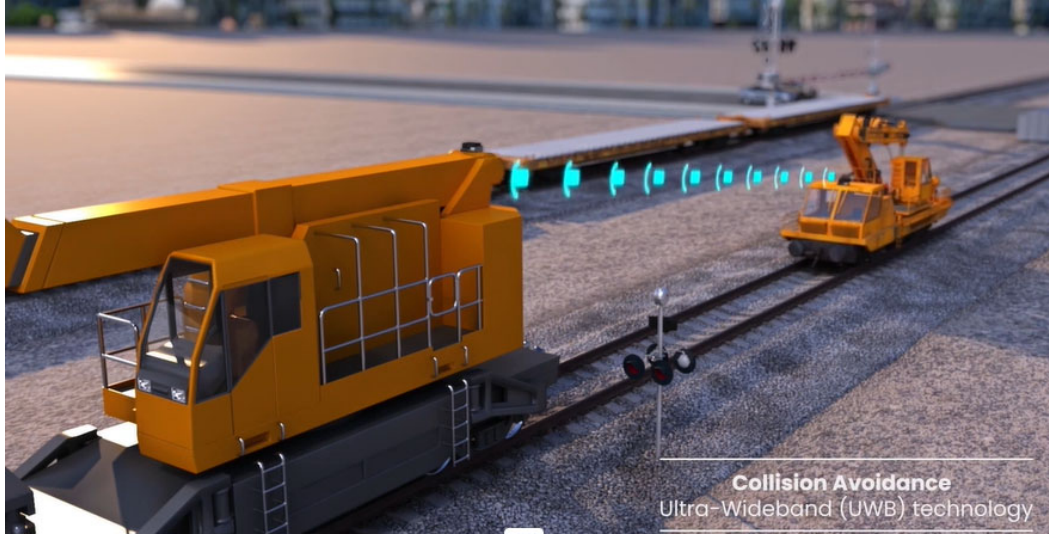
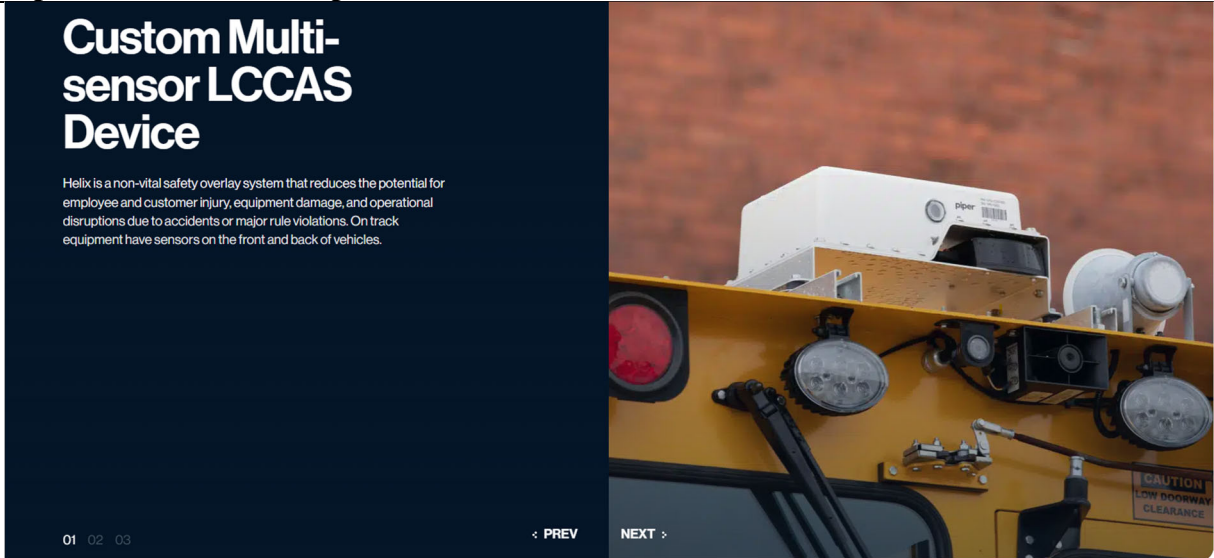


Claim Chart for Claim 1 of U.S. Patent No. 8,812,227

Claim 1, 227 Patent	Piper Helix Limits Compliance & Collision Avoidance
A collision avoidance system	The Helix system is a collision avoidance system  Collision Avoidance Ultra-Wideband (UWB) technology See https://www.pipernetworks.com/maintenance-of-way-safety/#brochure (last visited June 29, 2023).

Claim 1, 227 Patent	Piper Helix Limits Compliance & Collision Avoidance
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 first ultra wideband unit and a first antenna; a control electronics module comprising a processor in communication with at least the transponder sensor communication with at least the transponder sensor module unit; and	 See https://www.pipernetworks.com/maintenance-of-way-safety/#brochure (last visited June 29, 2023).

Claim 1, 227 Patent	Piper Helix Limits Compliance & Collision Avoidance
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 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	See https://www.pipernetworks.com/maintenance-of-way-safety/#brochure (last visited June 29, 2023).

Claim 1, 227 Patent	Piper Helix Limits Compliance & Collision Avoidance
	Work zones often include multiple MoW vehicles operating in close proximity to each other with bi-directional movements. It's imperative to monitor the front and rear of each of these vehicles to prevent collisions and damage. For this function Piper deploys its field-tested UWB solution. The Helix CPU uses its knowledge of which track the vehicle is localized to and communicates with other Helix-equipped vehicles on the same track using UWB in a localized fashion. The ranging data collected from the UWB sensors allows the Helix CPU to accurately track the distance between the two vehicles and warn both operators if they begin to encroach on their safety envelopes. Operators are able to view this proximity information through the in-cab display alerts that follow the rules for safe separation of vehicles in both work and travel modes. See https://www.pipernetworks.com/maintenance-of-way-safety/#general-info (last visited June 29, 2023).