

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIEMENS MOBILITY, INC., GROUND TRANSPORTATION SYSTEMS USA,
INC., HUMATICS CORP., and PIPER NETWORKS, INC.
Petitioners,

v.

METROM RAIL, LLC,
Patent Owner.

Case No. IPR2023-00468, -470
Patent Nos. 9,043,131 and 8,812,227

**DECLARATION OF KURT GUNTHER IN SUPPORT OF PATENT
OWNER**

Table of Contents

I.	Introduction.....	3
II.	Summary of my Qualifications.....	3
III.	Foundation for Industry Observations.....	4
IV.	Metrom Rail Aura Maintenance of Way (AURA CAS)	5
	A. Transmitter Sensor Module (TSM).....	8
	B. User Interface Module (UIM)	9
	C. Control Electronics Module (CEM).....	11
V.	Skepticism in the Industry	12
	A. Industry skepticism regarding using radio for collision avoidance generally	13
	B. Industry skepticism regarding using UWB radio for collision avoidance specifically	14
VI.	Piper Networks Access to AURA CAS.....	15
VII.	Other Failed Industry Attempts	17

I. INTRODUCTION

1. I, Kurt Gunther, of Woodstock, Illinois, am Director of Engineering at Metrom Rail, LLC.

2. I am a co-inventor on U.S. Patent Nos. 9,043,131 (the “131 Patent”) and 8,812,227 (the “227 Patent”), both assigned to Metrom Rail, LLC and hereinafter the “Asserted Patents.”

3. I have been asked to prepare this declaration for submission in inter partes review proceedings instituted against the Asserted Patents. The facts set forth below are based on my personal knowledge.

4. My compensation is not dependent on the outcome of these proceedings, and I am not receiving any compensation for submitting this declaration beyond the normal compensation for my job.

5. Set forth in this declaration is a summary of my qualifications, the background of my inventions as embodied in the Asserted Patents, safety in the railroad industry, and the Metrom Rail® AURA® Maintenance of Way (“MOW”) system, hereinafter, AURA CAS.

II. SUMMARY OF MY QUALIFICATIONS

6. I was awarded a Bachelor of Science degree in electrical engineering by the Illinois Institute of Technology in December 1983.

7. I was employed by Zenith Electronics as an Engineer from February 1984 to January 1986 in its switching power supply development group.

8. I was employed as a Design Engineer by Sun Electric from January 1986 to April 1992.

9. I served as an Engineer, as well as Engineering Manager, and finally Director of Engineering at BIT 7, Inc. from April 1992 to February 2011. At BIT 7, I managed a technical staff of engineers, technicians, PCB designers and contract engineers. In this role, I also contributed to the design of electronic circuits for medical, scientific, commercial, transportation and consumer industries.

10. In March 2011, I was hired by Metrom Rail, LLC. My job title was Engineering Manager. My job responsibilities included architecting and developing products directed to improving railroad safety.

11. In April 2014, I was promoted to Director of Engineering. As Director of Engineering, I provide technical leadership to Metrom Rail's product development team.

12. A copy of my current CV is attached as Exhibit 2010 to this declaration.

III. FOUNDATION FOR INDUSTRY OBSERVATIONS

13. I have over twelve years of experience in designing and developing collision avoidance products for the railroad industry.

14. I have been responsible for product development of a number of different sensing systems over my career, including gas cells, piezoelectric pressure sensors, hall-effect devices, infra-red and UV emitters and detectors and MEMS microphones.

15. I started developing railroad safety equipment in March 2011, starting with oversight of the development of auxiliary train approach sensing to initiate rail crossing gate lowering. I also developed a monitoring system to detect movement of railroad bridge support pilings to ensure integrity during flooding events.

IV. METROM RAIL AURA MAINTENANCE OF WAY (AURA CAS)

16. Metrom Rail was founded in 2010 with the goal of developing a suite of innovative products and solutions to enhance safety in the railroad industry.

17. In addition to freight trains and passenger trains, railroad tracks are also used by maintenance of way (“MOW”) vehicles. The railroad track requires frequent maintenance. MOW vehicles are specialized vehicles that are optimized to perform the various tasks associated with maintenance of the railroad infrastructure. Sometimes the sight lines forward and backward on the vehicles are compromised, resulting in poor visibility when the machine is moved. MOW equipment is highly specialized, costly, and frequently operated in groups, and is prone to collisions from human error. The AURA system has nearly eliminated these collisions when enabled. Shown below are examples of MOW vehicles.



18. Depending on the length and type of a MOW vehicle in a work group and the terrain, a clear line of sight may not exist between MOW vehicles operating in the same area. Poor visibility, coupled with operator fatigue, contribute to surprisingly frequent collisions of MOW vehicles. Such collisions may result in work completion delays, equipment damage, operator injuries, and even death of a worker.

19. In 2011, we were aware of no reliable and accurate mechanism for collision avoidance between MOW vehicles operating on railroad tracks. The existing method used to avoid MOW collisions was visual separation based on operating rules, which is the approach historically used prior to our invention.

20. To address this void, upon my hire by Metrom in 2011, I was tasked with the design and development of a collision avoidance system (“CAS”) for MOW vehicles.

21. I, along with other engineers, developed what would be called the AURA collision avoidance system, or simply the AURA CAS.

22. The AURA CAS used ultra wideband (“UWB”) radio technology to provide an accurate time-of-flight ranging system. The system offered 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.

23. The main components of the AURA CAS are (i) the transmitter sensor module (TSM); (ii) the user interface module (UIM); and (iii) the control electronics module (CEM).

24. The AURA CAS mounted in one MOW vehicle communicates data wirelessly with the AURA CAS mounted in other MOW vehicles. Each AURA CAS

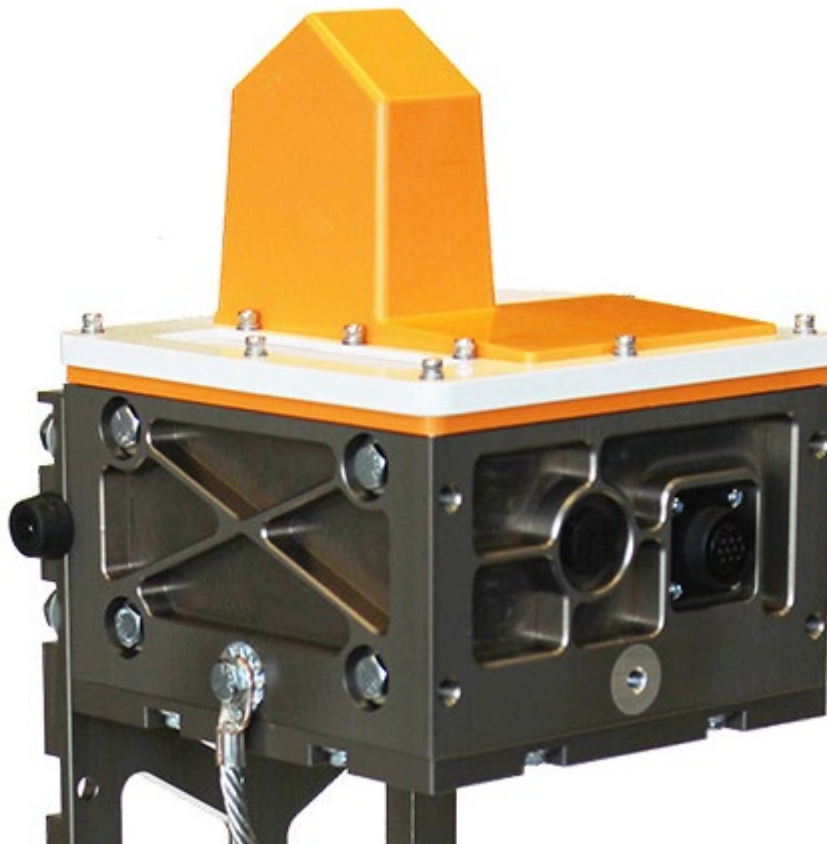
uses a time of flight measurement technique and GPS data generated locally to determine a separation distance between the MOW vehicles.

25. The AURA CAS in a MOW vehicle is designed to include central tracking functionality. This functionality is used to track the location of one or more MOW vehicles that are equipped with a similar AURA CAS.

26. The modules comprising the AURA CAS are described below.

A. Transmitter Sensor Module (TSM)

27. The TSM contains a UWB radio transceiver and a GPS receiver module. Shown below is an exemplary TSM.



28. The TSM is designed to be installed on the roof or alongside the roof of a MOW vehicle. Shown below is an exemplary TSM installed on the roof of a MOW vehicle.



29. The TSM installed on one MOW vehicle sends data to and receives data from a TSM installed on another MOW vehicle or rail vehicle using radio frequencies.

B. User Interface Module (UIM)

30. The UIM is contained within a housing and is capable of providing audio and visual output and accepting user input. Specifically, it includes a 2 x 16 alpha numeric display for information, messages, and configuration details, numeric displays of the separation distances to nearby MOWs, to the front and to the rear, variable audio feedback for alarms, indicator lights for alarm conditions and a tactile feedback keypad control panel. Shown below is a picture of an exemplary UIM.



31. The UIM module is capable of being installed on or near the MOW operator console. The UIM provides information and visual as well as audio alerts regarding the separation distance between the two MOW vehicles. The UIM also receives input from the MOW vehicle operator. Shown below are exemplary installation of the UIMs on the MOW operator console.



C. Control Electronics Module (CEM)

32. The CEM is mounted in the cab of the MOW vehicle, often inside equipment bays or cabinets. The CEM controls operation of the system and interfaces with the UIM and the TSM of the MOW vehicle. Shown below is an exemplary CEM.



33. The UIM connector of the CEM mounted in the cab of a MOW vehicle is connected via a cable to the UIM mounted at the operator position in the MOW vehicle. The TSM connector is connected via a cable to the TSM mounted in the MOW vehicle.

34. The AURA CAS system mounted in one MOW vehicle communicates with the AURA CAS system mounted in other MOW vehicles. Each AURA CAS system uses an UWB time of flight measurement technique to determine a separation distance between the two MOW vehicles.

V. SKEPTICISM IN THE INDUSTRY

35. I have been asked to describe the skepticism that Metrom Rail's AURA CAS encountered when it was first offered for sale.

A. Industry skepticism regarding using radio for collision avoidance generally

36. Our efforts to market AURA CAS to Class 1 freight rail were initially met with skepticism because they had witnessed previous failed attempts at collision avoidance. For example, the decision maker for the first demonstration took us to what he apparently considered the “acid test”. Two MOW vehicles were equipped with the AURA CAS.



37. This is a view from the rear MOW vehicle. The forward vehicle in the photo on the left entered the rail tunnel and the expectation was that AURA CAS would not properly detect that vehicle as a collision risk once it entered the tunnel. In the photo on the right, the forward vehicle is in the tunnel (the vehicle lights are visible). The AURA CAS in the rear vehicle continued to accurately track the vehicle. The decision maker was not expecting that result, we believe based on prior failed attempts to demonstrate other MOW collision avoidance systems. The

decision maker was satisfied at that point and moved forward with a purchase order for AURA CAS.

B. Industry skepticism regarding using UWB radio for collision avoidance specifically

38. UWB radio was an unfamiliar technology to everyone that we met during our marketing of the AURA CAS. Even radio engineers became increasingly skeptical when told that the UWB ranging system utilized an ultra wide bandwidth radio. The radio engineers were familiar with narrowband systems using licensed 25 kHz bandwidths, while Metrom Rail was advocating the use of an unlicensed band with a bandwidth that was nearly 100,000 times greater than narrowband systems.

39. Because of the extreme bandwidth of the UWB radio signal, engineers in the industry were concerned that the outgoing UWB signal would interfere with the operation of other radio systems used for other purposes by the railroads, because by definition, the UWB radio emits across numerous frequencies licensed for use by other services.

40. In addition, when told that the UWB operating power level was low, some became concerned that the UWB radios would not perform their collision avoidance function because of incoming interference from other radio systems being used by the railroad. UWB was such a strange concept to engineers familiar with standard narrowband radios, and even those familiar with wider bandwidth spread-

spectrum radios, that convincing individuals that the AURA CAS UWB ranging was a viable approach for collision avoidance in the railroad space was difficult.

41. Some engineers were apparently familiar with the limitations of narrow band radio ranging in terrestrial applications, likely having seen issues with poor measurement accuracy and multipath phenomenon which may result in exaggerated distance measurements. It was difficult to convince them that the wide bandwidth of UWB solved those problems instead of adding to them.

VI. PIPER NETWORKS ACCESS TO AURA CAS

42. I am aware that Piper Networks specifically is a Petitioner, and have been asked to describe Piper Network's access to the technical details of the AURA CAS. The facts set forth below are based on my personal knowledge.

43. Parsons Transportation Group (Parsons), a part of Parsons Corporation, is a large contractor that, in part, implements public transportation projects. Before bidding for a project or after winning the bid, Parsons typically enters into agreements with different subcontractors with the expertise to implement the different portions of a project.

44. In 2017, the Massachusetts Bay Transportation Authority (MBTA) solicited proposals for a non-vital Collision Avoidance System for its Green Line Project. Parsons intended to submit a proposal for this project. Parsons entered into

a Teaming Agreement with Metrom Rail in 2017 to compete for this project. Metrom Rail's role was to provide its UWB technology and expertise to the project.

45. In 2018, the New York Metropolitan Transportation Authority (MTA) was seeking solutions to its issues with costly and unreliable legacy safety systems. Metrom's proposed solution for the MTA was based on the AURA CAS, and led both to "Proof of Concept" (POC) testing with the MTA and the MTA awarding Metrom a "Genius" award . Exs 2014, 2015.

46. Parsons oversaw the POC testing for the MTA. Parsons' representative for the Metrom POC test campaign was David Garcia, who was tasked with vetting Metrom Rail's UWB products prior to and during the POC demonstrations. In his role as lead project manager, Mr. Garcia was required to work closely with Metrom Rail's technical team. Because of this, Mr. Garcia had access to Metrom Rail's facilities, Metrom Rail's technical personnel and Metrom Rail's UWB-based technology including Metrom Rail's AURA CAS hardware and software. In all, Mr. Garcia had at least 12 months of unrestricted access to the technical details of AURA CAS.

47. Mr. Garcia left Parsons and commenced employment with Piper Networks in or around 2020. David Garcia is currently Vice President at Piper Networks, and as far as we can determine, Piper introduced its competing CAS

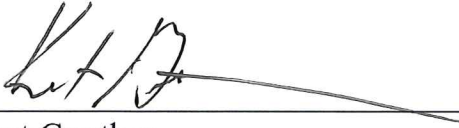
system after Mr. Garcia joined Piper, presumably leveraging the knowledge that he acquired when he had access to AURA CAS.

VII. OTHER FAILED INDUSTRY ATTEMPTS

48. I have reviewed the declaration that Mr. Andrews submitted for the inter partes review, particularly the background section. What Mr. Andrews does not acknowledge is that prior to AURA CAS, no one had deployed a commercially successful, terrestrial radio-ranging-based collision avoidance system in the railroad industry despite every motivation to reduce expensive MOW accidents.

I, Kurt Gunther, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that those statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

September 14, 2023


Kurt Gunther