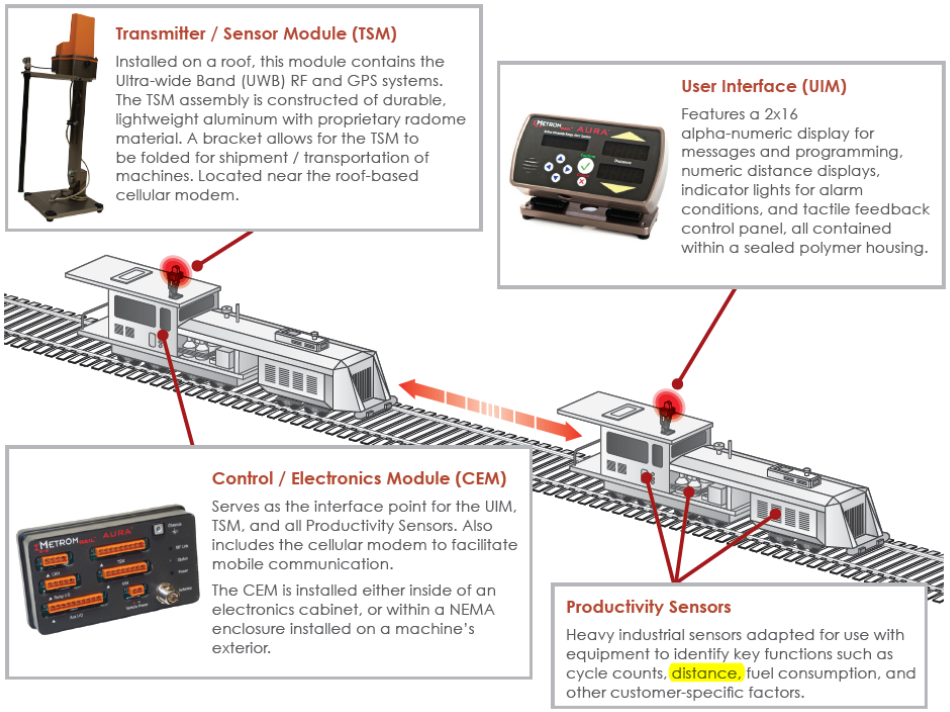
Claims 1 and 17	**AURA Collision Avoidance System**
a first user interface module including a first user inter face, the first user interface operable to provide rail vehicle information to a vehicle operator and to receive input from the vehicle operator;	 **User Interface (UIM)** Features a 2x16 alpha-numeric display for messages and programming, numeric distance displays, indicator lights for alarm conditions, and tactile feedback control panel, all contained within a sealed polymer housing.
a second vehicle mounted module mounted on a second rail vehicle, the second vehicle mounted module comprising: a second transponder sensor module operable to send and receive data wirelessly, the second transponder sensor module comprising a second radio communication unit and a second antenna;	 **Transmitter / Sensor Module (TSM)** Installed on a roof, this module contains the Ultra-wide Band (UWB) RF and GPS systems. The TSM assembly is constructed of durable, lightweight aluminum with proprietary radome material. A bracket allows for the TSM to be folded for shipment / transportation of machines. Located near the roof-based cellular modem.

Claims 1 and 17	**AURA Collision Avoidance System**
a second control electronics module comprising a second processor in communication with at least the second transponder sensor module; and	 **Control / Electronics Module (CEM)** Serves as the interface point for the UIM, TSM, and all Productivity Sensors. Also includes the cellular modem to facilitate mobile communication. The CEM is installed either inside of an electronics cabinet, or within a NEMA enclosure installed on a machine's exterior.
a second user interface module including a second user interface, the second user interface operable to provide rail vehicle information to the vehicle operator and to receive input from the vehicle operator;	 **User Interface (UIM)** Features a 2x16 alpha-numeric display for messages and programming, numeric distance displays, indicator lights for alarm conditions, and tactile feedback control panel, all contained within a sealed polymer housing.

Claims 1 and 17	AURA Collision Avoidance System
wherein: the first vehicle mounted module is operable to communicate with the second vehicle mounted module mounted on the second rail vehicle; and the first vehicle mounted module and the second vehicle mounted module are operable to apply a time of flight technique to determine a separation distance between the first rail vehicle and the second rail vehicle.	**Ultra-Wide Band RF (UWB)** • Allows the MU to provide accurate and reliable range measurements between equipment without being affected by the same multi-path distortion effects that limit traditional 900 Mhz or 2.4 Ghz systems. The AURA MU deploys advanced radio technology to provide the most accurate time-of-flight ranging system in the industry. The system offers the flexibility of operator-defined detection and alarm criteria, with integrated, expandable hardware options and the ability to function in all environments and terrain – even tunnels.
7. The collision avoidance system of claim 1, wherein: the first vehicle mounted module further comprises a first global positioning system unit, the global positioning system unit operable to receive information from one or more satellites to determine an absolute position of the first rail vehicle; and the first global positioning system unit is in communication	**Advanced GPS Technologies** • Utilized for speed acquisition for mode-based alerts and alarms. • Universal to all current GPS platforms, including GNSS, GONASS, QZSS, and SBAS technologies.

Claims 1 and 17	**AURA Collision Avoidance System**
with the first control electronics module.	

Claim Chart for Claims 1 & 7 of U.S. Patent No. 8,812,227

Claims 1 and 7	AURA Collision Avoidance System
1. A collision avoidance system	The AURA Maintenance of Way Utility (MU) combines the field-proven capabilities of the Metrom Rail Collision Avoidance System with a comprehensive productivity suite, providing customers with an industry-leading safety and efficiency platform. 

Claims 1 and 7	**AURA Collision Avoidance System**
one or more vehicle mounted modules, each vehicle mounted module mountable on a rail vehicle, each vehicle mounted module comprising: a transponder sensor module operable to send and receive data wirelessly, the transponder module comprising a first ultra wideband unit and a first antenna	 **Transmitter / Sensor Module (TSM)** Installed on a roof, this module contains the Ultra-wide Band (UWB) RF and GPS systems. The TSM assembly is constructed of durable, lightweight aluminum with proprietary radome material. A bracket allows for the TSM to be folded for shipment / transportation of machines. Located near the roof-based cellular modem.
a control electronics module comprising a processor in communication with at least the transponder sensor module unit; and	 **Control / Electronics Module (CEM)** Serves as the interface point for the UIM, TSM, and all Productivity Sensors. Also includes the cellular modem to facilitate mobile communication. The CEM is installed either inside of an electronics cabinet, or within a NEMA enclosure installed on a machine's exterior.

Claims 1 and 7	**AURA Collision Avoidance System**
a user interface module including a user interface, the user interface being operable to provide rail vehicle information to a vehicle operator and to receive input from the vehicle operator; and	 **User Interface (UIM)** Features a 2x16 alpha-numeric display for messages and programming, numeric distance displays, indicator lights for alarm conditions, and tactile feedback control panel, all contained within a sealed polymer housing.
wherein each vehicle mounted module is operable to communicate with at least one other vehicle mounted module mounted on at least one other rail vehicle, and wherein each vehicle mounted module is operable to apply a time of flight technique to determine a separation distance between the rail vehicles.	**Ultra-Wide Band RF (UWB)** • Allows the MU to provide accurate and reliable range measurements between equipment without being affected by the same multi-path distortion effects that limit traditional 900 Mhz or 2.4 Ghz systems. The AURA MU deploys advanced radio technology to provide the most accurate time-of-flight ranging system in the industry. The system offers the flexibility of operator-defined detection and alarm criteria, with integrated, expandable hardware options and the ability to function in all environments and terrain – even tunnels.

Claims 1 and 7	AURA Collision Avoidance System
7. The collision avoidance system of claim 1, wherein the first vehicle mounted module further comprises a global positioning system unit, the global positioning system unit operable to receive information from one or more satellites to determine an absolute position of the rail vehicle, wherein the global positioning system unit is in communication with the control electronics module.	**Advanced GPS Technologies** • Utilized for speed acquisition for mode-based alerts and alarms. • Universal to all current GPS platforms, including GNSS, GONASS, QZSS, and SBAS technologies.