

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC,
Petitioner,

v.

ALD SOCIAL, LLC,
Patent Owner.

IPR2023-01398
U.S. Patent No. 9,198,054

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

TABLE OF CONTENTS

PETITIONER’S EXHIBIT LIST	5
I. INTRODUCTION	6
II. GROUNDS FOR STANDING.....	7
III. NOTE.....	7
IV. SUMMARY OF THE ’054 PATENT	7
V. PROSECUTION HISTORY	11
VI. LEVEL OF ORDINARY SKILL IN THE ART.....	12
VII. CLAIM CONSTRUCTION	13
VIII. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF	14
IX. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE.....	15
A. Discretionary denial under the <i>Fintiv</i> factors is not appropriate.....	15
1. No evidence regarding a stay	15
2. Parallel proceeding trial date	15
3. Investment in the parallel proceeding	16
4. Overlapping issues with the parallel proceeding	16
5. Petitioner is a defendant.....	16
6. Other circumstances.....	16
B. The <i>Fintiv</i> Framework Should Be Overturned.....	16
C. Discretionary denial under <i>General Plastic</i> is not appropriate.....	17

D.	Discretionary denial under 35 U.S.C. § 325(d) is not appropriate	17
X.	IDENTIFICATION OF HOW THE CLAIM IS UNPATENTABLE	18
A.	Challenged Claims	18
B.	Statutory Grounds for Challenges	18
C.	Ground 1: Claims 1 and 2 are obvious under 35 U.S.C. § 103 over Wolfe and Pfeffer.	19
1.	Summary of Wolfe.....	19
2.	Summary of Pfeffer.....	21
3.	Reasons to Combine Wolfe and Pfeffer	23
4.	Claim 1	27
5.	Claim 2.....	41
D.	Ground 2: Claims 3-6 are obvious under 35 U.S.C. § 103 over Wolfe in view of Pfeffer and further in view of Hua.....	44
1.	Summary of Hua	44
2.	Reasons to combine Wolfe and Pfeffer with Hua	44
3.	Claim 3	48
4.	Claim 4.....	51
5.	Claim 5.....	53
6.	Claim 6.....	55
E.	Ground 3: Claims 7-14 are obvious under 35 U.S.C. § 103 over Wolfe in view of Hua.....	57
1.	Reasons to combine Wolfe and Hua.....	57

2.	Claim 7	60
3.	Claim 8	67
4.	Claim 9	69
5.	Claim 10	71
6.	Claim 11	71
7.	Claim 12	72
8.	Claim 13	72
9.	Claim 14	74
XI.	CONCLUSION.....	76
XII.	MANDATORY NOTICES	77
A.	Real Party-in-Interest	77
B.	Related Matters.....	77
C.	Lead and Back-up Counsel and Service Information	78
	CERTIFICATE OF WORD COUNT	79
	CERTIFICATE OF SERVICE	80

PETITIONER’S EXHIBIT LIST

Ex.1001	U.S. Patent No. 9,198,054
Ex.1002	Prosecution History of U.S. Patent No. 9,198,054
Ex.1003	Declaration of Dr. Stephen J. Guy under 37 C.F.R. § 1.68
Ex.1004	U.S. Published Application US2011/0040603 to Wolfe et al.
Ex.1005	U.S. Published Application US2009/0284348 to Pfeffer et al.
Ex.1006	U.S. Published Application US2009/0222388 to Hua et al.
Ex.1007	U.S. Published Application US2012/0106782 to Nathan et al.
Ex.1008	US Published Application US2010/0217837 to Ansari et al.
Ex.1009	September 16, 2022 Complaint in Western District of Texas
Ex.1010	Order Transferring to the Northern District of California
Ex.1011	Federal Court Statistics
Ex.1012	CV of Dr. Stephen J. Guy
Ex.1013	<i>ALD Social, LLC v. Apple, Inc.</i> , No. 3-23-cv-02695, D.I. 49 (N.D. Cal. July 24, 2023)
Ex.1014	Order Granting Motion to Dismiss
Ex.1015	Amended Complaint

I. INTRODUCTION

U.S. Patent No. 9,198,054 (the “’054 patent,” Ex.1001) is generally related to “an Aggregate Location Dynamometer (ALD), an analytical server utilizing location based services (LBS) on a network to predict public safety risks.”

Ex.1001, 2:52-56. The ’054 patent evaluates the positioning and movement of wireless devices and provides an alert of a crowd related public safety risk.

Ex.1001, 2:65-67. The alleged invention of the ’054 patent is merely the well-known concept of monitoring a crowd and alerting first responders based on the behavior of the crowd. For example, U.S. Published Application US2011/0040603 to Wolfe teaches gathering wireless device positioning data to determine crowd behavior and activity. Ex.1004, [0011]. In Wolfe, a police force may be informed about the crowd activity. Ex.1004, [0014]. Further, U.S. Published Application US2009/0284348 to Pfeffer teaches a first responder dispatch system used for crowd control that receives incident data, analyzes the data to assess the risk, and dispatches the appropriate first responders. Ex.1005, [0028].

Accordingly, pursuant to 35 U.S.C. §§ 311, 314(a), and 37 C.F.R. § 42.100, Petitioner respectfully requests that the Board review and cancel claims 1-14 of the ’054 patent (“Challenged Claims”) as unpatentable under (pre-AIA) 35 U.S.C. §103.

II. GROUNDS FOR STANDING

Petitioner certifies that the '054 patent is eligible for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the patent claim. 37 C.F.R. § 42.104(a).

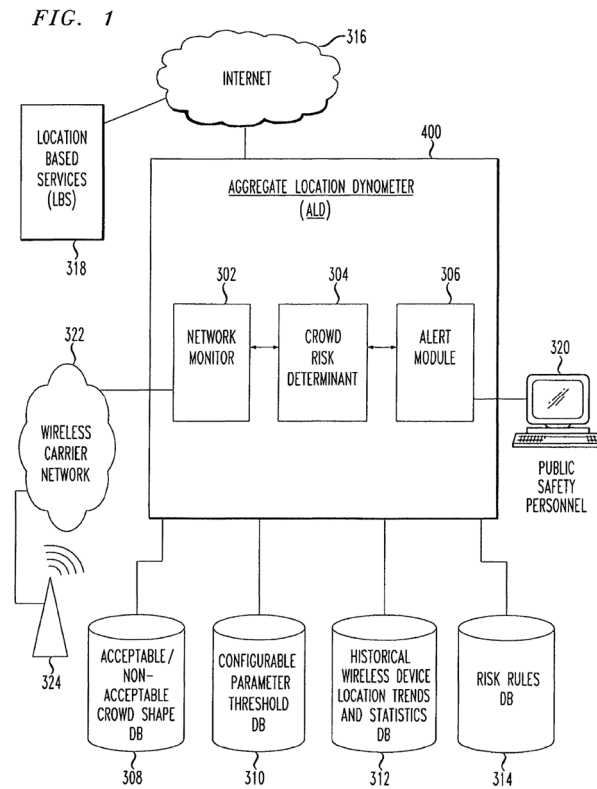
III. NOTE

Petitioner cites to exhibits' original page numbers. **Emphasis** in quoted material has been added. Claim terms are presented in *italics*.

IV. SUMMARY OF THE '054 PATENT

The '054 patent is generally related to “an Aggregate Location Dynamometer (ALD), an analytical server utilizing location based services (LBS) on a network to predict public safety risks, e.g., the unexpected impending formation of a flashmob, or a riot, etc.” Ex.1001, 2:52-56. Through “evaluation of the positioning and movement of wireless devices” the system “predicts public safety risk in a given geographical area.” Ex.1001, 2:65-67. The system “provides an alert of a possible impending crowd related public safety risk in real time, as the crowd risk arises, informing emergency personnel as early as possible, even before such event is consummated.” Ex.1001, 3:22-26.

Figure 1 illustrates an Aggregate Location Dynamometer (ALD) based in a server in a wireless network. The ALD is shown having (1) a network monitor, (2) a crowd risk determinant, and (3) an alert module. Ex.1001, 3:33-37.



'054 patent, Fig. 1

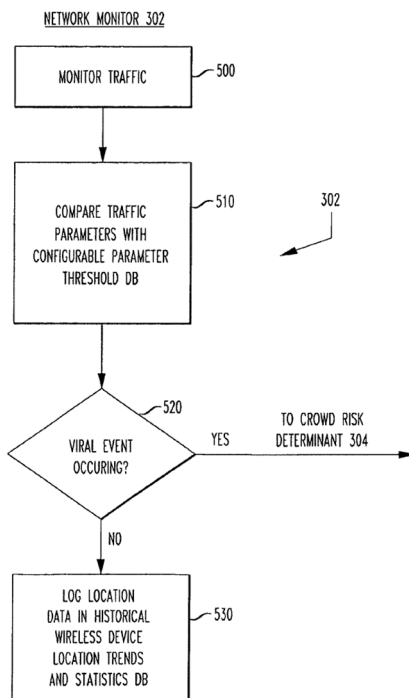
The “Aggregate Location Dynamometer (ALD) predicts public safety risk in a given geographical area through evaluation of the positioning and movement of wireless devices.” Ex.1001, 2:65-67.

The '054 patent describes a “viral event” as “the first state of alarm” but “the occurrence of a viral event does not necessarily infer a definite public safety risk.” Ex.1001, 4:38-44. “Crowd risk” is an analysis of the mobile devices associated with a viral event (such as a density as indicated by the number of devices in communication with a given base station). Ex.1001, 3:9-15. A “public safety risk” is a “compromise in crowd safety, e.g., the impending formation of a flash mob, or

a riot, etc.” Ex.1001, 4:53-55.

In operation, the ALD “monitors wireless device network traffic to predict an impending viral event.” Ex.1001, 3:1-2. Location based services are utilized “to obtain sets of aggregate location data corresponding to a number and pattern of wireless devices within an area, region, city, etc. of interest.” Ex.1001, 2:48-51.

As depicted in Fig. 2, the network monitor “preferably continuously, or at least periodically or intermittently, monitors network traffic.” Ex.1001, 5:65-67.



Ex.1001, Fig. 2

The '054 patent describes monitoring wireless data traffic “for the presence of abnormal events.” One example of an “abnormal event” would be an “excessive volume for the time of day.” Ex.1001, 6:1-3

The Network Monitor triggers the Crowd Risk Determinant to analyze the location data of the wireless devices to “determine if a possible viral event indicates a public safety risk. A viral pattern may or may not imply public safety risk.” Ex.1001, 6:34-36.

The crowd risk determinant uses configurable parameters to determine “if location information pertaining to a viral event indicates a likely public safety risk.” Ex.1001, 7:7-8. “Factors for risk determination include but are not limited to the shape a cluster of location markers representing individual wireless devices of given density is forming, whether or not markers are spreading out or coming together, and/or at what rate of change a cluster of wireless devices is moving.” Ex.1001, 7:8-13. Additional factors considered “include the behavior of collective XY location coordinates of the most dense clusters of wireless devices, to where the most dense clusters of wireless devices of concern are moving, and/or whether or not a cluster of wireless devices in a particular location makes sense given the time of day.” Ex.1001, 7:14-19.

Motion trends of the wireless devices are also used to assess a crowd risk. The crowd risk determinant utilizes the location of each wireless device using “the volume, density, shape and movement of data points collected.” “Cell tower locations for each wireless device may be sufficient to satisfy initial triggering requirements for a possible viral event.” Ex.1001, 8:25-29.

The shape of a cluster of mobile devices is also considered when determining whether a viral event is a public safety risk. After the location of the wireless devices is collected, “the best-fit shape of dense clusters formed by accumulation of wireless devices in a given area may be determined. The best-fit shape of a cluster of wireless devices may be compared against data contained in the historical Acceptable/Non-Acceptable Crowd Shape database 308 to determine danger potential. Different thresholds may be set for like parameters based on varying location.” Ex.1001, 7:37-43.

If the crowd risk determinant determines a public safety risk is occurring, it triggers the alert module “to take responsive public safety measures.” Ex.1001, 6:37-38.

V. PROSECUTION HISTORY

On February 10, 2014, applicant filed patent application 14/176,691, claiming priority to application 13/317,996 (now U.S. Patent No. 8,649,806) and to provisional patent application No. 61/573,112, filed September 2, 2011.

On February 10, 2014, applicant filed a preliminary amendment canceling original claims 2-12. On May 2, 2014, the Examiner issued an Office Action, rejecting claim 1 for statutory double-patenting. On October 2, 2014, applicant filed an amendment cancelling claim 1 and proposing new claims 13-26. On November 5, 2014, the Examiner issued an Office Action, rejecting claims 13-26

for nonstatutory double-patenting. On May 4, 2015, applicant filed a Request for Continued Examination that included a terminal disclaimer to overcome the double-patenting rejection.

On June 4, 2015, Examiner issued a first Notice of Allowability. The Examiner provided no discussion or reasons for allowance. On September 3, 2015, applicant filed a Request for Continued Examination, along with a 28-page IDS that listed over 380 prior art references, along with six PCT international search reports. One week later, on September 10, 2015, the Examiner issued the Notice of Allowability for claims 13-26. The Examiner provided no discussion or reasons for allowance. Claims 13-26 were renumbered as claims 1-14 in the issued patent.

At no point did the Examiner issue a rejection over any prior art reference.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) in the field of the ’054 patent, as of September 2, 2011, would have been someone knowledgeable and familiar with the field of crowd analysis and location-based computing that are pertinent to the ’054 patent. That person would have at least a bachelor’s degree in computer science/computer engineering, or equivalent training, and approximately two years of experience working in the field of crowd analysis and location-based computing. Lack of work experience can be remedied by additional education, and vice versa. Ex.1003, ¶¶19-21.

VII. CLAIM CONSTRUCTION

In an *inter partes* review, claims “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). The Board only construes the claims to the extent necessary to resolve the underlying controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Petitioner submits that for the purposes of this proceeding, other than the claim terms set forth below, the terms of the challenged claims should be given their plain and ordinary meaning.¹

“indication of a viral event” / “a forming viral event”

The limitation “indication of a viral event” is recited in independent claim 1 and “a forming viral event” is recited in independent claim 7. The specification does not provide any explicit definition for these terms. The specification

¹ Petitioner does not concede that any term in the challenged claims meets the statutory requirements of 35 U.S.C. § 112, or that the challenged claims recite patentable subject matter under 35 U.S.C. § 101.

describes, however, an instance in which a “viral event may be occurring or impending” by virtue of an excessive number of wireless devices in a given area. Ex.1001, 5:9-15. Another example is when “two highly dense clusters” of wireless devices move “toward each other at a significant rate of speed.” Ex.1001, 5:26-31. A third example is when there is a “difference in the number of wireless devices in a given area” over time. Ex.1001, 5:45-51.

Accordingly, a POSITA would have understood that the ’054 patent’s “*indication of a viral event*” and “*a forming viral event*” are indicators of a crowd’s activity. Ex.1003, ¶44. These indicators can include the crowd’s size, density, movement, or other characteristics. Ex.1001, 5:26-31; 5:45-51; Ex.1003, ¶44.

Because the specification describes an indication of viral event based on characteristics of a crowd of wireless devices, such as the number of devices, density of devices, the movement of devices, and other characteristics of a crowd, a POSITA would have understood the phrases “*indication of a viral event*” and “*a forming viral event*” to comprise an indication of a crowd’s activity, including the crowd’s size, density, movement or other characteristics. Ex.1003, ¶¶40-45.

VIII. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF

Petitioner asks that the Board institute a trial for *inter partes* review and cancel the Challenged Claim in view of the analysis below.

IX. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

A. Discretionary denial under the *Fintiv* factors is not appropriate

The six factors considered for § 314 strongly favor institution. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020). The district court case is at an early stage—the original complaint was dismissed for failure to allege factual support for infringement. Ex.1014. An amended complaint was filed on August 14, 2023. Ex.1015.

1. No evidence regarding a stay

No motion to stay has been filed, so the Board should not infer the outcome of such a motion. *See Dish Network L.L.C. v. Broadband iTV, Inc.*, IPR2020-01359, Paper 15 at 11 (Feb. 12, 2021). This factor is neutral.

2. Parallel proceeding trial date

The original complaint in the co-pending litigation was dismissed on July 24, 2023. Ex.1014. Accordingly, the co-pending litigation is early stage, and there is no trial date.

The Northern District of California’s median time-to-trial is 37 months, setting the trial date for purposes of the *Fintiv* analysis in September 2026. Ex.1011. Accordingly, this proceeding will reach Final Written Decision long before the co-pending litigation proceeds to trial. This factor favors institution.

3. Investment in the parallel proceeding

The amended complaint was filed less than one month before the filing of this IPR. Ex.1015. There has been no investment at the district court. *See PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8 at 17 (Jan. 6, 2021). This lack of investment favors institution.

4. Overlapping issues with the parallel proceeding

The amended complaint was filed less than one month before the filing of this IPR. Ex.1015. There are no overlapping issues yet in the co-pending litigation.

5. Petitioner is a defendant

Petitioner is a defendant in the co-pending litigation. That is true of most petitioners, making this factor neutral. *See HP Inc. v. Slingshot Printing LLC*, IPR2020-01084, Paper 13 at 9 (Jan. 14, 2021) (having the “same parties as parallel proceeding” makes factor 5 “neutral”).

6. Other circumstances

The prior art presented in this Petition renders the Challenged Claims unpatentable as obvious. The merits of Petitioner’s arguments are strong.

Because the *Fintiv* factors are either neutral or weigh against discretionary denial, institution should not be denied on discretionary factors.

B. The *Fintiv* Framework Should Be Overturned

Apart from Petitioner’s showing that the *Fintiv* factors favor institution, the

Fintiv framework should be overturned because it (1) exceeds the Director’s authority, (2) is arbitrary and capricious, and (3) was adopted without notice-and-comment rulemaking.

C. Discretionary denial under *General Plastic* is not appropriate

There are no other proceedings at the PTAB regarding this patent. Based on the *General Plastic* factors, the Board should decline to exercise its discretion to deny the present Petition under §314(a).

D. Discretionary denial under 35 U.S.C. § 325(d) is not appropriate

Denial under § 325(d) is not warranted because the challenges presented in this petition were not considered in the prosecution of the ’054 patent.

Under the first prong of the *Advanced Bionics* framework, Petitioner acknowledges that Pfeffer and Hua—but not Wolfe—were “previously presented to the Office.” *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 7-8 (Feb. 13, 2020). Under the second prong, however, the evidence shows that the Examiner “erred in a manner material to the patentability of challenged claims.” *Id.* Here, the Examiner issued no rejection that applied any prior art. Moreover, when given a 28-page IDS that listed over 380 prior art references, the Examiner spent only a week with that art before deciding to issue a Notice of Allowance. The second prong is guided by *Becton, Dickinson* factors (c), (e), and (f). *Id.* at 9-10, n. 10 (citing *Becton, Dickinson & Co. v. B.*

Braun Melsungen AG, IPR2017-01586, Paper 8 at 17-18 (Dec. 15, 2017)). These factors weigh against exercising discretion.

X. IDENTIFICATION OF HOW THE CLAIM IS UNPATENTABLE

A. Challenged Claims

The present petition challenges all claims of the '054 patent.

B. Statutory Grounds for Challenges

Grounds	Claim(s)	Basis
#1	1-2	35 U.S.C. § 103 over Wolfe in view of Pfeffer
#2	3-6	35 U.S.C. § 103 over Wolfe in view of Pfeffer and Hua
#3	7-14	35 U.S.C. § 103 over Wolfe in view of Hua

U.S. Published Application US2011/0040603 to Wolfe (“Wolfe,” Ex.1004) was filed on August 12, 2009, and published February 17, 2011. Wolfe is prior art under pre-AIA 35 U.S.C. § 102(a).

U.S. Published Application US2009/0284348 to Pfeffer et al. (“Pfeffer,” Ex.1005) was filed April 27, 2009, and published November 19, 2009. Pfeffer is prior art under pre-AIA 35 U.S.C. § 102(b).

U.S. Published Application US2009/0222388 to Hua et al. (“Hua,” Ex.1006) was filed November 17, 2008, and published September 3, 2009. Hua is prior art under pre-AIA 35 U.S.C. § 102(b).

Petitioner’s analysis also cites evidentiary references to demonstrate the

knowledge of a POSITA and to provide contemporaneous context to support what a POSITA would have understood from the prior art. *See Yeda Research v. Mylan Pharm. Inc.*, 906 F.3d 1031, 1041-1042 (Fed. Cir. 2018) (affirming the use of “supporting evidence relied upon to support the challenge”); 37 C.F.R. § 42.104(b).

C. Ground 1: Claims 1 and 2 are obvious under 35 U.S.C. § 103 over Wolfe and Pfeffer.

1. Summary of Wolfe

Wolfe teaches a crowd detection system using “telemetrics-based location and/or tracking technology” to determine “locations of wireless devices.” Ex.1004, [0010]. Wolfe’s system determines “where crowds of people are located, how the crowds are changing, where they are moving to, when they are transitioning from one activity to another, and/or what activity they are transitioning to.” Ex.1004, [0011]. In one embodiment, Wolfe’s system is used so that “a police force may be informed of the distribution of people around a city and/or changes in activity levels in specific locations around a city.” Ex.1004, [0014].

Wolfe discloses that its system can be implemented in computing device 300, a “server.” Ex.1004, [0068], [0074]. Wolfe further describes that computing device 300 may include “one or more applications 322.” Ex.1004, [0070]. The one or more applications 322 “may be arranged to operate with program data 324 on an

operating system 321 to effectuate the aggregation of the mobile device data.”

Ex.1004, [0070].

Crowd detection system implemented as computing device 300

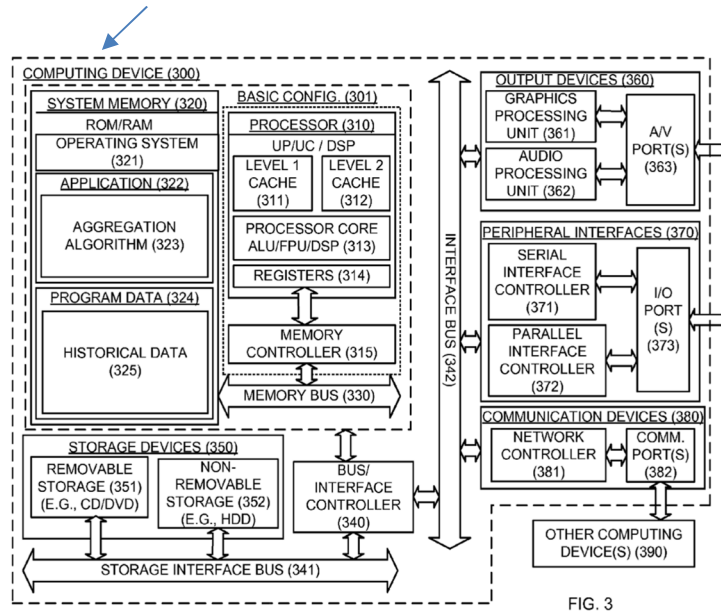
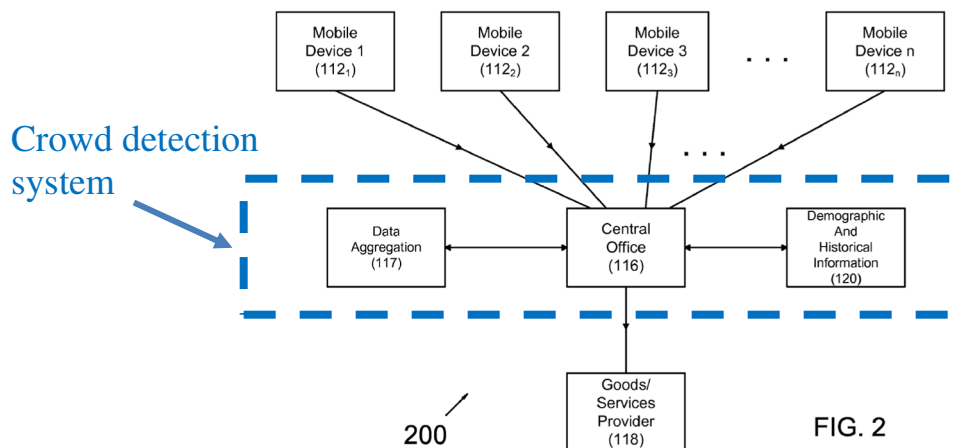


FIG. 3

Ex.1004, Fig. 3 (annotated)

Wolfe further discloses an example embodiment of its system that includes a “central office 116,” “mobile devices 112₂, 112₃ ..., 112_n, (where n is any number),” and “a memory device 120” for storing historical information. Ex.1004, [0024]



Ex.1004, Fig. 2 (annotated); Ex.1003, ¶54.

Wolfe’s system uses “aggregation algorithms” to “create a model of the distribution of locations of the mobile device users” to “estimate size and location of crowds.” Ex.1004, [0018].

Wolfe’s system also uses information about the crowd to determine the crowd’s activity level. Ex.1003, ¶59. As one example, Wolfe’s system determines the crowd’s “level of conviction,” as evidenced by the speed at which the crowd is moving. Ex.1004, [0042]. Using this information, “the police may better position patrol officers to locations around the city where the officers may be needed.” Ex.1004, [0014]; Ex.1003, ¶¶49-61.

2. Summary of Pfeffer

Pfeffer provides a methodology “to identify incidents, develop one or more incident scenarios to resolve the incidents, and implement the one or more incident scenarios by assigning tasks to one or more responders through dispatch requests.”

Ex.1005, [0028]. Example uses for Pfeffer’s methodology include “crowd control and monitoring.” Ex.1005, [0028].

Fig. 5 depicts a flow diagram of one embodiment of Pfeffer’s methodology for analyzing incident information and dispatching first responders:

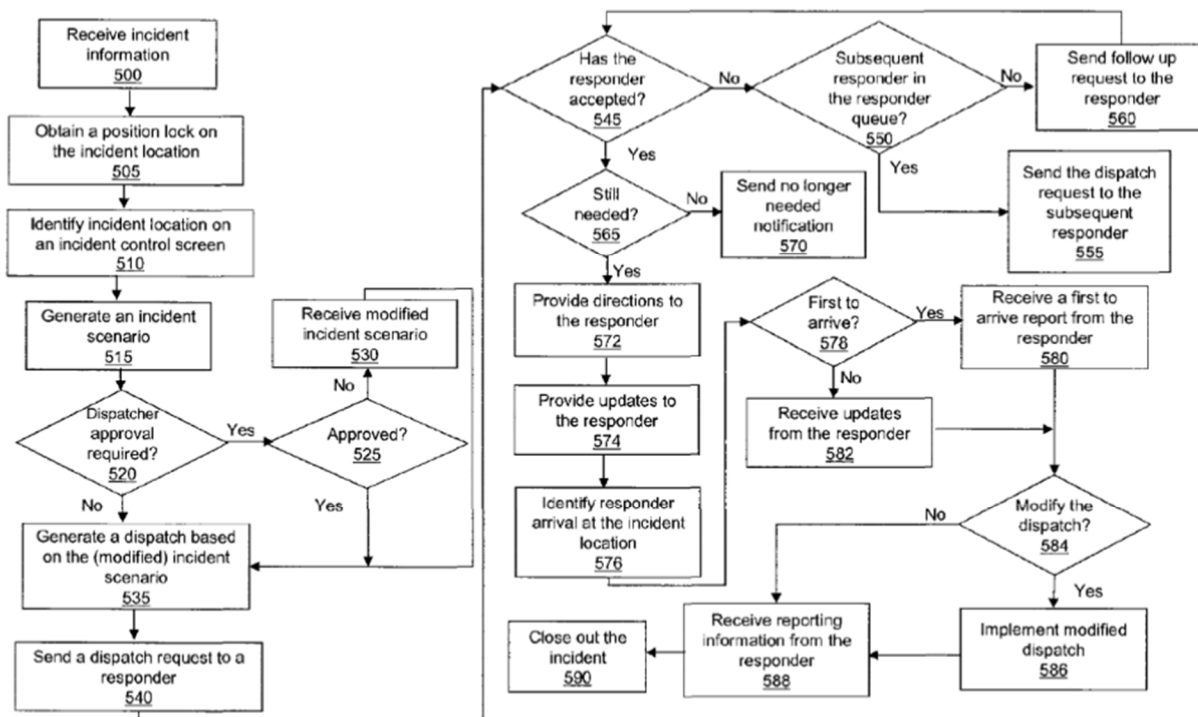


FIG. 5

Pfeffer’s methodology is designed to receive incident information “from any source through any method.” Ex.1005, [0037]. An incident can refer to any event for which it is desirable to have the assistance of a responder, such as “car accidents,” “terrorist attacks,” “sporting event crowd control and monitoring,” and “concert crowd control.” Ex.1005, [0028].

After receiving the incident information, Pfeffer’s scenario analysis engine

generates a detailed response plan for responding to the incident. Ex.1005, [0038]. As part of the analysis, Pfeffer determines a “level of alert.” Ex.1005, [0077]. If the “level of alert exceeds a predetermined threshold” then a message is sent requesting additional first responders. Ex.1005, [0077]. The dispatch requests may be to “a police department in which one or more of the police officers are responders.” Ex.1005, [0031].

Pfeffer’s method also includes a “fully customizable” scenario database that stores information about incidents and provides possible responses to resolve the current incidents. Ex.1005, [0039]; Ex.1003, ¶¶62-69.

3. Reasons to Combine Wolfe and Pfeffer

A POSITA would have been motivated to combine the teachings of Wolfe with Pfeffer because Wolfe discloses a crowd detection system that is intended to provide detailed crowd information to the police, and Pfeffer discloses methods to receive and evaluate incident information, develop and implement a response to effectively resolve the incident, and send an alert to the police. Ex.1003, ¶70.

a) Wolfe and Pfeffer are analogous art

A POSITA considering the ’054 patent would have looked to the teachings of Wolfe and Pfeffer. Ex.1003, ¶71. The field of endeavor of the ’054 patent is “alerting to a problematic crowd risk in a given geographical location” by analyzing “location information pertaining to a multitude of wireless devices, to

detect potential crowd risks.” Ex.1001, 1:31-37.

Wolfe is analogous art because it, like the ’054 patent, alerts the police to “changes in activity levels in specific locations” of crowds by analyzing “the locations” of mobile devices. Ex.1004, [0014], [0017]. Pfeffer is analogous art because it, like the ’054 patent, provides incident resolution methods that are designed to receive incident information about an unusual event and determine the appropriate response, e.g., dispatch first responders, to effectively handle the risk to the crowd. Ex.1005, [0031], [0035], [0037], [0039], [0109]; Ex.1003, ¶¶70-72.

b) A POSITA would have found it obvious to apply Pfeffer’s techniques for responding to incidents to Wolfe’s crowd analysis system

Wolfe tracks each mobile device associated with a monitored crowd and informs first responders of “the distribution of people around a city and/or changes in activity levels in specific locations around a city.” Ex.1004, [0011], [0014]. Based on Wolfe’s crowd information, the police can position its patrol officers to locations around the city where the officers “may be needed.” Ex.1004, [0014]. Although Wolfe teaches providing relevant crowd information to police, Wolfe does not provide the details for how to alert and notify the police. Ex.1003, ¶73.

Pfeffer, however, fills in Wolfe’s details by specifically teaching techniques for receiving information about crowds, evaluating the information, and alerting first responders when needed. Ex.1005, Abstract, [0006], [0040]-[0041]; Ex.1003,

¶¶73-74.

c) A POSITA would have found the combination of Wolfe and Pfeffer predictable

A POSITA would have found the combination of Wolfe and Pfeffer predictable. Ex.1003, ¶75. First, Wolfe and Pfeffer are the same type of system, in that both systems analyze crowd information to identify safety risks. Ex.1003, ¶75. For example, Wolfe’s system detects “a plurality of wireless mobile devices within a geographic region” and analyzes “where crowds of people are located” and “how the crowds are changing.” Ex.1004, Abstract, [0011], [0014]. Similarly, Pfeffer is designed for “crowd control and monitoring.” Ex.1005, [0028].

Second, Wolfe teaches informing “a police force ... of the distribution of people around a city.” With that “information, the police force may better position its patrol officers to locations around the city.” Ex.1004, [0011], [0014], [0016], [0027], [0042]. Similarly, Pfeffer teaches that it is designed to receive incident information “from any source through any method” so that “police officers” can be alerted to incidents. Ex.1005, [0029], [0030], [0037], [0039], [0077], [0109]; Ex.1003, ¶¶75-76.

d) A POSITA would have had a reasonable expectation of success when combining Wolfe and Pfeffer

A POSITA would have had a reasonable expectation of success when combining Wolfe and Pfeffer because Wolfe and Pfeffer are implemented in the

same manner. Ex.1003, ¶78. For example, Wolfe is implemented with “one or more applications” executing on a “server” to analyze crowd data. Ex.1004, [0070], [0074]. Similarly, Pfeffer’s techniques are described as being implemented in a “central server.” Ex.1005, [0037]. Pfeffer describes that its methodologies could be “any combination of software and/or hardware that is configured to perform one or more tasks.” Ex.1005, [0032].

Wolfe’s system would also benefit from incorporating Pfeffer’s techniques for assessing and responding to incidents. Ex.1003, ¶77. Wolfe already teaches tracking and monitoring crowds and providing crowd information to first responders. Ex.1004, [0014], [0016]. Pfeffer provides additional features for a tracking system, such as Wolfe’s system. Ex.1003, ¶77. Pfeffer’s features include continuous updates to the incident scenario model saved for future use, recommendations for the most effective methods to respond to an incident based on past responses and current trends, and determining if the incident should be elevated based on the number of people involved in the incident. Ex.1005, [0028], [0077], [0085].

Accordingly, a POSITA would have found it obvious to apply Pfeffer’s teachings to Wolfe’s system because the combination would use known techniques (Pfeffer’s implementation details of an incident response method) to improve a similar system (Wolfe’s crowd detection and incident response system) in the same

way (providing crowd details and incident information to first responders so that they may better respond to compromised crowd safety). Ex.1003, ¶¶77-79.

4. Claim 1

[1.0] *An aggregate location dynometer in a physical wireless network server, said aggregate location dynometer comprising:*

To the extent the preamble is limiting, the '054 patent describes the “aggregate location dynometer” as “an analytical server utilizing location based services (LBS) on a network to predict public safety risks.” Ex.1001, 2:52-55. “Three main components from the Aggregate Location Dynometer (ALD) 400: a Network Monitor 302, a Crowd Risk Determinant 304, and an Alert Module 306.” Ex.1001, 3:33-37. Accordingly, a POSITA would understand that the “*aggregate location dynometer*” comprises a server having functional hardware or software components. Ex.1003, ¶80.

Wolfe discloses a computing device, such as a “server,” for “telematics based location and/or tracking implementations.” Ex.1004, [0068], [0074].

*Aggregate Location Dynamometer
implemented in a server*

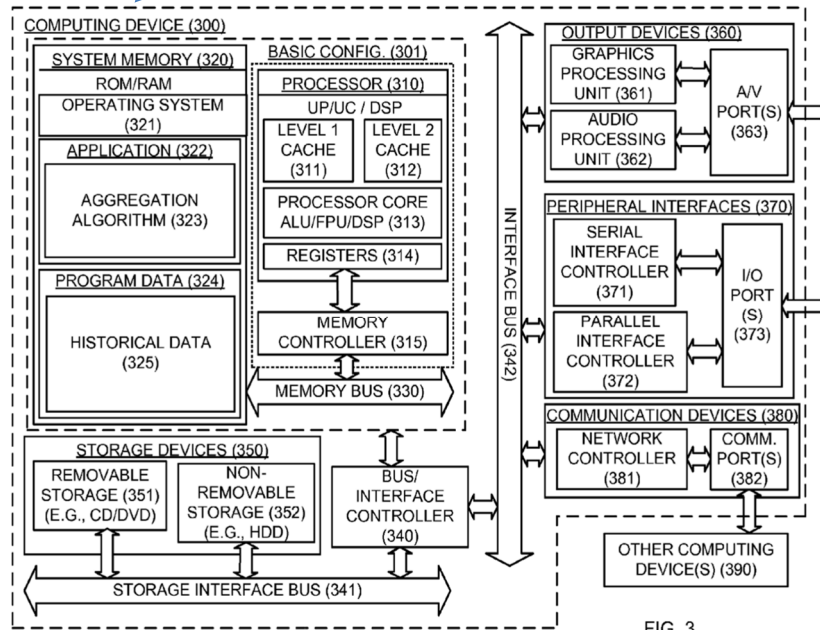
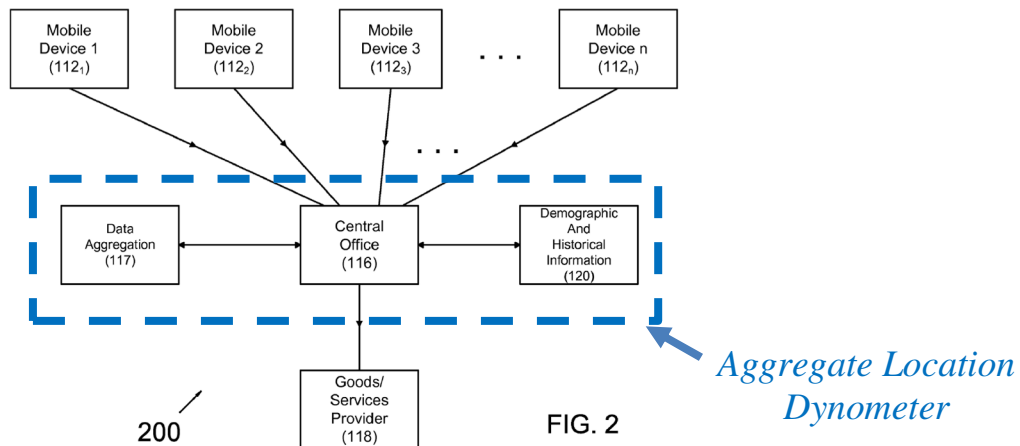


FIG. 3

Ex.1004, Fig. 3 (annotated); Ex.1003, ¶82.

Wolfe further describes “one or more applications 322” running on the server. Ex.1004, [0070]. The one or more applications “may be arranged to ... effectuate the aggregation of the mobile device data.” Ex.1004, [0070].

Wolfe further discloses an arrangement having a central office 116, data aggregation module 117 and memory device 120 storing demographic and historical information, as shown in Fig 2. Ex.1004, [0024], [0027].



Ex.1004, Fig. 2 (annotated); Ex.1003, ¶85.

Accordingly, Wolfe discloses “an aggregate location dynometer” because Wolfe teaches a server with one or more applications that perform “telemetrics-based location and/or tracking” using “details of where crowds of people are located, how the crowds are changing, where they are moving to.” Ex.1004, [0010]-[0011], [0018], [0040], [0044]. In one embodiment, Wolfe’s system is used so that “a police force may be informed of the distribution of people around a city and/or changes in activity levels in specific locations around a city.” Ex.1004, [0014].

Second, Wolfe discloses that its server is a wireless network server because the server can communicate with “mobile devices” using “wireless media such as acoustic, radio frequency (RF), infrared (IR) and other wireless media.” Ex.1004, [0030], [0073].

Third, Wolfe further discloses that its server is a physical wireless network

server because it is “connected in a network environment.” Ex.1004, [0075].

Thus, Wolfe’s telemetrics-based location and tracking system implemented in a server, in a wireless network environment, using one or more applications to analyze the distribution of mobile device users based on each mobile device’s current and prior location data, which is collected and integrated together, renders obvious “*an aggregate location dynamometer in a physical wireless network server.*” Ex.1003, ¶¶80-89.

[1.1] *a network monitor to monitor a wireless network for an indication of a viral event*

First, as discussed above, Wolfe teaches a server that executes “one or more applications.” Ex.1004, [0070]. Further, Wolfe teaches that its server “is connected in a networking environment such that [it] ... may perform with or as a computer system in accordance with embodiments herein.” Ex.1004, [0075]. One such embodiment is depicted in Fig. 2. Ex.1003, ¶90.

With reference to Fig. 2, Wolfe discloses that its system communicates with wireless service carriers associated with mobile devices “within a geographic area.” Ex.1004, [0030] (describing how mobile devices communicate with wireless service carriers, which in turn send information to Wolfe’s central office server).

Wolfe also discloses that its system monitors wireless mobile devices, within a geographical area, by determining and continuously updating the number of

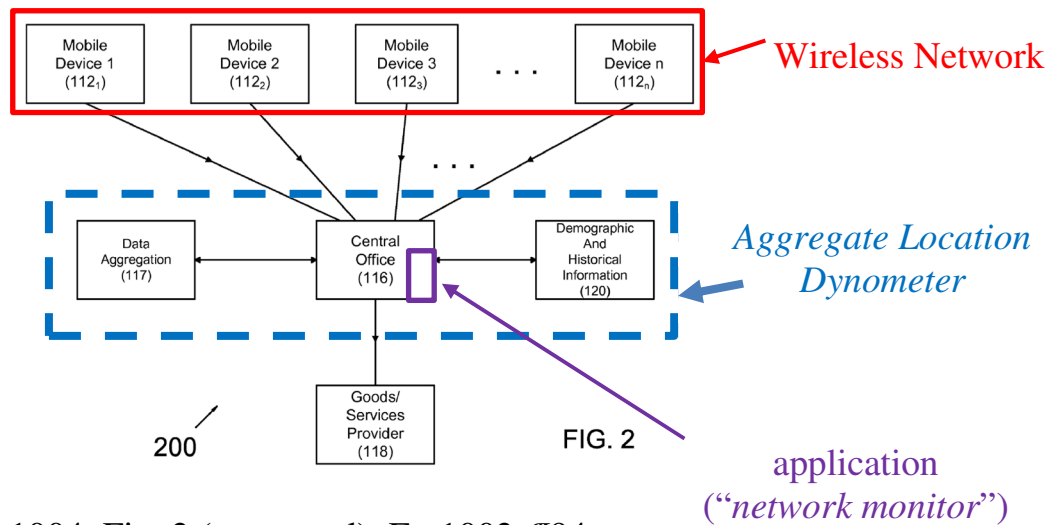
devices in contact with a wireless access point or base station:

A first operation of this process may include **determining the number of phones and/or wireless data terminals in contact with a single cell and/or access point** for individual such cells and/or access points in a mapped area. For example, **individual wireless access points and/or base stations in a geographic region may determine and/or continuously update the number of mobile devices that the access point is in communication with at any time.**

Ex.1004, [0053].

In considering the embodiments of Fig. 2 and Fig. 3 of Wolfe, a POSITA would have understood that the functionality of central office 116 (e.g., monitoring the wireless service carriers, access points and base stations) described in connection with Fig. 2 corresponds to one of the applications/algorithms executing on a server 300. Ex.1003, ¶93; *See also*, Ansari, [0009], [0068] (describing a computing device “performing traditional central office functions” and having “a library of application support service processes that facilitate data collection and data distribution”).

Accordingly, the application 322 of server 300 that performs the functionality/algorithm that monitors wireless service carriers (as described in connection with central office 116 of Fig. 2) is a *network monitor*. Ex.1003, ¶94.



Ex.1004, Fig. 2 (annotated); Ex.1003, ¶94.

Second, Wolfe discloses that the network monitor application 322 of server 300 (as described in connection with central office 116 of Fig. 2) monitors “for an indication of a viral event.” Ex.1003, ¶95. First, Wolfe discloses that it determines the location of mobile devices:

This disclosure is drawn, inter alia, to methods and systems related to telemetrics-based location and/or tracking technology. An example embodiment may relate to determining the locations of wireless devices (e.g., cell phones).

Ex.1004, [0010].

Wolfe further discloses that, using the mobile device’s location information, the system can determine “where crowds of people are located, how the crowds are changing, where they are moving to, when they are transitioning from one activity to another, and/or what activity they are transitioning to.” Ex.1004, [0011].

Wolfe discloses monitoring crowd changes as a group by taking “‘snapshots’ of the group locations may be taken at periodic time intervals without regard to the identities of the individual terminals.” Ex.1004, [0020].

Wolfe also teaches that the “police force may be informed of the distribution of people around a city and/or changes in activity levels in specific locations around a city.” Ex.1004, [0014]; *see also* [0016] (informing an ambulance service).

As discussed above, a POSITA would understand that an “*indication of a viral event*” includes an “indication of a crowd’s activity, including the crowd’s size, density, movement or other characteristics.” Ex.1003, ¶99. Accordingly, any of the crowd’s characteristics identified by Wolfe’s system are an “*indication of a viral event*.” Ex.1003, ¶99. Example indicators of a viral event in Wolfe include indicating where crowds of people are located, how the crowds are changing, where they are moving to, when they are transitioning from one activity to another, and/or what activity they are transitioning to, distribution of people around a city and/or changes in activity levels. Ex.1003, ¶99.

Thus, the application 322 of server 300 (performing the functionality of the central office) that communicates with wireless carriers, determines the number of wireless devices connected to access points and base stations within a particular area, takes “snapshots” of the group locations, and analyzes crowd movements renders obvious “*a network monitor to monitor a wireless network for an*

indication of a viral event.” Ex.1003, ¶¶90-100.

[1.2] *a location aggregator to obtain a location of each of a plurality of wireless devices associated with said viral event;*

First, as discussed above, Wolfe teaches a server in Fig. 3 that executes “one or more” applications to perform the functionality described with reference to Fig. 2. Wolfe further describes that one of the applications “may be arranged to operate with program data 324 on an operation system 321 to **effectuate the aggregation of the mobile device data.**” Ex.1004, [0070]. The application may include an “aggregation algorithm 323 that is implemented to add together and integrate the identities, demographic information and/or historical information related to the mobile devices within the geographic region.” Ex.1004, [0070].

Accordingly, the application 322 of server 300 that (i) includes an algorithm to add together and integrate information related to mobile devices to (ii) effectuate the aggregation of the mobile device data teaches a “*location aggregator.*” Ex.1003, ¶101.

Second, Wolfe teaches that its location aggregator obtains location information directly from the mobile devices within a geographic area and stores each mobile device’s location. Ex.1004, [0022]. Wolfe further teaches that the location aggregator can “*obtain a location of each of a plurality of wireless devices*” because Wolfe describes determining the locations of mobile devices

using “GPS-based location techniques and/or Wi-Fi-based or cell-tower-based location determination techniques, which may involve triangulation.” Ex.1004, [0017], [0019], [0020], and [0027].

Third, as discussed in [1.1], Wolfe discloses using the mobile devices’ information to determine the crowd’s motion trends, e.g., the size and/or locations of the crowd, how the crowd is changing, where the crowd is moving to, and when the crowd is transitioning from one activity to another (indicating a “*viral event*”). Accordingly, because the crowd data is continuously obtained over time, each iteration of data collection about the crowd would be obtaining data about devices associated with a viral event. Ex.1003, ¶104.

Thus, the application 322 of server 300 of Wolfe that obtains and aggregates mobile device data, such as GPS-based location, of a crowd of people, where the mobile device data is associated with the crowd’s movement and activity level, renders obvious “*a location aggregator to obtain a location of each of a plurality of wireless devices associated with said viral event.*” Ex.1003, ¶¶101-105.

[1.3] *a crowd risk determinant, triggered by said network monitor, to determine a crowd risk based on an aggregation of said location of each of said plurality of wireless devices associated with said viral event; and*

First, Wolfe discloses “*a crowd risk determinant*” because it teaches application 322 of server 300 determines the “size and location of crowds,” “movement of a crowd,” and “level of conviction” of the crowd. Ex.1004, [0018]-

[0019], [0027], [0051].

In considering the embodiments of Fig. 2 and Fig. 3, a POSITA would understand that the functionality described in Wolfe with respect to the central office of Fig. 2 (i.e., using models to estimate the size and location of crowds) corresponds to one of the applications 322 executing on a server 300. Ex.1003, ¶108.

Wolfe further teaches that its system is specifically designed so that “a police force may be informed of the distribution of people around a city and/or changes in activity levels in specific locations around a city” and that “police force may better position its patrol officers to locations around the city where the officers may be needed.” Ex.1004, [0014]; *see also*, Ex.1004, [0016].

Accordingly, the application 322 of server 300 that performs the crowd analysis functionality (described in relation to the central office) in order to position patrol officers where needed in the city renders obvious a *crowd risk determinant*. Ex.1003, ¶109.

Second, Wolfe discloses that the “*crowd risk*” is determined “*based on an aggregation of said location of each of said plurality of wireless devices associated with said viral event*” because as discussed in [1.2], the application 322 of server 300 that effectuates the aggregation of the mobile device data (“*a location aggregator*”) uses the mobile device’s location information to create a model

(“*based on an aggregation*”) of the distribution of the monitored crowd’s mobile device’s location (“*of said location of each of a plurality of wireless devices associated with said viral event*”). Ex.1003, ¶111.

Third, Wolfe discloses that the crowd risk determinant is triggered by the network monitor. As discussed above, Wolfe discloses that one application/algorithm of the central office monitors the wireless carriers and mobile devices (the *network monitor*). The central office, after obtaining the “new location data” (i.e., after the *location aggregator* application has performed its process), then runs the algorithms on that new data to determine the “size and location of crowds,” “movement of a crowd,” and “level of conviction” of the crowd. Ex.1004, [0018]-[0019], [0027], [0051].

In another example, Wolfe describes monitoring the number of people in a geographic region, and then, if enough people are within that geographic region, triggering an analysis to determine the likelihood that the crowd of people will take an action:

Thus, for example, if 10,000 people are determined to be within a half-mile of the restaurant, and each person has, on average, a 0.37% likelihood of ordering a slice of pizza, then it may be estimated that 37 slices of pizza will be needed in the next ten minutes.
Ex.1004, [0046].

Accordingly, in this example, Wolfe teaches that the network monitor

functionality determines that there are 10,000 people within a geographic region. Ex.1003, ¶114. Once the analysis by the network monitor is completed (i.e., determining that there are 10,000 people in that region), then the crowd risk determinant functionality is triggered. *Id.* The crowd risk determinant functionality analyzes the likelihood that the crowd will take a particular action (i.e., determining that the crowd will likely want to purchase 37 slices of pizza within the next ten minutes). *Id.* Here, the “crowd risk” is that it is likely that 37 slices of pizza will be needed. Per Wolfe’s teachings, this crowd risk could just as easily have been the likelihood of needing taxis or needing police. Ex.1004, [0047], [0014]; Ex.1003, ¶114.

Because, the central office, after obtaining the “new location data,” then runs the algorithms on that new data to analyze characteristics of the crowd and determine the likelihood of the crowd’s activities, it would be obvious to a POSITA that the *network monitor* functionality triggers the *crowd risk determinant* functionality. Ex.1003, ¶115. The sequence of events described in Wolfe establishes that the network monitoring functionality causes the crowd risk functionality to execute. *Id.*

Thus, Wolfe’s application 322 of server 300 that (i) is triggered by the network monitoring functionality and (ii) uses the monitored crowd’s mobile device’s current and stored location information to analyze the crowd’s activity

level (such as a level of conviction) and likelihood of the crowd's actions renders obvious "*a crowd risk determinant, triggered by said network monitor, to determine a crowd risk based on an aggregation of said location of each of said plurality of wireless devices associated with said viral event.*"² Ex.1003, ¶¶106-116.

[1.4] *an alert module to initiate an alert message relating to a public safety risk determined from an analysis of said viral event.*

First, Wolfe teaches that its system is designed so that "a police force may be informed of the distribution of people around a city and/or changes in activity levels in specific locations around a city" and that the "police force may better position its patrol officers to locations around the city where the officers may be needed." Ex.1004, [0014]; *see also*, Ex.1004, [0016].

Moreover, Wolfe describes that the functionality of its system that alerts first responders is implemented in a server that includes "one or more applications 322" Ex.1004, [0070]. Accordingly, the application 322 that implements the alert first responders functionality is the "*alert module.*" Ex.1003, ¶118.

Second, Pfeffer teaches a first responder dispatch methodology that receives incident information including crowd location information, analyzes the incident,

assigns a level of alert, and acting upon the incident should the level of alert exceed a predetermined threshold. Ex.1003, ¶¶121-22. In more detail, Pfeffer teaches receiving “incident information can be received through any method.” Ex.1005, [0073]. Information received by Pfeffer’s methodology can include, among other things, the number of people involved in the incident. Ex.1005, [0039].

Pfeffer’s methodology then determines the “level of alert” by using information about the incident and the geographic region, such as weather, the number of incidents, the available resources, information received regarding potential threats, and unusual events involving crowds, such as parades, sporting events, and festivals. Ex.1005, [0077].

Pfeffer’s first responder dispatch methodology monitors the level of alert and “if the level of alert exceeds a predetermined threshold” (“*a public safety risk*”) the system “can send out requests for additional first responders.” (“*initiating an alert message*”). Ex.1005, [0077].

To the extent Patent Owner argues that the functionality of “*relating to a public safety risk determined from an analysis of said viral event*” is necessarily performed by the “*crowd risk determinant*” in [1.3], the combination of Wolfe and Pfeffer nevertheless renders such arrangement obvious. As discussed in [1.4], Pfeffer provides additional teachings of analyzing incident information to

determine a level of alert associated with the incident, and if the level of alert exceeds a threshold, dispatching first responders. As more fully discussed in [1.4], Pfeffer discloses determining a public safety risk from an analysis of a viral event. As discussed in [1.3], Wolfe discloses an application 322 that analyzes a crowd and, it would be obvious to a POSITA, to similarly implement the methodology of Pfeffer in the “crowd risk determinant” application of Wolfe. Ex.1003, ¶122.

Thus, Wolfe’s application 322 that sends crowd information to police and other first responders in view of Pfeffer’s first responder dispatch methodology that receives: (i) incident information, (ii) determines the level of alert, (iii) determines if the level of alert exceeds a threshold based on the received incident information, and (iv) sends a request for additional first responders because of unusual events renders obvious “*an alert module to initiate an alert message relating to a public safety risk determined from an analysis of said viral event.*” Ex.1003, ¶¶117-23.

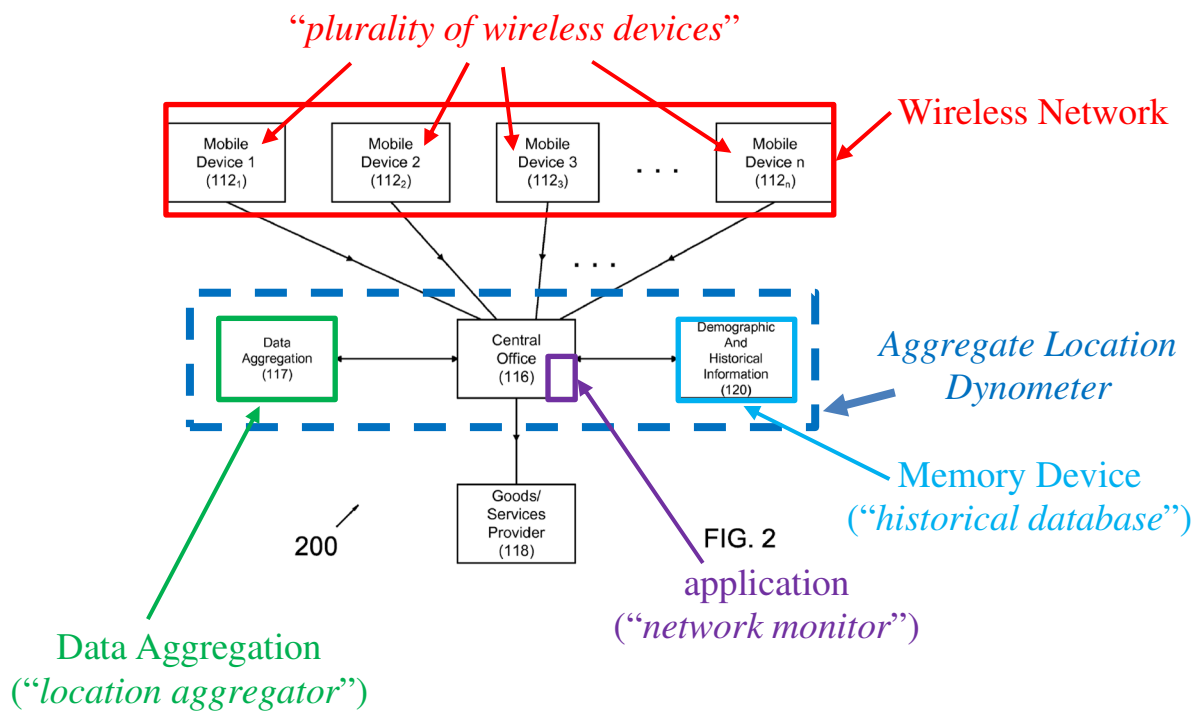
5. Claim 2

[2.0] *The aggregate location dynamometer in a physical wireless network server, said aggregate location dynamometer according to claim 1, further comprising:*

This limitation is substantially similar to the limitation of [1.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[2.1] *a historical database maintaining a geographic region associated with said viral event.*

First, Wolfe discloses a “historical database” because its system uses a “memory 120 storing ... historical information.” Ex.1004, [0024]. Wolfe also discloses storing “the received mobile device locations” in “memory device 120.” Ex.1004, [0022].



Ex.1004, Fig. 2 (annotated); Ex.1003, ¶126.

Further, Wolfe discloses using the historical data stored in the memory device. Ex.1004, [0027] (“run aggregation algorithms on ... the demographic and historical data from memory device 120”).

Second, Pfeffer teaches that it was known that a memory device for storing information in a first responder dispatch system would be a “database.” Ex.1005, [0031] (“Task management system 100 is also in communication with a remote

database 140”).

Accordingly, a POSITA would understand that Wolfe renders obvious a “*database*” because Wolfe teaches the memory device (i) is “communicatively coupled” to the central office, (ii) stores historical information, and (iii) provides historical data to the aggregation algorithms. Ex.1003, ¶129. A POSITA would recognize that a memory device that stores historical data and provides data when requested teaches a “*database.*” *See*, Ex.1005, [0031]; Ex.1003, ¶129.

Fourth, Pfeffer discloses “*maintaining a geographic region associated with said viral event*” in a database because Pfeffer teaches storing information associated with the locations of previous incidents in a database and updating the database based on previous incidents or current trends. Ex.1005, [0039] (“scenario database 175 can include pre-programmed optimal responses based on incident information such as ... location of incident”); Ex.1005, [0040] (“scenario analysis engine 170 can continually update scenario database 185 based on the experiences of task management system 100 in dealing with previous incidents and/or current trends in incidents”).

Thus, Wolfe’s system that uses historical information about incidents maintained a memory device in view of Pfeffer’s technique of updating a database with data about the location of incidents, previous incidents and current trends renders obvious “*further comprising a historical database maintaining a*

geographic region associated with said viral event.” Ex.1003, ¶¶125-31.

D. Ground 2: Claims 3-6 are obvious under 35 U.S.C. § 103 over Wolfe in view of Pfeffer and further in view of Hua

1. Summary of Hua

Hua’s methods are directed to “detecting specified behaviors of ... a crowd of people.” Ex.1006, [0040]. Hua teaches that “detecting the formation and presence of a crowd and understanding its behavior are important to many applications in military, security, and commercial environments.” Ex.1006, [0003].

Hua discloses that it was known to POSITAs that crowd information, such as a crowd’s shape, is easily acquired from a density map of the crowd. Ex.1006, [0072] (“After getting the density map, crowd level features can be easily obtained. ... such as location, shape, size and count.”). Ex.1003, ¶134.

Hua’s method uses crowd behavior such as “a crowd forming, a crowd dispersing, two way traffic, a waiting crowd, a quick moving crowd, a very crowded scene, a medium crowded scene, and a non-crowded scene” when assessing whether a crowd problem exists. Ex.1006, [0011], [0084]; Ex.1003, ¶¶132-35.

2. Reasons to combine Wolfe and Pfeffer with Hua

A POSITA would be motivated to combine the teachings of Wolfe-Pfeffer with those of Hua because Wolfe-Pfeffer discloses a crowd detection system that is

specifically designed to provide crowd information to first responders when unusual crowd events occur, and Hua discloses a method to use additional crowd information, such as the crowd's shape, when analyzing whether a risk exists. Ex.1006, [0011], [0072]; Ex.1003, ¶136.

a) Wolfe, Pfeffer and Hua are analogous art

As an initial matter, a POSITA considering the problem purportedly solved by the '054 patent, would have looked to the teachings of Wolfe, Pfeffer and Hua. Ex.1003, ¶137.

As discussed above, Wolfe is analogous art to the '054 patent. Ex.1004, [0014], [0017], [0018], [0042]. As also discussed above, Pfeffer is analogous to the '054 patent. Ex.1005, [0031], [0035], [0037], [0039], [0109]. Hua is analogous art because Hua is related to a method for “crowd characterization and crowd behavioral detection” that relates to “detecting specified behaviors of ... a crowd of people” for “use with in security monitoring and crowd management.” Ex.1006, [0002], [0040]; Ex.1003, ¶138.

b) A POSITA would have found it obvious to apply Hua's techniques for crowd analysis to the crowd analysis system of Wolfe-Pfeffer

A POSITA would have been specifically motivated to apply Hua's crowd shape information to crowds identified by Wolfe-Pfeffer's crowd detection system. Ex.1003, ¶139. For example, Wolfe-Pfeffer's system identifies and tracks each

mobile device associated with a monitored crowd and informs first responders of the crowd's motion trends when unusual events occur. Ex.1004, [0011], [0014].

Based on Wolfe-Pfeffer's crowd information, the police force can position its patrol officers in locations around the city where the officers may be needed.

Ex.1004, [0014]. To alert the police, Wolfe describes that it analyzes size, arrangement, and density of wireless devices and creates a population density map.

Ex.1003, ¶139. A POSITA would recognize that a crowd's shape is discernable from the size, arrangement and density of devices plotted in a population density map. Ex.1003, ¶139.

Hua further teaches that it was known to POSITAs to extract the presence of a crowd and additional crowd features, e.g., crowd shape, from a density map (such as the density map used in Wolfe). Ex.1006, [0003], [0072]. Hua's method uses crowd behavior such as "a crowd forming, a crowd dispersing, two way traffic, a waiting crowd, a quick moving crowd, a very crowded scene, a medium crowded scene, and a non-crowded scene" when assessing a possible risk to the crowd. Ex.1006, [0011], [0084]. Moreover, Hua is designed to "enhance the detection of crowd features." Ex.1006, [0047]; Ex.1003, ¶¶139-40.

c) The combination of Hua with Wolfe-Pfeffer would have been predictable

The combination of Hua with Wolfe-Pfeffer would be predictable because

Wolfe-Pfeffer and Hua are the same type of system, in that both are evaluating crowd's movement and behavior for an indication of a risk to the crowd. Ex.1003, ¶141. For example, the Wolfe-Pfeffer system detects “a plurality of wireless mobile devices within a geographic region” and provides “details of where crowds of people are located, how the crowds are changing.” Ex.1004, Abstract, [0011], [0014]. Similarly, Hua's method detects “specified behaviors of ... a crowd of people” using “sensor and external data” including “GPS location, weather, date, and time data.” Ex.1006, [0011], [0040].

Further, Wolfe-Pfeffer teaches creating a population density map using the aggregated locations of mobile devices, associated with a monitored crowd, within a geographical area. Ex.1004, [0082]. Hua provides additional teachings when using a density map. Ex.1006, [0072]. Wolfe's system of analyzing the characteristics of a crowd with a density map would benefit from Hua's teachings of how a crowd's shape changes over time. Ex.1006, [0073]; Ex.1003, ¶142.

Implementing Hua's techniques of obtaining the crowd's shape from the density map to Wolfe-Pfeffer's system, where crowd information already includes a population density map, would have been within the level of skill in the art because Hua notes that “crowd level features can be easily obtained” from the density map. Ex.1006, [0072]; Ex.1003, ¶143.

Accordingly, a POSITA would have found it obvious to apply Hua's

teachings to the Wolfe-Pfeffer system because the combination would use known techniques (Hua's technique of determining crowd shapes from a density map) to improve a similar system (Wolfe-Pfeffer's system that analyzes crowds and how the crowds change over time) in the same way (analyzing crowds using density maps). Ex.1003, ¶¶141-44.

3. Claim 3

[3.0] The aggregate location dynamometer in a physical wireless network server, said aggregate location dynamometer according to claim 2, wherein said historical databases comprises:

This limitation is substantially similar to the limitation of [2.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[3.1] a plurality of acceptable crowd shapes, a crowd shape being defined by said aggregation of said location of each of said plurality of wireless devices associated with said viral event.

First, as discussed in with respect to claim 1, Wolfe's location and tracking system uses an application to monitor the crowd's motion trends, aggregates location data about a plurality of mobile devices located in a geographical area and analyzes the motions trends and level of conviction of the crowds. Ex.1003, ¶146.

Second, as discussed with respect to claim 2, Wolfe discloses storing "historical information." Ex.1004, [0024]. Further, Pfeffer teaches that it was known to save incident information in a database for future use. Ex.1005, [0040] (describing continually updating the database with "incidents" and "current trends"

for use in evaluating “a subsequent incident”).

Third, Wolfe teaches creating a population density map using aggregated locations of the monitored crowd’s mobile devices within a geographic area. Ex.1004, [0082]. Hua further teaches that, in a system using a density map (such as Wolfe’s system), it was known to track additional information about crowds, such as a crowd’s shape. Ex.1006, [0072] (“After getting the density map, crowd level features can be easily obtained. ... such as location, shape, size and count.”).

Accordingly, Wolfe and Hua render obvious “*a crowd shape being defined by said aggregation of said location of each of said plurality of wireless devices associated with said viral event.*” Ex.1003, ¶148.

Fourth, the combined teachings of Wolfe, Pfeffer and Hua render obvious “*a plurality of acceptable shapes.*” As discussed in [1.4], one purpose of Wolfe’s system is to provide crowd information to first responders so that police officers can be positioned where “needed.” Ex.1004, [0014]. Similarly, Pfeffer’s first responder dispatch methodology analyzes incident information and monitors a level of alert based on the received incident information in order to dispatch first responders. Ex.1005, [0038].

Pfeffer further teaches determining if the level of alert does or does not exceed a predetermined threshold. Ex.1005, [0078]. A POSITA would understand and recognize that if an incident has a level of alert that “exceeds a predetermined

threshold,” thus needing additional first responders, the incident generating that level of alert represents an “unacceptable” situation. Ex.1003, ¶150. Conversely, if the level of alert did not exceed the predetermined threshold, the incident generating that level of alert would represent an “acceptable” situation. Ex.1003, ¶150.

Accordingly, (i) Wolfe and Hua’s teachings of using location information to create a density map that shows the shape of a crowd for purposes of analyzing the crowd’s motion trends and level of conviction, in view of (ii) Pfeffer’s teaching of using incident information to determine whether an incident is below a threshold, which does not necessitate dispatching additional police, renders obvious “*a plurality of acceptable shapes.*” Ex.1003, ¶151. Further, it was already known to POSITAs to implement algorithms to detect abnormal events by analyzing the shape of a group of people. Ex.1007, [0084].

Thus, Wolfe’s telemetrics-based location and tracking system that detects a plurality of mobile devices located in a geographical area and tracks a crowd’s characteristics using density maps, and which stores information in a historical database, in view of Hua’s teaching that it was known to analyze the shape of a crowd using density maps, further in view of Pfeffer’s methodology of identifying an acceptable or unacceptable situation based on crowd information and updating a database with incident information for future analysis, renders obvious “*a plurality*

of acceptable crowd shapes, a crowd shape being defined by said aggregation of said location of each of said plurality of wireless devices associated with said viral event.” Ex.1003, ¶¶146-56.

4. Claim 4

[4.0] The aggregate location dynamometer in a physical wireless network server, said aggregate location dynamometer according to claim 2, wherein said historical databases comprises:

This limitation is substantially similar to the limitation of [2.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[4.1] a plurality of non-acceptable crowd shapes, a crowd shape being defined by said aggregation of said location of each of said plurality of wireless devices

First, as discussed in [3.1], Wolfe teaches that its process creates a population density map using aggregated locations of the monitored crowd’s mobile devices within a geographic area and storing historical information. As also discussed in [3.1], Hua further teaches that, in a system using a density map (such as Wolfe’s system), it was known to analyze crowds using a crowd’s shape. Ex.1006, [0072].

As also discussed in [1.3], one purpose of Wolfe’s system is to provide crowd information to first responders so that police officers can be positioned where “needed.” Ex.1004, [0014]. Similarly, Pfeffer’s first responder dispatch methodology analyzes incident information, monitors a level of alert based on received incident information, and if the level of alert exceeds a threshold,

dispatching additional first responders. Ex.1005, [0038], [0077].

A POSITA would understand and recognize that if an incident has a level of alert that “exceeds a predetermined threshold,” thus needing additional first responders, the incident generating that level of alert represents an “unacceptable” situation. Ex.1003, ¶160. Conversely, if the level of alert did not exceed the predetermined threshold, the incident generating that level of alert would represent an “acceptable” situation. Ex.1003, ¶160.

Further, Pfeffer teaches several examples of unacceptable situations, e.g., emergencies such as car accidents, airplane accidents, terrorist attacks, medical emergencies, and natural disasters. Ex.1005, [0028]. As also discussed in [3.1], Pfeffer teaches updating and saving incident information in the scenario database for future use.

Thus, Wolfe’s telemetrics-based location and tracking system that detects a plurality of mobile devices located in a geographical area and tracks a crowd’s characteristics using density maps, and which stores information in a historical database, in view of Hua’s teaching that it was known to analyze the shape of a crowd using density maps, further in view of Pfeffer’s methodology of identifying an acceptable or unacceptable situation based on crowd information and updating a database with incident information for future analysis, renders obvious “*a plurality of non-acceptable crowd shapes, a crowd shape being defined by said aggregation*

of said location of each of said plurality of wireless devices.” Ex.1003, ¶¶158-65.

5. Claim 5

[5.0] *The aggregate location dynometer in a physical wireless network server, said aggregate location dynometer according to claim 2, wherein said historical databases comprises:*

This limitation is substantially similar to the limitation of [2.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[5.1] *a configurable parameter defining a threshold of a crowd shape becoming unacceptable and thus said crowd risk.*

First, as discussed with respect to claims 3 and 4, the combined teachings of Wolfe, Pfeffer and Hua renders obvious that certain crowd shapes are acceptable and other crowd shapes are not acceptable and that incident information is stored in a database. Ex.1003, ¶167.

Second, Pfeffer teaches, when analyzing an incident, using a predetermined threshold to assess the level of alert. Ex.1005, [0077] (“If the level of alert exceeds a predetermined threshold ... send out requests for additional responders”).

A POSITA would understand that if an incident has a level of alert that “exceeds a predetermined threshold,” thus needing additional first responders, the incident generating that level of alert represents an “unacceptable” situation. Ex.1003, ¶169. Conversely, if the level of alert did not exceed the predetermined threshold, the incident generating that level of alert would represent an acceptable

situation. Ex.1003, ¶169. *See also* Ex.1007, [0084] (describing that an “abnormal event” can be detected from “a specific shape, such as a line, circle, or rectangle; a group of people forming a circle, rectangle or partial circle or rectangle”).

Accordingly, because Wolfe in view of Hua teaches determining a crowd risk and uses a crowd shape, and Pfeffer teaches using a threshold to determine the level of risk of an incident, a POSITA would find it obvious that the combined teachings of Wolfe, Hua, and Pfeffer render obvious “*a threshold of a crowd shape becoming unacceptable.*” Ex.1003, ¶170.

Third, Pfeffer teaches that the “predetermined threshold” is part of a “database 185 that can be fully customizable.” Ex.1005, [0109], [0039], [0041] (describing “number of people involved in the incident” as an example predetermined threshold value in the database, which if exceeded, would require additional first responders). Further, Pfeffer teaches “continually updat[ing] scenario database 185 based on the experiences ... in dealing with previous incidents and/or current trends in incidents.” Ex.1005, [0040]. In another example, Pfeffer teaches that if the predetermined threshold is exceeded, e.g., the number of people involved in the incident exceeds a threshold, then the type of incident is elevated to a complex incident:

In one embodiment, a predetermined threshold value for a number of people involved in the incident or a number of agencies which need to

be involved in the response may be used to determine if the incident is a complex incident.

Ex.1005, [0109].

Accordingly, Pfeffer's "predetermined threshold" in a "fully customizable" database that is "continually update[d]" renders obvious a "*configurable parameter defining a threshold.*" Ex.1003, ¶176.

Accordingly, Wolfe's telemetrics-based location and tracking system that detects a plurality of mobile devices located in a geographical area and tracks a crowd's characteristics using density maps, in view of Hua's teaching that it was known to analyze the shape of a crowd using density maps, further in view of Pfeffer's teaching of identifying an acceptable or unacceptable situation based on crowd information by comparing against a customizable threshold, renders obvious "*a configurable parameter defining a threshold of a crowd shape becoming unacceptable and thus said crowd risk.*" Ex.1003, ¶¶167-77.

6. Claim 6

[6.0] *The aggregate location dynometer in a physical wireless network server, said aggregate location dynometer according to claim 2, wherein said historical databases comprises:*

This limitation is substantially similar to the limitation of [2.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[6.1] *a plurality of crowd shape trends based on historical wireless device locations during previous viral events.*

First, as discussed with respect to claims 3 and 4, Wolfe’s telemetrics-based location and tracking system detects a plurality of mobile devices located in a geographical area and tracks a crowd’s characteristics using density maps, in view of Hua’s teaching of analyzing the shape of a crowd using density maps, further in view of Pfeffer’s teaching of identifying an acceptable or unacceptable situation based on crowd information renders obvious that certain crowd shapes are acceptable and other crowd shapes are not-acceptable. Ex.1003, ¶179.

As discussed in [2.1], Wolfe and Pfeffer render obvious a “*historical database maintaining a geographic region associated with said viral event.*”

Second, Pfeffer’s methodology “continually update[s]” the scenario database based on the “experiences ... in dealing with previous incidents.” Ex.1005 [0040]. The previous incidents stored in the database are “*previous viral events.*” Ex.1003, ¶181.

Third, it would have been obvious to a POSITA that Wolfe’s historical database containing demographic and historical information including mobile device locations would also contain information about crowd shape, as taught in Hua. Ex.1003, ¶182. As further evidence of obviousness, POSITAs were actively tracking and storing crowd shapes in crowd event analysis systems. Ex.1007, [0084] (discussing crowd shape based analysis and motion history).

Thus, Wolfe’s system providing and saving details of the crowd’s movement

and location within a geographical area, aggregating the mobile device's location information, and creating a population density map, in view of Hua's technique of extracting crowd shape from density maps, and further in view of Pfeffer's teaching of updating a scenario database to contain information about prior incidents, renders obvious the "*a plurality of crowd shape trends based on historical wireless device locations during previous viral events.*" Ex.1003, ¶¶179-83.

E. Ground 3: Claims 7-14 are obvious under 35 U.S.C. § 103 over Wolfe in view of Hua

1. Reasons to combine Wolfe and Hua

A POSITA would be motivated to combine the teachings of Wolfe with those of Hua because Wolfe discloses a crowd detection system that is specifically designed to provide detailed crowd information to police, and Hua discloses a method to provide additional crowd information known to POSITAs, e.g., the crowd's shape, when analyzing whether a risk to the crowd exists. Ex.1006, [0011], [0072]; Ex.1003, ¶184.

a) Wolfe and Hua are analogous art

As an initial matter, a POSITA, considering the problem purportedly solved by the '054 patent, would have looked to the teachings of Wolfe and Hua. Ex.1003, ¶185.

As discussed above, Wolfe is analogous art to the '054 patent. Ex.1004, [0014], [0017], [0018], [0042]. As also discussed above, Hua is analogous art Ex.1006, [0002], [0040]; Ex.1003, ¶¶185-86.

b) A POSITA would have found it obvious to apply Hua's techniques for crowd analysis to the crowd analysis system of Wolfe

A POSITA would have been specifically motivated to apply Hua's crowd shape information to Wolfe's crowd detection system. Ex.1003, ¶187. For example, Wolfe's system identifies and tracks each mobile device associated with the monitored crowd and informs first responders of the crowd's motion trends when unusual events occur. Ex.1004, [0011], [0014]. Based on Wolfe's crowd information, the police force can position its patrol officers in locations around the city where the officers may be needed. Ex.1004, [0014]. To alert the police, Wolfe describes that it analyzes size, arrangement, and density of wireless devices and creates a population density map. Ex.1003, ¶187. A POSITA would recognize that a crowd's shape is discernable from the size, arrangement and density of devices plotted in a population density map. Ex.1003, ¶187.

Hua further teaches that it was known to POSITAs to extract the presence of a crowd and additional crowd features, e.g., crowd shape, from a density map (such as the density map from Wolfe). Ex.1006, [0003], [0072]; Ex.1003, ¶188. Hua's method uses crowd behavior such as "a crowd forming, a crowd dispersing,

two way traffic, a waiting crowd, a quick moving crowd, a very crowded scene, a medium crowded scene, and a non-crowded scene” when assessing a possible risk to the crowd. Ex.1006, [0011], [0084]. Moreover, Hua is designed to “enhance the detection of crowd features.” Ex.1006, [0047]; Ex.1003, ¶¶187-88.

c) The combination of Hua with Wolfe would have been predictable

A POSITA would have found the combination of Wolfe and Hua predictable and would have had a reasonable expectation of success. Ex.1003, ¶189. First, Wolfe and Hua are the same type of system, in that both systems are evaluating crowd’s movement and behavior for an indication of a risk to the crowd. Ex.1003, ¶189. For example, Wolfe’s system detects “a plurality of wireless mobile devices within a geographic region” and provides “details of ... how the crowds are changing.” Ex.1004, Abstract, [0011], [0014]. Similarly, Hua’s method detects “specified behaviors of ... a crowd of people” using “sensor and external data” including “GPS location, weather, date, and time data.” Ex.1006, [0011], [0040].

Second, Wolfe teaches creating a population density map using the aggregated locations of mobile devices within a geographical area. Ex.1004, [0082]. Hua provides additional teachings when using density maps. Ex.1006, [0072]. Wolfe’s system of analyzing the characteristics of a crowd with a density map would benefit from Hua’s teachings of how a crowd’s shape changes over

time. Ex.1006, [0072]; Ex.1003, ¶191.

Implementing Hua's techniques of obtaining the crowd's shape from the density map to Wolfe's system, where crowd information already includes the crowd's population density map, would have been within the level of skill in the art because Hua specifically identifies that its "invention is intended to cover alternatives, modifications and equivalents." Ex.1006, [0103]; Ex.1003, ¶193.

Accordingly, a POSITA would have found it obvious to apply Hua's teachings to Wolfe's system because the combination would use known techniques (Hua's technique of determining crowd shapes from a density map) to improve a similar system (Wolfe's system that analyzes about crowds and how the crowds change over time) in the same way (analyzing crowds using density maps). Ex.1003, ¶¶184-94.

2. Claim 7

[7.0] A method of alerting to a problematic crowd risk based on location based services (LBS), comprising:

First, Wolfe expressly teaches a method in which "a police force may be informed" ("*a method of alerting*") that the "distribution of people" and "changes in activity levels" may require that the positioning patrol officers where "needed." ("*problematic crowd risk*"). Ex.1004, [0014].

Second, Wolfe discloses that informing the police about changes in a

crowd's activity level is based on "specific locations around a city" ("*location based services (LBS)*"). Ex.1004, [0014].

Third, as discussed in [1.1], Wolfe teaches monitoring wireless service carriers by determining the number of wireless devices connected to access points and/or base stations within a particular area.

Thus, Wolfe's method for monitoring a wireless network by monitoring the wireless access points and/or base stations, providing alerts about the crowd's location information to first responders based on changes in the crowd's activity level, providing alerts about changes in the crowd's activity level, based on mobile device location information, renders obvious "*a method of alerting to a problematic crowd risk based on location based services (LBS)*." Ex.1003, ¶¶195-99.

[7.1] *monitoring wireless traffic for a forming viral event associated with a plurality of physical wireless devices within a given region;*

First, Wolfe discloses "*monitoring wireless traffic... associated with a plurality of physical wireless devices within a given region*" because Wolfe teaches a method for "detecting a plurality of wireless mobile devices within a geographic region." Ex.1004, Abstract. Specifically, Wolfe discloses monitoring wireless traffic by gathering information from wireless access points and base stations about the number of phones and wireless terminals in an area. Ex.1004, [0030]

(“determining the number of phones and/or wireless terminals in a mapped area” using “data from individual wireless access points and/or base stations within the mapped area”).

Second, Wolfe discloses that it detects “*a forming viral event associated with a plurality of physical wireless devices within a given region*” by using mobile device location information to determine “where crowds of people are located, how the crowds are changing, where they are moving to, when they are transitioning from one activity to another, and/or what activity they are transitioning to.” Ex.1004, [0010], [0011].

Wolfe also discloses monitoring crowd changes as a group by using “‘snapshots’ of the group locations ... taken at periodic time intervals.” Ex.1004, [0020].

As discussed above, a POSITA would understand that “*a forming viral event*” includes an “indication of a crowd’s activity, including the crowd’s size, density, movement or other characteristics.” Accordingly, any of the crowd’s characteristics identified by the system of Wolfe would be a “*a forming viral event*.” Ex.1003, ¶205. Examples of a forming viral event in Wolfe include indicating “where crowds of people are located, how the crowds are changing, where they are moving to, when they are transitioning from one activity to another, and/or what activity they are transitioning to,” distribution of people around a city

and/or changes in activity levels. Ex.1004, [0011], [0014].

Thus, Wolfe’s method of monitoring base stations and access points for connected wireless mobile devices, receiving each mobile device’s location information within a geographic region, identifying a crowd based on the received mobile device’s locations, and identifying the distribution of people around a city and/or changes in activity levels of the crowd, renders obvious “*monitoring wireless traffic for a forming viral event associated with a plurality of physical wireless devices within a given region.*” Ex.1003, ¶¶200-06.

[7.2] *initiating location requests to a physical location server to obtain a current location of each of said plurality of physical wireless devices;*

First, as discussed in [1.0], Wolfe discloses that its method can be implemented in a server that collects and integrates mobile device location data. Wolfe teaches storing each received mobile device’s location information. Ex.1004, [0030], [0022]. Wolfe’s method also includes a location aggregator application 322 of server 300 that obtains wireless devices’ current location using “GPS-based location determination techniques, Wi-Fi-based or cell-tower-based location determination techniques, including triangulation.” Ex.1004, [0017].

Second, Wolfe’s method uses one central computer to pull data from a plurality of central offices (each, a server that obtains location data about mobile devices). Ex.1004, [0034] (“one central computer system may be arranged to

create the maps and the associated data structures for many or all of the regions. Such a central computer system may be communicatively coupled to each of a plurality of central offices 116.”).

A POSITA would understand that the central computer system that is arranged to analyze data from a plurality of central office servers would initiate requests to those servers to obtain the data. Ex.1003, ¶209.

Thus, Wolfe’s method in which a central computer system requests, from a central office server, continuously updated location information about each mobile device within a geographic area renders obvious “*initiating location requests to a physical location server to obtain a current location of each of said plurality of physical wireless devices.*” Ex.1003, ¶¶207-210.

[7.3] forming a crowd shape based on an aggregation of said current location of each of said plurality of physical wireless devices;

First, Wolfe teaches that it creates a population density map using the aggregated locations of the monitored crowd’s mobile devices within a geographic area. Ex.1004, [0082]. Wolfe also discloses monitoring crowd changes as a group by using “‘snapshots’ of the group locations ... taken at periodic time intervals.” Ex.1004, [0020].

Second, Hua teaches that, in a system using a density map (such as Wolfe’s system), a crowd’s “shape” can be calculated. Ex.1006, [0072].

Accordingly, a POSITA would have understood that, in Wolfe's system, which teaches monitoring snapshots of group locations at periodic time intervals, in view of Hua's teaching of detecting crowd shapes, would disclose detecting the formation of a shape of a crowd. Ex.1003, ¶214. POSITAs were already doing such an analysis of crowds and crowd shapes. *See* Ex.1007, [0084].

Thus, Wolfe's method for creating a population density map using the aggregated locations of the monitored crowd's mobile devices using snapshots over periodic intervals, in combination with Hua's method that crowd shape is derived from a density map, renders obvious "*forming a crowd shape based on an aggregation of said current location of each of said plurality of physical wireless devices.*" Ex.1003, ¶¶211-16.

[7.4] *determining a crowd risk of said crowd based on said crowd shape of said current location of each of said plurality of physical wireless devices; and*

First, as discussed in [3.1], Wolfe discloses creating a population density map using the current location of each mobile device associated with the monitored crowd. As discussed in [7.3], Hua teaches that it was known to analyze a crowd's shape obtained from a density map (such as Wolfe's density maps).

As also discussed in [7.3], a POSITA would have understood that, in Wolfe's system, which teaches monitoring snapshots of group locations at periodic time intervals based on continuously updated location information, in view of

Hua's teaching of detecting crowd shapes, would disclose detecting the formation of a shape of a crowd. POSITAs were already doing such an analysis of crowds and crowd shapes. *See*, Ex.1007, [0084]; Ex.1003, ¶220.

Second, as discussed in [1.3], Wolfe discloses analyzing the characteristics of the crowds, such as the size and location, to determine a crowd risk. Ex.1004, [0034], [0042]. Wolfe also discloses informing the police based on "changes in activity levels" of the crowds. Ex.1004 [0014].

Thus, Wolfe's teaching of determining a crowd risk based on the characteristics of the crowd based on the current location of the mobile devices in a density map, in combination with Hua's method of analyzing a crowd's shape derived from a density map render obvious "*determining a crowd risk of said crowd based on said crowd shape of said current location of each of said plurality of physical wireless devices.*" Ex.1003, ¶¶217-222.

[7.5] triggering a crowd alert message when said determined crowd risk is above a given threshold.

First, as discussed in [7.4], Wolfe in view of Hua render obvious that the risk of a crowd can be determined and assessed by taking into account the shape of the crowd.

Second, Wolfe teaches that when the activity levels of the crowd changes, the police force may be informed so that patrol officers can be sent to needed

locations. Ex.1004, [0014].

To the extent Patent Owner argues that “crowd alert message” should be treated as a message sent *only* to the devices of the individuals that make up the crowd, such a proposed claim construction would contradict the specification. Ex.1003, ¶225. The specification describes “alerts” as uniformly *not* communicating with the individuals in the crowd. Ex.1001, 2:1-2 and 6:60-61 (“proper authorities”), 3:22-24 (“emergency personnel”), 3:49-51 (“public safety personnel”).

Third, as discussed in [7.0], Wolfe teaches using a threshold because Wolfe discloses monitoring changes in the crowd’s activity level compared to a threshold, such as monitoring “only those mobile devices 112 moving at at least a minimum threshold speed.” Ex.1004, [0043]. Further, Pfeffer evidences that POSITAs knew to trigger an alert predicated upon a crowd’s activity level exceeding a threshold. Ex.1005, [0077].

Thus, sending a message due to changes in the crowd’s activity levels exceeding a threshold renders obvious “*triggering a crowd alert message when said determined crowd risk is above a given threshold.*” Ex.1003, ¶¶223-28.

3. Claim 8

[8.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 7, wherein:*

This limitation is substantially similar to the limitation of [7.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[8.1] *said crowd risk of said crowd is further determined based on a movement of said crowd shape.*

As discussed in [7.0], Wolfe teaches a method for informing the police force when the crowd's activity level changes in particular areas so that patrol officers can go to needed locations.

As discussed in [1.2], the application 322 of server 300 (performing the functionality of central office 116) monitors the locations of the mobile devices as a crowd over time. Ex.1004, [0019].

As discussed in [7.3], a POSITA would have understood that Wolfe's system, which teaches monitoring snapshots of group locations at periodic time intervals, in view of Hua's teaching of detecting crowd shapes, would disclose detecting the formation of a shape of a crowd. POSITAs were already doing such an analysis of crowds and crowd shapes. See, for example, Ex.1007, [0084].

Thus, Wolfe's teaching of determining a compromise to crowd safety using the crowd's motion trends, such as monitoring the movement of the crowd's characteristics over time, in view of Hua's teaching of detecting crowd shapes, renders obvious "*said crowd risk of said crowd is further determined based on a movement of said crowd shape.*" Ex.1003, ¶¶231-36.

4. Claim 9

[9.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 7, wherein said monitoring wireless traffic comprises:*

This limitation is substantially similar to the limitation of [7.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[9.1] *monitoring wireless traffic at a given point in a wireless network; and*

First, as discussed in [1.1], the application 322 of server 300 (performing the functionality of central office 116) of Wolfe monitors a wireless network by determining and continuously updating the number of wireless devices connected to access points and/or base stations within a particular area. Ex.1004, [0049].

Thus, Wolfe’s method in which the system monitors the wireless network by determining and continuously updating the number of mobile devices connected to wireless access point(s) and base station(s) within a particular region renders obvious “*monitoring wireless traffic at a given point in a wireless network.*”

Ex.1003, ¶¶238-41.

[9.2] *comparing a given traffic parameter associated with said obtained current location of each of said plurality of physical wireless devices, with a historical traffic parameter associated with a previous problematic crowd formation.*

First, Wolfe discloses “*a given traffic parameter.*” As one example, Wolfe teaches analyzing the “number of phones” or “wireless data terminals” in contact with an “access point.” Ex.1004, [0053]. In another example, Wolfe discloses

analyzing “the flow information within [a] region to determine an activity level.”

Ex.1004, [0056].

Second, Wolfe discloses comparing the current parameter value (such as the location of a group of devices) against a previous value (“*comparing a given traffic parameter ... with a historical traffic parameter*”):

For example, **the average location, and/or center of gravity, of the group of mobile devices 112 may be compared to a previous (such as its immediately previous) average location** to determine trends in where people are going.

Ex.1004, [0056].

Third, Wolfe discloses informing the police (1) about the “distribution of people” or (2) the “changes in the activity levels in specific locations” so that the police can “better position its patrol officers” (“*problematic crowd formation*”).

Ex.1004, [0014].

Further, Wolfe discloses using historical data when conducting its analysis with its algorithms. Ex.1004, [0027]. (“...run aggregation algorithms on the new location data ... and ... on the demographic and historical data”).

Thus, determining and continuously updating the number of wireless devices in contact with access point(s) and base station(s) in a particular area, comparing the current crowd information with the same type of saved historical crowd information from a prior event renders obvious “*comparing a given traffic*

parameter associated with said obtained current location of each of said plurality of physical wireless devices, with a historical traffic parameter associated with a previous problematic crowd formation.” Ex.1003, ¶¶242-51.

5. Claim 10

[10.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 9, wherein:*

This limitation is substantially similar to the limitation of [9.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[10.1] *said given point is at a given base station in said wireless network.*

This limitation is substantially similar to the limitation of [9.1], and for the same reasons as discussed above, the prior art renders this limitation obvious.

6. Claim 11

[11.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 9, further comprising:*

This limitation is substantially similar to the limitation of [9.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[11.1] *logging a snapshot formation created by said current location of each of said plurality of physical wireless devices.*

Wolfe discloses a method of tracking changes of the monitored crowd by taking “snapshots” of the group locations “at periodic time intervals” (“*logging a snapshot formation*”). Ex.1004, [0020].

Thus, tracking location changes of the monitored crowd as a group using snapshots over time renders obvious “*logging a snapshot formation created by said current location of each of said plurality of physical wireless devices.*” Ex.1003, ¶¶255-56.

7. Claim 12

[12.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 7, wherein said initiating location requests comprises:*

This limitation is substantially similar to the limitation of [7.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[12.1] *initiating a location request for each of said plurality of physical wireless devices.*

This limitation is substantially similar to the limitation of [1.2], and for the same reasons as discussed above, the prior art renders this limitation obvious.

8. Claim 13

[13.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 7, further comprising:*

This limitation is substantially similar to the limitation of [7.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[13.1] *comparing a viral pattern of respective locations of said plurality of wireless devices to predetermined risk rules.*

First, as discussed in [1.0], Wolfe teaches a system that detects a plurality of

mobile devices located in a geographical area. As discussed in [1.1], Wolfe's system tracks the monitored crowd's motion trends and transmits crowd information to first responders when the crowd's motion trends are unusual in particular areas. Wolfe also discloses monitoring crowd changes as a group by using "'snapshots' of the group locations ... taken at periodic time intervals." Ex.1004, [0020].

Second, Wolfe discloses using a data aggregation module that aggregates the mobile device's location information to create a model of the distribution of the monitored crowd's mobile device's location associated with the crowd's motion trends. Ex.1004, [0027].

Third, as discussed in [7.0], Wolfe discloses monitoring changes in the crowd's activity level as compared against a threshold. Ex.1004, [0043] ("only those mobile devices 112 moving at at least a minimum threshold speed").

A POSITA would have understood that monitoring a crowd's activity by using snapshots of the mobile device locations within that crowd (i) to detect a change in activity level that warrants police officers and/or (ii) to detect that a characteristic exceeds a threshold, as taught by Wolfe, discloses comparing a viral pattern of activity of the location of mobile devices against "*predetermined risk rules*." Ex.1003, ¶265. As further evidence of the knowledge of a POSITA, Pfeffer describes:

If the level of alert exceeds a predetermined threshold, the dispatcher or task management system can send out requests for additional responders to make themselves available.

Ex.1005, [0077].

Thus, Wolfe's system that monitors a crowd's activity by using snapshots of the mobile device locations within that crowd (i) to detect a change in activity level that warrants police officers and/or (ii) to detect that a characteristic exceeds a threshold, as taught by Wolfe, renders obvious "*comparing a viral pattern of respective locations of said plurality of wireless devices to predetermined risk rules.*" Ex.1003, ¶¶260-66.

9. Claim 14

[14.0] *The method of alerting to a problematic crowd risk with location based services (LBS) according to claim 13, further comprising:*

This limitation is substantially similar to the limitation of [13.0], and for the same reasons as discussed above, the prior art renders this limitation obvious.

[14.1] *logging said viral pattern.*

As discussed in [13.1], Wolfe discloses monitoring a crowd's activity by using snapshots of the mobile device locations within that crowd (i) to detect a change in activity level that warrants police officers and/or (ii) to detect that a characteristic exceeds a threshold ("*a viral pattern of respective locations of said plurality of wireless devices*").

As discussed in [2.1], Wolfe further discloses storing “historical information about mobile devices,” which may include the number of times and frequency that a device visited a particular location. Ex.1004, [0035]. The “historical data” is later used by the aggregation algorithms to estimate the characteristics of the crowd. Ex.1004, [0027].

Accordingly, because Wolfe’s system (i) detects the movement patterns of crowds by tracking the location information of mobile devices, (ii) uses a historical database to store information about the location of the mobile devices, and (iii) uses the historical information to estimate crowd characteristics, it would have been obvious to a POSITA that Wolfe is storing information about the mobile device’s movements in the historical database (“*logging said viral pattern*”). Further, Pfeffer evidences that POSITAs knew to log such information. Ex.1005, [0040] (updating a database with previous to assist with analyzing subsequent incidents). Ex.1003, ¶270.

Thus, Wolfe’s system that (i) detects the movement patterns of crowds by tracking the location information of mobile devices, (ii) uses a historical database to store information about the location of the mobile devices, and (iii) uses the historical information to estimate crowd characteristics renders obvious “*logging said viral pattern*.” Ex.1003, ¶¶268-71.

XI. CONCLUSION

Petitioner has established a reasonable likelihood that the Challenged Claim are unpatentable.

Respectfully submitted,

Dated: September 8, 2023
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XII. MANDATORY NOTICES

A. Real Party-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that the real party-in-interest is Apple Inc.

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of the Petitioner, the '054 patent is or was involved in the following cases:

Case Heading	Number	Court	Filed
<i>ALD Social, LLC v. Verkada, Inc.</i>	<i>3-23-cv-00049</i>	N.D. CA	Jan. 05, 2023
<i>ALD Social LLC v. Verizon Communications Inc.</i>	<i>6-22-cv-01011</i>	W.D. TX	Sep. 28, 2022
<i>ALD Social LLC v. Apple Inc.</i>	<i>6-23-cv-02695</i>	N.D. CA	September 16, 2022
<i>ALD Social LLC. V. AT&T Inc.</i>	<i>6-22-cv-00970</i>	W.D. TX	September 16, 2022
<i>ALD Social LLC v. Google LLC</i>	<i>6-22-cv-00927</i>	W.D. TX	September 16, 2022
<i>ALD Social LLC v. T-Mobile US, Inc.</i>	<i>6-22-cv-00973</i>	W.D. TX	September 16, 2022
<i>ALD Social, LLC v. Verkada, Inc.</i>	<i>6-22-cv-0097</i>	W.D. TX	Sep. 16, 2022
<i>ALD Social, LLC v. Alert Media, Inc.</i>	<i>6-22-cv-00959</i>	W.D. TX	Sep. 15, 2022

C. Lead and Back-up Counsel and Service Information

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Please address all correspondence in this proceeding to lead and back-up counsel. Petitioner consents to service in this proceeding by email at the addresses above.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,985. Pursuant to 37 C.F.R. § 42.24(d), this word count excludes the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

Dated: September 8, 2023

/Andrew S. Ehmke/
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Lead Counsel for Petitioner
Registration No. 50,291

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, service was made on Patent Owner as detailed below.

Date of service September 8, 2023

Manner of service FEDERAL EXPRESS

Documents served Petition for *Inter Partes* Review Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104 of U.S. 9,198,054; Petitioner's Exhibit List; Certificate of Word Count; Exhibits 1001-1015.

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