

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HARMAN INTERNATIONAL INDUSTRIES, INC.

Petitioner,

v.

ST CASESTECH, LLC,

Patent Owner.

Case IPR2024-01300

U.S. Patent No. 11,589,329

PETITION FOR *INTER PARTES* REVIEW

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EXHIBIT LIST

Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 11,589,329 (“’329”)
1002	File History of U.S. Application No. 17/235,130 (“’329FH”)
1003	Declaration of Dr. Sayfe Kiaei in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 11,589,329 (“Kiaei”)
1004	U.S. Patent No. 7,570,158 (“Denny”)
1005	U.S. Patent Application Publication No. 2008/0132199 (“Hirata”)
1006	U.S. Patent Application Publication No. 2007/0038395 (“Green”)
1007	Certified Translation of Japanese Patent Application Publication No. 2004/212544 (“Murata”)
1008	Japanese Patent Publication No. 2004/212544
1009	U.S. Patent No. 6,219,645 (“Byers”)
1010	United States District Courts - National Judicial Caseload Profile
1011	Complaint for Patent Infringement, <i>Staton Techiya, LLC v. Harman International Industries, Inc.</i> , No. 1:23-cv-801, D.I. 1 (D. Del. July 25, 2023)
1012	Excerpts of A.S. Tanenbaum, <i>Introduction to Computer Networks</i> , 3d. ed. 1997
1013	Excerpts of Specification of the Bluetooth System, Vol. 1, Version 1.2, Nov. 5, 2003
1014	U.S. Patent No. 7,529,677 (“Wittenberg”)
1015	U.S. Patent No. 7,769,591 (“White”)
1016	File History of U.S. Application No. 16/736,820 (related to the ’329)

Exhibit No.	DESCRIPTION
1017	File History of U.S. Application No. 16/055,488 (related to the '329)
1018	File History of U.S. Application No. 13/976,636 (related to the '329)
1019	Declaration of Jonathan Bradford in Support of Petition for <i>Inter Partes</i> Review of United States Patent No. 11,589,329

TABLE OF ABBREVIATIONS

Abbreviation	DESCRIPTION
'329	U.S. Patent No. 11,589,329 (Ex. 1001)
'329FH	File History of U.S. Application No. 17/235,130 (Ex. 1002)
IPR	<i>Inter Partes</i> Review
Petitioner	Petitioner
PO	Patent Owner
POSITA	Person of Ordinary Skill in the Art
PTAB	Patent Trial and Appeal Board
USPTO	United States Patent and Trademark Office

LIST OF CHALLENGED CLAIMS

[1.pre] A system comprising:

[1.a.1] a device among a plurality of acoustic devices;

[1.a.2] wherein the device is configured as a controller, wherein the controller is configured to perform operations comprising:

[1.b] selecting a subset of acoustic devices from among the plurality of acoustic devices for acquiring sensor acoustic data,

[1.c] wherein the subset of acoustic devices are configured to interchange device information and data over a communication link;

[1.d] receiving a first set of sensor acoustic data from a first acoustic device of the selected subset of acoustic devices;

[1.e] receiving a second set of sensor acoustic data from a second acoustic device of the selected subset of acoustic devices; and

[1.f] analyzing at least one of the first set of sensor acoustic data or the second set of sensor acoustic data or a combination of both to identify if speech is present.

[2] The system according to claim 1, wherein the operations further comprise: analyzing the speech for a keyword.

[3] The system of claim 2, wherein the first set of sensor acoustic data and the second set of sensor acoustic data are received based on a triggering event.

[4] The system of claim 3, wherein the operations further comprise: determining a direction of measurement of at least one device of the subset of devices.

[5] The system of claim 1, wherein the operations further comprise: selecting the subset of devices based on geographic proximity to a user.

[6] The system of claim 2, wherein the operations further comprise: activating a sensor based upon the keyword.

[7] The system of claim 1, wherein the operations further comprise: generating an alert signal based upon an analysis of at least one of the first set of acoustic sensor data or the second set of acoustic data or a combination of both.

[8] The system of claim 1, wherein the operations further comprise: analyzing at least one of the first set of acoustic sensor data or the second set of acoustic sensor data or a combination of both for animal sounds.

[9] The system of claim 1, wherein the operations further comprise: determining the locations of each of the selected subset of acoustic devices.

[10] The system of claim 2, wherein the operations further comprise: determining which of the selected subset of acoustic devices is the closest acoustic device to a user that uttered the keyword.

[11] The system of claim 10, where the operations further comprise: determining a voice command from the keyword; and sending the voice command to the closest acoustic device.

Pursuant to §§311-319 and §42.1,¹ Harman International Industries, Incorporated (“Petitioner”) petitions for *inter partes review* (“IPR”) of claims 1-11 (“Claims”) of U.S. Patent No. 11,589,329 (Ex. 1001, “’329”), assigned to ST CasesTech, LLC (“PO”). There is a reasonable likelihood—and it is highly likely—that at least one challenged claim is unpatentable as explained herein. Petitioner requests review of the Claims and judgment finding them unpatentable under §§102/103.

I. INTRODUCTION

The ’329 is generally directed to a system of acoustic devices that communicate information to one another, whereby one of the acoustic devices assumes control, receives data from the other acoustic devices and performs speech detection. ’329, cl. 1.

While no rejections of the Claims were issued during prosecution, applicant filed a preliminary amendment to add that the acoustic devices are configured to interchange “data over a communication link” and that the controller acoustic device

¹ Section cites reference 35 U.S.C. (pre-AIA) or 37 C.F.R. as context indicates. All emphasis/annotations added unless noted. Figure annotations herein generally quote the Claims for reference. Citations herein are exemplary and not meant to be limiting.

analyzes the received data “to identify if speech is present.” ’329 File History (“’329FH, Ex. 1002), 76-78. The Claims were subsequently allowed. *Id.*, 324-330.

But these concepts, and the rest of the claim limitations, were not new. **Denny** (Ex. 1004) discloses an incident reporting system comprising remote sensing units (“RSUs”) that **communicate with one another, such as via Bluetooth**, whereby upon detection of an incident (e.g., a car accident), **one of the RSUs** assumes control, identifies **other RSUs** in the vicinity that may have collected audio **data**, requests and collects their **data**, and analyzes the received data to confirm the incident occurred, such as by detecting fearful screaming. *Kiaei*, ¶¶34-37.

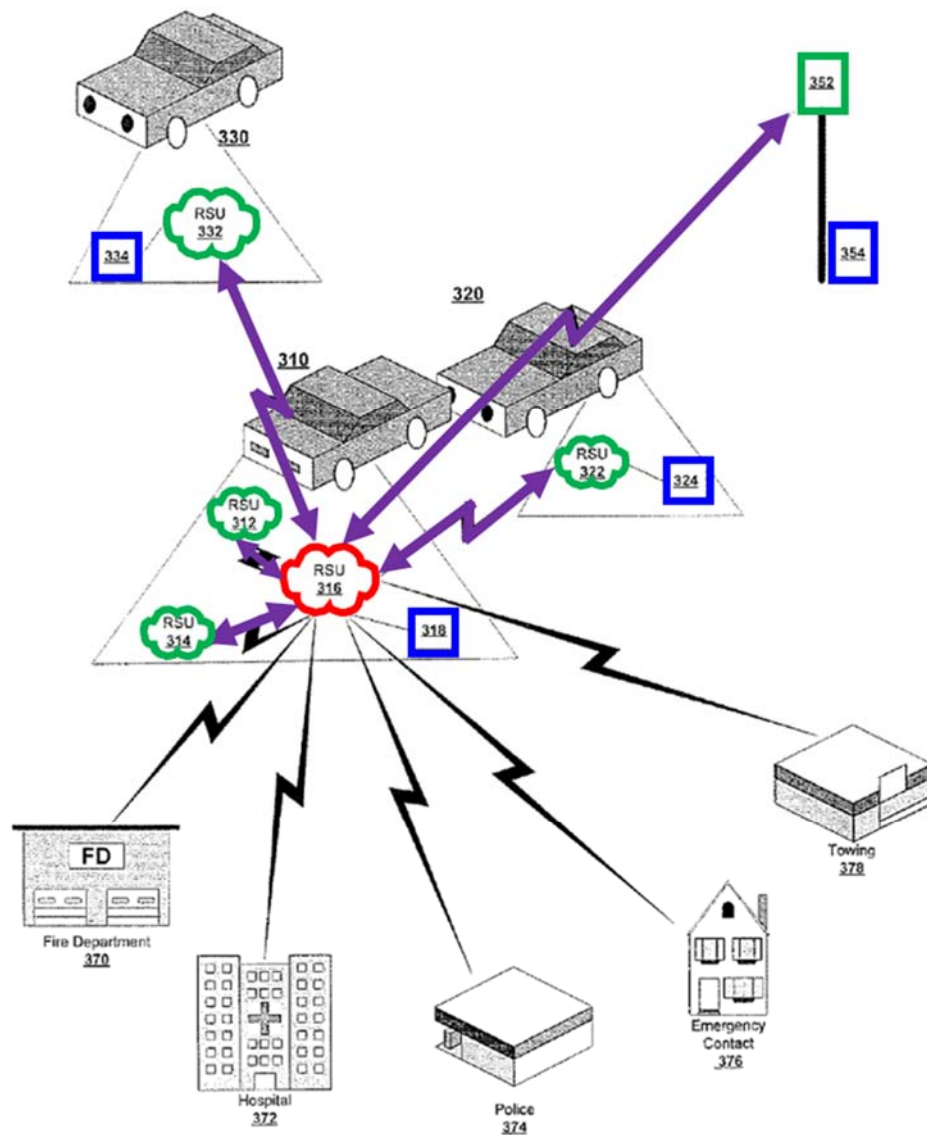


Figure 3

Denny, Fig. 3.

Accordingly, Petitioner requests that the Board institute trial and find the Claims unpatentable.

II. MANDATORY NOTICES

A. Real Party-in-Interest

Petitioner Harman International Industries, Inc. is the real party-in-interest. No other parties had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.

B. Related Matters

The '329 is the subject of the following co-pending civil action:

Staton Techiya, LLC v. Harman Int'l Indus., Inc., 1:23-cv-00801-JCG (D. Del.)
("Delaware Case").

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Petitioner consents to electronic service of documents to the email addresses of the counsel identified above.

III. PAYMENT OF FEES

The undersigned authorizes the Office to charge the fee required by §42.15(a) and any additional fees that might be due to Deposit Account No. 18-1945, under Order No. 111496-0011-653.

IV. REQUIREMENTS FOR *INTER PARTES* REVIEW

A. Grounds for Standing

Pursuant to §42.104(a), Petitioner certifies that the '329 is available for IPR. Petitioner and any real parties-in-interest are not barred or estopped from requesting IPR challenging the Claims on the Grounds identified herein.

B. Identification of Challenge

Pursuant to §§42.104(b)-(b)(1), Petitioner requests IPR of Claims 1-11, and that the Board cancel the same as unpatentable.

1. Specific Art on Which the Challenge Is Based

Petitioner relies on the following prior art (Kiaei, ¶¶50-51):

Name	Ex.	Publication/Title	Published/Issued	Prior art under at least
Denny	1004	US7,570,158	8/4/2009	§102(b)
Hirata	1005	US2008/0132199	6/5/2008	§102(b)
Green	1006	US2007/0038395	2/15/2007	§102(b)
Murata	1007-1008	JP2004/212544	7/29/2004	§102(b)
Byers	1009	US6,219,645	4/17/2001	§102(b)

Each of these references was published at least one year before the earliest possible claimed priority date of the '329 of 12/30/2010, and therefore qualifies as prior art under §102(b).

2. Statutory Grounds on Which the Challenge Is Based²

Ground	Claims	Basis	References
1	1, 5, 7-9	§§102/103	Denny
2	1-9	§103	Denny in view of Hirata
3	1-11		Denny in view of Byers
4-5	4		Grounds 2-3 further in view of Green
6-8	8		Grounds 1-3 further in view of Murata

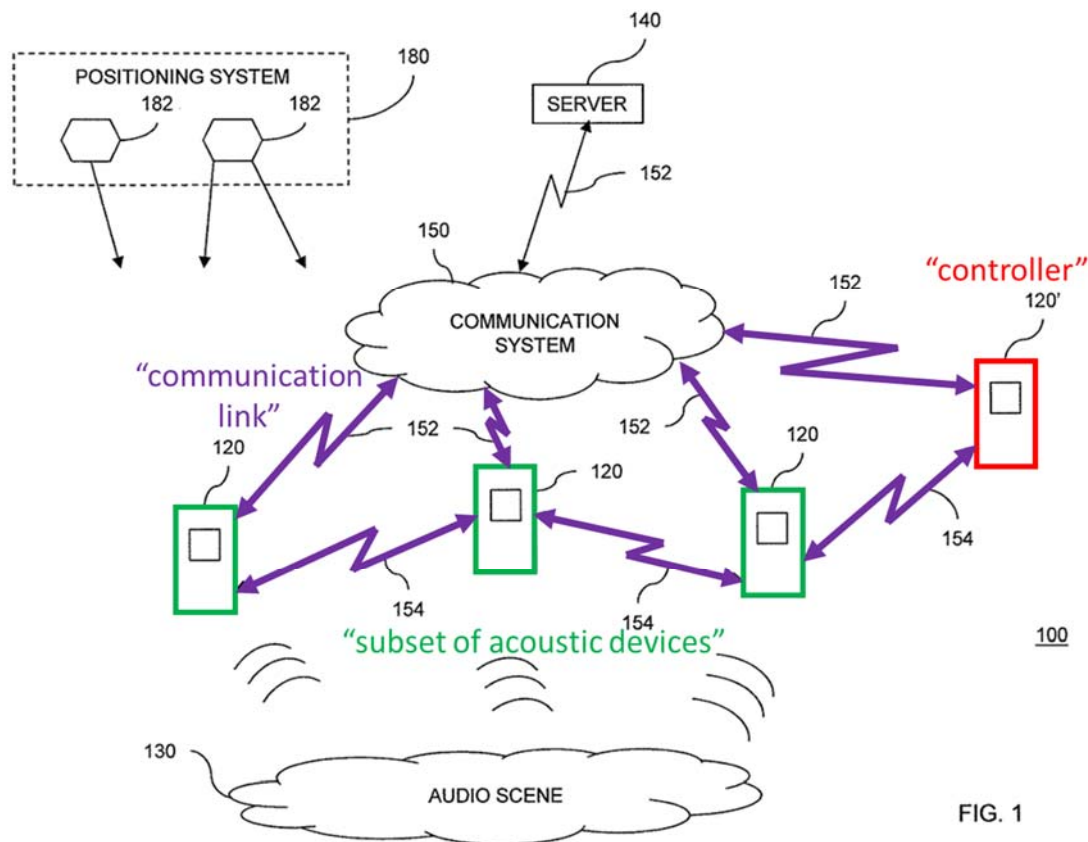
V. '329 PATENT AND PROSECUTION HISTORY

A. '329

The '329 generally describes a system comprising multiple devices for “acoustic analysis,” including the detection of “speech.” '329, 1:25-29, 3:50-53, 6:49-57. As shown in Fig. 1, the system includes “one or more distributed **devices**

² See Kiaei, ¶¶52-53.

120 (also referred to herein as devices 120) and **device 120'** (also referred to as **controller 120'**) in an environment.” ’329, 3:48-53. The **devices 120** and **controller 120'** “may be configured to acquire information relating to audio scene 130,” such as an “urban environment.” ’329, 3:53-55, 4:16-19. **Devices 120** and **controller 120'** communicate with one another via **communication links 154**. ’329, 4:3-12. **Controller 120'** “selectively acquir[es] sensor information from among **devices 120**.” ’329, 3:55-58; 4:42-49, 8:37-48. Such sensor information includes “the device owner’s own speech” and “the speech of others in proximity to the user.” ’329, 4:42-49. Kiaei, ¶¶38-41.



’329, Fig. 1.

B. Prosecution History

There was no substantive prosecution of the '329. A preliminary amendment added Claims 2-11 and amended Claim 1 to recite that the received data is analyzed “to identify if speech is present” and remove the limitation that the “acoustic devices” are “distributed in an environment.” '329FH (Ex. 1002), 76-78. These amended claims received a first-action allowance, which provided no reason for allowance, but identified U.S. Publication Nos. 2009/0085873 and 2010/00316033 as pertinent art. '329FH, 324-330. The claims were allowed again after PO subsequently filed an IDS. '329FH, 406-413, 666-672. Kiaei, ¶¶42-43.

VI. §325(d) AND §314(a) DISCRETION DOES NOT APPLY

A. §325(d)

Under the two-part *Advanced Bionics* framework, the Board should not exercise discretion.

The Grounds raised by this Petition are not the same or substantially the same as the art or arguments raised during '329's prosecution. There were no rejections issued, and **Denny, Hirata, Green, Murata, and Byers** were not considered during prosecution. These references' disclosures of, *e.g.*, [1.a.2]-[1.f] are not substantially similar to those the Examiner considered. See §IX.

Even if the art or arguments were substantially the same, the Examiner erred in a manner material to the patentability of the Claims. Because the

Examiner “did not expressly consider” **Denny, Hirata, Green, Murata, and Byers** as prior art, “[i]t is...difficult, if not impossible, to discern exactly why the Examiner allowed the claims of the [’329] patent, or how the Examiner might have considered the arguments presented in the Petition, had they been presented to the Examiner.” *Bowtech, Inc. v. MCP IP, LLP*, IPR2019-00379, Pap. 14, *19-20 (declining to exercise §325(d) discretion where Petitioner did not “even attempt[] to explain how the Examiner erred in any way”); see §IX.

B. §314(a)

The PTAB should not exercise its §314(a) discretion where, as here, no schedule has been set in the Delaware Case (filed July 2023), and the median time to trial in Delaware is 33 months, which would set the Harman trial to about April 2026, one month after an expected FWD. Ex. 1010, 14; Ex. 1011.

VII. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this Petition only, Petitioner assumes the Claims are entitled to the 12/30/2010 filing date of Provisional Application No. 61/428,369, to which the ’329 claims priority. Kiaei, ¶¶45-47.

A person of ordinary skill in the art (“POSITA”) as of the claimed priority date of the ’329 would have had a bachelor’s degree in electrical or computer engineering, computer science, or a similar field, and at least two years of experience

with signal or acoustic data processing systems. Kiaei, ¶¶45-47. More education can supplement practical experience, and vice-versa. *Id.*

VIII. CLAIM CONSTRUCTION

Claim terms subject to IPR are construed using *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). 37 C.F.R. §42.100(b). Only terms necessary to resolve the controversy need construction. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Because the prior art asserted herein discloses embodiments within the Claims’ indisputable scope, the Board need not construe the Claims’ outer bounds. All claim terms should be construed according to their plain and ordinary meaning. Kiaei, ¶¶48-49.

IX. GROUNDS OF UNPATENTABILITY

This Petition is supported by the Declaration of Dr. Sayfe Kiaei, which describes the prior art’s scope and content at the time of and well before the ’329. *See* Ex. 1003. The prior art renders the Claims unpatentable based on the below Grounds. Kiaei.

A. Ground 1: Denny (Claims 1, 5, and 7-9)

1. Overview of Denny

Denny is directed to “[i]mproved methods and systems for responding to incidents” by “enhanc[ing] the collection of data regarding the incident” to “more quickly and efficiently initiate responsive actions.” Denny, 1:44-48. Kiaei, ¶54.

Denny discloses “a plurality of distributed sensing units,” also referred to as “remote sensing units” or “RSUs,” that “collect data over a localized or wide geographic area.” Denny, 5:35-38, 10:18-20. The RSUs each include an “audio recorder,” and “automatically...identif[y]” various “type[s] of incident[s],” including “automobile accidents” and/or “fearful screaming.” Denny, 5:53-67, 16:61-17:10. Kiaei, ¶¶55-56. Figure 3 shows an embodiment, in which “an automobile accident occurs between a first vehicle 310 and a second vehicle 320.” Denny, 9:43-44.

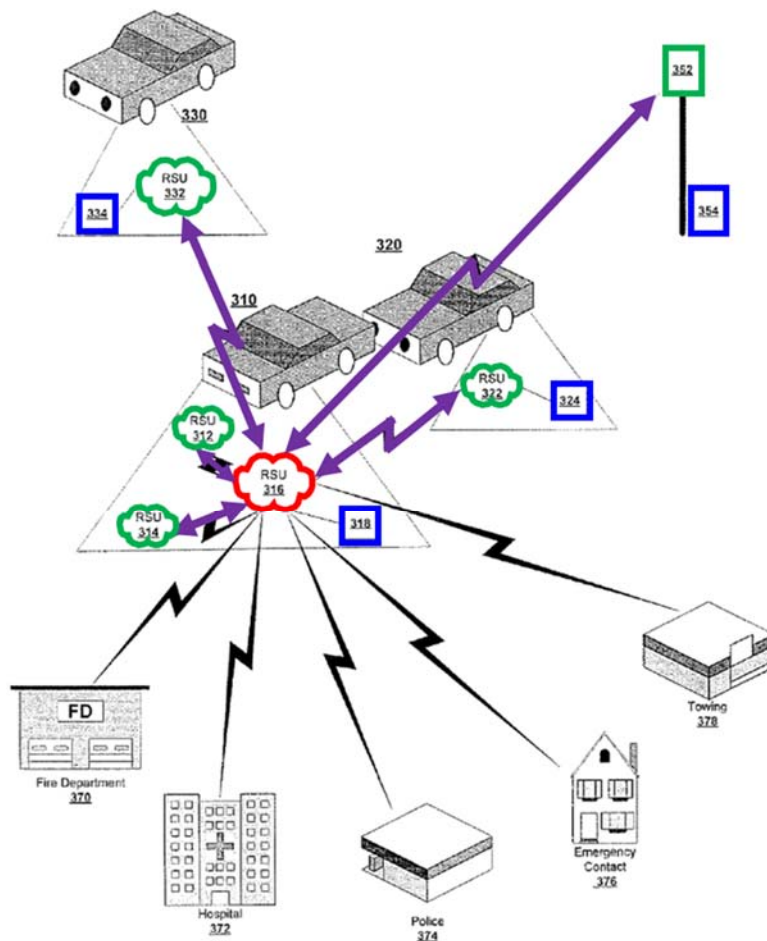


Figure 3

Denny, Fig. 3. Kiaei, ¶57.

The first vehicle 310 involved in the automobile accident has two passengers (not shown), each of whom is carrying a personal **remote sensing unit 312, 314**, and the first vehicle 310 also has a built-in **remote sensing unit 316**. The second vehicle 320 has a single passenger (not shown) who is carrying a **remote sensing unit 322**. A third vehicle 330 that contains an embedded **remote sensing unit 332** is also in the vicinity at the time of the accident, and a fixed **remote sensing unit 352** is also located nearby. When the first vehicle 310 collides with the second vehicle 320, each of the remote sensing units **312, 314, 316, 322, 332, 352** may collect sensor data that provides information about the collision. This collected sensor data is depicted in FIG. 3 as **data sets 318, 324, 334, 354**.

Denny, 9:44-57. Kiaei, ¶58.

Each RSU **“continuously or periodically broadcast[s] its identification”** and **“other information, such as its location”** to nearby RSUs. Denny, 10:53-58. **RSU 316** “collect[s] sensed data using its sensors,” including its audio recorder, and “periodically or continuously analyze[s] the collected data to determine if an incident has occurred.” Denny, 9:65-10:7. When **RSU 316** detects an incident, it uses the “location” data to “identify additional [RSUs] that may have collected data about the incident,” such as RSUs **312, 314, 322, 332**, and **352**, which are “in the vicinity of the incident.” Denny, 10:18-10:22, 10:53-58. **RSU 316** then **collects data sets** from the RSUs within proximity of the incident, and “perform[s] a second analysis...on the more complete data set that includes data from additional [RSUs].” Denny, 11:9-17. Based on this second analysis, **RSU 316** “coordinates...a response,” such as “automatically notify[ing] the local fire department 370, the nearest hospital

372 (or emergency response unit) to the site of the collision, and/or the closest police substation 374.” Denny, 11:20-26, 11:36:40. Kiaei, ¶¶59-61.

Denny discloses in Figure 4, “a flow chart illustrating operations that may be performed at, for example, the remote sensing unit 316 of FIG. 3 to identify that the automobile accident has occurred and to coordinate an appropriate response thereto.” Denny, 9:38-42. Kiaei, ¶57.

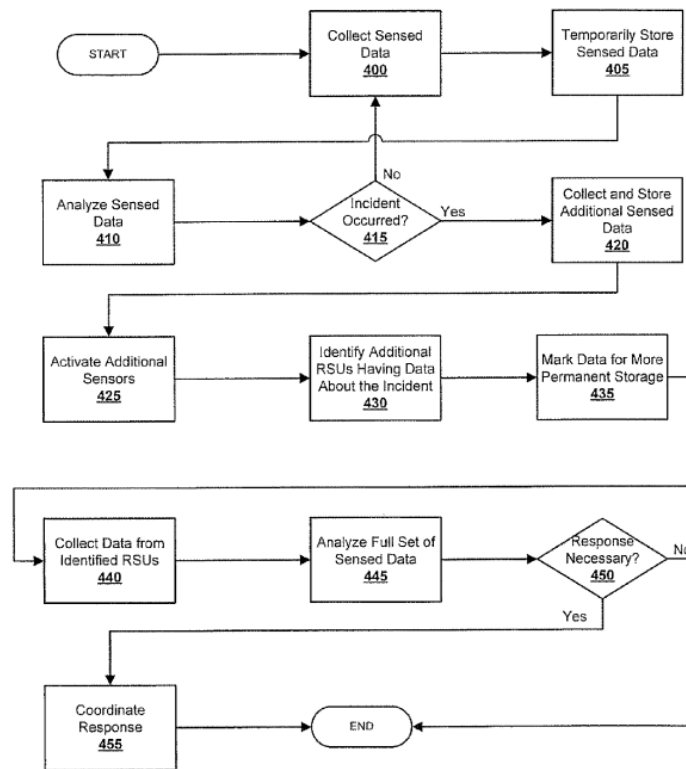


Figure 4

Denny, Fig. 4.

Figure 6 of **Denny** discloses “the remote sensing units illustrated in FIG 1, 3 and/or 5” and “include[s] a communications unit 610,” such as a “Bluetooth...connection,” to “transmit and receive information between the remote sensing unit 600 and other remote sensing units.” Denny, 13:48-14:13. Kiaei, ¶62.

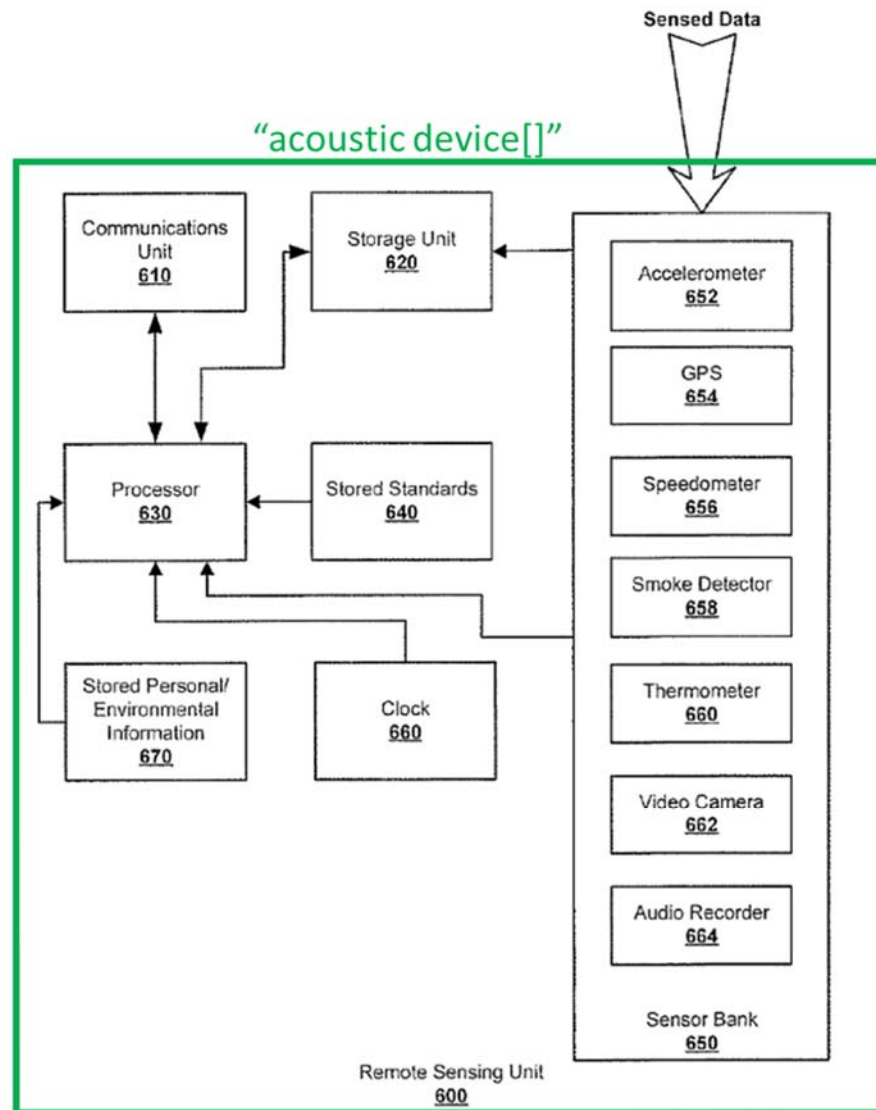


Figure 6

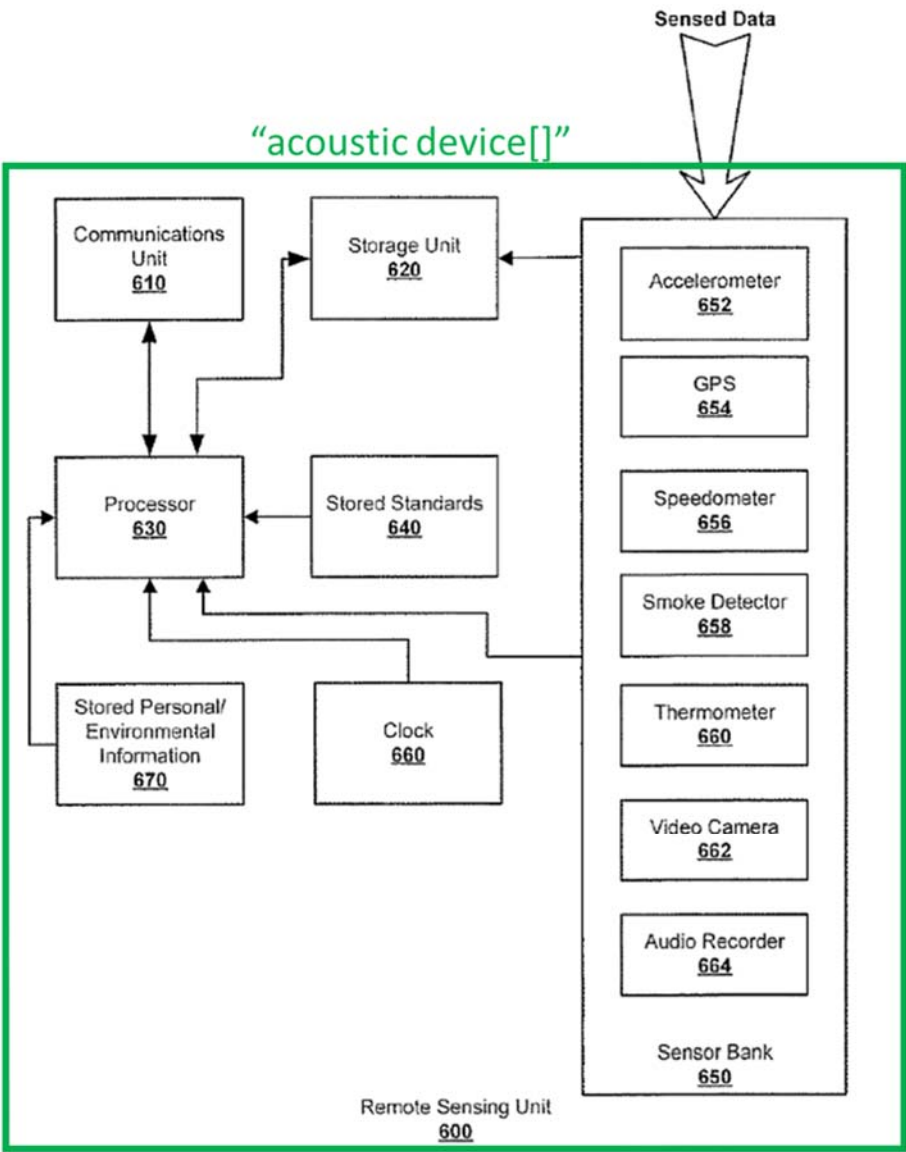
Denny, Fig. 6.

2. Claim Chart

As set forth in the below claim chart, Claims 1, 5, and 7-9 are anticipated by, and at minimum obvious over, **Denny**. In addition to §IX.A.1, the following identifies example disclosures followed by bulleted excerpts that each disclose, and at minimum render obvious, Claims 1, 5, and 7-9. Kiaei, ¶¶63-143.

'329 Claim	Denny
[1.pre] A system comprising:	To the extent the preamble is limiting, Denny discloses a system (<i>e.g.</i>, “systems...for gathering information relating to a specific incident”). Kiaei, ¶¶64-66. <u>E.g., Denny:</u> • 1:7-9: “The present invention relates to information gathering and, more particularly, to <i>systems</i> and methods <i>for gathering information relating to a specific incident.</i>” • See also 3:31-34.
[1.a.1] a device among a plurality of acoustic devices;	Denny discloses a device (<i>e.g.</i>, “remote sensing unit 316”) among a plurality of acoustic devices (<i>e.g.</i>, “remote sensing units” each having “an audio recorder”). <u>E.g., Denny:</u> Denny discloses RSUs (including an RSU 316) each having multiple sensors, including “an audio recorder” for recording “audio data.” Denny, 5:53-67, 6:16-34, 9:43-64, 13:48-56, 15:18-43, Fig. 3, Fig. 6. Kiaei, ¶¶67-72. • Fig. 3

'329 Claim	Denny
	Figure 3 is a network diagram illustrating a system for emergency services. A central red cloud labeled "RSU 316" is connected to several vehicles (310, 320, 330) and various emergency services (Fire Department 370, Hospital 372, Police 374, Emergency Contact 376, Towing 378). The vehicles are also connected to their respective RSUs (312, 314, 322, 332). A "plurality of acoustic devices" (352, 354) is shown connected to the network. The diagram includes labels for RSU 316, RSU 312, RSU 314, RSU 322, RSU 332, and various emergency services.

'329 Claim	Denny
	- Fig. 6  The diagram illustrates an acoustic device (600) enclosed in a green rectangular frame. At the top, a large downward-pointing arrow labeled "Sensed Data" enters the device. Inside the frame, a "Sensor Bank 650" is a vertical column of seven sensors: Accelerometer 652, GPS 654, Speedometer 656, Smoke Detector 658, Thermometer 660, Video Camera 662, and Audio Recorder 664. Arrows from the Sensor Bank point to a "Remote Sensing Unit 600" label at the bottom. To the left of the Sensor Bank is a "Processor 630". It is connected to a "Communications Unit 610" above it and a "Storage Unit 620" to its right. Below the Processor are "Stored Standards 640", "Stored Personal/Environmental Information 670", and a "Clock 660". Arrows show data flow from the Processor to the Communications and Storage units, and from the Standards, Information, and Clock to the Processor. The entire assembly is labeled "acoustic device[]" in green text above the frame. Figure 6 5:53-67: “Each remote sensing unit includes one or more sensors that intermittently or continuously collect data regarding what is occurring in the vicinity of the remote sensing unit. <i>A few examples of the types of sensors that may be included on a remote sensing unit include a</i>

'329 Claim	Denny
	noise meter, <i>an audio recorder</i>, an accelerometer, a speedometer, a clock, a video camera, a global positioning satellite receiver, a thermometer, a breathalyzer, a wind gauge, a seat belt sensor, etc....” 6:16-34: “The <i>remote sensing units also typically include capabilities for communicating with other remote sensing units</i>, with a system hub, and/or with other elements of the system such as, for example, a local aggregator. <i>Upon determining that out-of-range sensor readings indicate that an incident has occurred, a remote sensing unit</i> (or other element of the system that makes such a determination) <i>may identify and communicate with additional remote sensing units that are in the general vicinity of the remote sensing unit that collected the data relating to the incident. These additional remote sensing units may then be contacted</i> (1) to ensure that they keep data that was collected around the time of the incident and/or (2) <i>to request that they transmit the relevant data to a system element that will perform further analysis of the incident based on an aggregation of sensed data collected by a plurality of remote sensing units.</i> An element of the system may also initiate a response to the incident such as dispatching police, fire and/or ambulance units to the location of the incident.” 7:18-27: “It will be appreciated that the types of sensors carried by each remote sensing unit 12, 14, 16, 22, 32, 42, 52, and hence the collected sensor data contained in the data sets 18, 24, 34, 44, 54, may be quite varied. For example, <i>the first data set 18 and/or the second data set 24 may include</i> accelerometer data, speedometer data, <i>audio data</i>, braking data, global positioning satellite location data, temperature data, rain detector information, information regarding the number of passengers, seat belt status information, breathalyzer information, trajectory information, etc. Some of this

'329 Claim	Denny
	collected data may be indicative of an automobile accident (i.e., a sudden deceleration, the stopping of the vehicle, the vehicle decelerating more quickly than anticipated based on the braking data, audio recordings of the sound of the vehicles colliding, etc.)” 9:36-64: “FIG. 3 is a schematic diagram illustrating <i>several remote sensing units that are in the vicinity of an automobile accident</i> (i.e., an exemplary incident)...As shown in FIG. 3, an automobile accident occurs between a first vehicle 310 and a second vehicle 320. The first vehicle 310 involved in the automobile accident has two passengers (not shown), each of whom is carrying a <i>personal remote sensing unit 312, 314</i>, and the first vehicle 310 also has a <i>built-in remote sensing unit 316</i>. The second vehicle 320 has a single passenger (not shown) who is carrying a <i>remote sensing unit 322</i>. A third vehicle 330 that contains an <i>embedded remote sensing unit 332</i> is also in the vicinity at the time of the accident, and a <i>fixed remote sensing unit 352</i> is also located nearby. When the first vehicle 310 collides with the second vehicle 320, <i>each of the remote sensing units 312, 314, 316, 322, 332, 352 may collect sensor data</i> that provides information about the collision....The flow chart of FIG. 4 depicts an exemplary set of operations that show how the remote sensing unit 316 may identify that the automobile accident occurred....” 13:50-56: “Any one of, or all of, the remote sensing units illustrated in <i>FIG. 1, 3</i> and/or <i>5 could be implemented using the remote sensing unit 600</i> of FIG. 6. As shown in FIG. 6, <i>the remote sensing unit 600 may include</i> a communications unit 610, a storage unit 620, a processor 630, stored standards 640, <i>a sensor bank 650</i>, a clock 660 and stored personal and/or environmental information 670.”

'329 Claim	Denny
	• 15:18-43: “The remote sensing unit 600 also includes a sensor bank 650. The <i>sensor bank 650 includes one or more sensors that collect data regarding the surrounding environment</i>. The block diagram of FIG. 6 illustrates exemplary sensors that may be included in the sensor bank 650 such as...<i>audio recorder 664....</i>”
[1.a.2] wherein the device is configured as a controller, wherein the controller is configured to perform operations comprising:	Denny discloses the device is configured as a controller (<i>e.g.</i>, “remote sensing unit 316” “identif[ies] additional...RSUs...that may have collected data about the incident” and “collect[s] data from each of the other identified remote sensing units”), wherein the controller is configured to perform operations (<i>e.g.</i>, RSU 316 performs a “set of operations”). <u>E.g., Denny:</u> See [1.a.1] (§IX.A.2). Denny discloses one of the RSUs, such as RSU 316, controls other RSUs by, for example, requesting that the nearby RSUs transmit their collected data to RSU 316. Denny, 6:16-34, 9:43-64, 10:18-36, 11:9-26, Fig. 4. These “operations” are discussed further below in [1.b]-[1.f], [5], and [7]-[9] (§IX.A.2). Kiaei, ¶¶73-78.

'329 Claim	Denny
	• Fig. 4 <pre> graph TD START([START]) --> 400[Collect Sensed Data 400] 400 --> 405[Temporarily Store Sensed Data 405] 405 --> 410[Analyze Sensed Data 410] 410 --> 415{Incident Occurred? 415} 415 -- No --> 400 415 -- Yes --> 420[Collect and Store Additional Sensed Data 420] 420 --> 425[Activate Additional Sensors 425] 425 --> 430[Identify Additional RSUs Having Data About the Incident 430] 430 --> 435[Mark Data for More Permanent Storage 435] 435 --> 440[Collect Data from Identified RSUs 440] 440 --> 445[Analyze Full Set of Sensed Data 445] 445 --> 450{Response Necessary? 450} 450 -- Yes --> 455[Coordinate Response 455] 455 --> END([END]) 450 -- No --> 440 </pre> Figure 4 • 6:16-34: “The <i>remote sensing units</i> also typically include capabilities for communicating with other <i>remote sensing units</i>, with a system hub, and/or with other elements of the system such as, for example, a local aggregator. <i>Upon determining that out-of-range sensor readings indicate that an incident has occurred, a remote sensing unit</i> (or other element of the system that makes such a determination) <i>may identify and communicate with additional remote sensing units that are in the general vicinity of the remote sensing unit</i>”

'329 Claim	Denny
	<i>that collected the data relating to the incident. These additional remote sensing units may then be contacted (1) to ensure that they keep data that was collected around the time of the incident and/or (2) to request that they transmit the relevant data to a system element that will perform further analysis of the incident based on an aggregation of sensed data collected by a plurality of remote sensing units. An element of the system may also initiate a response to the incident such as dispatching police, fire and/or ambulance units to the location of the incident.”</i> 9:43-64: “...The first vehicle 310 involved in the automobile accident has two passengers (not shown), each of whom is carrying a personal remote sensing unit 312, 314, and the first vehicle 310 also has a built-in <i>remote sensing unit 316.... The flow chart of FIG. 4 depicts an exemplary set of operations that show how the remote sensing unit 316 may identify that the automobile accident occurred in one specific embodiment of the present invention, and respond to the accident</i> by contacting for example, a fire department 370, a hospital 372, a police department 374, an emergency contact 376 and/or a towing service 378.” 10:18-36: “As shown at block 430 of FIG. 4, <i>the remote sensing unit may also proceed to identify additional remote sensing units (RSUs) that may have collected data about the incident (and/or which could be activated to start collecting data about the incident)...A remote sensing unit that determines that an incident has occurred may use such a paging channel to page all other remote sensing units in the general vicinity. The remote sensing unit may then assume that any remote sensing units that respond to the page may have data regarding the incident, or may collect data (e.g., global positioning satellite data) from the responding remote sensing units to make a determination as to</i>

'329 Claim	Denny
	whether the responding remote sensing units have data regarding the incident.” • 11:9-26: “One of the remote sensing units (e.g., the remote sensing unit that identified that an incident occurred) may then proceed to collect data from each of the other identified remote sensing units....” • See also 7:52-8:2
[1.b] selecting a subset of acoustic devices from among the plurality of acoustic devices for acquiring sensor acoustic data,	Denny discloses that the controller is configured to select a subset of acoustic devices (e.g., RSU 316 “identif[ies]” “remote sensing units” 312, 314, 322, 332 and 352 “in the general vicinity of the incident” and “collect[s] data about the incident”) from among the plurality of acoustic devices for acquiring sensor acoustic data (see [1.a.1]-[1.a.2]). <u>E.g., Denny:</u> See [1.a.1], [1.a.2] (§IX.A.2). Denny discloses that a controller RSU (e.g., 316) “identif[ies] additional [RSUs] that may have collected data” (e.g., 312, 314, 322, 332, 352), including, e.g., by using “location” data to contact RSUs “in the vicinity of the incident,” and requests and collects data from those RSUs, including audio data therefrom. Denny, 6:16-34, 10:18-36, 10:37-11:2. Kiaei, ¶¶79-85.

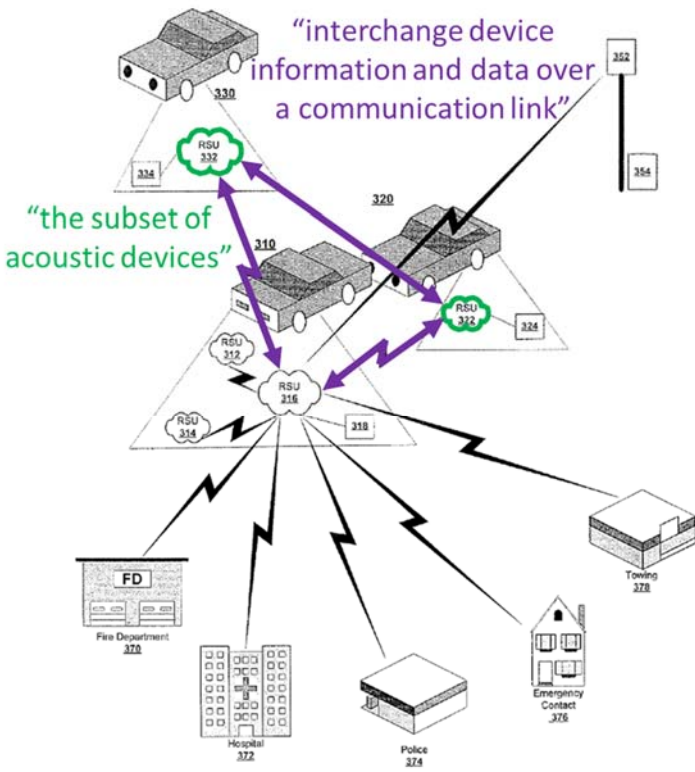
'329 Claim	Denny
	• Fig. 3 Figure 3

'329 Claim	Denny
	• Fig. 4 <pre> graph TD START([START]) --> 400[Collect Sensed Data 400] 400 --> 405[Temporarily Store Sensed Data 405] 405 --> 410[Analyze Sensed Data 410] 410 --> 415{Incident Occurred? 415} 415 -- No --> 400 415 -- Yes --> 420[Collect and Store Additional Sensed Data 420] 420 --> 425[Activate Additional Sensors 425] 425 --> 430[Identify Additional RSUs Having Data About the Incident 430] 430 --> 435[Mark Data for More Permanent Storage 435] 435 --> 440[Collect Data from Identified RSUs 440] 440 --> 445[Analyze Full Set of Sensed Data 445] 445 --> 450{Response Necessary? 450} 450 -- No --> 455[Coordinate Response 455] 455 --> END([END]) 450 -- Yes --> 440 </pre> “selecting a subset of acoustic devices” Figure 4 • 6:16-34: “The <i>remote sensing units</i> also typically include capabilities for communicating with other <i>remote sensing units</i>, with a system hub, and/or with other elements of the system such as, for example, a local aggregator. <i>Upon determining that out-of-range sensor readings indicate that an incident has occurred, a remote sensing unit</i> (or other element of the system

'329 Claim	Denny
	that makes such a determination) <i>may identify and communicate with additional remote sensing units that are in the general vicinity of the remote sensing unit that collected the data relating to the incident. These additional remote sensing units may then be contacted</i> (1) to ensure that they keep data that was collected around the time of the incident and/or (2) <i>to request that they transmit the relevant data to a system element that will perform further analysis of the incident based on an aggregation of sensed data collected by a plurality of remote sensing units.</i> An element of the system may also initiate a response to the incident such as dispatching police, fire and/or ambulance units to the location of the incident.” • 9:43-64: “As shown in FIG. 3, an automobile accident occurs between a first vehicle 310 and a second vehicle 320. The first vehicle 310 involved in the automobile accident has two passengers (not shown), each of whom is carrying a <i>personal remote sensing unit 312, 314</i>, and the first vehicle 310 also has a <i>built-in remote sensing unit 316</i>. The second vehicle 320 has a single passenger (not shown) who is carrying a <i>remote sensing unit 322</i>. A third vehicle 330 that contains an <i>embedded remote sensing unit 332</i> is also in the vicinity at the time of the accident, and a <i>fixed remote sensing unit 352</i> is also located nearby. When the first vehicle 310 collides with the second vehicle 320, <i>each of the remote sensing units 312, 314, 316, 322, 332, 352 may collect sensor data</i> that provides information about the collision. This collected sensor data is depicted in FIG. 3 as data sets 318, 324, 334, 354.” • 10:18-36: “As shown at block 430 of FIG. 4, <i>the remote sensing unit may also proceed to identify additional remote sensing units (RSUs) that may have collected data about the incident</i> (and/or which could be activated to start collecting data about the incident). This may be

'329 Claim	Denny
	accomplished in a variety of ways. For example,...<i>A remote sensing unit that determines that an incident has occurred may use such a paging channel to page all other remote sensing units in the general vicinity. The remote sensing unit</i> may then assume that any remote sensing units that respond to the page may have data regarding the incident, or <i>may collect data (e.g., global positioning satellite data) from the responding remote sensing units to make a determination as to whether the responding remote sensing units have data regarding the incident.</i> • 10:37-11:2: “In other embodiments, <i>a remote sensing unit may use mesh networking techniques at block 430 of FIG. 4 to identify additional remote sensing units (RSUs) that may have collected data about the incident.</i> Pursuant to these mesh networking techniques, the remote sensing unit might, for example, contact other nearby remote sensing units who, in turn, would contact other nearby remote sensing units on an ad hoc basis in order to identify all of the remote sensing units that were in the general vicinity of the incident. <i>GPS data could be included in the messages forwarded between remote sensing units to ensure that only remote sensing units in the general vicinity of the incident are contacted. In still other embodiments, a page could be sent to every remote sensing unit and responsive information provided by the remote sensing units (e.g., location data) could be used to identify which other remote sensing units are likely to have collected data regarding the incident. In still other embodiments, every remote sensing unit could continuously or periodically broadcast its identification (e.g., via an ultrawideband system) and perhaps other information, such as its location, which could then be used by a remote sensing unit to identify the other remote sensing units in the vicinity of the incident. In still further embodiments, at</i>

'329 Claim	Denny
	<i>block 430 of FIG. 4 the remote sensing unit might sense communications networks that are operating in the area and send out a page or messages on each different type of network as means of contacting and identifying other remote sensing units in the general vicinity...."</i> • 11:9-26: <i>"One of the remote sensing units (e.g., the remote sensing unit that identified that an incident occurred) may then proceed to collect data from each of the other identified remote sensing units...."</i>
[1.c] wherein the subset of acoustic devices are configured to interchange device information and data over a communication link;	Denny discloses that the subset of acoustic devices are configured to interchange device information (e.g., "every [RSU]...continuously or periodically broadcast its identification" for use by other RSUs) and data (e.g., "information, such as [RSU's] location") over a communication link (e.g., communication link over which information is "broadcast" / "Bluetooth" / "internet"). <u>E.g., Denny:</u> See [1.b] (§IX.A.2). For example, Denny discloses that every RSU "continuously or periodically broadcast[s] its identification" and "other information, such as its location," and, when an incident occurs, whichever RSU becomes a controller (e.g., RSU 316) uses this information to "identify the other [RSUs] in the vicinity of the incident." Denny, 10:37-11:2. Kiaei, ¶¶86-90. Denny also discloses "transmit[ting] and receiv[ing] information between" RSUs using "an internet protocol" or "wired internet connection." Denny, 13:57-14:13. Denny therefore teaches and suggests using the Internet to interchange device information and data between RSUs, which requires the

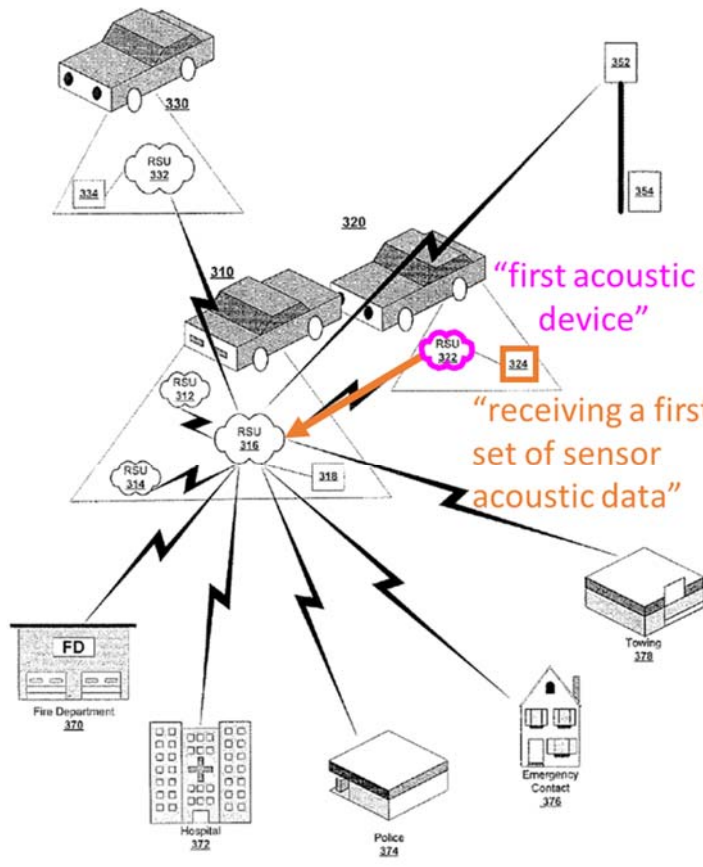
'329 Claim	Denny
	exchange of, e.g., IP addresses and data over a communication link. Kiaei, ¶¶91-95.³ As a further example, Denny discloses the RSUs communicate with each other via Bluetooth, which exchanges device information (“BD_ADDR”) and data. Denny, 13:57-14:13; Kiaei, ¶¶96-98.⁴ Fig. 3  Figure 3 is a network diagram illustrating a system of Road Side Units (RSUs) and their communication with various emergency services. At the top, a car is shown with an RSU (330) and a label "interchange device information and data over a communication link" pointing to a communication link (352) connecting to a base station (354). Below this, a group of RSUs (310, 312, 314, 316, 318, 320, 322, 324, 330, 332) are shown, with a label "the subset of acoustic devices" pointing to a subset of them (310, 312, 314, 316, 318, 320, 322, 324). These RSUs are connected to a central RSU (316) via communication links (310, 312, 314, 318, 320, 322, 324, 330, 332). The central RSU (316) is then connected to various emergency services: Fire Department (370), Hospital (372), Police (374), Emergency Contact (376), and Towing (378). The diagram also shows a communication link (352) connecting the central RSU (316) to a base station (354). Figure 3

³ Ex. 1012 (A.S. Tanenbaum, Introduction to Computer Networks, 3d. ed. 1997), 86-88.

⁴ ; Ex. 1013 (Specification of the Bluetooth System, Vol. 1, Version 1.2, Nov. 5, 2003), 15-16, 31.

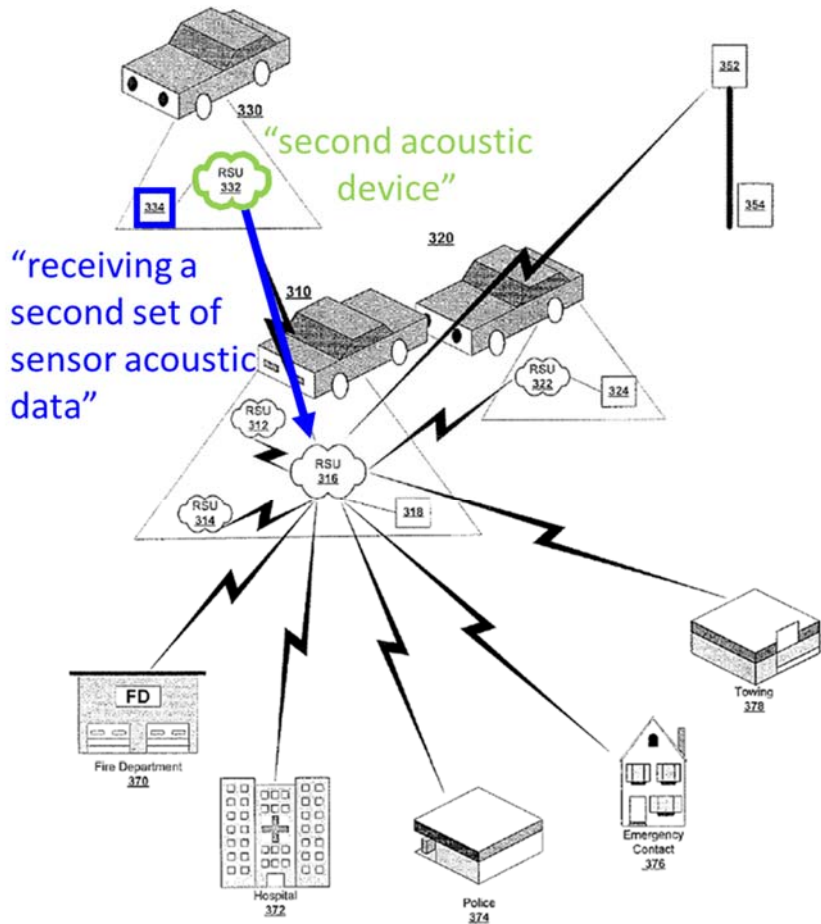
'329 Claim	Denny
	10:37-11:2: “In other embodiments, a remote sensing unit may use mesh networking techniques at block 430 of FIG. 4 to identify additional remote sensing units (RSUs) that may have collected data about the incident. Pursuant to these mesh networking techniques, the remote sensing unit might, for example, contact other nearby remote sensing units who, in turn, would contact other nearby remote sensing units on an ad hoc basis in order to identify all of the remote sensing units that were in the general vicinity of the incident. <i>GPS data could be included in the messages forwarded between remote sensing units to ensure that only remote sensing units in the general vicinity of the incident are contacted.</i> In still other embodiments, <i>a page could be sent to every remote sensing unit and responsive information provided by the remote sensing units (e.g., location data) could be used to identify which other remote sensing units are likely to have collected data regarding the incident. In still other embodiments, every remote sensing unit could continuously or periodically broadcast its identification (e.g., via an ultrawideband system) and perhaps other information, such as its location, which could then be used by a remote sensing unit to identify the other remote sensing units in the vicinity of the incident.</i> In still further embodiments, at block 430 of FIG. 4 the remote sensing unit might sense communications networks that are operating in the area and send out a page or messages on each different type of network as means of contacting and identifying other remote sensing units in the general vicinity. In other embodiments, a system hub (or other system element) could track the location of some or all of the remote sensing units, and the identification step at block 430 could simply comprise requesting the identification from such a system hub. Various other methods of identifying

'329 Claim	Denny
	remote sensing units having data regarding the incident may be implemented.” 13:57-14:13: “The <i>communications unit 610</i> may be used to transmit and receive information between the remote sensing unit 600 and other remote sensing units as in the embodiments of FIGS. 1 and 3, and/or to transmit and receive information between the remote sensing unit 600 and a local aggregator and/or one or more system hubs (such as the local aggregator 550 or system hub 515 in FIG. 5). The communications unit 610 may comprise, for example, <i>a cellular telephone, an internet protocol or other packet switched wireless communications device, a Bluetooth or WiMax connection, a landline telephone, a wired internet connection, a combination thereof, or any of a wide variety of other communications systems</i>. In some embodiments, each remote sensing unit can directly communicate with all of the other elements of the system (e.g., other remote sensing units, local aggregators and system hubs). In other embodiments, some remote sensing units may only have indirect communications ability. By way of example, a <i>remote sensing unit mounted in an automobile might include a communication unit 610 that is implemented as a Bluetooth transceiver. This Bluetooth transceiver could then interface with other remote sensing units and/or a system hub via a Bluetooth connection to a cellular telephone of one of the occupants of the automobile, and a cellular connection from that cellular telephone to the system hub.</i>”
[1.d] receiving a first set of sensor acoustic data from a first acoustic device of the selected	Denny discloses that the controller is configured to receive (e.g., “collect[.]”) a first set of sensor acoustic data (e.g., “data set[.]” 324 including “audio data”) from a first acoustic device of the selected subset of acoustic devices (e.g., “remote sensing unit 322”).

'329 Claim	Denny
subset of acoustic devices;	<u>E.g., Denny:</u> See [1.a.1]-[1.c] (§IX.A.2). For example, and as discussed in [1.a.1] and [1.b], Denny discloses that the controller RSU identifies and collects acoustic sensor data from other RSUs. For example, in connection with Fig. 3, after detecting an incident, controller RSU 316 identifies additional RSUs, such as RSUs 322 and 332, that likely have data, such as data sets 324 and 334, based on their proximity to the incident. Denny, 9:65-10:17, 10:18-10:36, 10:37-11:2, Fig. 3, Fig. 4. After identification, controller RSU 316 collects data set 324 from RSU 322. Denny, 11:9-26, Fig. 3, Fig. 4. Kiaei, ¶¶99-104. • Fig. 3  Figure 3

'329 Claim	Denny
	• Fig. 4 <pre> graph TD START([START]) --> 400[Collect Sensed Data 400] 400 --> 405[Temporarily Store Sensed Data 405] 405 --> 410[Analyze Sensed Data 410] 410 --> 415{Incident Occurred? 415} 415 -- No --> 420[Collect and Store Additional Sensed Data 420] 420 --> 400 415 -- Yes --> 425[Activate Additional Sensors 425] 425 --> 430[Identify Additional RSUs Having Data About the Incident 430] 430 --> 435[Mark Data for More Permanent Storage 435] 435 --> 440[Collect Data from Identified RSUs 440] 440 --> 445[Analyze Full Set of Sensed Data 445] 445 --> 450{Response Necessary? 450} 450 -- Yes --> 455[Coordinate Response 455] 455 --> END([END]) 450 -- No --> 440 </pre> Figure 4 • 7:18-31: “It will be appreciated that the types of sensors carried by each remote sensing unit 12, 14, 16, 22, 32, 42, 52, and hence <i>the collected sensor data contained in the data sets 18, 24, 34, 44, 54, may be quite varied.</i> For example, <i>the first data set 18 and/or the second data set 24 may include</i> accelerometer data, speedometer data, <i>audio data</i>, braking data, global positioning satellite location data, temperature data, rain detector information, information regarding the number of

'329 Claim	Denny
	passengers, seat belt status information, breathalyzer information, trajectory information, etc. Some of this collected data may be indicative of an automobile accident (i.e., a sudden deceleration, the stopping of the vehicle, the vehicle decelerating more quickly than anticipated based on the braking data, audio recordings of the sound of the vehicles colliding, etc.).” 9:43-64: “As shown in FIG. 3, an automobile accident occurs between a first vehicle 310 and a second vehicle 320. The first vehicle 310 involved in the automobile accident has two passengers (not shown), each of whom is carrying a <i>personal remote sensing unit 312, 314</i>, and the first vehicle 310 also has a <i>built-in remote sensing unit 316</i>. The second vehicle 320 has a single passenger (not shown) who is carrying a <i>remote sensing unit 322</i>. A third vehicle 330 that contains an <i>embedded remote sensing unit 332</i> is also in the vicinity at the time of the accident, and a <i>fixed remote sensing unit 352</i> is also located nearby. When the first vehicle 310 collides with the second vehicle 320, <i>each of the remote sensing units 312, 314, 316, 322, 332, 352 may collect sensor data</i> that provides information about the collision. This collected sensor data is depicted in FIG. 3 as <i>data sets 318, 324, 334, 354</i>.” 10:18-36: “As shown at block 430 of FIG. 4, <i>the remote sensing unit may also proceed to identify additional remote sensing units (RSUs) that may have collected data about the incident</i> (and/or which could be activated to start collecting data about the incident). This may be accomplished in a variety of ways.” 11:9-26: “<i>One of the remote sensing units (e.g., the remote sensing unit that identified that an incident occurred) may then proceed to collect data from each of the other identified remote sensing units</i>.”

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[1.e] receiving a second set of sensor acoustic data from a second acoustic device of the selected subset of acoustic devices; and	Denny discloses that the controller is configured to receive (e.g., “collect[.]”) a second set of sensor acoustic data (e.g., “data set[.]” 334 including “audio data”) from a second acoustic device of the selected subset of acoustic devices (e.g., “remote sensing unit 332”). <u>E.g., Denny:</u> See [1.a.1]-[1.d] (§IX.A.2). For example, in addition to data set 324, Denny discloses that the controller RSU 316 collects data set 334 including audio data from RSU 332. See [1.d]. Kiaei, ¶¶105-109. • Fig. 3  Figure 3

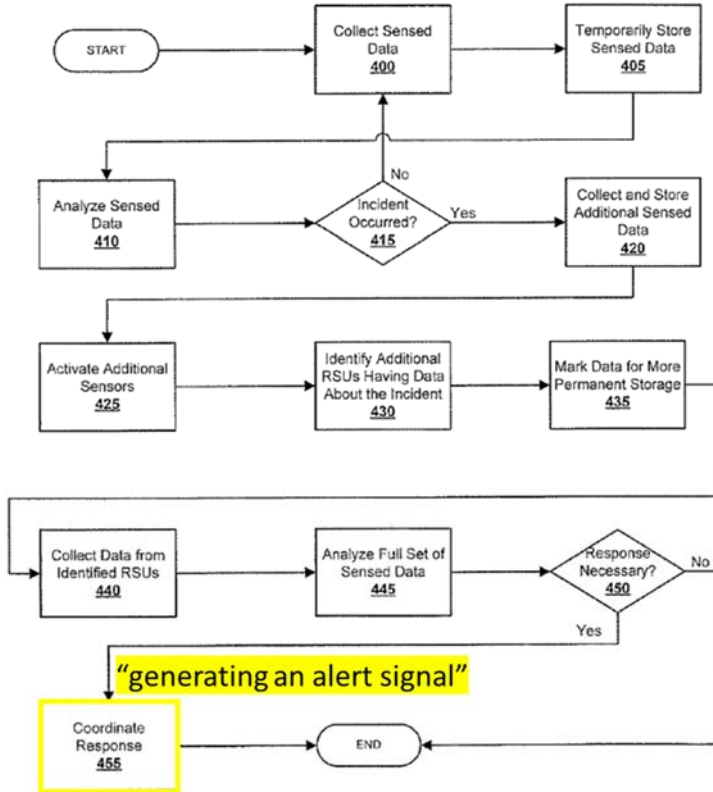
'329 Claim	Denny
	• Fig. 4 <pre> graph TD START([START]) --> 400[Collect Sensed Data 400] 400 --> 405[Temporarily Store Sensed Data 405] 405 --> 410[Analyze Sensed Data 410] 410 --> 415{Incident Occurred? 415} 415 -- No --> 400 415 -- Yes --> 420[Collect and Store Additional Sensed Data 420] 420 --> 425[Activate Additional Sensors 425] 425 --> 430[Identify Additional RSUs Having Data About the Incident 430] 430 --> 435[Mark Data for More Permanent Storage 435] 435 --> 440[Collect Data from Identified RSUs 440] 440 --> 445[Analyze Full Set of Sensed Data 445] 445 --> 450{Response Necessary? 450} 450 -- Yes --> 455[Coordinate Response 455] 455 --> END([END]) 450 -- No --> 440 </pre> “receiving a second set of sensor acoustic data” Figure 4 • <i>See also 7:18-31, 9:43-64, 10:18-36, 11:9-26</i>
[1.f] analyzing at least one of the first set of sensor acoustic data or the second set of	Denny discloses that the controller is configured to analyze (e.g., “perform a second analysis”) at least one of the first set of sensor acoustic data (e.g., “data set[]” 324) or the second set of sensor acoustic data (e.g., “data set[]” 334) or a combination of both to identify if speech is present (e.g., “exemplary incidents include...fearful screaming”).

'329 Claim	Denny
sensor acoustic data or a combination of both to identify if speech is present.	<u>E.g., Denny:</u> See [1.a.2], [1.d]-[1.e] (§IX.A.2). For example, Denny discloses that the controller RSU performs “a second analysis” on a “more complete data set that includes data from additional [RSUs],” such as data sets 324 and 334 from RSUs 322 and 332, respectively (see [1.d]-[1.e], §IX.A.2). Denny, 11:9-26. Based on this analysis, the controller RSU “determine[s] whether a response is necessary to the identified incident,” where an example of an incident is “fearful screaming,” which is a form of speech. Denny, 11:9-26, 16:61-17:10. If “fearful screaming” is detected in the data sets 324 and 334, then the controller RSU “coordinates...a response” “appropriate for the specifically identified incident.” Denny, 11:9-26, 16:61-17:10, Fig. 4. If “fearful screaming” is not detected in the data sets 324 and 334, then the controller RSU does not coordinate a response and the incident response method ends. Denny, 11:9-26, 16:61-17:10, Fig. 4. Kiaei, ¶¶110-117, 119. A POSITA would have understood (or at least found it obvious) that “fearful screaming” includes “speech,” such as a passenger screaming “help me,” resulting from an automobile accident. Kiaei, ¶117. Contemplation of the substance of the fearful screaming would have advantageously enhanced the reliability of Denny’s system, such that an incident would be confirmed based on passenger’s speech, such as the passenger screaming “help me,” as opposed to just a passenger screaming “augh.” Kiaei, ¶¶117-118. For example, a passenger might scream when their vehicle nearly gets into an accident with another vehicle, even though no actual accident occurs. Kiaei, ¶¶117-118. A POSITA would have recognized the benefits in implementing Denny’s system such that it would initiate an emergency response if the passenger screams “help me,” not just a scream in the event of an incident that almost occurred but did not. See, e.g., Hirata, [0044], [0208]. Kiaei, ¶¶117-120.

'329 Claim	Denny
	Fig. 4 <pre> graph TD START([START]) --> 400[Collect Sensed Data 400] 400 --> 405[Temporarily Store Sensed Data 405] 405 --> 410[Analyze Sensed Data 410] 410 --> 415{Incident Occurred? 415} 415 -- No --> 400 415 -- Yes --> 420[Collect and Store Additional Sensed Data 420] 420 --> 425[Activate Additional Sensors 425] 425 --> 430[Identify Additional RSUs Having Data About the Incident 430] 430 --> 435[Mark Data for More Permanent Storage 435] 435 --> 440[Collect Data from Identified RSUs 440] 440 --> 445[Analyze Full Set of Sensed Data 445] 445 --> 450{Response Necessary? 450} 450 -- No --> END([END]) 450 -- Yes --> 455[Coordinate Response 455] 455 --> END </pre> “analyzing [the acoustic data] to identify if speech is present” Figure 4 11:9-26: “One of the remote sensing units (e.g., the remote sensing unit that identified that an incident occurred) may then proceed to collect data from each of the other identified remote sensing units. <i>Once this additional data is collected, as shown at block 440 of FIG. 4, the remote sensing unit may perform a second analysis (block 445), this time on the more complete data set that includes data from additional remote sensing units and perhaps additional data collected subsequent to the identification of the incident at block 415. Based on this analysis, the remote sensing unit</i>

'329 Claim	Denny
	<i>may determine whether a response is necessary to the identified incident (block 450).</i> While this determination may be made earlier in other embodiments of the present invention, by waiting until a more complete data set has been collected and analyzed, it may be possible to more accurately identify the type of incident that has occurred and therefore <i>enact a response that is appropriate for the specifically identified incident.</i> At block 455, the remote sensing unit <i>coordinates such a response</i>, if necessary.” • 16:61-17:10: “While the above automobile accident provides one example of a type of incident that can automatically be identified by the systems and methods according to embodiments of the present invention...<i>Other exemplary incidents include</i> fires in homes, offices or automobiles, gunshot detection, plane or boat crashes, <i>fearful screaming</i>, suspicious behavior, muggings, bombings, war, running out of gas, etc....”
[5] The system of claim 1, wherein the operations further comprise: selecting the subset of devices based on geographic proximity to a user.	See [1]. Denny discloses that the controller selects the subset of devices based on geographic proximity to a user (e.g., “built-in” RSU 316 of a “first vehicle 310 involved in [an] automobile accident ha[ving] two passengers” detects an incident and “identifies additional [RSUs],” such as RSUs 312, 314, 332, 334, 352 based on their proximity to RSU 316 and the user). <u>E.g., Denny:</u> See [1.a.2], [1.b] (§IX.A.2). For example, Denny discloses a first vehicle having a “built-in” RSU 316 and “two passengers,” such that, when the first vehicle has “an automobile accident” with another vehicle, controller RSU 316 “identifies additional [RSUs],” such as RSUs 312, 314, 332, 334, and 352, that “have collected data about the incident” because they are “in the vicinity of the

'329 Claim	Denny
	incident” involving the user, i.e., the passenger. Kiaei, ¶¶121-126. • 9:43-64: “As shown in FIG. 3, <i>an automobile accident</i> occurs between a first vehicle 310 and a second vehicle 320. The <i>first vehicle 310 involved in the automobile accident has two passengers</i> (not shown), each of whom is <i>carrying a personal remote sensing unit 312, 314, and the first vehicle 310 also has a built-in remote sensing unit 316</i>. The second vehicle 320 has a single passenger (not shown) who is carrying a <i>remote sensing unit 322</i>. A third vehicle 330 that contains an embedded <i>remote sensing unit 332 is also in the vicinity at the time of the accident</i>, and a <i>fixed remote sensing unit 352 is also located nearby....</i>” • 10:18-36: “As shown at block 430 of FIG. 4, <i>the remote sensing unit may also proceed to identify additional remote sensing units (RSUs) that may have collected data about the incident</i> (and/or which could be activated to start collecting data about the incident). This may be accomplished in a variety of ways. For example, in some embodiments of the present invention, <i>the remote sensing units may have a low power communication system which they can use to communicate via, for example, a paging channel, with other remote sensing units in the general vicinity (e.g., within a mile)....</i>” • See also 5:53-67.
[7] The system of claim 1, wherein the operations further comprise: generating an alert signal based upon an	See [1]. Denny discloses that the controller generates an alert signal (e.g., “automatically notify the local fire department 370, the nearest hospital 372 (or emergency response unit) to the site of the collision, and/or the closest police substation 374”) based upon an analysis of at least one of the first set of acoustic sensor data or the second set of acoustic data or a combination of both (e.g., “based on...the analysis of the sensed data,” “data sets” 324 and 334; see [1.d]-[1.f]).

'329 Claim	Denny
analysis of at least one of the first set of acoustic sensor data or the second set of acoustic data or a combination of both.	<u>E.g., Denny:</u> See [1.a.2], [1.d]-[1.f] (§IX.A.2). For example, Denny discloses that the controller RSU is programmed to analyze data from additional RSUs to determine if an incident occurred and, based on that determination, send automatic notifications, such as to the fire department, nearest hospital, police substation, etc. Denny, 11:27-55. Kiaei, ¶¶127-131. Fig. 4  <pre> graph TD START([START]) --> 400[Collect Sensed Data 400] 400 --> 405[Temporarily Store Sensed Data 405] 405 --> 410[Analyze Sensed Data 410] 410 --> 415{Incident Occurred? 415} 415 -- No --> 400 415 -- Yes --> 420[Collect and Store Additional Sensed Data 420] 420 --> 425[Activate Additional Sensors 425] 425 --> 430[Identify Additional RSUs Having Data About the Incident 430] 430 --> 435[Mark Data for More Permanent Storage 435] 435 --> 440[Collect Data from Identified RSUs 440] 440 --> 445[Analyze Full Set of Sensed Data 445] 445 --> 450{Response Necessary? 450} 450 -- No --> END([END]) 450 -- Yes --> 455[Coordinate Response 455] 455 --> END </pre> The flowchart illustrates a process for handling an incident. It begins with a 'START' terminal leading to 'Collect Sensed Data 400', which then leads to 'Temporarily Store Sensed Data 405'. From there, the process moves to 'Analyze Sensed Data 410'. A decision diamond 'Incident Occurred? 415' follows. If the answer is 'No', the flow returns to 'Collect Sensed Data 400'. If 'Yes', it proceeds to 'Collect and Store Additional Sensed Data 420', then 'Activate Additional Sensors 425', 'Identify Additional RSUs Having Data About the Incident 430', and 'Mark Data for More Permanent Storage 435'. This leads to 'Collect Data from Identified RSUs 440', followed by 'Analyze Full Set of Sensed Data 445'. Another decision diamond 'Response Necessary? 450' follows. If 'No', the process ends at 'END'. If 'Yes', it proceeds to 'Coordinate Response 455', which is highlighted with a yellow box, and then ends at 'END'. A yellow box with the text '“generating an alert signal”' is placed above the arrow leading to block 455. Figure 4 11:27-55: “The <i>responsive measures</i> that are enacted at block 455 in response to <i>determining that an incident has occurred</i> may be preprogrammed responses. The particular response selected may be <i>based on, for</i>

'329 Claim	Denny
	<i>example, the analysis of the sensed data performed at block 445 (or alternatively based on the analysis performed at block 410) of FIG. 4. Referring again to our automobile accident example of FIG. 3, the analysis of the sensed data by remote sensing unit 316 may indicate with a high degree of probability that the first vehicle 310 was involved in some sort of collision. Upon making this determination, the remote sensing unit 310 could be programmed to automatically notify the local fire department 370, the nearest hospital 372 (or emergency response unit) to the site of the collision, and/or the closest police substation 374....</i>” See also 11:9-26.
[8] The system of claim 1, wherein the operations further comprise: analyzing at least one of the first set of acoustic sensor data or the second set of acoustic sensor data or a combination of	See [1]. Denny discloses that the controller analyzes at least one of the first set of acoustic sensor data (see [1.d]) or the second set of acoustic sensor data (see [1.e]) or a combination of both for animal sounds (e.g., “fearful screaming”). See [1.a.2], [1.d]-[1.f] (§IX.A.2). To the extent human sounds are considered “animal sounds,” Denny discloses that the system can be used to detect “fearful screaming.” See [1.f] (§IX.A.2). Further, it would have been obvious to implement Denny’s incident reporting system to analyze acoustic data containing animal sounds, such as an injured dog’s whimper or bark, resulting from a car accident. Kiaei, ¶¶132-137.⁵

⁵ See, e.g., Murata, [0084] (comparing “animal vocalization data 132” with “reference vocalization patterns to determine the emotions contained in the animal vocalization data”).

'329 Claim	Denny
both for animal sounds.	
[9] The system of claim 1, wherein the operations further comprise: determining the locations of each of the selected subset of acoustic devices.	See [1]. Denny discloses that the controller determines the locations of each of the selected subset of acoustic devices (e.g., RSU 316 uses “location” data of RSUs 312, 314, 322, 332 and 352 to “identify” them as “additional...RSUs” having “data about the incident”). See [1.a.2], [1.b]-[1.c], [5] (§IX.A.2). For example, as discussed in [1.b] (§IX.A.2), Denny discloses that a controller RSU (e.g., 316) “identif[ies] additional [RSUs] that may have collected data” (e.g., 312, 314, 322, 332, 352), including, e.g., by using “location” data to contact RSUs “in the vicinity of the incident.” Denny, 10:18-36, 10:37-11:2. By using the “location” data to select the subset of RSUs that may have collected data, a POSITA would have understood this involves determining the locations of each of the selected subset of RSUs and at minimum found it obvious to do so advantageously accurately identify the RSUs in the vicinity and collect relevant data. Kiaei, ¶¶138-143.

B. Ground 2: Denny in view of Hirata (Claims 1-9)

Limitation [1.f] requires the controller to analyze received acoustic data “to identify if speech is present” (Claim 1). As discussed above in §IX.A.1-2 ([1.f]), Claim 1 is disclosed or at least rendered obvious by **Denny**. Kiaei, ¶¶110-120, 158.

For [1.f], to the extent additional disclosure of “identify[ing] if speech is present” is required, Hirata further discloses analyzing acoustic data (e.g., “sound data,” such as “utter[ed]...words,” picked up by a “microphone”) to identify if speech is present (e.g., performing “speech recognition” on “the sound data to

judge whether the emergency notification process is necessary or not”). *E.g.*, Hirata, [0001]-[0002], [0019]-[0020], [0044], [0206], [0208]. Kiaei, ¶¶159-161.

Hirata discloses portable radio devices (such as “portable telephones” or “automobile telephones”) that use “speech recognition” for sending emergency notifications related to accidents (such as “traffic accident[s]”). Hirata, [0001]-[0002], [0019]-[0020], [0044]. For example, a “user seek[ing] someone’s help...utter[s] some words such as ‘help me,’” which is picked up by the device’s “microphone” and processed by “sound processing section 40” using “speech recognition using the sound data [from the microphone] to judge whether the emergency notification process is necessary or not,” such as “notif[ying]...the police, [a] private security company, and his/her family and friends.” Hirata, [0044], [0206], [0208], Fig. 3. If the “sound processing section 40” “judges that the emergency notification process is necessary” based on the “speech recognition,” then the “emergency notification process” is performed. Hirata, [0044], [0208]. If the “sound processing section 40” “judges that the emergency notification process is...not” “necessary” based on the “speech recognition,” then the “emergency notification process” is not performed. Hirata, [0044], [0208]. Kiaei, ¶¶144-146.

Denny and **Hirata** are in the same field as the ’329—which includes acoustic data analysis—and are reasonably pertinent to the problems purportedly addressed by the ’329—e.g., detecting triggering events. See ’329, 1:25-29, 1:44-67; Denny,

Abstract, 5:55-60, 7:21-41, 16:61-17:10; Hirata, Abstract, [0044], [0208]. Like the '329, **Denny** and **Hirata** each contemplate acoustic incident reporting systems comprising a device that collects and analyzes data for certain information in various applications, including emergencies. '329, 4:42-49, 14:50-64, 16:47-65, 20:1-21:2; Denny, 9:57-64, 11:27-55, 16:61-17:10; Hirata, [0044], [0208]. Kiaei, ¶¶147-150.

Denny discloses detecting “fearful screaming” incidents, and **Hirata** provides an exemplary form of “fearful screaming” detection using speech and keywords, such as “help me.” Denny, 16:61-17:10; Hirata, [0208]. A POSITA would have been motivated to apply **Hirata’s** teachings of using keyword detection in implementing **Denny’s** incident reporting system to advantageously detect incidents based on spoken words associated with an incident, such as a person saying “help me” when, for example, a car accident occurs. Kiaei, ¶151. A POSITA would have found it obvious to apply **Hirata’s** known keyword detection technique to improve **Denny’s** incident identification system in the same way, whereby **Denny’s** controller RSU, such as RSU 316, would analyze received audio data comprising speech to determine if an incident occurred and make an appropriate response. Kiaei, ¶¶151-152.

Further, a POSITA would have been motivated to apply **Hirata’s** teachings of detecting an incident in response to a specific, predetermined keyword in implementing **Denny’s** incident reporting system so that the system would

accurately detect an incident or trigger an emergency response based on speech being present in the received signals. This will ensure that the relevant authorities are “notified quickly and surely” of “a state of emergency.” Hirata, [0066] *see also* Hirata, [0144] (“For example, the microphone 17 is used for voice recognition to judge whether the emergency notification is necessary or not....”). For example, by using targeted keywords (such as “help me”) rather than sound in general, applying **Hirata’s** teaching in implementing **Denny’s** incident reporting system would improve the system to more accurately discern between acoustic data that requires a responsive action (e.g., “help me”) from another acoustic data that does not require a responsive action (e.g., “I’m tired” or a relatively loud sound unrelated to an incident). Kiaei, ¶153.

Further, applying **Hirata’s** teaching in implementing **Denny’s** incident reporting system would have also improved the system to discern between different types of incidents and the appropriate response thereto. For example, upon detection of the keyword “help me,” a POSITA would have understood the benefits in notifying only the “police department 374” and not also “towing service 378” (*see* Denny, Fig. 3) unless the keyword detected provided more context warranting a towing service to be deployed, such as “help me, I have a flat tire.” Kiaei, ¶154.

A POSITA would have had a reasonable expectation of success in applying **Hirata’s** speech detection teachings in implementing **Denny’s** incident reporting

system, as both references teach incident reporting systems that use audio data to perform an appropriate response. Kiaei, ¶¶155-156. Further, both **Denny** and **Hirata** disclose using software to carry out their respective functionalities, and implementing **Hirata's** teaching in **Denny** would have required only additional sound patterns to be recognized by **Denny's** controller RSU. See **Denny**, 2:8-11, 2:62-3:16, 4:27-5:9, 5:35-52, 13:48-56, 14:23-31, 15:52-57, Fig. 6; **Hirata**, Abstract, [0002], [0157], [0208], Fig. 3. This would have been a straightforward application of **Hirata's** teachings of speech recognition in a manner that advantageously improves **Denny's** incident reporting system. Kiaei, ¶¶155-156.

A POSITA would have understood that, applying **Hirata's** teachings of speech recognition to **Denny's** incident reporting system would not impact the analysis of Claims 5 and 7-9, and thus the same analysis regarding **Denny** (§IX.A.2) applies such that **Denny** in view of **Hirata** render those claims obvious. Kiaei, ¶¶180, 190.

For [2], **Hirata** discloses analyzing the speech for a keyword (*e.g.*, performing “speech recognition” on “utter[ed]...words,” such as “help me”). *E.g.*, **Hirata**, [0044], [0206], [0208]. And, as noted earlier in this section, a POSITA would have been motivated to apply **Hirata's** teachings of speech recognition to **Denny's** incident reporting system. Kiaei, ¶¶162-165.

For [3], which depends from [2], Denny discloses that the first set of sensor acoustic data (see [1.d], §IX.A.2) and the second set of sensor acoustic data (see [1.e], §IX.A.2) are received based on a triggering event (e.g., “remote sensing unit [316]...determine[s] if an incident has occurred” and then “identif[ies]” and “collect[s]” “data sets” 324 and 334 from RSUs 322 and 332). As discussed in [1.a.1]-[1.e] (§IX.A.2), **Denny** discloses that the controller RSU first determines if an incident has occurred. If the controller RSU determines that an incident has occurred, the controller RSU identifies additional RSUs to collect sensor data from. Upon receipt, the controller RSU analyzes the fuller set of collected data to again determine if an incident occurred. Denny, 9:65-10:17, 10:18-10:36, 11:12-17, Fig. 4. Kiaei, ¶¶166-169.

For [4], which depends from [3], Denny discloses determining a direction of measurement of at least one device of the subset of devices (e.g., determining “the direction where an incident is believed to have happened”). For example, **Denny** discloses that, after performing a “second analysis” that includes the data received from the additional RSUs, the controller RSU’s response to incident detection includes “modifying the current settings on various sensors” of “one or more” RSUs, such as the sensors of the controlled RSUs. Denny, 9:13-27, 11:12-17. For example, the controller RSU “redirect[s] a video camera” of a controlled RSU “to point in the direction where an incident is believed to have happened.” Denny,

9:13-27. Redirecting the camera to the incident involves determining the direction of measurement of that device, and at minimum it would have been obvious to do so in order to train the camera on and receive video of the location of the incident. Kiaei, ¶¶170-179.

This is consistent with how the '329 patent discloses determining a direction of detection of at least one of the subset of devices, which discloses that the “direction of measurement” includes the direction of the sound source. For example, the specification discloses that “audio is buffered at devices 120 carried by multiple soldiers, and the combined information may be used to estimate the direction of a sniper location.” '329, 14:60-64. The specification also discloses that “devices 120 may locally exchange information to perform aggregated analysis,” including “local assessments of shooter direction based on the information they obtain.” '329, 14:66-15:7. Kiaei, ¶¶177-178.

For [6], which depends from [2], Denny discloses that the controller (e.g., RSU 316) activates a sensor based upon detected speech (e.g., “activating additional sensors on one or more remote sensing units” based on “fearful screaming”). See [1.b], [1.f], [2] (§IX.A.2); §IX.B. For example, Denny discloses that the controller RSU uses data from other RSUs to “determine whether a response is necessary to the identified incident,” e.g., based on “fearful screaming,” and activate a “response” to the incident. Denny, 11:12-19, 17:3-6. Denny further

discloses “the response may further include activating additional sensors on one or more remote sensing units.” Denny, 9:23-27. Thus, **Denny** discloses (or at least renders obvious) activating additional sensors on one or more RSUs to advantageously confirm it has appropriately identified the incident. Kiaei, ¶¶181-187. **Hirata discloses the keyword** (see [2], §IX.B). A POSITA would have understood and found obvious that, in applying **Hirata’s** teachings of speech recognition to **Denny’s** incident reporting system, the additional sensor(s) would be activated based on the detected keyword triggering the response in order to advantageously “determine whether a response is necessary to the identified incident.” Kiaei, ¶¶188-189.

C. Ground 3: Denny in View of Byers (Claims 1-11)

Limitation [1.f] requires the controller to analyze received acoustic data “to identify if speech is present” (Claim 1). As discussed above in §IX.A.1-2 ([1.f]), Claim 1 is disclosed or at least rendered obvious by **Denny**. Kiaei, ¶¶110-120, 191.

For [1.f], to the extent additional disclosure of “identify[ing] if speech is present” is required, Byers further discloses analyzing acoustic data (e.g., “voice command[s]” “pick[ed] up or transduce[d]” by “microphones” into “microphone signal[s]”) to identify if speech is present (e.g., “perform[ing] speech recognition” on “the plurality of microphone signals” for a “valid match”). E.g., Byers, 4:20-22, 4:33-49, 4:66-5:12, 8:22-35, 8:38-47. Kiaei, ¶¶192-201.

Byers discloses “a plurality of microphones” that “each individually and respectively pick up or transduce” a user’s “voice command into a microphone signal” and “relay[]” them to an “automatic speech recognition (ASR) controller 50.” *Byers*, 4:20-22, 4:33-49, 4:66-5:7. The controller “interprets the plurality of microphone signals,” including to “perform[] speech recognition” using “a speech recognition vocabulary table” consisting of “all the possible commands for the successfully detected device.” *Byers*, 5:6-12, 8:22-35. If “a valid match was made,” the controller “determin[es] the control command for the successfully detected device” and transmits it to that device. *Byers*, 8:38-47. *Kiaei*, ¶193.

Denny and **Byers** are in the same field as the ’329—which includes acoustic data analysis—and are reasonably pertinent to the problems purportedly addressed by the ’329—e.g., detecting triggering events. *See* ’329, 1:25-29, 1:44-67; *Denny*, Abstract, 1:7-9, 5:55-60, 7:21-41, 16:61-17:10; *Byers*, Abstract, 1:14-17, 2:10-18, 4:20-5:7. Like the ’329, **Denny** and **Byers** each contemplate acoustic analysis systems comprising a device that collects and analyzes data for certain information in various applications. ’329, 4:42-49, 14:50-64, 16:47-65, 20:1-21:2; *Denny*, 9:57-64, 11:27-55, 16:61-17:10; *Byers*, Abstract, 1:14-17, 2:10-18, 4:20-5:7. *Kiaei*, ¶¶194-195.

A POSITA would have been motivated to apply **Byers’** teachings of using keyword detection in implementing **Denny’s** incident reporting system to

advantageously detect incidents based on spoken words, including voice commands, associated with an incident, such as a person saying “help me” or “call 911” when, for example, a car accident occurs. Kiaei, ¶196. A POSITA would have found it obvious to apply **Byers’** known keyword detection technique to improve **Denny’s** incident identification system in the same way, whereby **Denny’s** controller RSU, such as RSU 316, would analyze received audio data comprising speech to determine if an incident occurred and make an appropriate response. Kiaei, ¶197.

Further, a POSITA would have been motivated to apply **Byers’** teachings of detecting an incident in response to a specific, predetermined keyword in implementing **Denny’s** incident reporting system so that the system would accurately detect an incident or trigger an emergency response based on speech being present in the received signals. For example, by using targeted keywords (such as “help me”) rather than sound in general, applying **Byers’** teaching in implementing **Denny’s** incident reporting system would improve the system to more accurately discern between acoustic data that requires a responsive action (e.g., “help me”) from another acoustic data that does not require a responsive action (e.g., “I’m tired” or a relatively loud sound unrelated to an incident). Kiaei, ¶198.

Further, applying **Byers’** teaching in implementing **Denny’s** incident reporting system would have also improved the system to discern between different types of incidents and the appropriate response thereto. For example, upon detection

of the keyword “help me,” a POSITA would have understood the benefits in notifying only the “police department 374” and not also “towing service 378” (see Denny, Fig. 3) unless the keyword detected provided more context warranting a towing service to be deployed, such as “help me, I have a flat tire.” Kiaei, ¶199.

A POSITA would have had a reasonable expectation of success in applying **Byers’** speech detection teachings in implementing **Denny’s** incident reporting system, as both references teach incident reporting systems that use audio data to perform an appropriate response. Kiaei, ¶¶200-201. Further, both **Denny** and **Byers** disclose using processors and memories to carry out their respective functionalities, and implementing **Byers’** teaching in **Denny** would have required only additional sound patterns to be recognized by **Denny’s** controller RSU. See Denny, 2:8-11, 2:62-3:16, 4:27-5:9, 5:35-52, 13:48-56, 14:23-31, 15:52-57; Byers, 6:51-58, 6:63-7:26, Fig. 2. This would have been a straightforward application of **Byers’** teachings of speech recognition in a manner that advantageously improves **Denny’s** incident reporting system. Kiaei, ¶¶200-201.

A POSITA would have understood that, applying **Byers’** teachings of speech recognition to **Denny’s** incident reporting system would not impact the analysis of Claims 5 and 7-9, and thus the same analysis regarding **Denny** (§IX.A.2) applies such that **Denny** in view of **Byers** renders those claims obvious. Kiaei, ¶¶208, 213-215.

For [2], Byers discloses analyzing the speech for a keyword (e.g., “performing speech recognition” on the “microphone signal” comprising the user’s “voice command” for a “valid match”). E.g., Byers, 4:20-22, 4:33-49, 4:66-5:12, 8:22-35, 8:38-47. See [1.f], §IX.C. And, as noted earlier in this section, a POSITA would have been motivated to apply **Byers’ teachings of speech recognition to **Denny’s** incident reporting system. Kiaei, ¶¶202-203.**

For [3], which depends from [2], Denny discloses that the first set of sensor acoustic data and the second set of sensor acoustic data are received based on a triggering event. See §IX.B. A POSITA would have understood that, applying **Byers’ teachings of speech recognition to **Denny’s** incident reporting system would not impact the analysis of Claim 3, and thus the same analysis regarding **Denny** (§IX.B) applies such that **Denny** in view of **Byers** renders Claim 3 obvious. Kiaei, ¶¶204-205.**

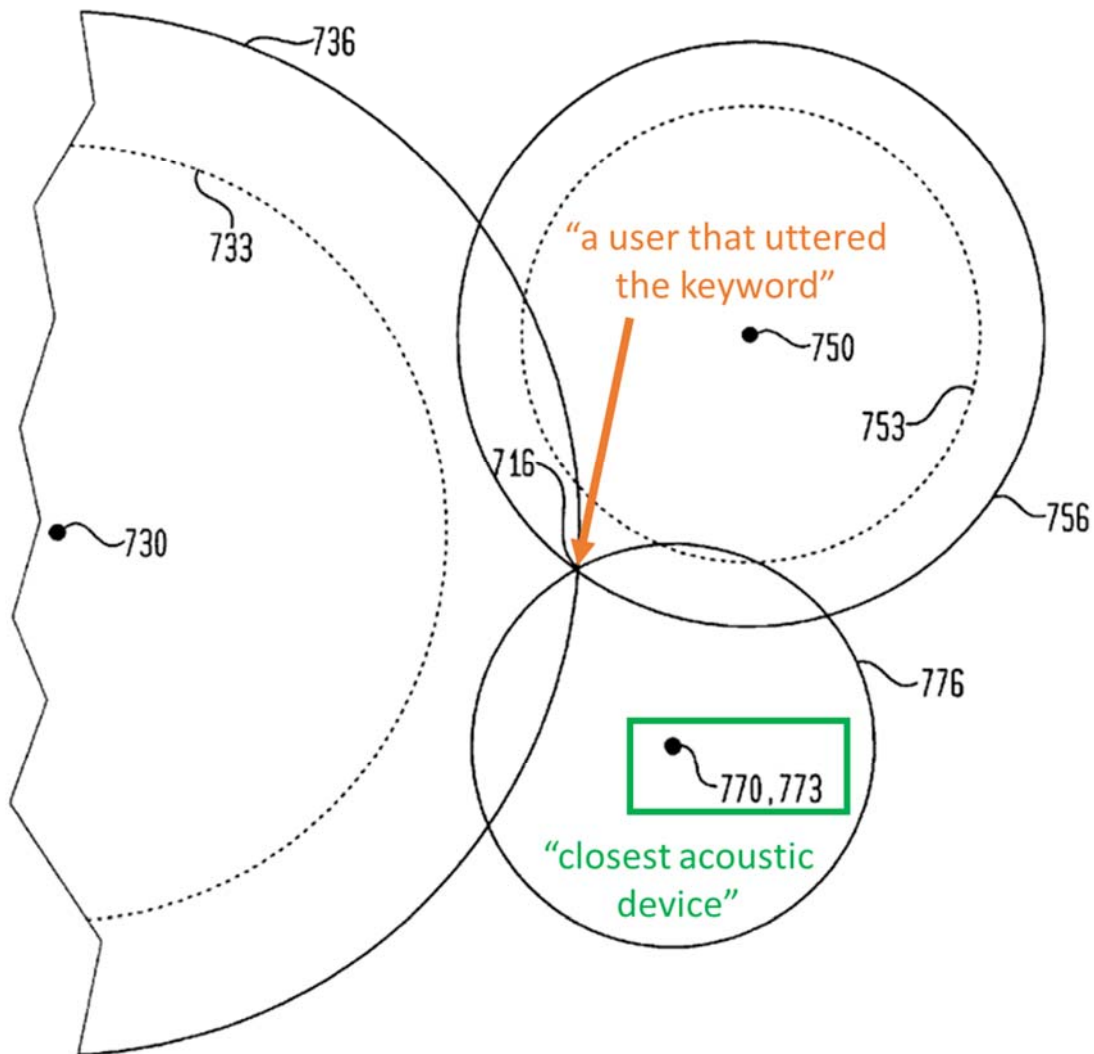
For [4], which depends from [3], Denny discloses determining a direction of measurement of at least one device of the subset of devices. See §IX.B. A POSITA would have understood that, applying **Byers’ teachings of speech recognition to **Denny’s** incident reporting system would not impact the analysis of Claim 4, and thus the same analysis regarding **Denny** (§IX.B) applies such that **Denny** in view of **Byers** render Claim 4 obvious. Kiaei, ¶¶206-207.**

For [6], which depends from [2], Denny discloses that the controller activates a sensor based upon detected speech. *See* §IX.B. Kiaei, ¶¶209-211. **Byers discloses the keyword** (*see* [2], §IX.C). A POSITA would have understood that, in applying **Byers’** teachings of speech recognition to **Denny’s** incident reporting system, the additional sensor(s) would be activated based on the detected keyword triggering the response. Kiaei, ¶212.

For [10], which depends from [2], Denny discloses the selected subset of acoustic devices (*see* [1.b], [1.f], §IX.A.2, §IX.B). **Byers discloses determining which of a set of acoustic devices** (*e.g.*, “microphones 730, 750, and 770”) **is the closest acoustic device to a user** (*e.g.*, determining “closest microphone” to “user 710” by “detect[ing]...the first arrival of the sound pressure wave at microphone 770” and “detect[ing] the time interval between the first detecting at microphone 770 and the next detection[s]” by “microphone 750” and then “microphone 730”) **that uttered the keyword** (*e.g.*, “voice command”). Kiaei, ¶¶216-225.

Byers discloses “triangulation techniques” for “locating” a “user” using “microphones 730, 750, and 770.” Byers, 13:6-30. The “user issues a voice command” from a “location 716” and “the system detects the event of the first arrival of the sound pressure wave” at “the closest microphone 770. Byers, 13:11-14, 13:15-30, 13:66-14:2. Kiaei, ¶¶220-221. This is illustrated in Fig. 9:

FIG. 9



'329, Fig. 9.

The system then “detects the time interval between first detecting at microphone 770 and the next detection” at “microphone 750,” and “detect[s] the time interval between detecting the sound pressure wave at microphone 770 and the third detection” at “microphone 730.” Byers, 13:11-14, 13:15-30. The system

proceeds to use the determined “closest microphone” to the user in its triangulation technique to determine “the location of the user.” Byers, 13:15-30, 13:61-14:2. Kiaei, ¶222.

A POSITA would have been motivated to apply **Byers’** teachings of determining the closest acoustic device to a user who uttered the keyword in implementing **Denny’s** system to advantageously increase the system’s accuracy when dispatching emergency services. For example, it would have been advantageous to pinpoint the closest RSU to the user who uttered “help me” and use that closest RSU’s location data to determine, e.g., where to send emergency services when the controller RSU sends a request to the police. Kiaei, ¶223. For example, if RSU 316 (“built-in” the “first vehicle 310” involved in “an automobile accident”) and RSU 332 (“embedded” into a passerby “third vehicle...in the vicinity at the time of the accident”) both capture the driver of first vehicle 310 saying “help me,” it would have been advantageous to determine that RSU 316 is the closest acoustic device to the driver and send emergency services to the location of RSU 316 instead of the location of RSU 332, which would have been further from the location of the incident. *See* Denny, 9:43-64. Kiaei, ¶223.

As another example, in the context of a larger vehicle (such as a bus or train) accident where an RSU embedded in the vehicle detects the accident, becomes the controller RSU, and receives acoustic data (e.g., a rider saying “help me”) from other

RSUs embedded in riders' personal devices, it would have been advantageous for the vehicle's RSU to determine the closest RSU to the rider in need of help and sending emergency services to the specific part of the vehicle (e.g., the back of the bus or a particular train car) where that rider is located. A POSITA would have understood the benefit in pinpointing where to specifically send emergency services upon an accident involving a larger vehicle being detected and a rider calling for help. Kiaei, ¶224.

A POSITA would have had a reasonable expectation of success in applying **Byers'** teachings for determining the closest acoustic device to a user in implementing **Denny's** incident reporting system, as these references teach acoustic detection systems that use audio data to perform an appropriate response. Kiaei, ¶225. Further, **Denny** and **Byers** disclose using processors and memories to carry out their respective functionalities, and implementing **Byers'** teaching in **Denny** would have required merely updating program instructions performed by **Denny's** controller RSU. *See* Denny, 2:8-11, 2:62-3:16, 4:27-5:9, 5:35-52, 13:48-56, 14:23-31, 15:52-57; Byers, 6:20-26, 6:63-7:5, 7:14-26. This would have been a straightforward application of **Byers'** teachings in a manner that advantageously improves **Denny's** incident reporting system. Kiaei, ¶225.

For [11], which depends from [10], Byers discloses determining a voice command from the keyword (e.g., “performing speech recognition” on the

“microphone signal” comprising the user’s “voice command” for a “valid match”) **and determining the closest acoustic device** (*e.g.*, “closest microphone” to “user 710”). *See* [1.f], [2], [10] (§IX.C). **Denny renders obvious sending the voice command to the closest acoustic device** (*e.g.*, controller RSU directing the closest RSU to a user execute the voice command, such as calling 911). Kiaei, ¶¶226-235.

As discussed above ([1.f], [10] (§IX.C)), **Byers** discloses a controller detecting a user’s “voice command” and sending a “control command” to a target device. Byers, 4:66-5:7, 8:38-47. Kiaei, ¶230. As discussed in Ground 1 ([1.a.1]-[1.f], §IX.A.1-2), **Denny** discloses a controller RSU that receives acoustic data from other RSUs in the vicinity to confirm an incident occurred. Kiaei, ¶230

Denny further discloses that only “[s]ome...of the remote sensing units may include a capability for analyzing collected sensed data,” such that not all RSUs have the capability to detect speech themselves. Denny, 6:1-2. Kiaei, ¶231. In such a scenario, a POSITA would have understood **Denny** teaches and suggests that, upon detection of an incident by the controller RSU, the controller RSU identifies an RSU closest to a user involved in the incident, whereby the identified RSU is not capable of performing speech or keyword detection. *See* Denny, 6:1-2; [1.a.2]-[1.b] (§IX.A.2). Kiaei, ¶231. For example, upon an incident occurring, a driver involved in an accident utters “call 911” to the closest RSU that is incapable of detecting the voice command itself. In applying **Byers’s** teachings of determining the closest

acoustic device ([10], §IX.C) and detecting voice commands ([11], §IX.C) in implementing **Denny’s** incident reporting system, the controller RSU would have received the voice command “call 911” from the RSU closest to the driver, performed speech recognition on the command, determined which RSU is closest to the driver, and sent a control signal back to the closest RSU to call 911. Kiaei, ¶231.

Indeed, performing such speech recognition remotely was known in the art and a POSITA would have been motivated to do so in order to process the voice command. *See, e.g.*, U.S. Pat. No. 7,529,677 (“Wittenberg,” Ex. 1014), 5:32-45 (“**Remote processor 130 includes at least a speech recognition processor** and a voice recognition processor. Although not shown in FIG. 1, remote processor 130 also includes a receiver capable of receiving audio signals from communication link 140 and a transmitter for transmitting resulting command signals over communication link 150 (e.g., a modem). Upon reception of an audio signal, **the speech recognition processor attempts to identify a voice command within the audio signal** (operation 240 in FIG. 2).”); U.S. Pat. No. 7,769,591 (“White,” Ex. 1015), Abstract (“Such speech input may specify **a command or a request by the user**. The local device performs preliminary processing of the speech input and determines whether it is able to respond to the command or request by itself. If not, **the local device initiates communication with a remote system for further processing of the speech input.**”). Kiaei, ¶232.

Further, in implementing **Denny**'s system to respond to a victim being in an accident and yelling "help me" or "call 911," upon receipt of data to further confirm an incident, it would have been obvious for the controller RSU to instruct the closest device to the user to call 911 so that the victim in need of help receives the assistance from 911 themselves, such as receiving instructions on what to do and where to go while emergency services are dispatched to the incident. Kiaei, ¶233.

As another example, **Denny** discloses that an "observer" RSU 332 "may end up being the [RSU] that identifies an incident," thereby becoming the controller RSU for an incident involving automobile 310 having its own RSU 316. *See Denny*, 11:64-12:24. In this example, controller RSU 332 would have requested the acoustic data from other RSUs in the general vicinity, such as RSU 316, and performed "a second analysis" to confirm whether an incident occurred. *Denny*, 11:9-26. Upon receipt of the audio data from RSU 316 to confirm the incident occurred, such as "call 911," controller RSU 332 would have recognized this utterance as a voice command, as taught by **Byers**. A POSITA would have understood the benefits in the controller RSU 332 directing RSU 316 (the device closest to the user uttering keyword containing a voice command) to call 911, as the user of RSU 332 may have minimal information regarding the accident and/or may be leaving the location where the accident occurred (e.g., because it is in another vehicle not involved in the accident). Kiaei, ¶234.

Such an implementation would have also advantageously avoided overburdening an emergency call center such that only the closest RSU to the user would have called 911, as opposed 911 being called by each RSU from which the controller RSU collected data. Kiaei, ¶235.

D. Grounds 4-5: Grounds 2-3 Further in View of Green (Claim 4)

Claim 4 requires that the controller “determin[es] a direction of measurement of at least one device of the subset of devices.” As discussed above, this claimed feature is rendered obvious by **Denny** in view of **Hirata** (Ground 2, §IX.B) and **Denny** in view of **Byers** (Ground 3, §IX.C). To the extent further disclosure is required, **Green** teaches “determining a direction of at least one device of the subset of devices.” Kiaei, ¶236.

Green discloses “a self organizing adaptive network” comprising sensor modules dispersed throughout a geographic area that “operate in a sensing mode to detect events” or a “controlling mode” to “receive data from [other] sensor modules for...analysis.” Green, Abstract, [0006]. Sensor modules use “an array of sensors” to acquire “information regarding the direction of origin of an acoustic wavefront...to determine the location of an event.” Green, [0024]. The sensor modules “form a spaced array and so can be used to give directional information about the origin of an acoustic event” to a “device acting in control mode.” Green, [0024], [0046]; *see also* Green, [0045]. Kiaei, ¶237.

Like **Denny, Hirata, and Byers, Green** is in the same field as the '329—which includes acoustic data analysis—and is reasonably pertinent to the problems purportedly addressed by the '329—e.g., detecting triggering events. *See* '329, 1:25-29, 1:44-67; Green, Abstract, [0001]-[0006]; §§IX.B-C. Indeed, like the '329, **Denny, Hirata, and Byers, Green** contemplates an acoustic incident reporting system comprising a device that collects and analyzes data for certain information in various applications, including emergencies. Green, [0002], [0049], [0050], [0052]. *Kiaei*, ¶¶238-239.

A POSITA would have been motivated to apply **Green's** teachings of determining direction in implementing **Denny's** incident reporting system (as modified by **Hirata**, §IX.B, or **Byers**, §IX.C), as **Green** provides implementation details regarding how **Denny's** controller RSU determines where to “redirect[] a video camera” of, e.g., the controller RSU or another RSU. Denny, 9:13-27. **Denny** does not disclose the details of how the controller RSU determines the direction in which the video camera is to be re-directed, and a POSITA would have turned to **Green's** teachings, which provide this known way of using the “spaced array” of sensor modules that “give directional information about the origin of an acoustic event.” Green, [0024]. *Kiaei*, ¶240.

A POSITA would have had a reasonable expectation of success in applying **Green's** details to implement **Denny's** incident reporting system (as modified by

Hirata, §IX.B, or **Byers**, §IX.C) because it is a straightforward use of **Green** for its intended purpose that would have yielded the predictable results of determining the direction of measurement of an acoustic source. *Kiaei*, ¶¶241-242. Indeed, both **Denny** and **Green** disclose using processors and memories to carry out their respective functionalities, and implementing **Green's** teaching in **Denny** would have required merely updating program instructions performed by **Denny's** controller RSU. *See Denny*, 2:8-11, 2:62-3:16, 4:27-5:9, 5:35-52, 13:48-56, 14:23-31, 15:52-57; *Green*, Abstract, [0005], [0008]-[0009], [0011]-[0012]. This would have been a straightforward application of **Green's** teachings in a manner that advantageously improves **Denny's** incident reporting system (as modified by **Hirata**, §IX.B, or **Byers**, §IX.C). *Kiaei*, ¶¶241-242.

E. Grounds 6-8: Grounds 1-3 Further in View of Murata (Claim 8)

Claim 8 requires the controller device to analyze received acoustic data for animal sounds. As discussed above, this claimed feature is disclosed or rendered obvious by **Denny** (Ground 1, §IX.A), **Denny** in view of **Hirata** (Ground 2, §IX.B), and **Denny** in view of **Byers** (Ground 3, §IX.C) to the extent human sounds are considered animal sounds. To the extent further disclosure is required, **Murata** provides explicit teachings of such a capability as claimed. *Kiaei*, ¶¶243-249.

Murata discloses an “animal care terminal” that “transmits the vocalizations of a dog 2 to a management server,” which “determines the emotion in the

vocalization data.” Murata, Abstract, [0053]. Upon receipt, the “management server” executes an “animal vocalization analysis program” to “convert the features of the animal vocalization data 132 into a predetermined vocalization pattern...which is then compared and matched with reference vocalization patterns to determine the emotions contained in the animal vocalization data.” Murata, [0084]. The results are then sent to a “user terminal” in “human language.” Murata, Abstract, [0053]-[0054]. Kiaei, ¶244.

Like **Denny**, **Hirata**, and **Byers**, **Murata** is in the same field as the ’329—which includes acoustic data analysis—and is reasonably pertinent to the problems purportedly addressed by the ’329—e.g., detecting triggering events. *See* Murata, Abstract, [0001], [0007]-[0009], [0053]-[0054], [0084], Fig. 2; §§IX.B-C. Kiaei, ¶245.

A POSITA would have been motivated to apply **Murata’s** teachings in implementing **Denny** (as optionally modified by **Hirata** §IX.B, or **Byers**, §IX.C) to advantageously enhance **Denny’s** system to detect incidents related to animals, such as a hurt dog’s whimper or bark resulting from an automobile accident. For example, **Denny** discloses a reporting system that uses acoustic data to detect an incident, such as “automobile accidents” or “fearful screaming.” Denny, 16:61-17:10. It would have been advantageous to apply **Murata’s** teachings in implementing **Denny’s** system such that an automobile accident involving an animal would be detected

based on the animal's vocalizations or emotion, such as a hurt dog's whimper or bark resulting from the accident or warning of a person (e.g., the dog's owner) in danger. Kiaei, ¶¶246.

A POSITA would have been further motivated to apply **Murata's** teachings in implementing **Denny** (as optionally modified by **Hirata** §IX.B, or **Byers**, §IX.C) to advantageously analyze animal vocalizations to confirm an automobile accident occurred, and determine the proper response to the accident. For example, after receiving the acoustic data from the other RSUs, including animal sound data, it would have been advantageous for the controller RSU to confirm an automobile accident involving an animal occurred based not only on fearful screaming or detected keywords (see [1.f], [2] (§IX.A.2, §IX.B, §IX.C)), but also on animal vocalizations, such as a dog's whimper that occurs in conjunction with other audio during the accident. Such an implementation would have advantageously improved the functionality of **Denny's** system because it would have allowed the system to alert the relevant services for the injured animal in the accident, in addition to the other emergency services for an accident. Kiaei, ¶247.

A POSITA would have had a reasonable expectation of success in applying **Murata's** animal sound analysis teachings in implementing **Denny's** incident reporting system (as optionally modified by **Hirata** §IX.B, or **Byers**, §IX.C), as both references teach incident reporting systems that use audio data to perform an

appropriate response. Kiaei, ¶¶248-249. Further, both **Denny** and **Murata** disclose using processors and memories to carry out their respective functionalities, and implementing **Murata's** teaching in **Denny** would have required only an additional sound pattern to be recognized by **Denny's** controller RSU. *See* Denny, 2:8-11, 2:62-3:16, 4:27-5:9, 5:35-52, 13:48-56, 14:23-31, 15:52-57; Murata, [0079]. This would have been a straightforward application of **Murata's** teachings in a manner that advantageously improves **Denny's** incident reporting system (as optionally modified by **Hirata** §IX.B, or **Byers**, §IX.C). Kiaei, ¶¶248-249.

X. SECONDARY CONSIDERATIONS

There is no evidence in the '329's prosecution history or elsewhere supporting any secondary considerations arguments, or evidence of nexus to any challenged Claim. *See generally* '329FH; Kiaei, ¶250. Indeed, as demonstrated by the prior art referenced herein, any purported solutions to problems or unexpected results in the '329 were already well known. Kiaei, ¶250. To the extent PO asserts the existence of any secondary considerations in its responses, Petitioner reserves the right to address any such evidence.

XI. CONCLUSION

Substantial, new, and noncumulative technical teachings have been presented for '329 Claims 1-11, which are obvious for the reasons set forth above. Kiaei,

¶¶251-256. There is a reasonable likelihood that Petitioner will prevail as to the Claims. *Inter partes* review of Claims 1-11 is accordingly requested.

Respectfully submitted,

Dated: August 30, 2024

/James L. Davis, Jr./

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Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to §42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 11,589,329 contains, as measured by the word-processing system used to prepare this paper, 12,577 words. This word count does not include the items excluded by §42.24 as not counting towards the word limit.

Dated: August 30, 2024

/James L. Davis, Jr./

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CERTIFICATE OF SERVICE

I hereby certify that on August 30, 2024, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 11,589,329 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on Patent Center:

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