

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC
Petitioner

v.

WIRELESSWERX IP LLC
Patent Owner.

**DECLARATION OF SCOTT ANDREWS
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,315,203**

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LIST OF EXHIBITS

Ex-1001	U.S. Patent No. 8,315,203
Ex-1002	Declaration of Scott Andrews
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Ex-1004	Prosecution History of U.S. Patent No. 8,315,203
Ex-1005	International Publication No. WO2005/106523 to Wrappe (“Wrappe”)
Ex-1006	U.S. Patent No. 7,203,497 to Belcea (“Belcea”)
Ex-1007	U.S. Patent Publication No. 2008/0042836 to Christopher (“Christopher”)
Ex-1008	U.S. Patent Publication No. 2004/0246926 to Belcea (“Belcea ’926”)
Ex-1009	U.S. Patent No. 6,813,501 to Kinnunen (“Kinnunen”)
Ex-1010	INTENTIONALLY LEFT BLANK
Ex-1011	INTENTIONALLY LEFT BLANK
Ex-1012	INTENTIONALLY LEFT BLANK
Ex-1013	INTENTIONALLY LEFT BLANK
Ex-1014	INTENTIONALLY LEFT BLANK
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Ex-1020	Claim Mapping Table for U.S. Patent No. 8,315,203
Ex-1021	U.S. Patent No. 8,836,580 to Mendelson (“Mendelson”)

Ex-1022	U.S. Patent Publication No. 2010/0048163 to Parr (“Parr”)
Ex-1023	U.S. Patent No. 8,259,692 to Bajko (“Bajko”)
Ex-1024	U.S. Provisional Patent Application Ser. No. 60/625,467
Ex-1025	U.S. Patent Application Ser. No. 11/848,178
Ex-1026	Hitesh Bhasin, History of Advertising: Definition and Complete Timeline, October 12, 2021
Ex-1027	U.S. Patent No. 3,906,166 to Cooper (“Cooper”)
Ex-1028	U.S. Patent No. 6,647,257 to Owensby (“Owensby”)
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Ex-1032	U.S. Patent No. 6,748,224 to Chen (“Chen”)
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I. INTRODUCTION

1. I have been retained as an independent expert witness on behalf of Google LLC in the above-captioned inter partes review (“IPR”) relating to U.S. Patent No. 8,315,203 (“the ’203 Patent”) (Ex-1001).

2. I understand that Google is petitioning for IPR of Claims 1-30 of the ’203 Patent and requests that the United States Patent and Trademark Office (“PTO”) cancel those claims.

3. In preparing this Declaration, I have reviewed the ’203 Patent and considered the documents identified below in light of the general knowledge in the relevant art. In forming my opinions, I relied upon my education, knowledge, and experience, and considered the level of ordinary skill in the art as discussed below.

4. I am being compensated for my work in this matter at my standard consulting rate, which is \$500 per hour, plus actual expenses. My compensation is not dependent in any way upon the outcome of this matter.

II. BACKGROUND AND QUALIFICATIONS

5. All of my opinions stated in this Declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, researching, and teaching the technology referenced in this Declaration.

6. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein. I understand that a copy of my current curriculum vitae, which details my education and professional and academic experience, is being submitted as Ex-1003. The following provides a brief overview of some of my experience that is relevant to the matters set forth in this Declaration.

7. I have over 30 years of professional experience in the field of mobile devices and technologies and systems, including handheld communications and navigation devices, vehicle information systems and vehicle safety and control systems, and the sensor systems that are used in these devices. Further, I have authored numerous published technical papers and am a named inventor on 13 U.S. and foreign patents.

8. I received a Bachelor of Science degree in Electrical Engineering from University of California, Irvine in 1977 and a Master of Science degree in Electronic Engineering from Stanford University in 1982.

9. From 1977 to 1979, I worked at Ford Aerospace where I designed, tested and delivered microwave radar receiver systems.

10. From 1979 to 1983, I worked at Teledyne Microwave, where I developed high reliability microwave components and developed CAD tools.

11. From 1983 to 1996, I worked at TRW, Inc., having held various positions. From 1983 to 1985, I was a Member of the technical staff and a Department Manager in the Space Electronics sector. Between 1985 and 1990 I was a project manager working on various communications systems projects including the US DoD Advanced Research Projects Administration (ARPA) MIMIC Program. Between 1990 and 1993 I was the Manager of MMIC (monolithic-microwave-integrated-circuit) Products Organization. In this role, I developed business strategy and managed customer and R&D programs. During this time, I also developed the first single chip 94 GHz Radar, used for automotive cruise control and anti-collision systems. In 1993, I transferred to the TRW Automotive Electronics Group, and managed about 30 engineers in the Systems Engineering and Advanced Product Development organization. In this role, I managed advanced development programs such as automotive radar, adaptive cruise control, occupant sensing, automatic crash notification systems, in-vehicle information systems, and other emerging transportation products.

12. During this time, I also worked with various types of location determining equipment. For example, one system I developed in 1992 used a pager based system that triangulated the user's position, and then used that position to provide information about and direction to user selected points of interest.

13. I was employed as a Project General Manager in the Electronics Division of Toyota Motor Corporation at Toyota headquarters in Toyota City, Japan from April 1996 to around April 2000. In this position, I was responsible for leading the development of vehicle telematics systems, infotainment systems, including on-board and off-board navigation systems, mobile device integration systems, traffic information systems, vehicle communications systems, safety applications, and automated vehicle control systems. At this time global positioning system (GPS) equipment has become inexpensive enough that nearly all of the location based systems we developed relied on GPS to determine the user/vehicle location. In particular, between 1997 and 2000, I was responsible for the development of several vehicle tracking systems in the United States and Europe. These systems used a GPS receiver coupled with a cellular telephone transceiver and a processor to provide the vehicle position and other status information to a monitoring center. In this capacity I met with and reviewed the in-vehicle and back-office systems offered by numerous service providers. All of the systems I reviewed would monitor the status of various vehicle systems and alert service provider operators if, for example, the vehicle had experienced a crash (indicated by an airbag activation) or had been stolen. The operator would then open a voice channel to the vehicle occupants, determine the extent of any assistance required, and dispatch appropriate help (tow truck, paramedics, etc.).

These systems also responded to vehicle theft and allowed the operator to perform various vehicle functions such as locking and unlocking doors and performing various vehicle diagnostics. One provider, ATX, had a system that was marketed to high net worth individuals that included a feature wherein a parent could define a geographic boundary on a map using a web browser. This boundary would be used to issue an alert to the parent if their teen driver ventured outside this so-called “geofence.”

14. Since late 2001, I have been a consultant for Cogenia Partners, LLC, focusing on systems engineering, business development and technical strategy supporting automotive and information technology. Between 2006 and 2010, I served as the chief system architect for the US DOT sponsored Vehicle Infrastructure Integration (VII) program, (later known as “Intellidrive”), and currently referred to as “connected vehicles”. This was a location based system using GPS to determine the position of the vehicle, and a short range radio data system to provide information to the vehicle from the roadside, to collect information from the vehicle, for example for traffic measurement, and to exchange information between vehicles to support various safety applications. As part of this project, I provided extensive background support for the US DOT ITS Joint Program Office about positioning systems and their capabilities and limitations.

15. Between 2010 and 2019 I served on various other US DOT Projects associated with connected vehicles. For example, recently I was the technical lead on a project funded by the National Highway Traffic Safety Administration (NHTSA) to develop requirements for connected vehicle safety systems in preparation for NHTSA regulations governing such systems. I also served as a technical consultant on multiple projects sponsored by the Federal Highway Administration (FHWA) related to connected vehicle technology research. In one FHWA project I developed a precision location and timing system that was able to record and report the user vehicle location to an accuracy of about 1 cm and time with an accuracy of about 100 nanoseconds. This system allowed us to track the precise trajectory of a vehicle as it moved through a test facility and supported the accurate characterization of other systems being tested.

16. In the various positions mentioned above, I was responsible for research and development projects relating to numerous mobile information systems, navigation systems, user interface systems, sensory systems, control systems and safety systems, and also had the opportunity to collaborate with numerous researchers and suppliers to the auto industry. I therefore believe that I have a detailed understanding of the state of the art during the relevant period, as well as a sound basis for opining how persons of skill in the art at that time would have understood the technical issues in this case.

III. INFORMATION CONSIDERED

17. In preparation for this declaration, I have considered the materials discussed in this declaration, including, for example, the '203 Patent, the references cited by the '203 Patent, the prosecution histories of the '203 Patent and applications from which it derives (including the references cited therein), various background articles and materials referenced in this declaration, and the prior art references identified in this declaration. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

IV. RELEVANT LEGAL STANDARDS

18. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Claim Interpretation

19. I have been informed and understand that in an IPR proceeding, claims are to be interpreted according to the *Phillips* claim construction standard based on the ordinary meaning that a person of skill in the art would have understood the claims to have at the time of the invention based on the intrinsic and extrinsic evidence. I have been informed and understand that claim construction is a matter of law and that the final claim constructions for this proceeding will be determined by the Patent Trial and Appeal Board ("PTAB").

B. Written Description

20. I understand that determining whether a particular patent or printed publication constitutes prior art to a challenged patent claim can require determining the effective filing date (also known as the priority date) to which the challenged claim is entitled. I understand that for a patent claim to be entitled to the benefit of the filing date of an earlier application to which the patent claims priority, the earlier application must have described the claimed invention in sufficient detail to convey with reasonable clarity to the POSITA that the inventor had possession of the claimed invention as of the earlier application's filing date. I understand that a disclosure that merely renders the claimed invention obvious is not sufficient written description for the claim to be entitled to the benefit of the filing date of the application containing that disclosure.

C. Perspective of One of Ordinary Skill in the Art

21. I have been informed and understand that a patent is to be understood from the perspective of a hypothetical "person of ordinary skill in the art" ("POSITA"). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I understand that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSITA.

D. Obviousness

22. I have been informed and understand that a patent claim is obvious under 35 U.S.C. § 103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSITA.

23. I understand that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long felt but unmet need, failure of others, copying by others, and skepticism of experts).

24. I understand that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. I understand that a reference may also be combined with the knowledge of a POSITA, and that this knowledge may be used to combine multiple references. I further understand that a POSITA is presumed to know the relevant prior art. I understand that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

25. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I understand that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether the combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results
- whether the combination is “obvious to try”;

- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces, where the variations are predictable to a POSITA;
- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

26. I understand that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I understand, however, that a teaching, suggestion, or motivation to combine is not required.

V. SUMMARY OF OPINIONS

27. Claims 1-5 of the '203 Patent are obvious over International Publication No. WO2005/106523 ("Wrappe," Ex-1005) in view of U.S. Patent No. 7, 203,497 ("Belcea," Ex-1006). Additionally, Claims 6-30 are obvious over Wrappe-Belcea in further view of U.S. Patent Publication No. 2008/0042836 ("Christopher," Ex-1007). Claims 6-30 are also obvious over Wrappe-Belcea in further view of U.S. Patent No. 6,813,501 ("Kinnunen," Ex-1008).

VI. THE CHALLENGED PATENT

28. The '203 Patent relates to a "system, and method for developing a map of a multi-dimensional space for use by a user" in a "preconfigured geographical zone." Ex-1001, 1:58–63. To develop the map, "the zone includes a plurality of spaced apart nodes . . . arranged in a multidimensional sense" on different floors of "a building" that "send[] data communications" using "GPS and/or . . . Bluetooth™ protocols" amongst the "one or more of the nodes, one or more users" with "Bluetooth™ protocol enabled" "mobile devices," and "one or more control stations." *Id.*, 1:63–67, 2:7–12; *see also id.*, 36:8–18, Cls. 1–6, 28–30.

29. "The Bluetooth™ equipped mobile personal device contains at least one specific algorithm to determine the relatively precise location of the user." Ex-1001, 3:63–66; *see also id.*, 26:29–28:33. "The device periodically interrogates its environment," "determine[s] all of the location nodes within range," and then

“determines which location node is most practically near.” *Id.*, 6:49–50, 7:10–13.

“The ‘location node’ is a stationary programmable device with a wireless transceiver, which is ‘Bluetooth™’ capable.” *Id.*, 6:40–42. “The most practically near node is defined as the node that is located at the closest accessible location to the movable entity.” *Id.*, 6:55–57; *see also id.*, 6:58–67.

30. “A three-dimensional[] map” can be “created using nodes 4000 in communication 4002 with each other” and “[d]etailed location information from each location node” can then be “downloaded to at least one mobile device 4010.” Ex-1001, 31:32–35. “When a mobile device 4010 determines its most practically near node 4000, the mobile device 4010 will download from that node 4000 the location information of that node 4000. The mobile device 4010 can use this location information in order to generate and display a two- or three-dimensional map of the mobile device’s 4010 position within a geographical area and/or zone.” *Id.*, 33:9–15.

31. In addition, the nodes can “download user profile information and/or location information from the mobile devices 4010, and transfer that profile information and/or location information to at least one control center” “via other nodes within the mesh network, relay stations, and/or intermediate supplementary stations.” Ex-1001, 4:4–7, 36:28–31. “The user profile information includes, but is not limited to, a history of geographical locations that the user has visited, the

amount of time the user spent in each of those locations, patterns of location activity of the user, and patterns of shopping habits of the user.” *Id.*, 36:31–36.
“The user’s location data can then be processed and analyzed at the central station and/or intermediate supplementary stations.” *Id.*, 4:7–9; *see also id.*, 9:28–10:10.

32. “Once the information is processed by the control center, the control center employs a messaging system to send messages to specific mobile devices 4010, according to the personal profiles of the mobile device users and/or the location of the mobile device users relative to specific nodes 4000.” Ex-1001, 36:44–49; *see also id.*, 36:56–37:31. “When the Bluetooth™ equipped mobile personal device is within the range of certain location nodes, specific events” can also be “triggered. These include, but are not limited to, the downloading of appropriate advertisements to the Bluetooth™ equipped mobile personal device.” *Id.*, 3:66–4:4. The device “communicates” to the most practically near “location node, and requests that any additional data information relevant to the specific location associated with that location node be sent back to the wireless communication device.” *Id.*, 6:51–54.

VII. PATENT PROSECUTION HISTORY

33. On January 8, 2009, U.S. Patent App. 12/350,817, the application leading to the ’203 Patent, was filed with 23 claims. Ex. 1001, Cover; Ex-1004, 74–77. The application would be rejected three times—on October 11, 2011,

January 30, 2012, and March 21, 2012. Ex-1004, 936–53, 993–1007, 1016–36.

Applicant responded by amending, canceling, or adding claims on January 10 and June 22, 2012. *Id.*, 969–80, 1056–72. The '203 Patent finally issued on August 3, 2012 with application Claims 24–53 as Claims 1–30. *Id.*, 1085–99.

34. On October 11, 2011, the Examiner issued a Non-Final Rejection, rejecting the claims for provisional double patenting over copending Application Nos. 12/350,828 and 12/350,822, improper claim of priority, § 112(2) for being indefinite, § 101 for claiming non-statutory subject matter, and §§ 102, 103 based on prior art references U.S. Patent App. No. 2005/0090978 (“Bathory”), U.S. Patent App. No. 2004/0225436 (“Yoshihashi”), and U.S. Patent No. 6,198,431 (“Gibson”). Ex-1004, 936–53. The Examiner found Applicant claimed priority to multiple applications, but none disclosed the essential claim limitation of “map of multi-dimensional space.” *Id.*, 941. The Examiner found Claims 1, 17, and 19 do not clearly identify the structure of the apparatus (system) and Claims 3–4, 7, 19, 21–22 improperly contain the trademark / trade name “Bluetooth.TM.” *Id.*, 941–42. The Examiner found Claims 22–23 recite a “map,” which is non-statutory subject matter. *Id.*, 942–43. The Examiner found that Bathory disclosed a system for developing a map or mapping of a multidimensional geographical space containing nodes that can be enabled with either GPS or Bluetooth for communicating data. *Id.*, 943–52.

35. In response, on January 10, 2012, the Applicant included terminal disclaimers, *see* Ex-1004, 987–88, deleted “map of multi-dimensional space” from the then-pending claims, amended the claims to be method claims, no longer included the Bluetooth trademark or claimed a map, and added a limitation defining the location of the nodes relative to the ground. *Id.*, 970–77. The Applicant then argued that none of the cited references deal with multidimensional nodes that are affixed and installed to a structure attached to the ground. *Id.*, 977–80.

36. On January 30, 2012, the Examiner issued a Final Rejection finding that Claims 1–23 are indefinite under §§ 112(1)–(2) because those claims recite a newly added limitation about the node being affixed to the ground without sufficient support in the specification or clarity about what that new limitation means. Ex-1004, 995–96. The Examiner also found the amendments did not overcome the previous rejections. *Id.*, 996–1005. On March 21, 2012, the Examiner issued another Final Rejection clarifying that Examiner had also rejected newly added Claims 24–28 under § 112 while also adding additional rejections for those claims under § 103 based on U.S. Patent App. No. 2005/0085257 (“Laired”). *Id.*, 1016–36.

37. In response, on June 22, 2012, the Applicant cancelled Claims 1–23 and amended or added Claims 24–53 to, among other changes, include a “system

[that] narrows the plurality of nodes for use by the user to the most practically near node to a user” as well as give users a “profile,” send “a targeted message” to users when “in range,” and tailor targeted messages based on the “profile of the user.” Ex-1004, 1056–72.

38. On July 18, 2012, the Examiner initiated an interview to inform Applicant that Claim 24 was inconsistent with the definition of “practically near” in the specification and Applicant agreed to amend the claim. Ex-1004, 1084.

39. A Notice of Allowance issued on August 3, 2012, with application Claims 24–53 as Claims 1–30. Ex-1004, 1085–99. *Id.*, 1085.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

40. In my opinion, a person of ordinary skill in the art would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in research, design, development, and/or testing of GPS and/or other positioning techniques, with additional education substituting for experience and vice versa.

41. Based on my education, training, and professional experience in the field of the claimed invention, I am familiar with the level and abilities of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a person having ordinary skill in the art at least as of August 30, 2007. Further, although my qualifications may exceed

those of the hypothetical person having ordinary skill in the art defined above, my analysis and opinions regarding the '203 Patent have been rendered from the perspective of a person having ordinary skill in the art at the time of the invention.

IX. TECHNOLOGY BACKGROUND

42. To provide background for the element-by-element analysis of the claims to follow, below I will present an overview of the state of the art existing at the time of the alleged invention relating to geolocation generally, and as it relates to locating mobile devices or individuals, among other relevant technology. As I will describe below from a high-level functional perspective, in the next section based on specific prior art, and then in subsequent sections on a limitation-by-limitation basis, all of these technologies and positioning techniques were well-known to those of ordinary skill in the art at the time of the alleged invention claimed in the '203 Patent, and a POSITA would have readily understood the combination of elements of Claims 1-30 to have been obvious.

A. Geolocation Generally

43. Navigation, and numerous other location based services rely on determining the position of a device (vehicle phone, etc.) with reasonable accuracy. This position can then be used to locate the device on a map, for example to inform or support the user, or to control various other actions based on the location. In general a "map" is simply a tool that correlates numerical positions in some

coordinate system to observable landmarks in the world. For example geographic coordinates (latitude, longitude and altitude) to streets, intersections and building numbers, or locations within a structure, such as a map of a shopping mall or a building.

44. Traditionally, navigation has related to the problem of locating a vehicle (ship, aircraft, car, etc.) in relation to world landmarks, such as land masses, ports, cities, or streets. This discipline has historically been based on two methods for determining location. Celestial navigation and what is known as “Dead Reckoning.” Celestial navigation involves measuring the positions of stars and planets at known times, and then converting those measurements to a position estimate using tables describing the well-established motions of these celestial objects. This celestial navigation process involves measuring the elevation of the object from the horizon using a telescope-like device called a sextant. By noting the name of the object, the elevation and the time, the observer can then determine where on the earth the object would be visible at that elevation at that specific time. As shown in Figure 1, an object in the sky will be observed at a specific elevation at a specific time only when viewed from anywhere on a unique circle on the earth’s surface.

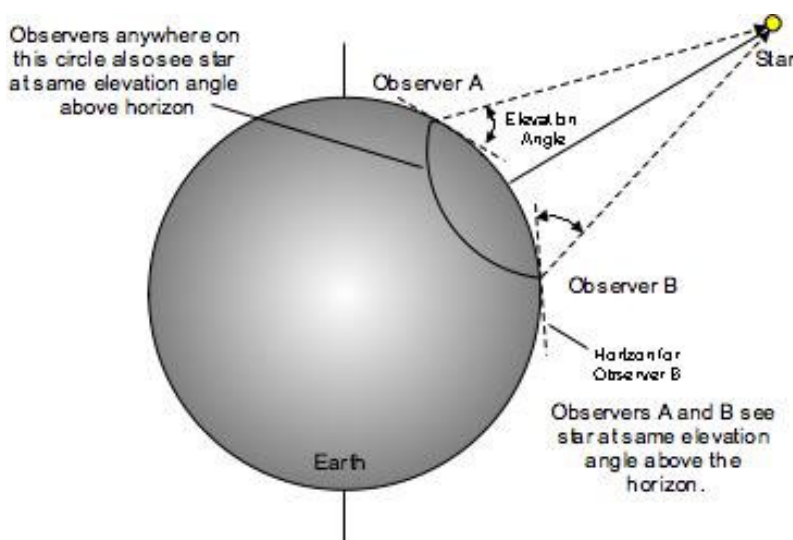


Figure 1
Star Viewed From Two Points On Earth Shows Same Elevation Angle

45. The observer uses a detailed table of the orbits of bright stars, the sun, the moon and the planets (depending on what celestial object is being observed to determine exactly where this circle (or a small segment of it in his local vicinity) is on the Earth's surface. This table is called an ephemeris.

46. By measuring one object the observer knows he is somewhere on that circle. By measuring two objects, he can define two circles, and his position is one of the two places where the circles intersect. As shown in Figure 2, by measuring a third object, and thereby creating a third circle, the observer can resolve his position to the one place where all three circles cross. Measurement of additional celestial objects will produce more overlapping circles, and will thus increase the confidence in the accuracy of the position estimate.

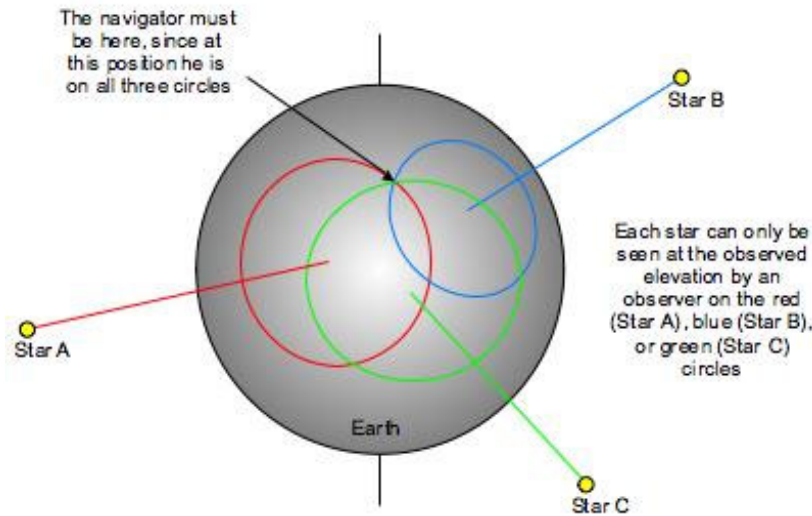


Figure 2
Multiple Observations Produce Multiple Position Lines.
Point of Mutual Intersection Is Position

47. Conventionally the geographic coordinates generated by this method are then transferred to a chart or map that provides a graphical relationship between earth coordinates and various landmarks, such as ports, buoys, city streets, etc.

48. Dead reckoning is an extrapolation technique that is used to determine a new position based on an earlier known position, and a record or log of changes in direction and/or speed of travel. As the vehicle moves away from a known point (often a buoy in a harbor, or a last known position at a landmark, it's heading and speed are recorded, and each time the heading or speed changes, a new record is made (originally this record was made in the ship's log), thereby

creating a chain of vectors with direction according to the heading at that time, and distance equal to the speed, and the time on that course. By linking together these vectors the navigator can plot the course traveled over time, and determine roughly where they are after traveling some distance.

49. These two methods (dead reckoning and celestial navigation) have served navigators well for centuries, but they have serious drawbacks. Celestial navigation lacks fine accuracy (because you have to measure the elevation of a star from the horizon, and this may be challenging on the deck of a floating ship, or flying aircraft, and is impractical in a moving automobile), and it suffers greatly from the fact that it cannot be used effectively in daylight or under cloud cover. Dead reckoning assumes that speed and heading can be measured reasonably accurately, but it does not inherently take into account effects from errors in these measurements either from the sensor errors, or from external effects such as current or wind. Dead reckoning works well over short distances, but if used for a long time the errors in heading and speed measurement accumulate, and the position estimate can drift off of the true position by significant amounts.

B. GPS

50. To provide a more reliable and accurate alternative to celestial navigation, the U.S. government built a constellation of satellites known as the

Global Positioning System (GPS).¹ This system operates in a way reminiscent of celestial navigation, but re-created in an electronic form.

51. The satellites are arranged in earth orbit in a way that allows several of them to always be visible from any point on the globe. As a result, it is possible to use the system at any time of day, and under most weather situations. In operation, the satellites transmit a repeating signal that contains a variety of information used by a receiver to determine the orbital location of the satellite, and also the time delay from when the signal was sent to when it was received by the receiver.

52. By measuring the time delay from the satellite, it is possible to determine the distance between the satellite and the receiver. This distance represents the radius of a sphere centered on the satellite, with a point on its surface touching the GPS receiver antenna. With the distance to one satellite the user will know they are somewhere on the surface of that sphere. If the distance to two satellites is known, the user will know they are somewhere on the intersection of the two spheres (a circle), and if three satellites are known they will know they are at one the point where all three spheres intersect. In practice, four satellite

¹ The GPS system is variously known as the Global Navigation Satellite System (GNSS), Navistar, and simply the Global Positioning System (GPS). Its European counterpart is the Galileo System, and a Russian counterpart is known as GLONASS. All of these systems operate similarly.

signals are generally required in order to correct for the fact that the receiver does not have a highly accurate atomic clock, so the addition of a fourth signal allows the determination of position in three dimensions, *and* the current GPS time.

53. The determination of the position of the receiver is done by solving a system of equations, known as “the GPS equation.” This is shown below.²

$$\begin{aligned}p_1 &= \sqrt{(x - x_1)^2 + (y - y_1)^2 + (z - z_1)^2} + c(dt - dT_1) \\p_2 &= \sqrt{(x - x_2)^2 + (y - y_2)^2 + (z - z_2)^2} + c(dt - dT_2) \\p_3 &= \sqrt{(x - x_3)^2 + (y - y_3)^2 + (z - z_3)^2} + c(dt - dT_3) \\p_4 &= \sqrt{(x - x_4)^2 + (y - y_4)^2 + (z - z_4)^2} + c(dt - dT_4)\end{aligned}$$

54. In this equation, p_i represents the measured pseudorange for satellite i (The pseudorange is the relative time offset for the signal from that satellite). x_i , y_i and z_i represent the position of satellite i , where i is the number of any particular satellite that has been measured; x , y and z represent the position of the receiver, dt represents the offset between the receiver clock and the time the satellites transmitted their signals, and dT_i is a time correction provided for each satellite to account for any clock errors at the satellite. Ignoring the dT_i terms for simplicity,

² See Vehicle Location and Navigation Systems by Yilin Zhao, ©1997, Artech House, Inc., ISBN 0-89006-861-5 (Ex-1029), page 69.

the time offset between the actual time, and the receiver time is just the term dt , and since the clocks in the satellites are all synchronized, this value is the same for all satellites for any given receiver. What this means is that the range to any given satellite based on time of flight measured by the receiver is off by this time delay times the speed of light, hence this $c(dt)$ correction term in the GPS equation.

55. This equation with four measured pseudoranges (from four satellites) represents a system of four equations with four unknowns (x , y , z and dt). If signals from only four GPS satellites are received, then the GPS receiver solves this system of four equations and four unknowns, and thereby determines x , y , z and dt . That is, its x , y , and z position and the time offset between its clock and the satellite clock. (*See, e.g.*, Ex-1029, pages 69-70.). If more than four signals are present, then the satellite has what is known as an “over specified” system of equations, and it then uses well-known approximation methods such as Least Squares or Newton’s method to obtain a best fit solution to the set of equations.

56. To perform these computations the receiver must also obviously know the orbital positions of the satellites, x_i , y_i , and z_i at the time the signals were sent. This information is computed based on information contained in the GPS navigation message (known as the ephemeris). Specifically GPS receiver uses the bits of the GPS navigation message from each satellite to determine the pseudorange for that satellite, but over time, it also uses information contained in

the message itself (coded in the bits of the message) to determine the orbital path for each satellite, and thus the x_i , y_i , and z_i position of the satellite in its orbit at the time the signal was sent.

57. The GPS receiver may also perform other measurements on the signals in order to determine its speed and direction. Specifically, since the frequency of the satellite signals is known, measuring the observed frequency of each satellite signal, which will be doppler shifted as a result of the relative velocity of the satellite and the receiver, allows the receiver to determine its own speed and heading. Specifically, if the position and direction (i.e., orientation of the orbit) of each satellite relative to the receiver are known, it is a simple matter to determine the (relative) velocity vector for the receiver relative to each satellite. These vectors can then be resolved to determine the speed and heading of the receiver on the earth.

58. GPS positioning requires the measurement of the relative delay of the signals from at least four satellites. Since these satellites are fairly far away (typically at least 20,200 km, or 10,900 nautical miles), the signals are fairly faint. Early GPS devices, and high precision devices today use(d) fairly large antennas in order to obtain high signal gain to better receive these signals. An example is shown below.



https://celebrating200years.noaa.gov/transformations/ht_mod/image6.html

59. Small hand held devices such as mobile phones cannot support such a large antenna, and thus have significantly less signal gain. A typical smartphone GPS antenna is shown below. As can be appreciated this antenna is quite small. In addition, since the phone may be held in any orientation, the antenna may not be aimed at the sky when the GPS receiver is being used.



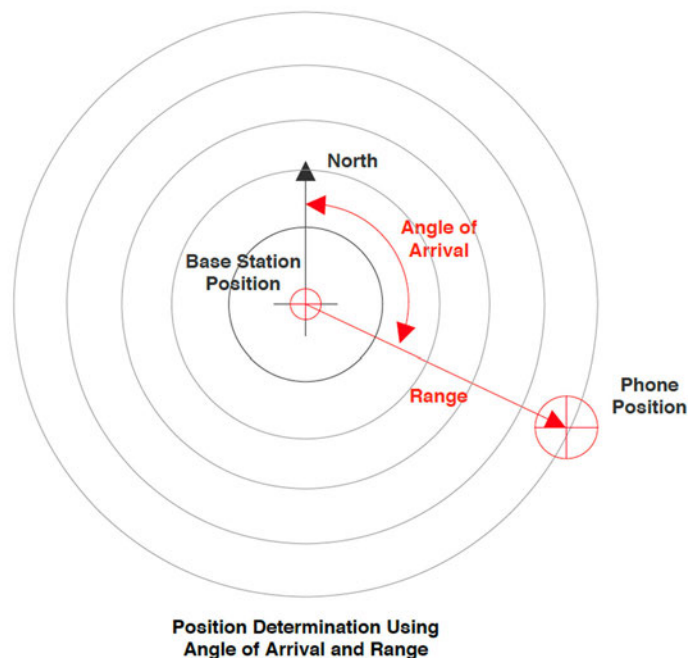
<https://www.sosav.com/guides/mobiles/huawei/honor5x/gps-antenna/>

60. GPS receivers generally do not function well indoors. This is because the materials of the building may absorb or reflect the signals from the satellites. This further reduces the signal level making the signals that much fainter. In addition, reflected signals from nearby buildings may enter the windows of the building, and these signals will have traveled farther than the distance from the satellite to the GPS receiver, the result of this “multipath” interference is that the measured time delay of the signals does not reflect the actual distance of the GPS satellite (the pseudorange), and this will result in an erroneous position determination. As a result, GPS is seldom used indoors.

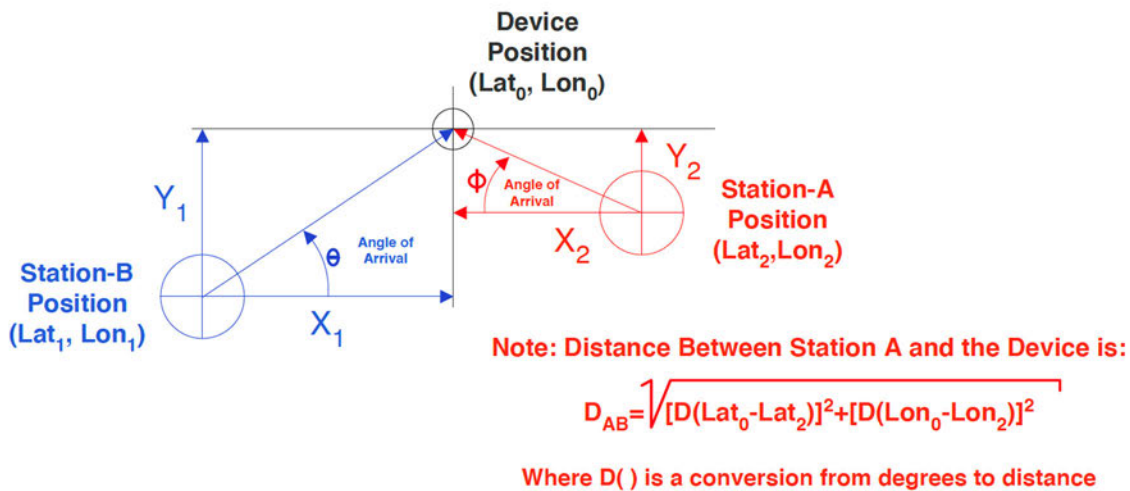
C. Geolocation Technology – Well-Known Techniques for Determining Device Location

61. An alternative to GPS is the use of other terrestrial signals to triangulate the position of the receiver. There are several different basic forms of

triangulation that can be used. The simplest is based on a signal measurement from a base station or beacon. It uses a concept known as angle of arrival (AOA) wherein the bearing direction from the device to the beacon is estimated using a directional antenna, and the range is estimated using the signal strength (often referred to as a Relative Received Signal Strength (RSSI)). Knowing the direction and range between the beacons and the device, as well as the position of the beacon, the approximate position of the device can be estimated. This approach is illustrated below. The accuracy of this method of position determination depends on the accuracy of the range measurement, which, because many things can affect RSSI, is generally somewhat prone to error.



62. A somewhat more accurate AOA method is to measure the angle of arrival between two beacons. This can be done with either a signal from each beacons received at the device being located, known as forward link AOA, or using a signal from the device to be located received by two stations (return link AOA). In this latter approach (generally used by cell phones) the cell phone or the base stations must determine the direction the signal is arriving from. Here the position of the cell phone is at the point where the bearing lines between the phone and two base stations intersect, as shown below. The accuracy of this method depends on the accuracy of the angle of arrival measurement, and the accuracy of the locations of the base stations.



**Position Determination Using
Angle of Arrival at Two Base Stations**

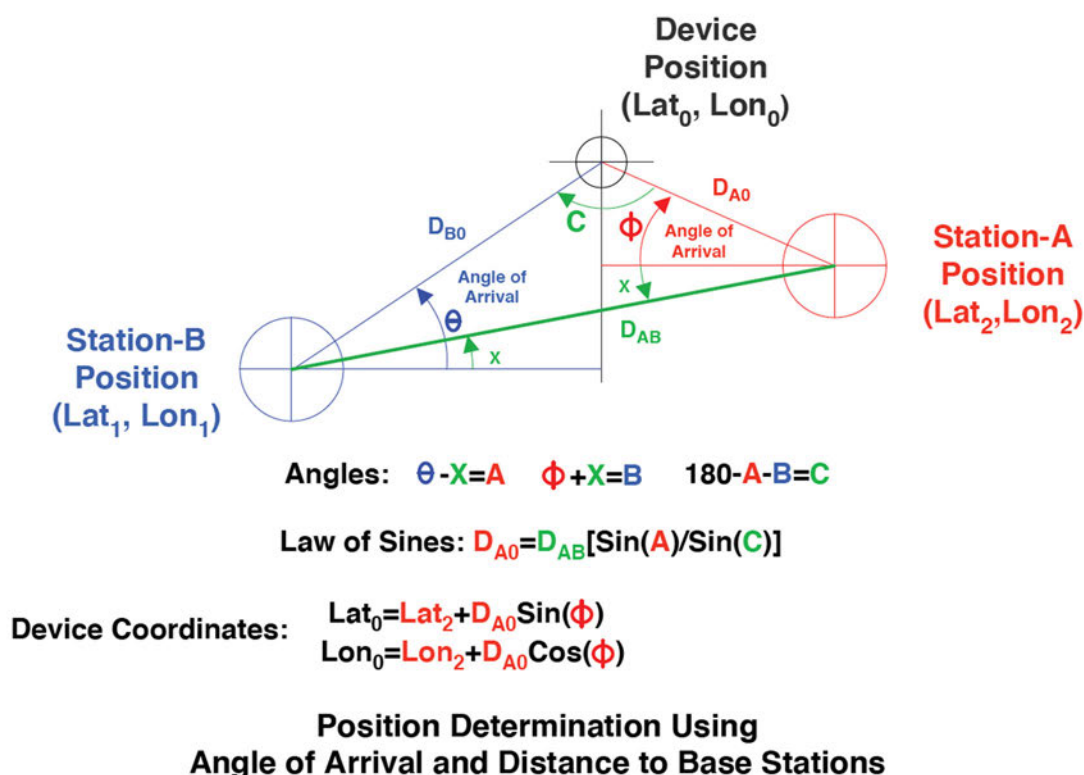
63. In practice the location of the device is determined by calculating the intersection point of a line that passes through the location of base station A at a slope given by the angle of arrival of the signal at station A, and a line that passes through the location of base station B at a slope given by the angle of arrival of the signal at station B. The solution is thus a relation that yields the latitude and longitude of the device to be located in terms of the latitude and longitude of the base stations and the angles of arrival. This relation is easily derivable using algebra and simple trigonometry. For example the latitude would be given by:

$$\text{Lat}_0 = [\text{Lon}_2 - \text{Lat}_2 \tan^{-1}(\Phi) - \text{Lon}_1 + \text{Lat}_1 \tan^{-1}(\Theta)] / [\tan^{-1}(\Theta) - \tan^{-1}(\Phi)]$$

64. Where Lat_1 and Lon_1 are the latitude and longitude of station B, and Θ is the angle of arrival at station B, and Lat_2 and Lon_2 are the latitude and longitude of station A, and Φ is the angle of arrival at station A. A similar relation can be generated for the longitude of the device to be located.

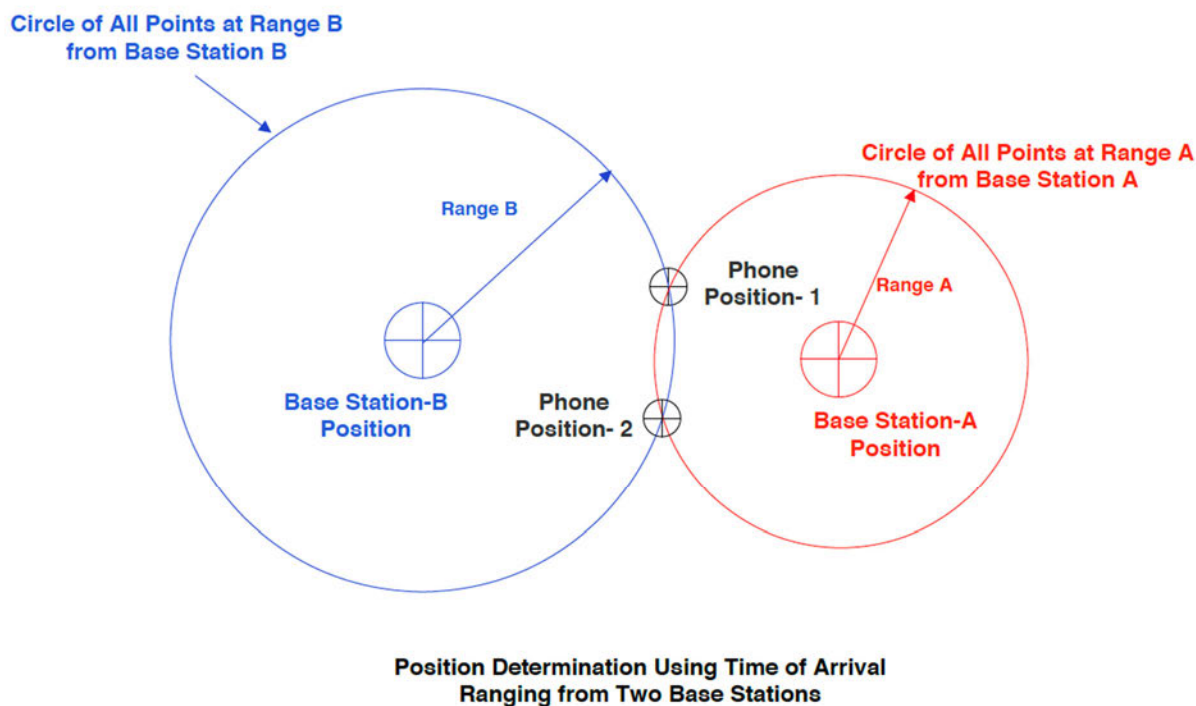
65. Alternatively, the triangle formed by the vertices located at the device to be located and the two stations can be resolved using the law of sines to determine the distances between the tracking stations and the device to be located. As shown below, since the locations of the tracking stations are known, the distance between them D_{AB} is known, and the angle X of the line passing between them is also known. If each tracking device then measures the angle between them and the device to be located, all of the angles of the triangle A, B and C) can be

determined. Since one distance (D_{AB}) is known, and all of the angles are known, the other distances can be determined using the law of sines. Once these distances are known, is it then a simple matter to determine the coordinates of the device to be located using basic trigonometry as shown below.

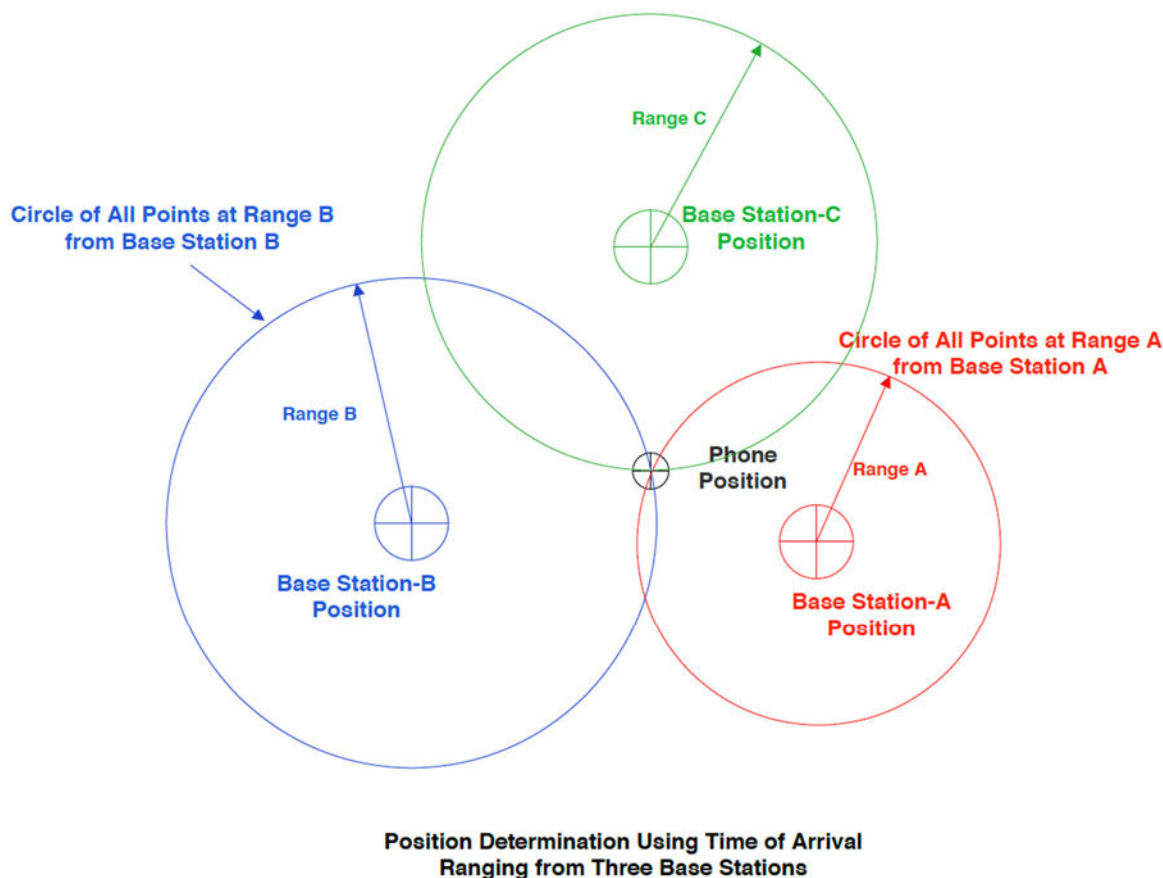


66. An alternate method that is used is known as “Time Of Arrival” (TOA). Since the beacon locations are known, it is a fairly simple matter to determine the distance between the device and the beacons by measuring signal time of flight. As with celestial navigation and GPS, if the distance to one base station is known, it can be determined that the cell phone is located on a circle

whose radius would create that time delay. If the distance to two base stations is known, then the position of the phone is at one of the two points where the circles associated with the delay to each of the two base stations intersect. And, if three distances are known the three resulting circles will intersect at only a single location, and this is the position of the cell phone. This is illustrated in the figure below.



67. As can be seen in the figure, there is some uncertainty in the position of the phone because there are two possible locations where the range circles cross. This ambiguity can be resolved by using range measurements from three base stations as shown below.



68. In actual practice, the *differences* between the signal flight times is used rather than trying to measure absolute flight time (similar to the way GPS uses “double differencing” to avoid local time errors), so this variation is known as “Time Difference Of Arrival” (TDOA).

69. Within AOA and TDOA/TOA systems, there are so-called “forward link” and “return link” approaches, and sometimes these may be combined. Forward link means that the signals sent from the base stations are received by the cell phone; the cell phone determines the time differences and computes its position. Return link means that the cell phone emits a signal that is received by

multiple base stations, and the base stations then communicate to determine the location of the cell phone, which location is then subsequently sent back to the cell phone.

70. Various enhancements and refinements of these triangulation based positioning methods are also used.

71. These methods of triangulation using cellular signals were well known as of the filing date of the '289 patent. For example, U.S. Patent No. 6,748,224 to Chen (Ex-1032), filed on December 16, 1998, describes a "local positioning system (LPS) uses the radio propagation parameters in a CDMA forward link or TDMA reverse link to establish a mobile station's position. Ex-1032, Abstract. Chen further describes that the system is based on TDOA. For example: "The LPS is based on TDOA which uses measured phase shift or chip offset information of the pilot channel signals transmitted from particular base stations that are "visible" to the mobile station. A TDOA triangulation approach requires time or propagation delay measurements from at least three "visible" base stations. *Id.* at 3:51-56.

72. U.S. Patent No. 6,889,053 to Chang (Ex-1033), filed on July 26, 1999, describes a mobile phone location system based on a model of signal characteristics such as the received signal strength as a function of location. For example:

The location of a mobile wireless communication unit in the service area of a CDMA communications system is predicted utilizing two likelihood functions that define maximum likelihood estimators of the mobile unit's location, based on attribute measurements, such as but not limited to pilot signal strength, being made at the location of the mobile unit and reported back to a base station. One of the likelihood functions comprises a frequentist likelihood function and the other comprises a Bayesian-modified likelihood function. The likelihood functions are based on the assumption that there is an RF model which provides the probability a mobile unit is able to detect one or more attributes associated with an arbitrary base station, given it is located at an arbitrary location within the service area.

Ex-1033, Abstract.

D. Cell Tower and WiFi Triangulation

73. The AOA, and TOA methods described above, can be used with any type of beacon. Forward link methods (based on signals received by the device from the beacons) are used with specialized beacons such as LORAN stations, and other available beacons such as cellular phone base stations and WiFi Access Points. This approach requires that the device being located has, or has access to a catalog or database of beacon locations (cell phone base station locations, WiFi Access Point locations, etc.). Using this information and the received signals (AOA and RSSI, TOA, or some combination of the two) the device is then able to determine its position relative to the locations of the beacons, and this relative to the global geographic coordinate system. While the received signal strength is generally much higher with beacons based systems such as Cellular base station and WiFi access point triangulation, these systems exhibit somewhat poor accuracy

indoors because the signals suffer from reflections (known as multipath – because the received signal may be reflected along multiple different paths, with different time delays).

E. Microcell Beacons

74. It is also increasingly common to use low power, often application specific, beacons (microcells) that send their location information using low power signals such as WiFi, Bluetooth, or Bluetooth Low Energy. These systems may or may not rely on triangulation since the indoor signals may be subject to significant multipath interference. In most cases the location of the microcell beacon is either known (i.e., included in a database), or it is simply provided in the beacon signal. Because the signal levels are known the position of the receiving device is simply assumed to be the same as the position of the beacon. Alternative techniques for using multiple beacons for determining location have also been known in the art. For example, patents and publications contemporaneous to the '203 patent show that the use of data and information from multiple spaced-apart nodes or communication points sending signals to a device to determine the device's location was well-known, and variations using different communication methods and different types of data from such communications were also well-known. For example, U.S. Patent No. 8,836,580 to Mendelson ("Mendelson"), filed May 8, 2006, uses similar techniques and discloses a system that "focuses on indoor

navigation, or navigation in crowded urban areas, where GPS based systems, due to lack of access to satellites or the GPS limitations detailed previously, cannot achieve the required results.” Ex-1021, 2:31-36. Mendelson discloses using RF tags installed in points of interest such as “a mall, department store, product inside a store, street or garage parking, inside or outside location, public or commercial.” *Id.* at 6:6-9. Mendelson explains that “[t]he tags can be RFID (long range type), or a long range Bluetooth, or a Wi-Fi or any RF type.” *Id.* at 6:9-11. Mendelson also explains that “[t]he tags broadcast a unique ID by wireless that identifies the location by the unique ID, the address and type of facility/store” and “[t]he tag broadcasts its information to be picked up by the navigator, by the cellular phone or any other Bluetooth device application.” *Id.* at 6:11-15.

75. Further, U.S. Patent No. 8,259,692 to Bajko (“Bajko”), filed July 11, 2008, discloses a system with “[v]arious embodiments [that] allow for positioning and/or navigation of an electronic device within a building when, e.g., GPS signals, are unavailable.” Ex-1023, 2:11-13. Bajko explains that the system comprises “multiple communication devices that can communicate through one or more networks.” *Id.* at 2:67-3:2. “The system [] may comprise any combination of wired or wireless networks including, but not limited to, a mobile telephone network, a wireless Local Area Network (LAN), a Bluetooth personal area network, an Ethernet LAN, a token ring LAN, a wide area network, the Internet, etc.” *Id.* at

3:2-7. Bajko also discloses that the system “allows for the positioning a device inside, e.g., a building, whenever a signal from at least one WLAN AP is available.” *Id.* at 4:2-4. Further, Bajko’s system “offer[s] the ability to provide navigation to one or more desired destinations inside the building (e.g., a specific shop in case of malls or a cubicle number in the case of office buildings).” *Id.* at 4:5-7.

76. U.S. Patent Publication No. 2010/0048163 to Parr (“Parr”), published February 25, 2010, discusses the need “to provide exact location of mobile devices in building or underground subway stations, where radio signal strength may be too weak due to reflections, diffractions, and attenuated passage through internal walls, floors, ceilings or may be absent altogether due to the absence of radio towers.” Ex-1022 ¶5. Parr discloses “systems and methods for locating a mobile telecommunication device within a building or under mobile telecommunication device within a building or underground facility.” *Id.* ¶6. Parr explains that “the system includes one or more RF nodes located in the facility” and “is configured to receive an emergency wireless transmission from a mobile telecommunication device located within the facility.” *Id.* Parr discloses that “RF node [] may support one or more wireless communication standards” and “strategically placed throughout the underground facility [] to provide wireless network coverage of the

entire facility [] and to assure that mobile devices [] are within reach of at least two RF nodes [] at any given time.” *Id.* ¶17.

F. Geolocation Technology – Combining Well-Known Devices, Protocols, and Techniques

77. By November 5, 2004 and certainly by January 8, 2009, it was well-known to use a combination of such geolocation data, signals, devices, and techniques to more accurately determine the location of a device. A POSITA would have known that collecting, analyzing, and applying a variety of data from a variety of sources would tend to lead to more accurate results, and would assure that position could still be determined even if one or more of the positioning mechanisms was unavailable.

78. As described above, it was well-known that different positioning signals and methods have different benefits and/or limitations in different situations. For instance, it was well-known that GPS does not work well indoors because of low signal power and multipath interference, and may be problematic in urban environments or poor weather because of multipath interference. It was also well-known that in some instances cellular positioning (i.e., triangulation) may be more functional indoors and in urban canyons than GPS because it is less impacted by multipath, and is generally available even in poor weather conditions. And a POSITA would also have known that Bluetooth signals suffer from high signal attenuation when the signals pass through walls and floors in buildings, and thus

reception of a low level Bluetooth signal may not be indicative of the beacon location being far from the receiver.

79. It was therefore well-known to use data from multiple signals, if such data and signals were available, to improve the accuracy of geolocation systems.

80. Likewise, it was well-known that combining geolocation techniques would improve the geolocation accuracy. For instance, as noted above, while RSSI is useful because it may indicate the proximity of a beacon, it does not always provide an accurate position determination. Therefore, a POSITA seeking to build an geolocation system, particularly a system that works well in indoor applications, would have known and sought to combine multiple techniques, including the ones described above, to improve accuracy.

G. Targeted Advertising Technology

81. Advertising has been used by merchants to inform and entice potential customers for thousands of years³. Some of the earliest known advertisements were steel carvings in ancient Egypt around 2000 BC. The first print advertisement in the United States was a book ad printed in a 1704 newspaper, and the first large billboard (50 square feet) was erected in 1835. These advertisements only roughly targeted to any specific audience, and as a result were presumably fairly inefficient

³ <https://www.marketing91.com/history-of-advertising/> Accessed 4/12/2023

by today's standards. Specifically the book ad was presumably aimed at people who were readers of the newspaper, with the expectation that anyone who was able and interested in reading a newspaper might also be interested in reading a book. Billboard ads were generally aimed at anyone who happened to see them on the road, which would have been a very large, but very untargeted audience. In the 1920's radio was the primary mass media channel, and radio ads began to appear more frequently. In 1935 George Gallup created the concept of statistical market surveying, which provided radio advertisers with more specific information about who was listening to which radio stations, so that the advertiser could thus place ads on the radio station, or at a time of day where and when customers most likely to be interested in them would be listening. This trend obviously transitioned to television advertising, and then into Internet advertising. With the exception of very specific location based advertising such as handbills placed at locations where potential customers were likely to see them, most of this early Radio, TV and Internet advertising was aimed at broad audiences, possibly focused based on the statistics of the viewers/listener of a specific program or topic.

82. U.S. Patent No. 6,647,257 ("Owensby" was filed on January 21, 1998. Owensby describes a system and method for providing targeted messages based on wireless mobile location (Owensby, Title). Specifically the system determines the

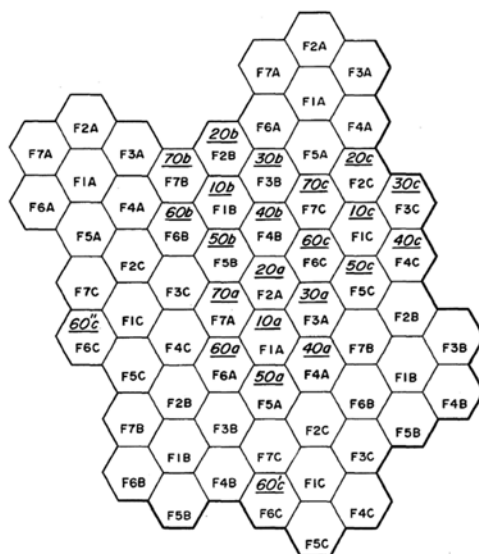
location of the mobile phone through the cellular system, and based on the location and/or user profile data delivers voice advertisements to the phone user.

In a preferred embodiment, the messages are chosen from a database of pre-selected commercial information or advertisements and are targeted to the subscriber of the wireless mobile communications service on the basis of Wireless Mobile Location Data included with the call signal. In an alternative embodiment, the messages are further targeted to the subscriber of the wireless mobile communication service on the basis of predetermined Subscriber Profile Data pertaining to the subscriber and stored in an electronic database.

Owensby 4:15-24

H. Cellular Telephone Communication

83. The first cellular telephone system was described in U.S. Patent No. 3,906,166 to Cooper (“the Cooper patent”), which was issued on September 16, 1975. This system uses a series of base stations arranged so that each base station is adjacent to six other base stations, as shown in Figure 1, reproduced below.

 $\overline{F\overline{H}G.1}$

84. The base station antennas are arranged into sub-cells which are linked to receivers and transmitters.

Referring to FIG. 1a, there is shown a more detailed drawing of the cell structure of FIG. 1. Although the frequency allocation scheme of FIG. 1 may be used in systems employing a single base station transmitter and receiver per cell, and a mobile unit having the same range as a base station, in a preferred embodiment, the system according to the invention uses a base station transmitter having a coverage range which covers the entire cell, a portable unit having a coverage area smaller than that of the base station transmitter and a plurality of receiver sites deployed within each cell. In FIG. 1a, the receiver sites are denoted by crosses and the combination receiver-transmitter base station sites are denoted by circles. The radially extending lines about the circles denote directional antennas for portable unit locating receivers, the function of which will be explained in a subsequent portion of this application. Each of the cells is divided into a group of sub-cells, for example, the cell 10a is divided into the subcells 11a-17a, the cell 20a into sub-cells 21a-27a, etc. Each base station site transmits and receives on duplex channels assigned to the cell in which the base station is located. For example, the base station site in the cell 10a transmits and receives on the frequencies in the set F1A, the base station site in the cell 20a transmits and receives on the channels in the set F2A and the base station site located in the cell 30a transmits and receives on the channels in the set F3A.

Cooper 5:9-25

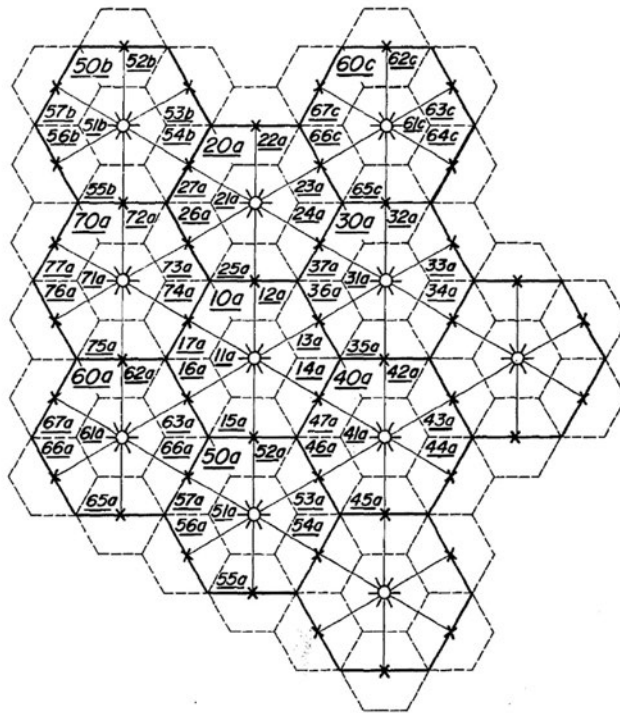


Fig. 1a

85. Cooper describes that the base stations and portable units (cell phones) are configured so that any give phone communicates with only a single base station at a time. This is done by intentionally limiting the transmission range of the portable unit as described below.

In the system of the instant invention, the transmission range of the base station is intentionally made greater than the transmission range of a portable unit. To provide two-way communications, the base station transmitter transmits directly to the receiver in the portable unit, and the portable unit transmitter transmits to the base station receiver or to one of the receiver sites deployed within the coverage area of the base station. The transmission range of the portable unit is intentionally limited because, unlike a base station, a portable

may move between areas and interfere with other portable transmissions in areas using the same frequency.
Cooper 6:44-56

86. Cooper also describes that as the portable unit moves between cells, it is re-assigned frequency channels associated with the next cell.

Once the initial voice frequency pair has been assigned to a portable unit, the location of the unit must be continuously monitored in order that new communications channel frequencies may be assigned thereto as required when the portable unit moves between cells.
Cooper 8:64-9:1

87. A POSITA would thus have understood that while a portable device (i.e., cell phone) is operating, it is connected to a dedicated base station, and as it moves it may be re-assigned to a different dedicated base station.

X. PRIORITY DATE

88. The '203 Patent states that "[t]his application is a Continuation in Part of U.S. Patent Application Ser. No. 1 1/848,178, filed Aug. 30, 2007, and claims the benefit of the prior filing date of U.S. Provisional Patent Application Ser. No. 60/625,467, filed Nov. 5, 2004. These applications are incorporated by reference in their entirety. This application is related to U.S. Patent Application Ser. No. 12/044,840, filed Mar. 7, 2008, which is incorporated by reference in its entirety." Ex-1001, 1:7-14.

89. The earliest possible priority date for the '203 Patent then is November 5, 2004, which is the filing date of U.S. Provisional Patent App. No.

60/625,467 (“the ’467 Provisional”), which the ’203 Patent “claims the benefit of” and “incorporate[s] by reference.” Ex-1001, 1:7–14. The next earliest possible priority date for the ’203 Patent is August 30, 2007, which is the filing date of Application No. 11/848,178 (“the ’178 App”), which the ’203 Patent claims to be a “Continuation in Part of” and “incorporate[s] by reference.” *Id.* The ’203 Patent finally claims to be “related to” U.S. patent application Ser. No. 12/044,840, (“840 App”) filed Mar. 7, 2008, which is “incorporated by reference in its entirety.” *Id.*

90. However, all of the ’203 Patent claims recite new subject matter not found in the ’467 Provisional or the ’178 Application. Each of the independent claims (Claims 1, 6, 29, 30) require locating a device in “a building,” with many also claiming “the building having different elevational levels.” Ex-1001, 41:26–27 (Claim 1); *see also id.*, 41:40–42 (Claim 2), 41:47–49 (Claim 3), 41:54–55 (Claim 4), 41:60–61 (Claim 5), 42:20 (Claim 6), 43:55–56 (Claim 25), 43:65–66 (Claim 28), 44:26 (Claim 29), 45:6 (Claim 30). Claim 1 also requires narrowing nodes to the node that is “most practically near” the user and on the same floor as the user by excluding nodes at other elevation levels. *Id.*, 41:26–27 (Claim 1). And Claims 6 through 30 all require “tailoring” a “targeted message” based on the profile of a user who is receiving the “targeted message.” *Id.*, 42:40 (Claim 6), 44:50 (Claim 29), 46:11 (Claim 30).

91. I reviewed the '467 Provisional, filed on November 5, 2004, and the '178 Application, filed on August 30, 2007, to look for written descriptions of these limitations, and I did not find any mention of trying to locate a user device that is in a building, especially not one with “different elevational levels,” excluding nodes at other elevations to identify a single “most practically near” node on at the same elevation as the user device, or tailoring a targeted message to a user based on the user’s profile.

92. I did not find any disclosures or descriptions that would have conveyed to a POSITA that the invention was intended for or even applicable to buildings. Instead, the '467 Provisional and the '178 Application both describe using their system and method by vehicles, which a POSITA would have understood is typically outdoors and not in a building. Beyond the fact that the '467 Provisional and '178 Application describe tracking a vehicle, which would typically be outdoors, a POSITA would also not have understood those applications to disclose locating a device inside a building because the applications do not describe doing so. The word “building” does not appear in either application. Furthermore, as described throughout this declaration, locating devices indoors presents a unique set of challenges. A POSITA would not have understood either the '467 Provisional or the '178 Application to disclose locating devices in a

building because they lack detailed discussions of those challenges and how to overcome those challenges.

93. I also did not find any disclosures of narrowing to a “most practically near node” at the same elevation as a user device by excluding nodes at other elevation levels. I saw no disclosure that even came close to this. There is no discussion of excluding nodes and certainly no discussion of excluding nodes based on elevation level.

94. I also did not find any disclosures of tailoring a targeted message based on the profile of a user who is to receive the message. At best, I found disclosure that a *sender* could send messages from a selection based on their user profile. *See* Ex-1024, ¶124-125; and Ex-1025 ¶149-150. This is not the same thing as targeting a message to a recipient based on a profile of data collected about the recipient.

95. I have therefore applied a priority date of January 8, 2009, the '203 Patent's filing date, for purposes of the invalidity arguments presented in my declaration. However, the relevant knowledge and motivations of a POSITA would not have differed if the priority date was November 5, 2004. The challenged claims are obvious even applying this earlier date of November 5, 2004, which I have also done, as explained in further detailed below.

XI. CLAIM CONSTRUCTION

96. I do not believe that any term requires explicit construction to resolve the issues presented in this declaration. I ascribe the plain meaning to each claim term, as that plain meaning would have been understood by a POSITA.

XII. BRIEF DESCRIPTION OF THE APPLIED PRIOR ART REFERENCES

A. Wrappe (Ex-1005)

97. Wrappe, titled “Methods and Apparatuses for Beacon Assisted Position Determination Systems” is International Publication, WO2005106523 published on November 10, 2005. I understand that Wrappe is prior art under either priority date discussed above.

98. Wrappe relates to “[m]ethods and apparatuses for microcell beacon assisted position determination.” Ex-1005 ¶9. As shown in Figure 5, Wrappe illustrates mobile station 501 (annotated green) “in an environment where the blockage of GPS signals is severe.” *Id.* ¶46. Wrappe explains that when “there are a number of stores and shops (e.g., 511-517, 521-529) in a commercial complex” and “[w]hen a conventional hybrid position determination system is used, the position solution of the mobile station may not be precise enough to accurately determine which store the mobile station is in.” *Id.* Thus, as shown in Figure 5, “microcell beacons [annotated purple] are placed to aid the position determination.” *Id.*

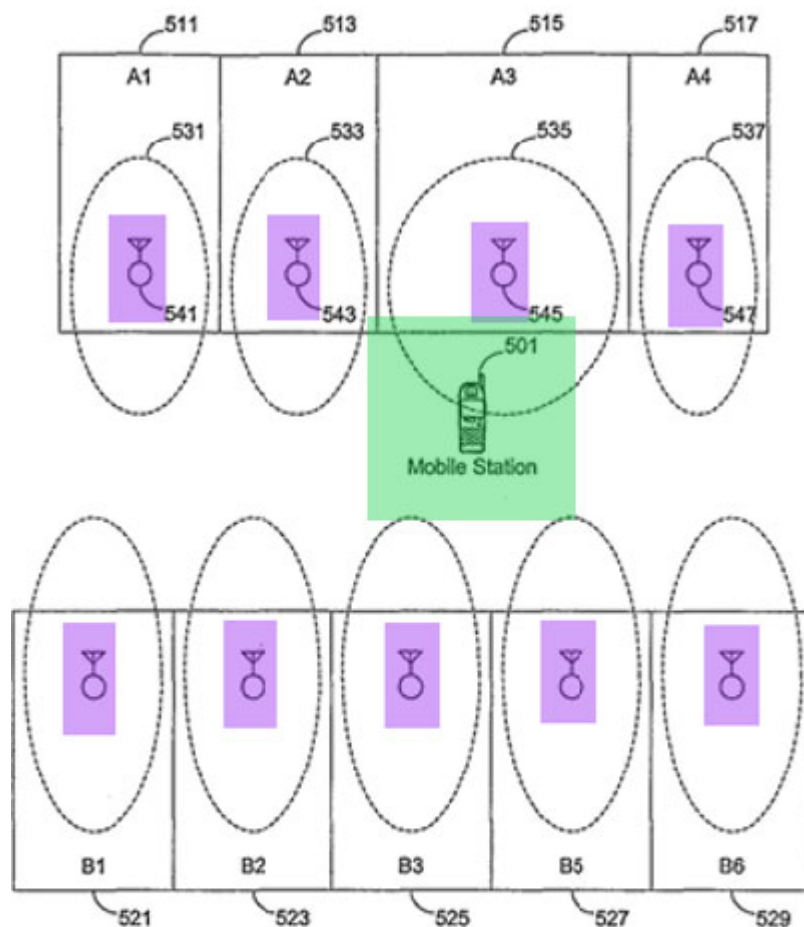


Fig. 5

Id. at Fig. 5 (annotated).

99. Wrappe discloses that the microcell beacons are “used to broadcast to mobile stations location information and/or identification information, which can be used to look up for the location information, to improve the precision of position solutions in a wide area position determination system (e.g., a GPS

system, an AFLT system, or a hybrid system).” Ex-1005 ¶10. Wrappe explains that “[t]he location information may be the coordinates (e.g., longitude, latitude and altitude), the physical addresses (e.g., street address), or other location specific information (e.g., an identification number of an area).” *Id.* ¶10. Further, “microcell beacons can provide information such as street address, identity of the site in which the microcell beacons are installed, zone identification information, etc., which can be directly used for the emergency response purpose (e.g., for fire, medical, or police responses).” *Id.* ¶45. Wrappe explains that “the position information (e.g., altitude aiding information) broadcast at the microcell beacons are used to improve the accuracy of the position solution so that it can be reliably determined which of the stores (e.g., 511-517, 521-529) the mobile station is in.” *Id.* ¶46. Further, Wrappe explains that identifying the site in which the microcell beacons are installed allows “information related to the store (e.g., electronic coupons, special of the day, a web page of the store, or other information that the user of mobile station 501 may be interested) [to] be transmitted to the mobile station.” *Id.* ¶47. Wrappe discloses that “microcell beacons may be installed within lightening fixtures or with security devices (e.g., security camera) in an area where the precision and the location fix yield are reduced due to the blockage of GPS signals.” *Id.* ¶34.

B. Belcea (Ex-1006)

100. Belcea, titled “System and Method for Accurately Computing the Position of Wireless Devices inside High-rise Buildings,” is U.S. Patent No. 7,203,497 filed June 4, 2004. I understand that Belcea is prior art under either priority date discussed above.

101. Belcea discloses a “method for accurately computing the position of wireless devices in a three dimensional network.” Ex-1006, 4:44-60. Specifically, Belcea discloses a “network of wireless devices including Mobile Terminals, Wireless Routers and Controllers within a three dimensional deployment structure such that communication, identification and position calculations can be achieved with high accuracy regardless of the building structure.” *Id.* at 1:24-33. As shown in Figure 1, Belcea discloses “a wireless network deployed at a fire incident 100 [which] includes a plurality of terminals, including Mobile Terminals 110-1 to 110-n [annotated green], which are typically associated with firefighters, Fixed References 120-1 to 120-n [annotated purple], fire trucks 130-1 to 130-n, and Main Controls 140-1 to 140-n [annotated blue].” *Id.* at 5:23-27.

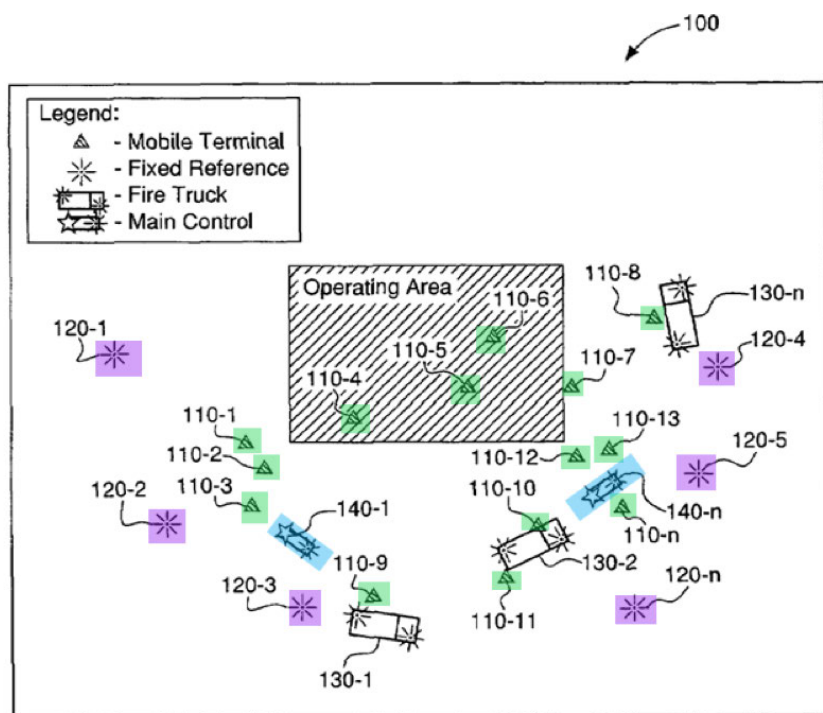


FIGURE 1

Id. at Fig. 1 (annotated).

102. Belcea explains that “[t]he Mobile Terminals can determine their respective locations using algorithms” such as those described in U.S. Patent Application Ser No. 10/861,121, published as U.S. Patent Publication No. 2004/0246926 to Belcea (“Belcea ’926”). Ex-1006, 11:26-33 (“the entire content of which is incorporated herein by reference”). Belcea ’926 is submitted concurrently herewith as Ex-1008. For example, using “Time of Flight (TOF) data and Received Signal Strength Indicator (RSSI) data and a scoring process to identify the correct floor on which they are located.” *Id.* at 11:35-38.

103. Shown in Belcea '926's Figure 7, "is a flowchart showing an example of the floor scoring operations performed for identifying the locations of mobile terminals. Ex-1008 ¶23. Belcea '926 discloses that a "function has a loop that identifies the floor on which the criterion (RSSI or TOF) has the best value. Once the floor was found in step 1340, all other data from the same floor are ignored and the next floor is identified." *Id.* ¶65.

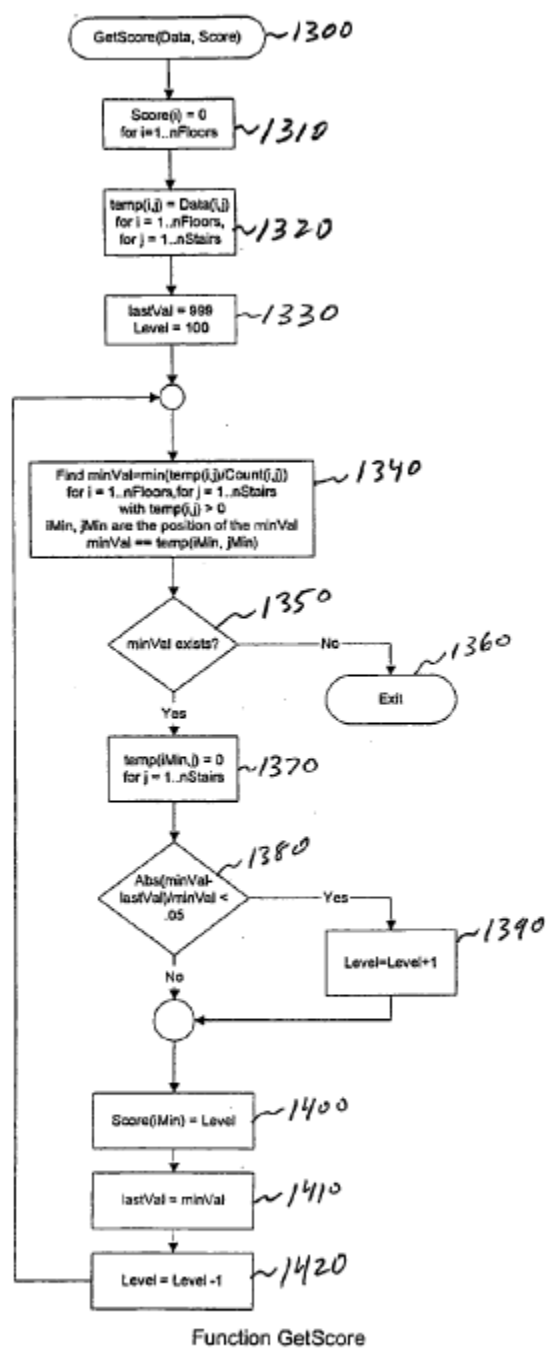


FIGURE 7

104. Belcea '926 discloses using a “wireless floor-indicating router (FIR)
106 [] in the stairwell 102 and by the elevator shaft 104 at each floor.” Ex-1008

¶43. Belcea '926 also discloses that “all FIRs deployed on the same floor are on the same line of the matrix, regardless the position on the floor.” *Id.* ¶55. Belcea '926 explains that this is because “the signals loose energy when passing through floors and walls, a FIR 106 may not be able to communicate with a firefighter [from the Rapid Intervention Crew] that is not on the same floor as the FIR 106.” *Id.* ¶43. Further, Belcea '926 discloses that “filtered data can be compared for finding the floor where is located the FIR that provides to the targeted mobile device the smallest TOF and the best RSSI simultaneously.” *Id.* ¶47.

105. Belcea '926 also discloses that each firefighter has a subscriber device, MeshTracker™ (MT) 116, that “exchanges range messages with all wireless routers (i.e., FIRs 106) with which it can communicate.” Ex-1008 ¶¶30, 50. “When the MT 116 determines that the list of FIRS 106 within its broadcast range, the MT 116 transmits information (e.g., a data packet) to the Incident Commander Computer.” *Id.* ¶50.

106. Belcea explains that “radio signal penetration is almost impossible through the concrete floors” and thus discloses using “a system of Vertical Routers 124-1 to 124-n [] to achieve communication between the Local Control and each floor of the building.” Ex-1006, 6:17-21. Figure 3 illustrates “a number of Intelligent Access Points (IAP) 122-1 to 122-n [annotated purple], and a system of

Vertical Routers (VR) 124-1 to 124-n [annotated purple], dispersed among a number of floors of an example building.” *Id.* at 6:6-11.

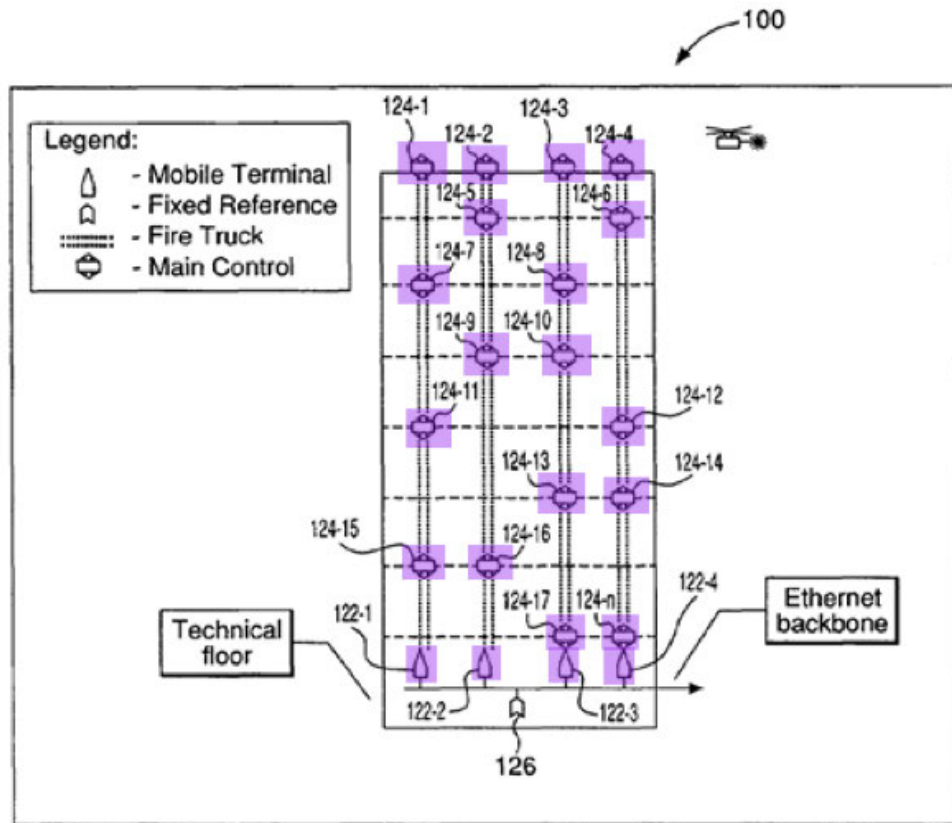


FIGURE 3

Id. at Fig. 3 (annotated).

C. Christopher (Ex-1007)

107. Christopher, titled “System and Method for Tracking Shopping Behavior” is U.S. Patent Publication No. 2008/0042836 filed September 11, 2007. I understand that Christopher is prior art under the January 8, 2009 priority dated discussed above, but not under the earlier 2004 date.

108. As shown in Figure 1, Christopher discloses “an RFID system 100 for locating an entity within a structure [which] comprises one or more portable radio frequency (RF) transmitter/receiver units 110 [annotated green], a base unit 120 [annotated blue] providing a command and control function, and a plurality of passive [or active] RFID tags 130 [annotated purple].” Ex-1007 ¶39.

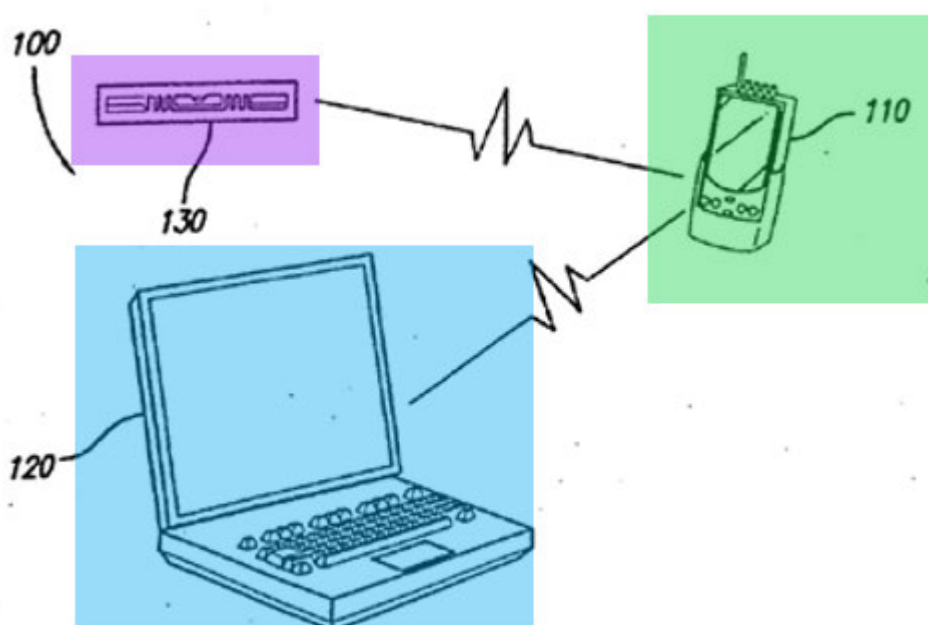


FIG. 1

Id. at Fig. 1 (annotated).

109. Christopher explains that “RF transmitter/receiver 110 may read an RFID tag 130 and thereby determine location based on the known location of the RFID tag 130.” Ex-1007 ¶40. Christopher also explains that the transmitter/receiver transmits “the location of the entity to a base unit computer,

which displays the location of the entity.” *Id.* ¶37. Christopher further discloses that the location “data may be observed almost anywhere on Earth through connectivity with the internet or by wireless communication.” *Id.* ¶60. For example, “[o]bservers may use multiple methods for data presentation” such as in conjunction with “Google Earth, Microsoft Virtual Earth, Google Maps, Yahoo Maps, or other mapping services.” *Id.*

110. As shown in Figure 2, Christopher illustrates “RFID system 100 of the invention within a six-story structure 150.” Ex-1007 ¶43. “Specifically, the RFID system 100 comprises a plurality of passive RFID tags 130 [annotated purple] disposed at predetermined intervals within the six-story structure 150.” *Id.* Christopher discloses that “the RF transmitter/receiver 110 may read an RFID tag 130 and thereby determine location based on the known location of the RFID tag 130.” *Id.* ¶40. Further, “[t]he location of RFID tag 130 may be determined by location data embedded in RFID tag 130.” *Id.* Christopher discloses that “the embedded location data may be programmed into RFID tag 130 using clear text or other suitable languages.” *Id.* Christopher also explains that “[t]he location data may include the floor number and location within the floor, latitude, longitude, elevation, and/or other location information.” *Id.*

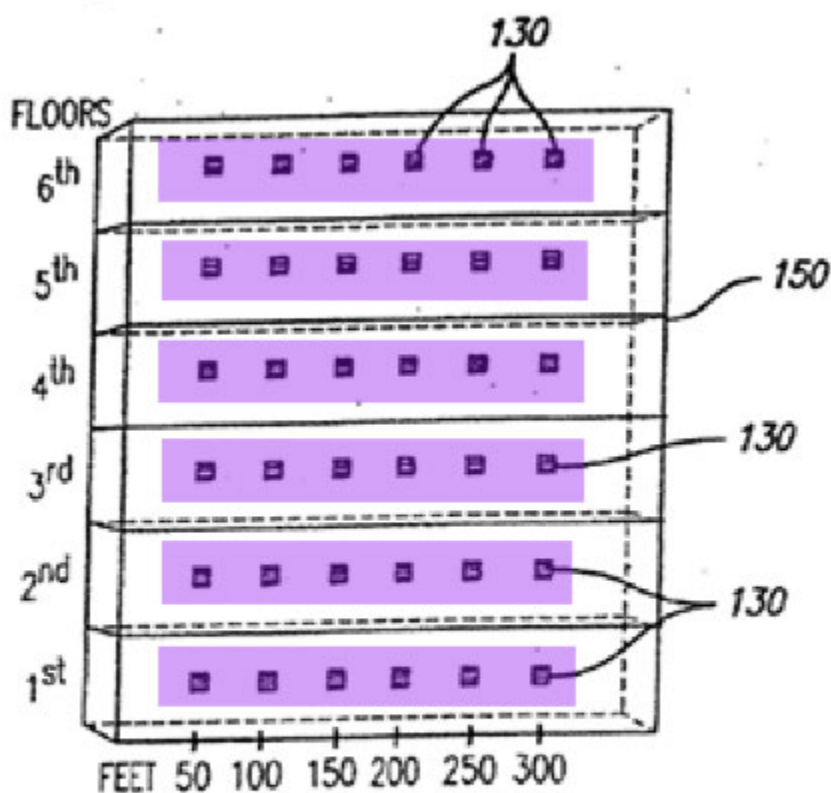


FIG. 2

Id. at Fig. 2 (annotated).

D. Kinnunen (Ex-2007)

111. Kinnunen titled “Location Dependent Services” is U.S. Patent No. 6,813,501 issued on November 2, 2004. I understand that Kinnunen is prior art under either priority date discussed above.

112. Kinnunen discloses a location-based system “[that] targets services to suitable mobile terminals or users by using profiles.” Ex-1009, 6:10-11, 6:43-44.

Kinnunen's system "comprises a profiling sub-system which keeps and/or compiles profiles related to one or more of a user, a mobile terminal and a service."

Id. at 3:28-30. "[T]he profiles may contain information selected from terminal capabilities, such as [] user characteristics, such as the user's gender, age and the category of user, for example whether a gold or a silver user, and preferences of the user selected list, such as expressed interest in music, clothes or electronics or other matters." *Id.* at 3:31-37. And "[t]he user and mobile terminal profiles can be used to determine targeting of advertisements." *Id.* at 3:41-43.

XIII. DETAILED EXPLANATION OF THE UNPATENTABILITY GROUNDS

113. The '203 Patent contains 30 claims—4 independent claims and 26 dependent claims. Claims 6, 29, and 30 are similar, with a few minor variations in some of the elements. Exhibit 1020 is a summary table showing correspondence between challenged claims and elements. Like claim elements in Claims 6, 29, and 30 (designated 6/29/30 below) are discussed together in the below element-by-element analysis. To the extent there are any meaningful differences, such differences are individually identified and discussed. As explained below, the challenged claims are disclosed and/or taught by the prior art.

A. Ground 1: Claims 1-5 are obvious over Wrappe and Belcea

1. A POSITA would have been motivated to combine the teachings of Wrappe and Belcea and would have had a reasonable expectation of success in doing so.

114. In addition to the reasons set forth below regarding specific claim elements, a POSITA would have been motivated to combine the teachings of Wrappe and Belcea would have had a reasonable expectation of success in doing so because each addresses similar issues corresponding to the same well-known technologies.

a. Geolocation Using Node Communications

115. These references disclose interrelated teachings based on routine technologies that would have been amendable to various well-understood and predictable combinations at the time. See, for example, my larger discussion of the technology background and similar patents reflecting the knowledge of a POSITA at the time in Section IX, above, which I incorporate as if set forth fully herein. Wrappe and Belcea describe the use of data and information from multiple spaced-apart nodes or communication points sending signals to a device and variations of using different communication methods and different types of data from such communications to determine the device's location. Specifically, Wrappe and Belcea relate to and describe similar methods for assisted position determination in

an environment where the blockage of GPS signals is severe. Ex-1005, Abstract, ¶¶10, 11, 48, 52; Ex-1006, Abstract.

116. For example, Wrappe discloses using microcell beacons “to broadcast to mobile stations location information and/or identification information [using WiFi or Bluetooth], which can be used to look up for the location information, to improve the precision of position solutions in a wide area position determination system (e.g., a GPS system, an AFLT system, or a hybrid system).” Ex-1005 ¶¶10, 35. Wrappe explains that the coverage of Wrappe’s microcell beacons may be extended “so that when mobile station 501 is in front of the store (e.g., store 515) the mobile station can be identified as being within the site of the store.” *Id.* ¶47.

117. Belcea discloses “[a] system and method for providing a network of wireless devices [] within a high rise building or other three dimensional deployment structure, such that communication, identification and position calculations can be achieved regardless of environment nature.” Ex-1006, Abstract. Specifically, Belcea provides a system that deploys “a network of wireless devices including Mobile Terminals, Wireless Routers and Controllers, within a three dimensional deployment structure such that communication, identification and position calculations can be achieved regardless of building structure.” *Id.* Belcea explains that the network of wireless devices can determine their respective locations using algorithms. *Id.* at 11: 26-33.

118. As described in section IX.E above, the idea and technology behind using signals and communications from location nodes such as microcell beacons, wireless routers, and RF tags to determine locations of users indoors was well-known before and at the time of the priority date of the '203 Patent. *See* Section IX.E (discussing, e.g., prior art Mendelson, Bajko, and Parr which demonstrate that these features were well known at the time)

b. Indoor Geolocation Using Node Communications

119. Wrappe utilizes systems and methods to determine a user's location in an environment such as a mall, where the blockage of GPS signals is severe, by using wireless communications with the user's device. Ex-1005 ¶¶10, 11, 48, 52. Wrappe discloses using microcell beacons that "are used to broadcast to mobile stations location information and/or identification information, which can be used to look up for the location information, to improve the precision of position solutions in a wide area position determination system (e.g., a GPS system, an AFLT system, or a hybrid system)." *Id.* ¶10. Wrappe explains that "[t]he location information may be the coordinates (e.g., longitude, latitude and altitude), the physical addresses (e.g., street address), or other location specific information (e.g., an identification number of an area)." *Id.* "For example, the microcell beacon station can broadcast the altitude of a floor of a building where the microcell beacon station is installed." *Id.* ¶40.

120. While Wrappe discloses the use of his system for identifying, for example which store a user is in within a “commercial complex” (e.g., a shopping center), and while he also discloses that the microcell beacons may provide latitude, longitude and altitude information, he does not specifically describe how his system would determine the floor on which the user is located in a multi-story building. Wrappe teaches that the altitude of the floor where the beacon is located may be sent to the mobile device from the beacon in order to aid in determining the position of the mobile device more precisely. Thus Wrappe discloses including floor information in the beacon transmission, based on altitude information. Wrappe thus provides a motivation to determine the precise location of a user, including what elevation level they are at in a building, which a POSITA would have understood would equate to the floors of a building. To the extent that a POSITA would have desired additional implementation details regarding identifying the floor where the user is, a POSITA would have turned to similar references that similarly teach determining a user’s location in a building and, specifically, which floor of a multi floor building a user is on. A POSITA would have looked for references that taught how to accurately determine which floor a user is on in view of issues caused by signal interference from floors and walls because Wrappe makes clear, and a POSITA would have understood, that floors

and walls of buildings with floors at differing altitudes would have adversely affected RF signals used for location.

121. For example, Belcea teaches overcoming challenges of determining a user's location indoors and methods for determining location with accuracy despite interference from walls and floors. Ex-1006, 3:28-33. Specifically, Belcea provides a system that deploys "a network of wireless devices including Mobile Terminals, Wireless Routers and Controllers, within a three dimensional deployment structure such that communication, identification and position calculations can be achieved regardless of building structure." *Id.* Thus, a POSITA would have been motivated to apply the teachings of Belcea to the system of Wrappe because Belcea teaches methods for determining location with accuracy despite interference from a building's structure, specifically determining the location in a building even when the floors of the building may impact the signals from the beacons. A POSITA would also have been motivated to combine Wrappe and Belcea because they would have recognized the benefit of incorporating Belcea's teachings of deploying wireless devices within a three-dimensional structure into a system like Wrappe's to improve the location determination relative to the floors of the building, that is not just the location on a floor of the building, but the location within the three dimensional structure of the building. Belcea and Wrappe each addresses similar issues such as determining a user's position in a building and also

correspond to the same well-known technologies. For example, Wrappe discloses using microcell beacons to aid in position determination when mobile stations are “in an environment where the blockage of GPS signals is severe.” Ex-1005 ¶46. Similarly, Belcea explains that “radio signal penetration is almost impossible through the concrete floors” and thus discloses using “a system of Vertical Routers 124-1 to 124-n [] to achieve communication between the Local Control and each floor of the building.” Ex-1006, 6:17-21. A POSITA would have thus recognized that Wrappe and Belcea disclose interrelated teachings that would be compatible in the combined Wrappe and Belcea system.

122. Specifically, the proposed combined Wrappe-Belcea teachings would have included all of Wrappe’s basic teachings, and would have incorporated the additional teachings of Belcea related to generating and displaying maps, as well as narrowing down and specifically identifying nodes on the same floor as, and near to, a user, including by allowing for communication between the beacons, as taught by Belcea.

123. A POSITA implementing the Wrappe and Belcea teachings would also have had a reasonable expectation of success in combining the teachings. For example, Wrappe discloses using microcell beacons to determine location within a building by transmitting that location within the range of the microcell beacon. However, Wrappe teaches that in situations where the user device may receive

transmissions from multiple microcell beacons, the location could be ambiguous (since the user device would receive two locations). Like Wrappe, Belcea teaches a similar approach to location within a building using beacon devices, but extends the approach to allow communication between the beacons, to mitigate the above limitations of Wrappe while also providing a means for determining the location in three dimensions, as well as a means for updating any information the beacons might transmit. Ex-1005, Abstract; Ex-1006, 3:29.

124. A POSITA would have been motivated to combine the teachings of Belcea with Wrappe because both provide a solution to aid position determination through the placement of nodes. For example, Wrappe's nodes, microcell beacons, are placed "in an environment where the blockage of GPS signals is severe" and Belcea uses the placement of nodes in a three dimensional structure with the ability to maintain and update a map database based on this deployment. Ex-1005 ¶46; Ex-1006, 3:52-55. Also, Belcea further provides an algorithm that aids in position determination and allows users to determine their respective locations including identifying the floor number in a three dimensional structure. *Id.* at 11:26-33.

125. Specifically, a POSITA would have understood that Belcea teaches techniques and algorithms for positioning in a three-dimensional building to determine which floor a user is on. A POSITA would have been motivated to apply these teachings to Wrappe because a POSITA would have found it desirable to

identify the precise location of a user in the building, and Wrappe teaches such motivation as well. For instance, using Belcea to identify which floor a user is on would be helpful in the system of Wrappe to identify exactly which store and/or department of a store a user is in. And Belcea further teaches that the wireless communication beacons used for locating the devices can also be used for other types of communications, which a POSITA would also have found desirable to apply. Such teaching would enable additional teachings and benefits in the system of Wrappe. For instance, communicating between beacons could improve the positioning system and allow the system to more precisely locate the user between nodes.

2. Independent Claim 1

a. 1[Pre] – A method for developing a map for use by a user, the user being selectively individuals, vehicles, and other entities, comprising:

126. Wrappe in view of Belcea teaches the preamble of Claim 1 to the extent it is limiting.

127. Wrappe and Belcea each teach or suggest developing a map for use by a user.

128. Wrappe relates to “[m]ethods and apparatuses for microcell beacon assisted position determination.” Ex-1005 ¶9. As shown in Figure 5, Wrappe illustrates mobile station 501 (annotated green) “in an environment where the

blockage of GPS signals is severe.” *Id.* ¶46. Wrappe explains that when “there are a number of stores and shops (e.g., 511-517, 521-529) in a commercial complex” and “[w]hen a conventional hybrid position determination system is used, the position solution of the mobile station may not be precise enough to accurately determine which store the mobile station is in.” *Id.* Thus, “microcell beacons [annotated purple] are placed to aid the position determination.” *Id.*

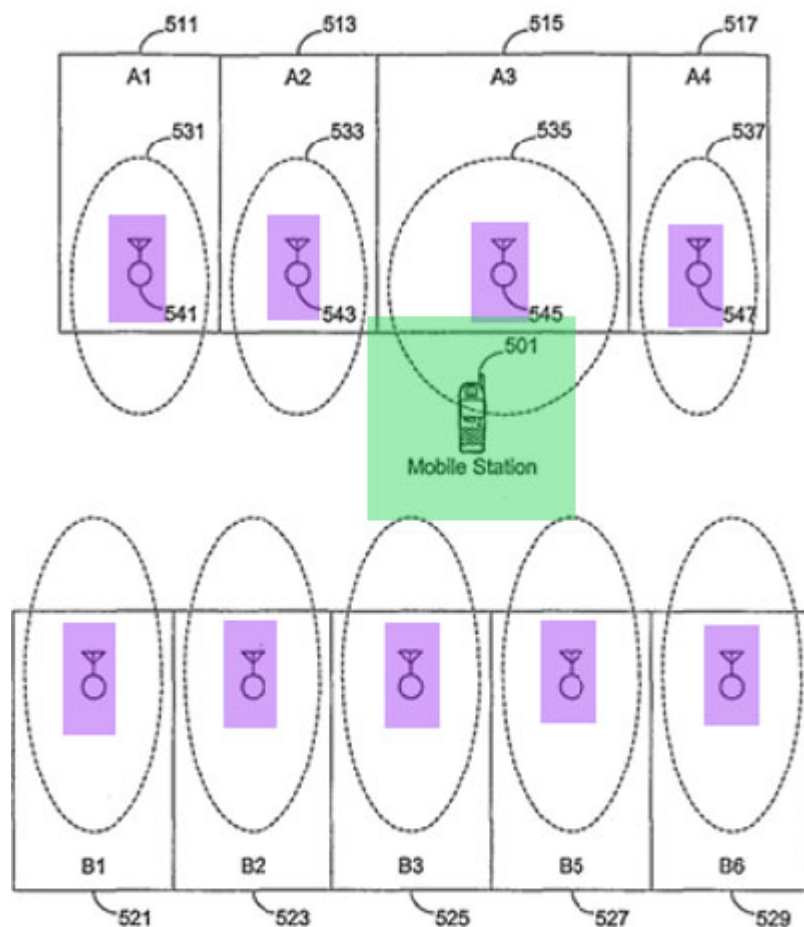


Fig. 5

Id. at Fig. 5 (annotated).

129. Wrappe explains that its microcell beacons “broadcast to mobile stations location information and/or identification information.” Ex-1005 ¶10. For example, as described in Figure 8 below, “[o]ne or more beacon stations are placed within a site in operation 801.” *Id.* at Fig. 8.

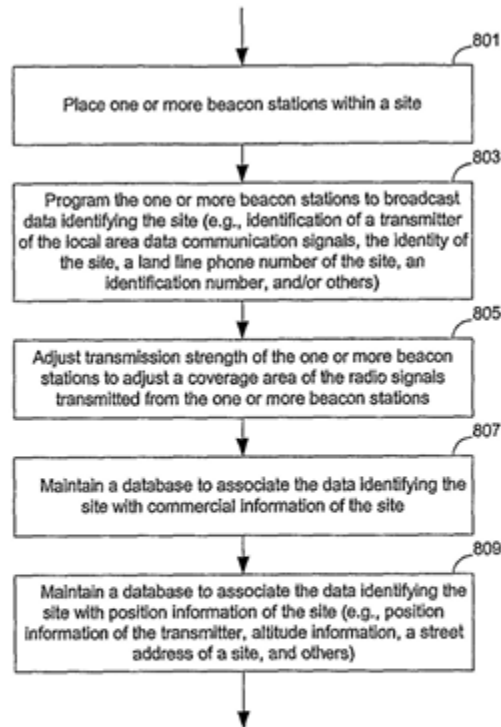


Fig. 8

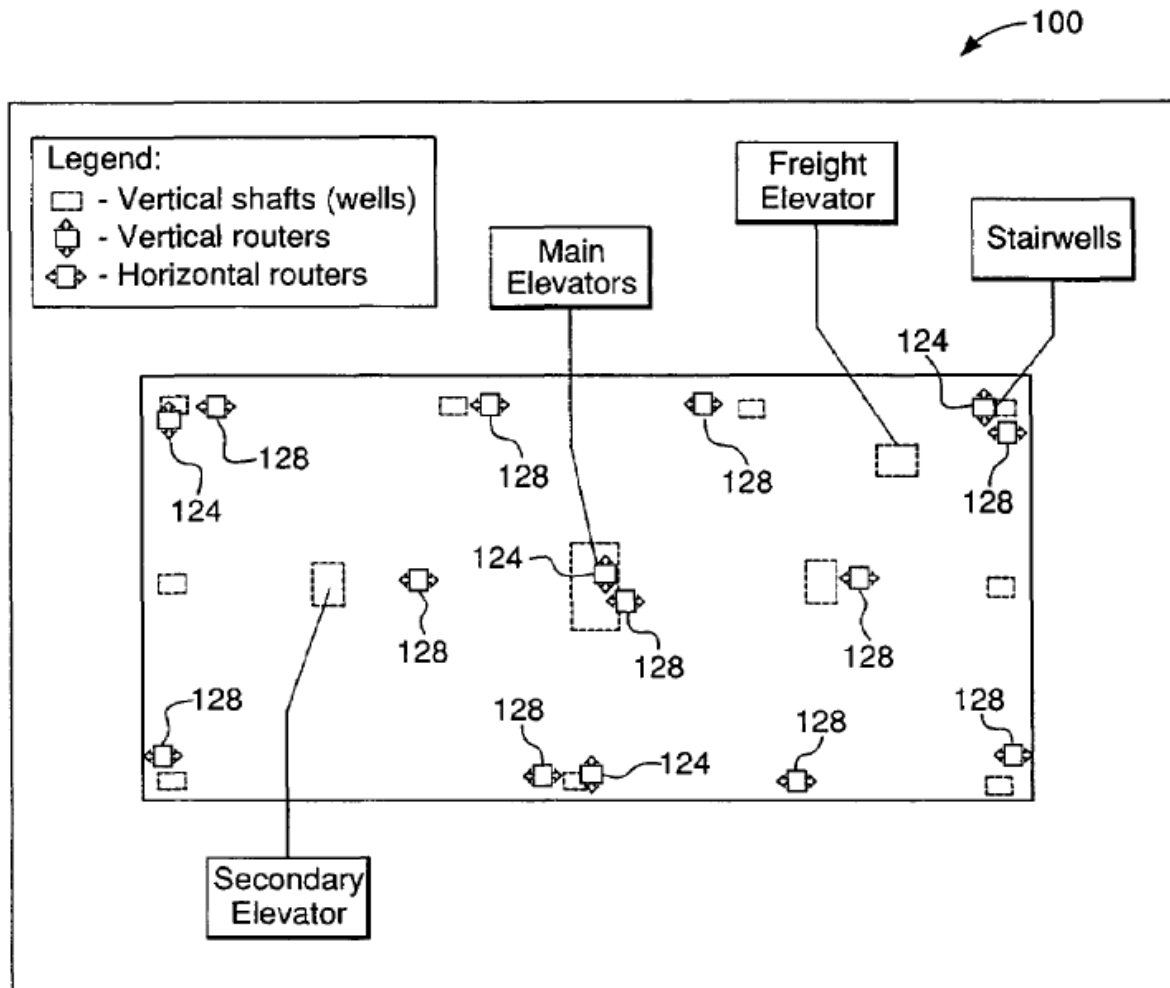
130. “The data identifying the site can be received by a mobile station to improve the precision of the position solution of the mobile station.” Ex-1005 ¶52. This is because Wrappe “maintains a database to associate the data identifying the site with position information of the site (e.g., position information of the transmitter, altitude information, a street address of a site, and others).” *Id.* A POSITA would have understood that a good way to indicate the location of the store, for example if the user was within zone 535 of Figure 5 above, but not inside the store, would be to show the user their location on a map of the store in a

manner similar to Figure 5. Indeed, the '203 Patent states "location data is used to generate a fine resolution map centering on [a] specific location." Ex-1001, 3:54-55. A POSITA would have understood that presenting the data in a map would be a typical way to provide such information to a user.

131. To the extent that a POSITA would have desired additional implementation details regarding mapping, a POSITA would have turned to similar references that include such mapping details, such as Belcea. *See* Section XIII.A.1 For example, Belcea similarly teaches developing a map with correlations between position and site or device information and rendering this information on a map on a device. *See* Ex-1006, 3:52-55 ("Another object of the present invention is to provide a system and method for downloading, maintaining and updating a map database of a three dimensional deployment Structure."), 11:24-26.

132. Belcea discloses "a system and method for downloading, maintaining and updating a map database of a three dimensional deployment structure." Ex-1006, 3:52-55. Similar to Wrappe, Belcea also discloses "deploying a network of wireless devices, including Mobile Terminals" within a three dimensional deployment structure. *Id.* at 3:29-31. Belcea explains that "[t]he position of the Mobile Terminal must be observed on a portable computer that shows the right floor map and the correct position of the Mobile Terminal." *Id.* at 11:6-8. Further, Belcea discloses a "Video Server [that] displays the front, side and top view of the

involved Mobile Terminals and maps of specified floors with Mobile Terminals operating on them.” *Id.* at 11:24-26. An example map of a specific flow is shown in Belcea’s Figure 4:



133. Thus, Belcea discloses a Video Server that displays a map for use by a user. Accordingly, POSITA would have been motivated to implement Wrappe’s use of location information with Belcea’s teachings regarding map database servers, because doing so would provide “an improved system and method for

easily determining and communicating the absolute and/or relative location of a mobile node in a deployed wireless communications network,” Ex-1006 at 3:21-25, and would have provided an improved way of informing the user of that location, using location data that is already determined and found in Wrappe. Ex-1005 ¶52, 46.

134. As shown in Figure 1, Belcea discloses that “a wireless network deployed at a fire incident 100 includes a plurality of terminals, including Mobile Terminals 110-1 to 110-n [annotated green], which are typically associated with firefighters, Fixed References 120-1 to 120-n [annotated purple], fire trucks 130-1 to 130-n, and Main Controls 140-1 to 140-n [annotated blue].” Ex-1006, 5:23-28. Thus, Belcea teaches users such as “firefighters” who are individuals or entities as described in the claim. Moreover, fire trucks 130 are “vehicles” as described in the claim. A POSITA would have applied these straightforward teachings to the users in Wrappe, who are similarly mobile and need to have their positions tracked in Wrappe’s commercial setting.

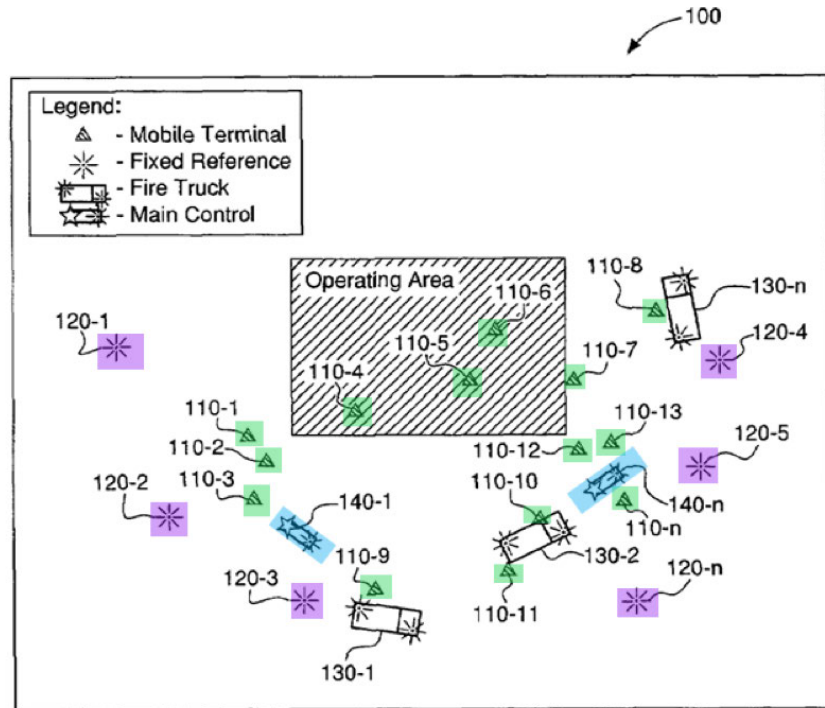


FIGURE 1

Id. at Fig. 1 (annotated).

135. Accordingly, the combined teachings of Wrappe and Belcea include the claimed method for developing a map for use by a user, the user being selectively individuals, vehicles, and other entities.

b. 1[A] – using a geographical zone, the zone selectively being a preconfigured geographical zone,

136. Wrappe in view of Belcea teaches element 1[A].

137. Wrappe teaches using a preconfigured geographical zone. As shown in Figure 5, Wrappe discloses microcell beacons (annotated purple) “which are placed to aid [in] position determination.” Ex-1005 ¶46. Wrappe explains that “the position information (e.g., altitude aiding information) broadcast at the microcell

beacons are used to improve the accuracy of the position solution.” *Id.* Wrappe also discloses that “microcell beacons can provide information such as street address, identity of the site in which the microcell beacons are installed, ***zone identification information***, etc., which can be directly used for the emergency response purpose (e.g., for fire, medical, or police responses).” *Id.* ¶45. Further, “[t]he coverage area of the radio signals may be adjusted to within the boundary of the site so that a neighbor of the site will not be misidentified.” *Id.* ¶52.

138. A POSITA would have thus understood from these teachings that Wrappe’s microcell beacons are positioned in a “geographical zone” as claimed because the microcell beacons provide zone identification information (i.e., within that geographic region of the selected store). Indeed, the ’203 Patent explains that “nodes [] are located at various locations within the geographical space, which comprises of at least one zone.” Ex-1001, 32:12-14. The ’203 Patent also explains that “users have the ability to [] change the boundaries of the zones employed by the system.” *Id.* at 32:19-21. Further, the ’203 Patent states “[t]he zones can be selectively preconfigured geographical zones” and that “[e]ach one includes a plurality of spaced-apart nodes [], where the nodes [] are arranged in a multi-dimensional sense about the zone.” *Id.* at 31:56-59. Accordingly, Wrappe discloses using a geographic zone the same way that feature is described in the ’203 Patent.

Moreover, the zone is “preconfigured” because the beacons are placed in advance, and thus the positioning is configured before the system is put into use.

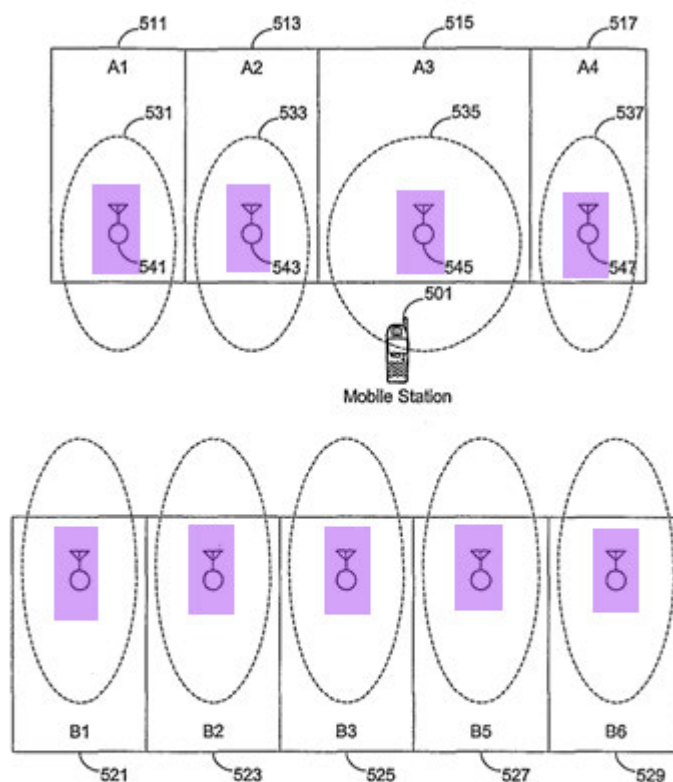


Fig. 5

Id. at Fig. 5 (annotated).

139. Belcea also discloses a “method for accurately computing the position of wireless devices in a three dimensional network.” Ex-1006, 4:44-60. And this similarly would have been understood as a “preconfigured geographical zone” as described by the ’203 Patent. Specifically, Belcea discloses a “network of wireless

devices including Mobile Terminals, Wireless Routers and Controllers within a three dimensional deployment structure such that communication, identification and position calculations can be achieved with high accuracy regardless of the building structure.” *Id.* at 1:24-33. That is Belcea’s system is able to provide this communication and position functionality in a variety of different building structures. Belcea’s Figure 3 illustrates “a number of Intelligent Access Points (IAP) 122-1 to 122-n [annotated purple], and a system of Vertical Routers (VR) 124-1 to 124-n [annotated purple], dispersed among a number of floors of an example building.” *Id.* at 6:6-11.

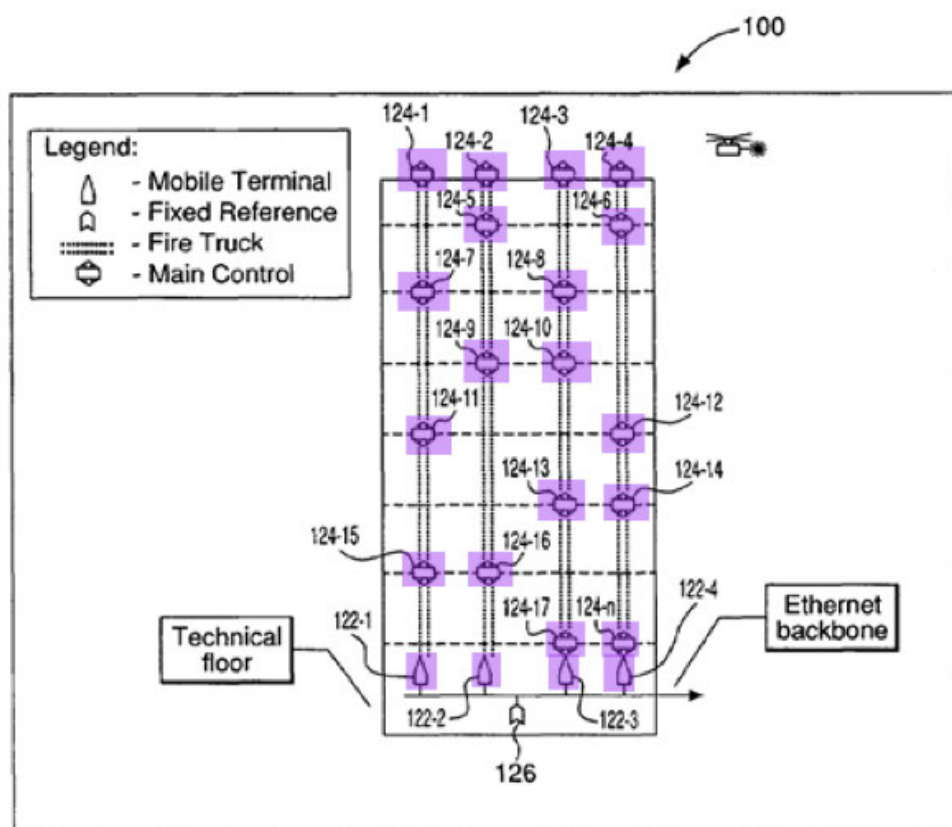


FIGURE 3

Id. at Fig. 3 (annotated).

140. A POSITA would have similarly understood from these teachings that Belcea's system and method uses a preconfigured geographical zone because of its deployment of devices in the three dimensional structure, which is fixed in a specific geographic area. Further, Belcea's three dimensional structure is divided according to latitude, longitude, and elevation in order to achieve high accuracy of identification and position calculations. Indeed, the '203 Patent states "[t]he mapping of the geographical space is affected in a three-dimensional sense,

selectively being defined by x, y and z axes or coordinates, which in some embodiments may correspond to latitude, longitude, and elevation.” Ex-1001, 32:7-10. Thus, Belcea’s deployment in a three-dimensional building discloses a geographical space the same way that features is described in the ’203 patent. Further, a POSITA would have understood that Belcea teaches that the floors of the building are zones in the dimensional structure. *See, e.g.*, Ex-1006, 6:6-11. The ’203 Patent explains that “[t]he four specific zones depicted are the first floor [], the second floor [], the third floor [], and the fourth floor [] of the building [].” Ex-1001, 31:63-65. Accordingly, Belcea discloses using a geographic zone the same way that feature is described in the ’203 Patent. Moreover, the zone is “preconfigured” because the beacons are placed in advance, and thus the positioning is configured before the system is put into use.

- c. **1[B] – the zone including a plurality of spaced apart nodes, wherein the nodes are arranged in a multi-dimensional sense, the location of the plurality of nodes in the multidimensional sense being placed with a structure attached to the ground;**

141. Wrappe in view of Belcea teaches element 1[B].

142. As shown in Figure 5, Wrappe teaches a zone including a plurality of spaced apart nodes. Wrappe’s “microcell beacon stations” correspond to the claimed “nodes.” Wrappe’s Figure 5 “illustrates a situation where each store (e.g., 511-517) has only one microcell beacon station (e.g., 541-547) [annotated

purple].” Ex-1005 ¶47. Wrappe discloses that its microcell beacons aid in position determination when mobile stations are “in an environment where the blockage of GPS signals is severe,” *Id.* ¶46, Fig. 5, such as, where “there are a number of stores and shops [] in a commercial complex.” *Id.* Also, “the position information (e.g., altitude aiding information) broadcast at the microcell beacons are used to improve the accuracy of the position solution so that it can be reliably determined which of the stores [] the mobile station is in” *Id.* Further “the microcell beacon station can broadcast the altitude of a floor of a building where the microcell beacon station is installed” and “may further broadcast its location coordinates.” *Id.* ¶40. A POSITA would have understood that Wrappe’s microcell beacons are “nodes” as claimed because they broadcast position information such as location coordinates and the altitude of a floor. Wrappe’s microcell beacons are nodes at least because they broadcast location data to user devices. Additionally, as shown in Figure 5, a POSITA would have understood that Wrappe’s microcell beacons [annotated purple] are spaced apart because they are located in different stores, and the stores themselves are spaced apart, for example adjacent or across from to each other in Rows A and B (A1-A4 and B1-B6). *Id.* at Fig. 5.

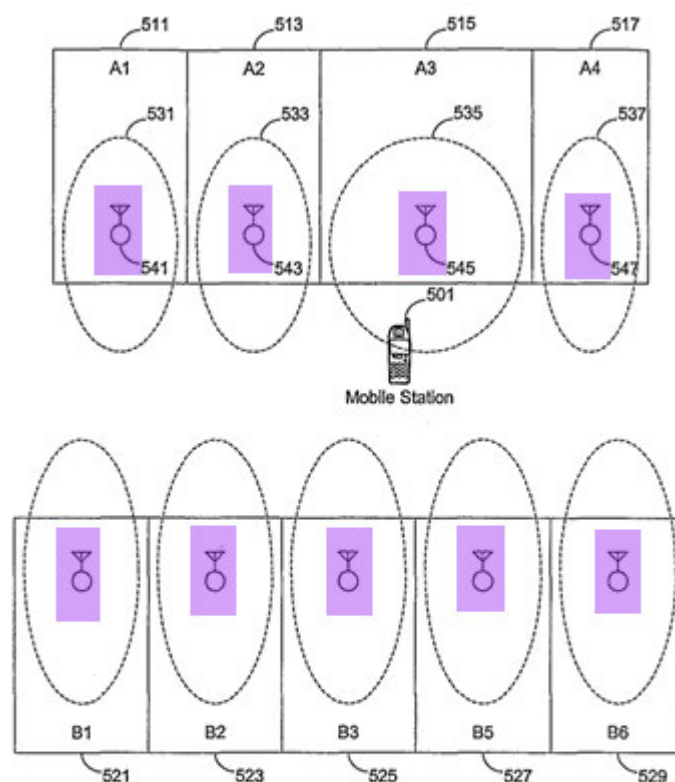


Fig. 5

Id. at Fig. 5 (annotated).

143. Similarly, as shown in Figure 1, Belcea teaches a zone including a plurality of spaced apart nodes. Belcea's Figure 1 is "a top view block diagram of an example ad-hoc wireless communications network including *a plurality of nodes* [annotated purple]." Ex-1006, 4:10-12. Belcea discloses "a system and method for accurately computing the position of wireless devices in a three dimensional network, such as a network distributed throughout a high-rise building

using *specific nodes*, such as wireless routers.” *Id.* at 4:45-49. Belcea thus teaches to use various “nodes,” and as shown in Figure 1, they are spaced apart such that, for example, various fire trucks 130 travel the distances between them.

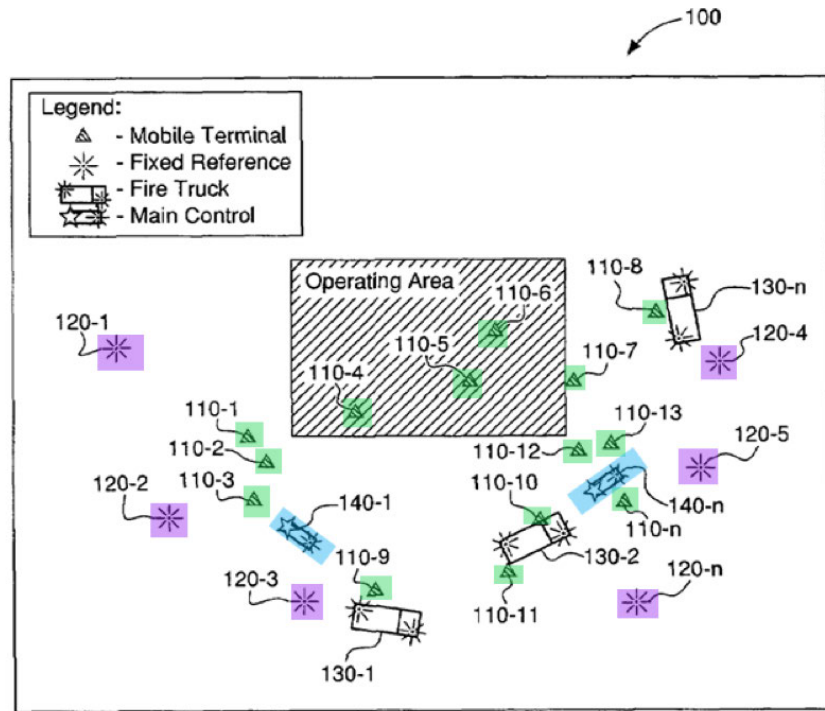


FIGURE 1

Id. at Fig. 1.

144. Wrappe further discloses that “the nodes are arranged in a multi-dimensional sense.” As previously discussed, “the microcell beacon station can broadcast the altitude of a floor of a building where the microcell beacon station is installed” and “may further broadcast its location coordinates.” Ex-1005 ¶40. “Altitude” in a building may refer to height above ground, a position in the “Z” axis, while positioning on a certain floor may refer to “X” and “Y” positions on

any given floor. Thus, Wrappe teaches position in a multidimensional sense, including X, Y, and Z dimensions.

145. Wrappe's Figure 5 also illustrates microcell beacons in a multi-dimensional sense. Ex-1005, Fig. 5. For example, the node at position B1 is spaced apart from the node at A6 in both X (horizontal as looking at the figure) and Y (vertical as looking at the figure) direction, and Wrappe also teaches considering the "altitude," which, as explained above, corresponds to a height or "Z" dimension.

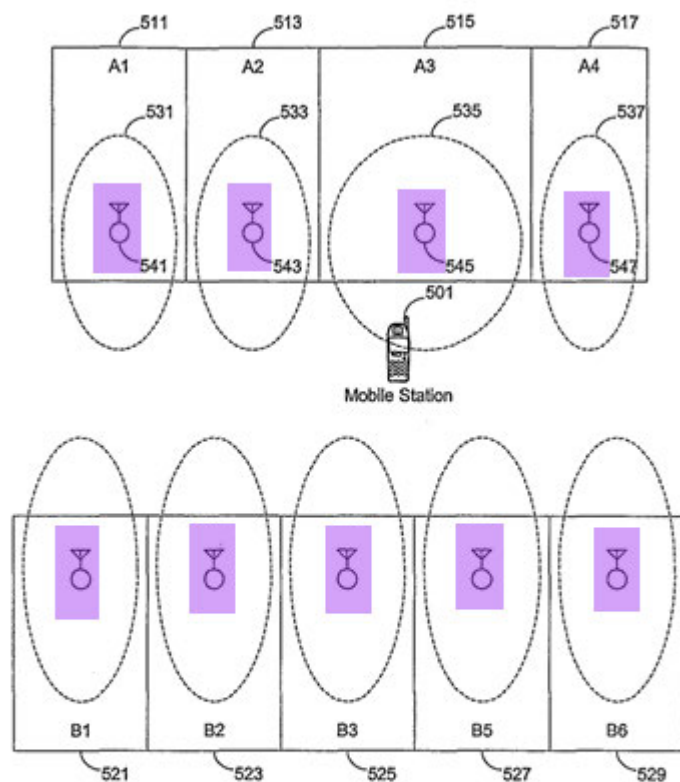


Fig. 5

Id. at Fig. 5- (annotated).

146. Similarly, Belcea discloses that “the nodes are arranged in a multi-dimensional sense.” Belcea’s Figure 3 illustrates “a number of Intelligent Access Points (IAP) 122-1 to 122-n [annotated purple], and a system of Vertical Routers (VR) 124-1 to 124-n [annotated purple], dispersed among a number of floors of an example building.” Ex-1006, 6:6-11. Belcea also discloses that “[d]ue to the fact that radio signal penetration is almost impossible through the concrete floors in the

example building, a system of Vertical Routers 124-1 to 124-n is used to achieve communication between the Local Control and each floor of the building.” Thus, like Wrappe, a POSITA would have understood that Belcea’s routers or specific nodes are arranged in a multi-dimensional sense in that they are spaced across the “Z” dimension in floors at different heights and also spaced at various X and Y dimensions on any given floor.

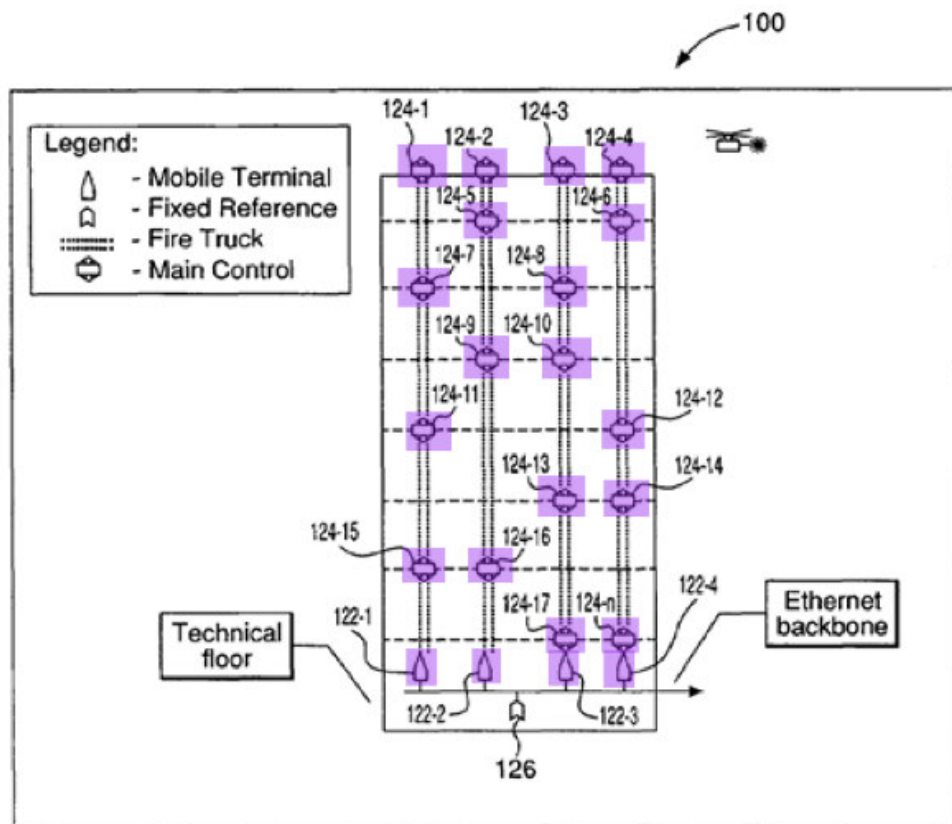


FIGURE 3

Id. at Fig. 3 (annotated).

147. Wrappe discloses the plurality of nodes being placed within a structure attached to the ground. For example, Wrappe's Figure 5 "illustrates a situation where each store (e.g., 511-517) has only one microcell beacon station (e.g., 541-547)." Ex-1005 ¶47. A POSITA would have understood that a "Store" is in a structure attached to the ground.

148. Likewise, Belcea's Figure 3 illustrates "a number of Intelligent Access Points (IAP) 122-1 to 122-n [annotated purple], and a system of Vertical Routers (VR) 124-1 to 124-n [annotated purple], dispersed among a number of floors of an example building." Ex-1006, 6:6-11. A "Building" with a number of floors is a structure attached to the ground.

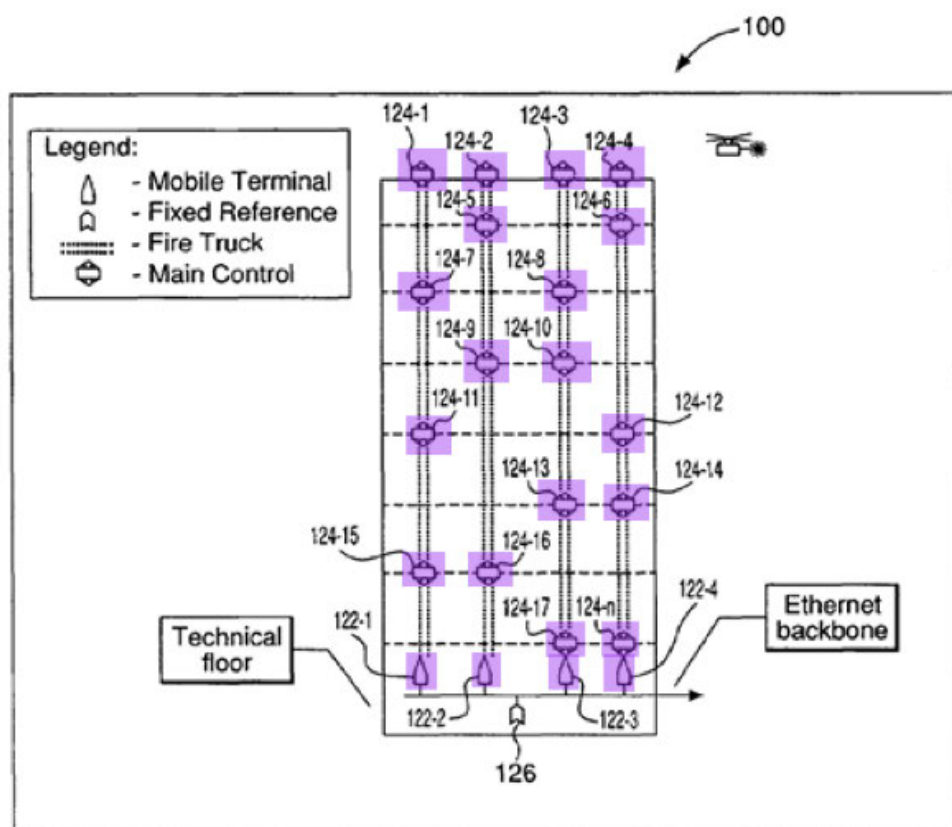


FIGURE 3

Id. at Fig. 3 (annotated).

- d. **1[C] – sending data communications between one or more of the nodes, one or more users, and one or more control stations; and**

149. Wrappe in view of Belcea teaches element 1[C].

150. Wrappe discloses “sending data communications between one or more of the nodes, one or more users, and one or more control stations.” Wrappe discloses that “microcell beacons use short range data transmitters [] for local area data communication, such as Bluetooth or WiFi [to broadcast information].” Ex-

1005 ¶¶35, 48. Wrappe also explains that “the microcell beacon station may receive data from a mobile station through a wireless local area data communication link (e.g., WiFi or Bluetooth).” These disclosures of Wrappe thus teach sending data communications between microcell beacons and the mobile station, which correspond to the claimed “nodes” and “users” (i.e. the users of the “mobile station”). Wrappe also explains that “a mobile station at one location may be associated with more than one site entity, each of which may be of interest to a user of the mobile station.” *Id.* ¶51. Indeed, the ’203 Patent explained that “[u]sers can include individuals, vehicles, and other moving entities.” Ex-1001, 39:22-23. Accordingly, a POSITA would have understood that data would be communicated between Wrappe’s various “entities.” Wrappe and Belcea also teach other types of communications between one or more nodes, one or more users, and one or more control stations as explained in Sections XIII.B.2a–d, f below.

151. Additionally, as shown in Figure 6, Wrappe’s “mobile station 607 [annotated green] has the capability of communicating with location server 621 [annotated blue] using a cellular communication link between mobile station 607 [annotated green] and cellular phone base station 601.” Ex-1005 ¶38. Thus, Wrappe’s mobile station communicates with a location server via its cellular base stations. A POSITA would have also understood that Wrappe’s location servers are “control stations” that are communicated with via the cellular base stations, as

“cellular base stations are typically arranged to cover a geographical area with radio coverage, and these different base stations are coupled to at least one mobile switching center.” *Id.* ¶60. Thus, the cellular base station is arranged to cover a geographical area and allow for communications between the mobile devices (i.e. users) and appropriate location servers (i.e. control stations) which provide location services and control operation of the system, acting as the claimed control station.

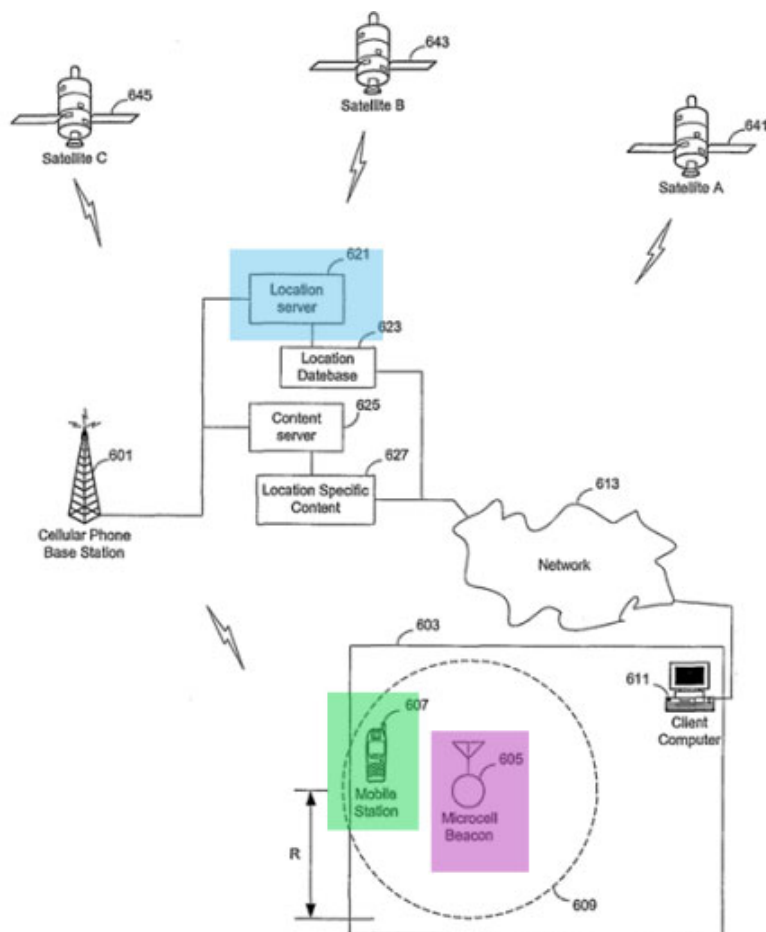


Fig. 6

Id. at Fig. 6 (annotated).

152. Belcea also discloses a system and method that “serves primarily as a location system with communications capabilities.” Ex-1006, 4:54-55. As shown in Figure 1, “[e]ach element 110, 120, 130 and 140 [] can include at least one of three types of wireless devices that exchange data for computing the location of each operator.” *Id.* at 5:48-50.

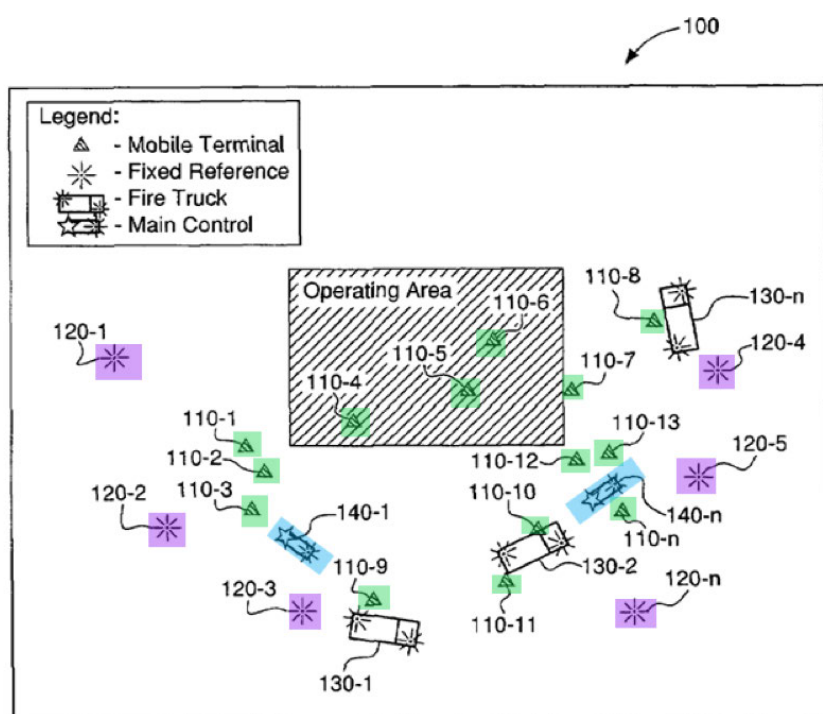


FIGURE 1

Id. at Fig. 1 (annotated).

153. Belcea explains that “[e]lements 110, 120, 130 and 140 can be comprised of one or more Mobile Terminal (MT) devices [annotated green], Fixed Reference (FR) devices [annotated purple] (i.e., Intelligent Access Points, Vertical and Horizontal Routers, and Fixed References), and Control devices [annotated

blue] (i.e. Local Controllers, and Main Controllers).” *Id.* at 5:51-56. Further, Belcea discloses that

154. The system and method of the embodiment described below employs these Mobile Terminals, Intelligent Access Points, Local Controllers, Vertical Routers, Horizontal Routers, Fixed References and Main Controllers where each typically contains at least one transceiver, or modem, adapted to transmit and receive communication signals to and from other wireless devices, and are capable of communicating with each other directly, or via one or more other devices operating as a router or routers for packets being sent between nodes. *Id.* at 5:59-6:1. Thus, a POSITA would have understood that Belcea discloses “sending data communications between one or more of the nodes, one or more users, and one or more control stations” because the devices are all capable of communicating with each other directly.

155. A POSITA would have also understood that Belcea’s Mobile Terminal discloses “users” as claimed. As discussed above, Belcea discloses that the “Mobile Terminals 110-1 to 110-n, [] are typically associated with firefighters” Thus, Belcea teaches that the users are firefighters. Ex-1006, 5:25-26. A POSITA would have also understood that Belcea’s control devices such as Local Controllers and Main Controllers are control stations. Specifically, because the control device “handles the information regarding the whole system” and “contains a database

with the position of each Vertical and Horizontal Router and Intelligent Access Point installed in the building.” *Id.* at 6:15-16, 9:14-16. Thus, a POSITA would have understood Belcea’s control devices disclose a control station. A POSITA would have understood that Belcea discloses “sending data communications between one or more of the nodes, one or more users, and one or more control stations.”

156. Accordingly, the extent that a POSITA implementing Wrappe would have desired additional implementation details regarding communications between users, nodes, and or control stations, such implementation details are found in Belcea as discussed above. And Belcea’s teachings in this regard would have been readily applied to Wrappe for the reasons explained in Section IX (technical background discussion), Sections XII.A and B (Summary of Wrappe and Belcea), and Section XIII.A.1 (motivations to combine and expectations of success). Further, a POSITA would have been motivated to combine the teachings of Belcea with the teachings of Wrappe because they both provide solutions to improve the functions of performing position location in a network of wireless devices. See Ex-1005 ¶2; Ex-1006, Abstract.

157. A POSITA would have a reasonable expectation of success implementing the teachings of Belcea into the system of Wrappe because Belcea and Wrappe both use similar communication nodes, e.g., Wrappe’s microcell

beacons which are used with a wide area location system for assisted position determination, Belcea's wireless routers that are deployed in a three dimensional building to achieve communication, identification, and position calculations. Ex-1005 ¶¶9, 34; Ex-1006, 3:29-33. Both use similar communications and data from those nodes, e.g., signal strength, identifiers, and known location information. Ex-1005 ¶¶43, 45-46; Ex-1006, 3:29-33, 6:17-26. Thus, implementing this teaching of Belcea would simply mean using the same or similar communications and hardware and applying an analysis, i.e., the logic and algorithms taught in Belcea, to obtain more granular information about the location of the user device. *See also*, e.g. Section XIII.A.1, above.

- e. **1[Di] – affecting multi-dimensional mapping according to the placement of the nodes and the communications between the nodes and the control stations, wherein the mapping is affected in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates and the structure is a building, the building having different elevational levels**

158. Wrappe in view of Belcea teaches element 1[Di].

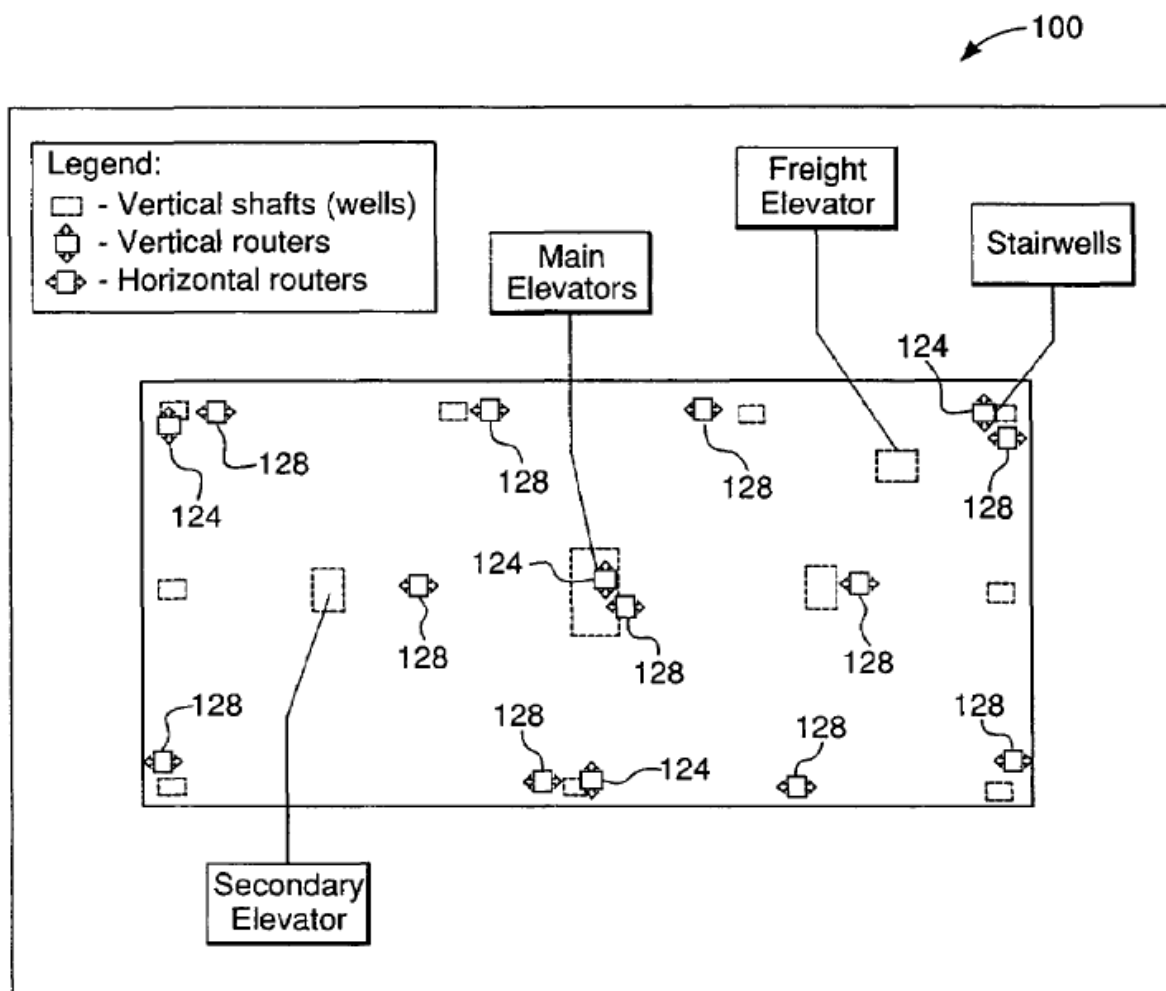
159. Wrappe discloses “affecting multi-dimensional mapping according to the placement of the nodes and the communications between the nodes and the control stations.” As discussed above, Wrappe discloses that the microcell beacon and cellular base station are capable of communicating with each other. Further, Wrappe discloses that “during the installation of the microcell beacons, the

placement and the signal transmission strength of the microcell beacons are adjusted so that the coverage of the dominant beacon signals substantially covers the store without substantially intruding into neighboring stores to cause misidentification.” Ex-1005 ¶46. Wrappe also explains that “[i]t is understood that in general more than one microcell beacon station can be used to create a desirable coverage, depending on the size of the store, GPS signal blockage conditions, radio signal blockage conditions, desirability of coverage, and others.” *Id.* ¶47. For these reasons, and as explained above in Section XIII.A.1, a POSITA would have understood that the placement of the microcell beacons would have been used to affect multi-dimensional mapping.

160. A POSITA would have also understood that “the mapping is affected in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates” because of the placement of Wrappe’s microcell beacons which broadcast location information that correspond to x, y, and z axes or coordinates. As explained in Section XIII.A.1, Wrappe discloses that the microcell beacons may broadcast “location information [that] may be the coordinates (e.g., longitude, latitude and altitude) [] or other location specific information (e.g., an identification number of an area).” Ex-1005 ¶10. Wrappe also discloses that “the microcell beacon station can broadcast the altitude of a floor of a building where the microcell beacon station is installed” and “may further broadcast its location

coordinates.” *Id.* ¶40. Indeed, the ’203 Patent states “[t]he mapping of the geographical space is affected in a three-dimensional sense, selectively being defined by x, y and z axes or coordinates, which in some embodiments may correspond to latitude, longitude, and elevation.” Ex-1001, 32:7-10. Thus, like the ’203 Patent, Wrappe discloses that the mapping is affected in a three-dimensional sense.

161. Similarly, as discussed in Section XIII.A.2.a, Belcea discloses “a system and method for downloading, maintaining and updating a map database of a three dimensional deployment structure.” Ex-1006, 3:52-55. As shown in Figure 3, Belcea discloses “deploying a network of wireless devices, including Mobile Terminals [annotated purple]” within a three dimensional deployment structure. *Id.* at 3:29-31. Belcea explains that “[t]he position of the Mobile Terminal must be observed on a portable computer that shows the right floor map and the correct position of the Mobile Terminal.” *Id.* at 11:6-8. An example floor map is shown in Belcea’s Figure 4:



Belcea also discloses a “Video Server [that] displays the front, side and top view of the involved Mobile Terminals and maps of specified floors with Mobile Terminals operating on them.” *Id.* at 11:24-26. A POSITA would have thus understood Belcea discloses affecting multi-dimensional mapping according to the placement of the wireless device within the three dimensional deployment structure. Further, as explained in Section XIII.A.2.d, Belcea discloses that the

commercial site. See Ex-1005 ¶52. Belcea teaches updating a map database of a three dimensional deployment structure with nodes and users deployed throughout the structure. See Ex-1006, 3:29-31, 3:52-55. Belcea also teaches that the position of the user can be observed on a computer than shows a floor map the correct position of a user. *Id.* at 11:6-8. Thus, both Wrappe and Belcea teach the importance of affecting multi-dimensional mapping according to the placement of nodes.

f. 1[Dii] – and there are nodes on different elevational levels whereby there are nodes at multiple different elevational levels

163. Wrappe in view of Belcea teaches element 1[Dii].

164. Wrappe in view of Belcea discloses this element for the same reason discussed in Section XIII.A.2.c. Specifically, Wrappe’s microcell beacon “can store and broadcast [for] altitude aiding” such as the altitude of a floor of a building where the microcell beacon station is installed.” Ex-1005 ¶¶40, 49. A POSITA would have understood that Wrappe discloses having microcell beacons on different elevational levels to help in altitude aiding.

165. Further, as shown in Figure 3, Belcea discloses “a number of Intelligent Access Points (IAP) 122-1 to 122-n [annotated purple], and a system of Vertical Routers (VR) 124-1 to 124-n [annotated purple], dispersed among a number of floors of an example building.” Ex-1006, 6:8-11. Thus, a POSITA

would have understood that Belcea's Intelligent Access Points and Vertical Routers are on different elevation levels as they are dispersed among different floors. A POSITA would have applied these teachings to Wrappe in contexts where Wrappe is used in a multi-story commercial context, such as a mall, to achieve the multi-floor benefits discussed by Belcea in a similar multi-floor Wrappe implementation.

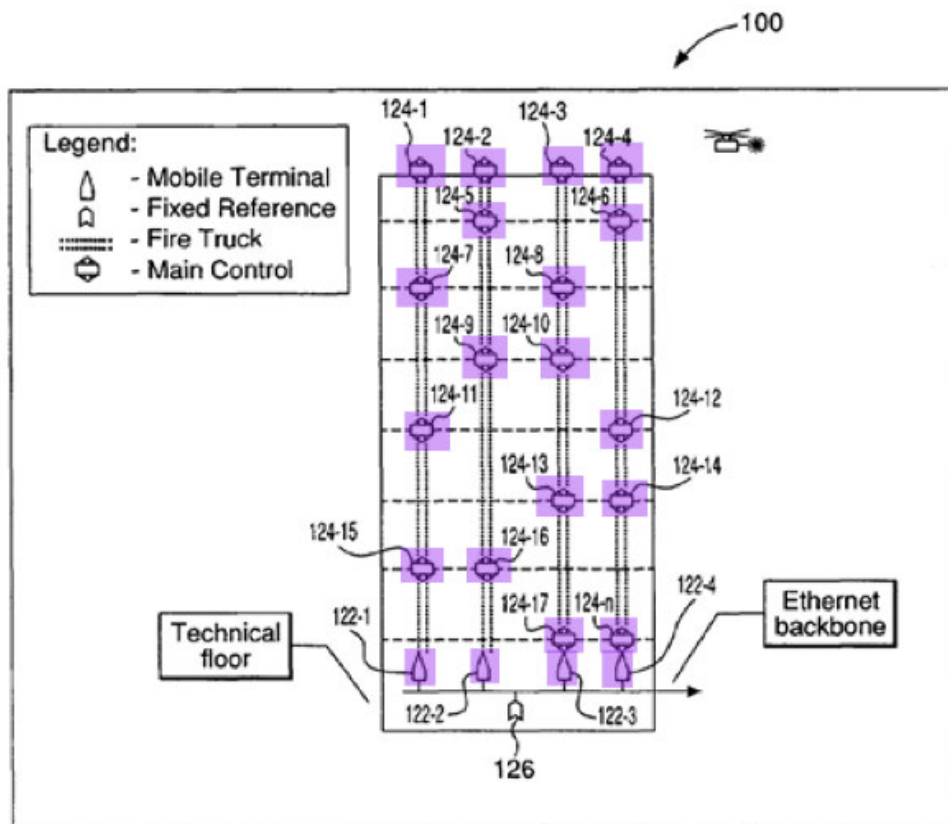


FIGURE 3

Id. at Fig. 3 (annotated).

- g. 1[Diii] – and wherein the system narrows the plurality of nodes for use by the user at a first elevational level to the most practically near node to the user, such that a node at another elevational level, even though physically closer to the user at the first elevational level is excluded as being a node the most practically near to that user, and a different node at the elevational level of the user is selected as the most practically near to that user.**

166. Wrappe in view Belcea teaches element 1[Diii].

167. As discussed in Section XIII.A.2.e, Wrappe explains that “the signal transmission strength of the microcell beacons and the distribution of the microcell beacons are adjusted during the installation process such that the beacon signals identifying one of the stores covers substantially the store.” Ex-1005 ¶46. Shown in Figure 5, “the beacon signals for store 511-517 have coverage areas 531-537 respectively so that when mobile stations 501[annotated green] receives a signal beacon signal for a store [], the mobile station can identify the store from the beacon signal.” *Id.* Thus, a POSITA would have understood Wrappe to teach the mobile station determining the closest microcell beacon in a store so the mobile station can receive a signal for a store.

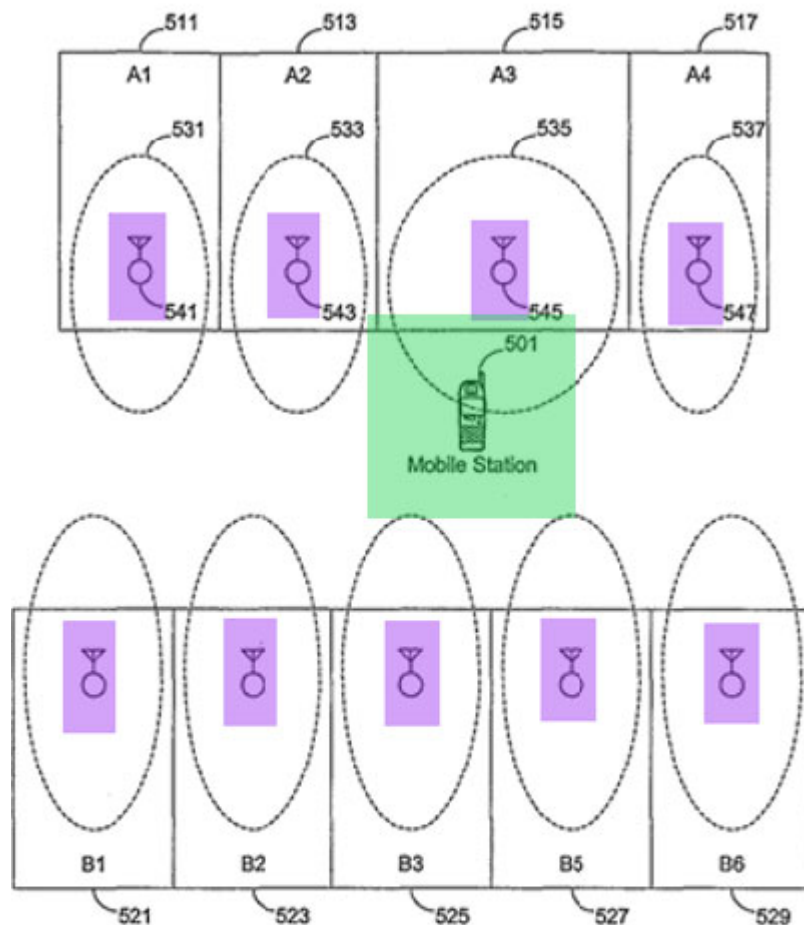


Fig. 5

Id. at Fig. 5 (annotated).

168. Wrappe further describes a desire to perform “[a]ltitude aiding” to determine the position of a mobile device and use “altitude or a location of a mobile device [to] constrain[] the possible positions of the mobile device to a surface of a sphere (or an ellipsoid) with its center located at the center of the

earth.” Ex-1005 ¶ 7. A POSITA would have understood this description to generally correlate to floors of a building, e.g., whether a user is on the ground floor or 10 floors above because different floors have different altitudes in a building. Wrappe itself encourages looking to other references for more information about such well-known techniques to the extent additional implementation details are desired by a POSITA. *See id.* (citing other references including U.S. Patent No. 5,999,124, U.S. Patent No. 6,061,018). A POSITA would have therefore sought references with additional teachings about mobile location techniques that utilize and determine altitude and the floor that a user is on. Belcea is one such reference containing similar and interrelated teachings.

169. Wrappe in view of Belcea teaches that the microcell beacons would have been implemented to include a system that “narrows the plurality of nodes for use by the user at a first elevational level to the most practically near node to the user.” Belcea discloses “deploying a network of wireless devices, including Mobile Terminals” within a three dimensional deployment structure, such as a building with floors at different elevation levels. Ex-1006, 3:29-31. Belcea explains that “[t]he Mobile Terminals can determine their respective locations using algorithms” such as those described in U.S. Patent Application Ser No. 10/861,121, published as U.S. Patent Publication No. 2004/0246926 to Belcea (“Belcea ’926”), and which is incorporated by reference in its entirety. *Id.* at 11:26-33. For example, Belcea

teaches to use “Time of Flight (TOF) data and Received Signal Strength Indicator (RSSI) data and a scoring process to identify the correct floor on which they are located.” *Id.* at 11:35-38.

170. Shown in Belcea '926's Figure 7 “is a flowchart showing an example of the floor scoring operations performed for identifying the locations of mobile terminals.” Ex-1008 ¶23. Belcea '926 discloses a “function has a loop that identifies the floor on which the criterion (RSSI or TOF) has the best value.” *Id.* ¶65.

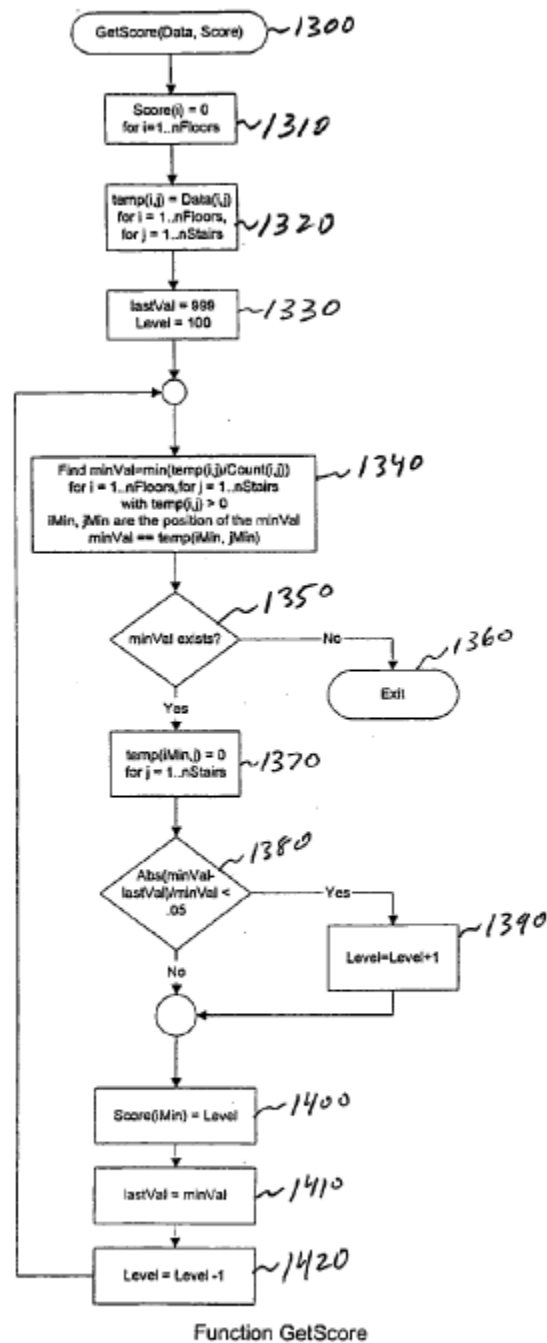


FIGURE 7

171. Belcea '926 teaches using a "wireless floor-indicating router (FIR)
106 [] in the stairwell 102 and by the elevator shaft 104 at each floor." Ex-1008

¶43. Belcea '926 also discloses that “all FIRs deployed on the same floor are on the same line of the matrix, regardless the position on the floor.” *Id.* ¶55. Belcea '926 explains that this is because “the signals loose energy when passing through floors and walls, a FIR 106 may not be able to communicate with a firefighter [from the Rapid Intervention Crew] that is not on the same floor as the FIR 106.” *Id.* ¶43. Further, Belcea '926 discloses that “filtered data can be compared for finding the floor where is located the FIR that provides to the targeted mobile device the smallest TOF and the best RSSI simultaneously.” *Id.* ¶15. Based on these teachings, a POSITA would have understood that Belcea teaches to first identify the nodes on a specific floor, disregard nodes on other floors, and then perform location determinations using only the nodes on the specific floor desired.

172. Implementing these teachings in Wrappe would have thus allowed for identification of stores near the user on the same floor and would have prevented false identification of stores on different floors that are not practically accessible to the user. A POSITA would have been motivated to implement these teachings with Wrappe to ensure that the user is connected to a beacon from the store that they are in as opposed to a different store on the floor above or below the user. Different stores on different floors are less relevant to the user, because even though they may be nearby in the vertical sense (e.g. directly underneath the user on a different

floor), if the user is not in the store, then they are less likely to be interested in messages from that store.

173. Additionally Belcea '926 also teaches that each firefighter has a subscriber device, MeshTracker™ (MT) 116, that “exchanges range messages with all wireless routers (i.e., FIRs 106) with which it can communicate.” Ex-1008 ¶¶30, 50. “When the MT 116 determines that the list of FIRs 106 within its broadcast range, the MT 116 transmits information (e.g., a data packet) to the Incident Commander Computer.” *Id.* ¶50. Accordingly, a POSITA would have understood Belcea as teaching methods for use to communicate both with the nodes and with a control station that monitors the user’s positions. A POSITA would have implemented these teachings with Wrappe so that users of Wrappe’s mobile stations could also be monitored, tracked, and provided with information by Wrappe’s Location server (i.e. a control station) to further achieve Wrappe’s purpose of providing users with the best and most current information about their commercial experience. Further, implementing the teachings of Belcea in Wrappe would further Wrappe’s goal “to improve the precision of position solutions in a wide area position determination system.” Ex-1005 ¶10.

174. A POSITA would have been motivated to implement these teachings of Belcea, such as a floor scoring operation, in Wrappe for the same reasons described above in Section XIII.A.1. This is because Belcea teaches that having the

“Mobile Terminals [] use Time of Flight (TOF) data and Received Signal Strength Indicator (RSSI) data and a scoring process to identify the correct floor on which they are located” improves the accuracy of location determination. Indeed, Wrappe also teaches use of similar techniques, using “AFLT or TDOA,” which stand for advanced forward link trilateration and time difference of arrival, to determine position. Ex-1005 ¶7. A POSITA would have been motivated to include this advantage in Wrappe to improve the accuracy of location determination.

3. Dependent Claims 2-5

- a. **Claim 2 – The method of claim 1, wherein the mapping is affected in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates and the structure is a building, the building having at least three different floors and there are nodes on the three different floors whereby there are nodes on at least three different levels.**

175. Claim 2 depends from Claim 1. As described above, Wrappe in view of Belcea teaches Claim 1. Wrappe in view of Belcea teaches Claim 2.

176. As described above with respect to Claim 1, Wrappe in combination with Belcea teaches affecting multi-dimensional mapping in a three-dimensional sense in the x, y, and z axes in a building. See, e.g., Section XIII.A.2.e.

177. Belcea also teaches the additional limitations of dependent Claim 2.

178. Belcea specifically teaches “a system and method for accurately computing the position of wireless devices in a three dimensional network, such as

a network distributed throughout a high-rise building using specific nodes, such as wireless routers.” Ex-1006, 4:45-55 (emphasis added); see also *id.*, 1:24-33.

Additionally, Belcea teaches “a system and method for downloading, maintaining and updating a map database of a three dimensional deployment structure.” *Id.*, 3:52-55. Similarly, Belcea teaches “deploying a network of wireless devices, including Mobile Terminals” within a three dimensional deployment structure as show in Figure 3. *Id.* at 3:29-31.

179. Belcea further discloses “the building having at least three different floors and there are nodes on the three different floors whereby there are nodes on at least three different levels.” For example, Belcea teaches that the nodes are spread throughout “a number of floors” in the building: “FIG. 3 shows a deployment of the “vertical infrastructure in accordance with an embodiment of the present invention in a high-rise building, and includes a number of Intelligent Access Points (IAP) 122-1 to 122-n, and a system of Vertical Routers (VR) 124-1 to 124-n, dispersed among a number of floors of an example building.” Ex-1006, 6:5-16 (emphasis added).

180. Moreover, Figure 3 of Belcea shows a building with a “technical floor” and seven floors above that are divided by dashed lines, which is more than three floors. See below:

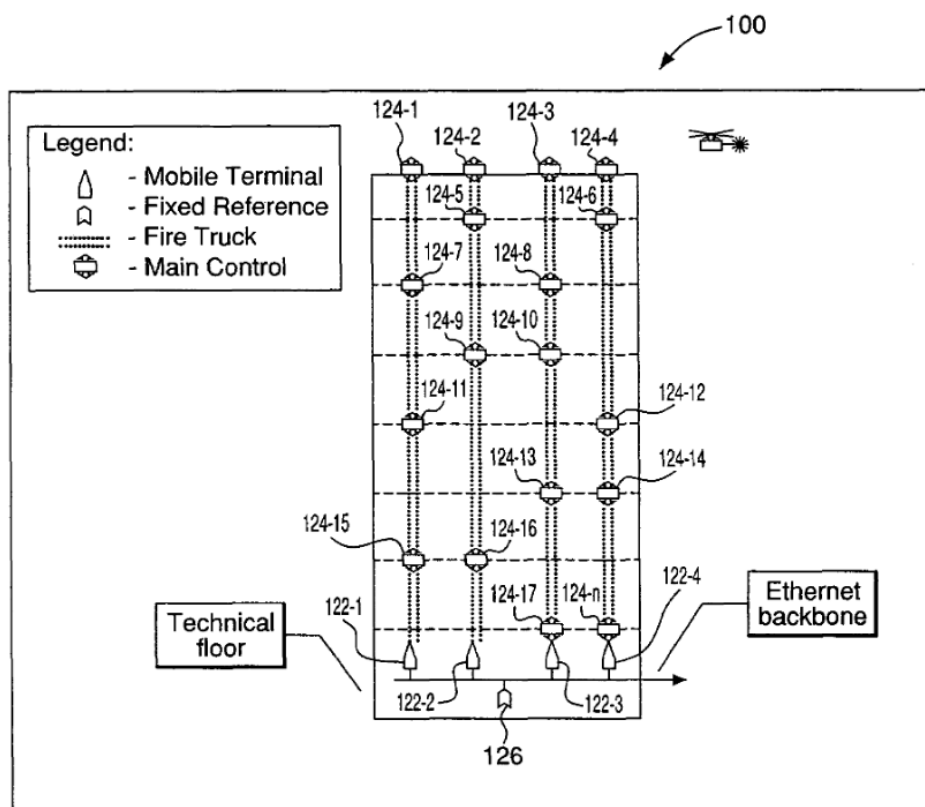


FIGURE 3

181. Belcea thus discloses a building having at least three different floors and having nodes on the at least three different floors.

182. In view of these teachings, POSITA would have found it obvious to implement the system of Wrappe in combination with Belcea in a building with at least three floors and nodes on the at least three floors. Specifically because Belcea explains that its teachings are intended to overcome challenges in high-rise buildings where “radio signal penetration is almost impossible through the concrete floors.” Ex-1006, 6:17-20. Further, Wrappe may be used in commercial shopping centers, Ex-1005, ¶44, and a POSITA would have understood that

commercial shopping centers may be 3 or more floors. Accordingly, a POSITA would have applied the multi-floor teachings of Belcea to Wrappe, because Wrappe would have been understood as appropriately used in a multi-floor commercial application, and Belcea explains how to implement multi-floor sensing.

- b. Claim 3 – The method of claim 1, wherein the mapping is affected in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates and the structure is a building, the nodes being contained in the building structure at different floors and there are nodes on the different floors whereby there are nodes on at least different levels.**

183. Claim 3 depends from Claim 1. As described above, Wrappe in view of Belcea teaches Claim 3.

184. As described above with respect to Claims 1 and 2, Wrappe in combination with Belcea teaches affecting multi-dimensional mapping in a three-dimensional sense in the x, y, and z axes in a building. See, e.g., Section XIII.A.2.e.

185. Wrappe further discloses “the nodes being contained in the building structure at different floors and there are nodes on the different floors whereby there are nodes on at least different levels.” Wrappe teaches that “the microcell beacon station can broadcast the altitude of a floor of a building where the microcell beacon station is installed” and “may further broadcast its location

coordinates.” Ex-1005 ¶ 40 (emphasis added). A POSITA would have understood that Wrappe teaches nodes on different floors of a building because broadcasting the altitude of the floor of a building would only be necessary if there were different floors and the nodes were on different floors. In other words, if there was only one floor or the nodes were only on one floor, then the beacons would all broadcast the same altitude information, which would not provide useful information to determine the location of a mobile device in the building. Therefore, by teaching that the beacons can broadcast altitude of a floor, Wrappe discloses that the nodes are on different floors of the building.

186. Belcea also discloses “the nodes being contained in the building structure at different floors and there are nodes on the different floors whereby there are nodes on at least different levels.” Belcea teaches that “FIG. 3 shows a deployment of the “vertical infrastructure in accordance with an embodiment of the present invention in a high-rise building, and includes a number of Intelligent Access Points (IAP) 122-1 to 122-n, and a system of Vertical Routers (VR) 124-1 to 124-n, dispersed among a number of floors of an example building.” Ex-1006, 6:5-16 (emphasis added).

- c. Claim 4 – The method of claim 1, wherein the mapping is affected in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates and the structure is a building, the nodes are fixed and non-movable relative to the ground and the nodes are on at least two different levels.**

187. Claim 4 depends from Claim 1. As described above, Wrappe in view of Belcea teaches Claim 1. Wrappe in view of Belcea also teaches Claim 4.

188. As described above with respect to Claims 1, 2, and 3, Wrappe in combination with Belcea teaches affecting multi-dimensional mapping in a three-dimensional sense in the x, y, and z axes in a building. See, e.g., Section XIII.A.3.a.

189. Wrappe also teaches the additional limitation of dependent Claim 4.

190. Wrappe discloses “the nodes are fixed and non-movable relative to the ground.” Wrappe teaches that “microcell beacons may be installed within lightening fixtures or with security devices (e.g., security camera) in an area where the precision and the location fix yield are reduced due to the blockage of GPS signals.” Ex-1005 ¶34 (emphasis added). A POSITA would have understood that lighting fixtures, for instance in a building with shops as Wrappe describes, are typically fixed and not movable relative to the ground. Likewise, security cameras are typically fixed and not movable relative to the ground. In addition, since the nodes are configured to broadcast the altitude of the floor on which they are

located, a POSITA would have understood that the nodes would be in fixed locations. If they were not, then they would broadcast the wrong floor altitude and the system, of Wrappe would be ineffective.

191. Moreover as described with respect to Claim 3 above, Wrappe and Belcea both disclose the system wherein the nodes are on at least two different levels. See, e.g., Section XIII.A.2.e.

- d. Claim 5 – The method of claim 1, wherein the mapping is affected in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates and the structure is a building, the building having different floors and there are nodes on different floors whereby there are nodes at multiple different levels, and the multi-dimensional mapping is effected internally in the building.**

192. Claim 5 depends from Claim 1. As described above, Wrappe in view of Belcea teaches Claim 1. Wrappe in view of Belcea also teaches Claim 5.

193. As described above with respect to Claims 1, 2, 3, and 4, Wrappe in combination with Belcea teaches affecting multi-dimensional mapping in a three-dimensional sense in the x, y, and z axes in a building. See, e.g., Section XIII.A.2.e.

194. As described above with respect to Claims 1, 2, and 3, Wrappe and Belcea teaches “the building having different floors and there are nodes on different floors whereby there are nodes at multiple different levels.”

195. Wrappe and Belcea in combination also teaches the “multi-dimensional mapping is effected internally in the building” limitation of Claim 5.

196. Wrappe also teaches “the building having different floors and there are nodes on different floors whereby there are nodes at multiple different levels, and the multi-dimensional mapping is effected internally in the building.” Wrappe teaches that “when a mobile station is identified to be entering (or exiting) the site, the commercial information (e.g., electronic coupon, a web page of advertisement) is automatically transmitted to the mobile station for display.” Ex-1005 ¶52.

Wrappe therefore teaches tracking user devices within a building and transmitting information to the user for display on their device while they are inside the building, so that the commercial purpose of Wrappe is furthered. That is, coupons distributed to users, are representative of the corresponding nodes internal to the commercial shopping center.

197. Additionally, Belcea teaches “the multi-dimensional mapping is effected internally in the building.” Belcea discloses that the “main function” of the “Vertical and Horizontal Routers” and “Fixed Reference Points” is “to provide location reference for computing the position of Mobile Terminals, and to relay voice and location data to the Main Control.” Ex-1006, 8:31-38. Belcea further explains that “Main Control . . . performs all mathematical operations for computing the position of all Fixed Routers and Mobile Terminals.” *Id.*, 9:45-49.

After computing their position, Main Control “displays the front, side and top view of the involved Mobile Terminals and the maps of specified floors with Mobile Terminals operating on them.” *Id.*, 11:24-26; see also *id.* at Cls. 2, 12, 32. Main Control can use these positions to provide “directions” to the operators. *Id.*, 8:15-17. And as Figure 3 of Belcea shows, Main Control can be in the building. See below:

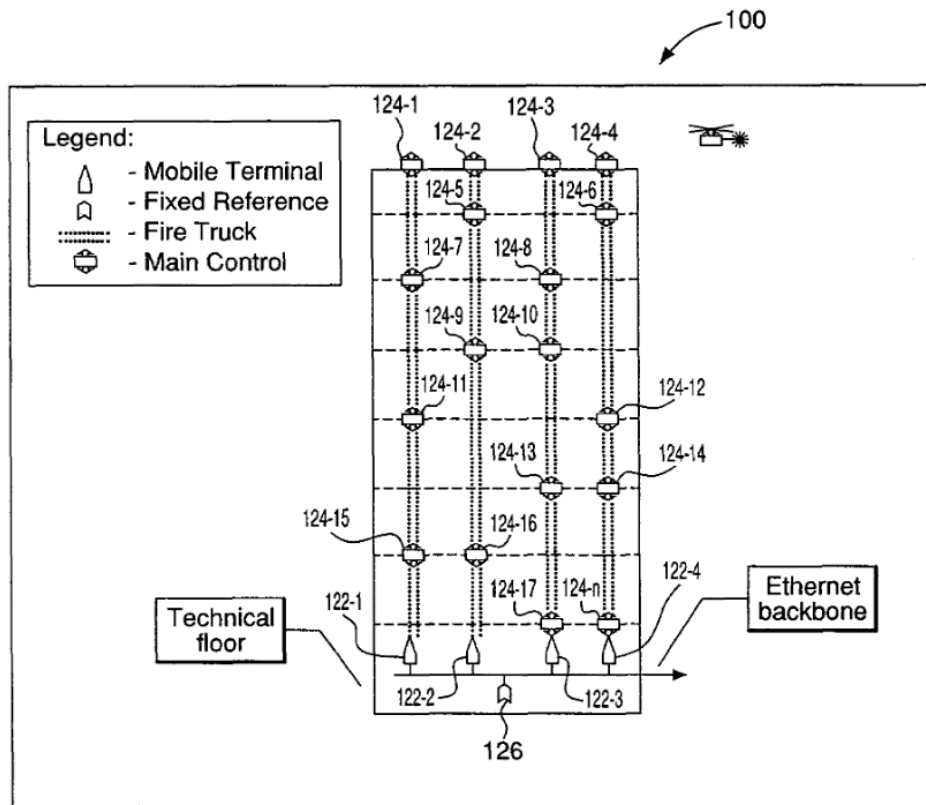


FIGURE 3

198. Belcea also incorporates an application that teaches this element. The incorporated application discloses a “Incident Command Console” (ICC) that “displays the position of each firefighter continuously” and “intended to provide a

graphical representation of real-time personnel location and identification information.” Ex-1008 ¶¶28, 49. The ICC “receives data from the [wireless floor-indicating routers] and [MeshTracker Device], . . . performs the computation of floor numbers and displays the floor number where each firefighter is located.” *Id.*, ¶50. The application further illustrates examples of display screens generated based on the locations of the firefighters in Figures 8-19, including an example of a multi-floor display and the personnel on each floor. *Id.* ¶68. Recognizing the need for versatility, the application explains that “[n]aturally, the system can be modified to display the information in any desirable format.” *Id.* And the application explains that if the Incident Commander (dispatcher) operating the ICC is located too far from the incident area, supplemental equipment must be deployed. *Id.* ¶34. Belcea therefore teaches that the mapping can be effected internally in the building, e.g., by displaying a map or other image showing locations of users or nodes in the building.

199. As described in Section XIII.A.1 above, a POSITA would have been motivated to combine the teachings of Belcea into the system described in Wrappe. In particular, a POSITA would have found it obvious to apply this teaching of Belcea to improve the Wrappe system by effecting the multi-dimensional mapping of the combined system of Wrappe and Belcea on the display of the mobile device in Wrappe. Wrappe suggests sending location-based information to the mobile

device when it is in the building, e.g., a shop. Ex-1005 ¶52. Belcea further describes the benefits of effecting the multi-dimensional mapping in the building. Ex-1006, 8:31-38, 11:24-26; Ex-1008 ¶68. Belcea teaches effecting the multi-dimensional mapping on the display of a device because “it is important to identify the correct location of personnel” and doing so helps the user figure out “correct directions” within the building. Ex-1006, 5:43-47. In Belcea, performing the mapping internally in the building requires less equipment. *Id.* ¶34; see also *id.* at 8:15-17, Fig. 3.

200. A POSITA would have known that it is beneficial to tell a user where they are internal to a building, and in particular, in building with shops as disclosed in Wrappe. For instance, shopping malls typically have several maps and store directories posted throughout the building showing shoppers that “YOU ARE HERE.” Doing so provides helpful context to shoppers such and creates a less frustrating experience for them because, e.g., they are less likely to get lost in the building, and may find it easier to locate a desired shop within the building. A POSITA would have been motivated to implement the teaching of Belcea to show mapping information on a mobile device to the system of Wrappe for the same reasons.

201. A POSITA would have a reasonable expectation of success implementing this teaching of Belcea into Wrappe. Adding a displayed map to the

user device would not require changing or replacing any elements of the Wrappe system. The Wrappe mobile device already has a user interface that can display information that is pushed or obtained via wireless communications. See Ex-1005 ¶52. Implementing the Belcea teaching to also display the map information would simply mean pushing additional image data to the Wrappe mobile device. Indeed, the mapping could be displayed in any number of ways along with the location-based messages described in Wrappe. For instance, the map could be displayed as the main image, with location-based messages as banners, pop-ups, overlays, in a screen-in-screen format, side-by-side. The mapping of Belcea and the location-based messages of Wrappe, e.g., coupons, could also be displayed in sequence, e.g., showing the map when the customer is outside a store, and then showing a coupon when the user moves closer to the door. In short, a POSITA would have had the skills and creativity to implement this combination of Wrappe and Belcea many different well-known ways and would have expected to be able to successfully do so. *See also, e.g.*, Section IX.F and G, regarding known and obvious ways to implement location based advertising.

B. Ground 2: Wrappe and Belcea in view of Christopher Disclose and Render Obvious Claims 6-30 of the '203 Patent

1. A POSITA would have been motivated to combine the teachings of Wrappe, Belcea, and Christopher and would have had a reasonable expectation of success

202. In addition to the reasons set forth below regarding specific claim elements, a POSITA would have been motivated to combine the teachings of Wrappe, Belcea, and Christopher and would have had a reasonable expectation of success in doing so because each addresses similar issues corresponding to the same well-known technologies for similar reasons as discussed in Section XIII.A.1. Claims 6-30 require that the nodes communicate amongst themselves, and, as part of the combination for this Ground, that specific teaching is found in the transponders of Belcea, and incorporated into the combination including for the motivations previously discussed, and further set out below.

a. Location-Based Targeted Messaging in Shopping Applications

203. Wrappe and Belcea would have been combined for a number of reasons, including those discussed in Section XIII.A.1 (motivations) and IX (known technology background), above. Additionally, Belcea's teachings would further have been combined with Wrappe's teachings to provide mesh network of nodes in stores that cover wider area than can feasibly be covered with a single node. For example, Wrappe explains that a node in a store in a mall may be

“spaced apart” from other nodes to assure that the beacons represent the individual stores with little or no overlap. This configuration works well as long as the footprint of the store area is roughly the same size as the footprint of a single node. However, larger stores in a commercial shopping center, for example a department store, often cover a larger area than other stores in the shopping center, and generally include multiple floors as well. Such large area stores would require several nodes working in concert to provide coverage for the entire store area. Indeed, Wrappe explains that “[i]t is understood that in general *more than one microcell beacon station can be used to create a desirable coverage*, depending on the size of the store, GPS signal blockage conditions, radio signal blockage conditions, desirability of coverage, and others.” Ex-1005 ¶46. In view of Wrappe’s teaching that more than one beacon can be used, combined with the practical reality that a larger store area would require a large number of beacons working in concert to provide the desired coverage, a POSITA would have been motivated to look to a reference such as Belcea for implementation details regarding nodes communicating together and working in concert. Belcea teaches to use a mesh network of interconnected nodes. A POSITA would have implemented Belcea’s teachings with Wrappe to ensure that Wrappe’s “*more than one microcell beacon station can be used to create a desirable coverage*” in the mesh configuration of Belcea. Doing so would have provided the desired coverage while

also ensuring that nodes in the same store could intercommunicate with each other to ensure consistent delivery of the commercial messages associated with the store (e.g. specific advertisements in the department store example I have discussed)

204. Wrappe and Christopher both also teach sending targeted messages to potential shoppers based on their proximity to a store or section of a store. For example, Wrappe discloses that “commercial information (e.g., electronic coupon, a web page of advertisement) is automatically transmitted to the mobile station for display” when a mobile station is identified entering or exiting a site. Ex-1005 ¶52. Christopher discloses “information specific to mobile device 1350 such as purchase records can be used to tailor a promotional message or sales coupons to mobile device.” Ex-1007 ¶80. This, too, was well-known at the time, and allowed for more tailored messages specific to a user’s established preferences or other characteristics, so that any given advertisement would have higher impact on the targeted user. *See also, e.g.,* Section IX.G (known targeted advertising approaches). In fact, even before the use of indoor geolocation technologies, stores in malls had employees standing in the stores or right outside the stores encouraging people to come in, e.g., by engaging them in conversation or handing out fliers/coupons. With the advent of technology as I have discussed in this analysis, and in the technical background section, it was known at the time to replace these in-person targeted outreach approaches with electronic analogs.

205. As discussed, Wrappe teaches sending location-based messages, in particular, to users, such as mobile stations, who are entering or exiting a site. Ex-1005 ¶52. Wrappe mentions a desire to target messages to users who are walking into a site, e.g., based on “the preferences of the user.” *Id.* ¶44. A POSITA would have wanted to specifically target users to ensure that a location-based message is most effective to the user—e.g., will not annoy the user and is more likely to convince the user to buy a product. A POSITA thus would have considered other related teachings directed to sending targeted messages for additional techniques and implementation details.

206. Christopher is one such reference that teaches implementing sending targeted messages based on data collected regarding a user’s current location, location history, shopping behaviors, or other demographic or historical information collected about the user. Christopher teaches the feature of “tracking traffic pattern in a store or other venue.” Ex-1007 ¶2. Christopher explains that “[t]argeted advertisement is an effective strategy for selling products.” *Id.* ¶3. For example, Christopher’s ViewPoint system “may [] monitor the mobile device's travel pattern, search history, etc., and record the activities into [a]database [].” Ex-1007 ¶87. Christopher explains that “[t]his allows the ViewPoint system to learn the behavior of mobile device [], which will enable the ViewPoint system to better serve the user of mobile device [] when he/she returns to the store in the future.”

Id. Further, Christopher teaches placing a “plurality of RFID tags distributed within a structure” to implement a tracking system that can “generate a shopping behavior report that may include statistics such as, for example, ten most frequently purchased items, average spending per transaction, traffic pattern the customer [], average time at various locations in the store, average time in the store, hours and day of week the customer usually visit the store, etc.” *Id.* ¶100.

207. A POSITA would further have recognized the benefit of incorporating Christopher’s teachings of tracking a user’s movement or purchase patterns into a system like Wrappe to improve the sending of location-based, targeted commercial communications.

2. Independent Claims 6, 29, and 30

208. As shown in Exhibit 1020, Claims 6, 29, and 30 are substantially similar, and each only has one unique claim element that is not found in the others. See Ex-1020. To avoid redundancy, I have analyzed the claims together below, grouping the identical or nearly-identical claim elements, as well as separately addressing the unique claim limitations in each as necessary.

a. 6/29/30[Pre] – A method of communicating data between at least one selected communication transponder and at least one selected mobile communication device comprising:

209. The preamble of Claims 6, 29, and 30 are identical. To the extent the preambles are limiting, Wrappe discloses the preamble of Claims 6, 29, and 30. To

be clear, the “communication transponder” or “transponder” in the claims is not the same transponder that is described in the specification and in the earlier applications. Instead, the specification and earlier applications use the term transponder to refer to the tracked device (or a hardware unit that is attached to the tracked device). See, e.g., Ex-1001, 7:25-29, 7:36 (describing a “transponder [or] subscriber device”), 7:36-41 (“transponder can be [in or on] vehicles, aircraft, cargo, persons, [etc.]”); Ex-1024, ¶¶7 (“monitor movement of an entity compris[ing] a transponder”), 8 (“transponder can be [in or on] vehicles, aircraft, cargo, persons, [etc.]”), 52-65 (describing a transponder with pins for attachment in a vehicle); Ex-1025, ¶¶14, 18, 46, 74, 76. As used in Claims 6-30, the “communication transponder” or “transponder” performs in a similar way to the “nodes” discussed in Ground 1.

210. Wrappe teaches a “method of communicating data between at least one selected communication transponder and at least one selected mobile communication device.” Wrappe’s microcell beacon is a transponder that sends and receives communications. Wrappe explains that “microcell beacon station can have both the transmission capability and the receiving capability for local area wireless data communication so that the microcell beacon station can be programmed wirelessly.” Ex-1005 ¶48. The microcell beacon also “can provide information such as street address, identity of the site in which the microcell

beacons are installed, zone identification information, etc.” *Id.* ¶45. As the ’203 Patent describes a transponder “communicates over cellular and satellite communication networks in combination with GPS satellites capable of providing position and status information of the movable entity” and “can be mounted, attached, manufactured, or otherwise included upon or in various articles or entities.” Ex-1001, 7:25-29, 7:36-41. Thus, Wrappe’s microcell beacon corresponds to the claimed transponder because it transmits and receives communications via, e.g., local area wireless data communication, and can provide position and other information.

211. Wrappe teaches communicating data between the microcell beacon (i.e. “transponder”) and a mobile communication device of a user. As discussed in Section XIII.A.2.d, Wrappe discloses that “microcell beacons use short range data transmitters [] for local area data communication, such as Bluetooth or WiFi [to broadcast information].” Ex-1005 ¶35. For instance, Wrappe’s, “microcell beacon station may receive data from a mobile station through a wireless local area data communication link (e.g., WiFi or Bluetooth) to relay the data to a remote service station (e.g., through Internet).” *Id.* ¶48. Thus, Wrappe’s mobile station is the claimed communication device and data is communicated between Wrappe’s microcell beacon and the mobile station.

- b. 6/29/30[A] – using a [preconfigured] geographical zone, wherein the zone includes a plurality of spaced apart communication transponders; the transponders including a transmitter and receiver and wherein at least one of the transponders permits communication with a mobile device of a user;**

212. Wrappe and Belcea in view of Christopher teaches Elements 6[A], 29[A], and 30[A]. As shown in Ex-1020, Elements [A] of Claims 6, 29, and 30 are nearly identical except that 30[A] additionally recites that the geographical zone is “preconfigured.”

213. Wrappe teaches “using a [preconfigured] geographical zone, wherein the zone includes a plurality of spaced apart communication transponders” for the same reasons as discussed in Section XIII.A.2.b–d.

214. As discussed, Wrappe’s Figure 5 “illustrates a situation where each store (e.g., 511-517) has only one microcell beacon station (e.g., 541-547) [annotated purple].” Ex-1005 ¶47. Wrappe discloses that its microcell beacons aid in position determination when mobile stations are “in an environment where the blockage of GPS signals is severe,” *Id.* ¶46, Fig. 5, such as, where “there are a number of stores and shops [] in a commercial complex.” *Id.* Wrappe describes one example wherein, “during the installation of the microcell beacons, the placement and the signal transmission strength of the microcell beacons are adjusted so that the coverage of the dominant beacon signals substantially covers the store without substantially intruding into neighboring stores to cause misidentification.” *Id.* ¶46.

“For example, it may be desirable to have the radio coverage extended into the hallway (e.g., area between stores 511-517 and stores 521-529) in front of a store so that when mobile station 501 is in front of the store (e.g., store 515) the mobile station can be identified as being within the site of the store.” *Id.* A POSITA would have understood from these teachings that the geographic zone in Wrappe has multiple stores and that the zone is pre-configured in multiple ways because the store’s locations are themselves pre-configured as part of the design of the building, and placing Wrappe’s microcell beacons within this pre-configured geographic zone practices the limitation of “using a [preconfigured] geographical zone, wherein the zone includes a plurality of spaced apart communication transponders” as claimed. In addition, Wrappe further teaches pre-configuring the zone based on the beacons by adjusting the location and strength of the beacons placed therein in order to assure that the beacons represent the individual stores with little or no overlap.

215. Additionally, as shown in Figure 5, a POSITA would have understood that Wrappe’s microcell beacons [annotated purple] are spaced apart because they are located in different stores, and the stores themselves are spaced apart, for example adjacent or across from to each other in Rows A and B (A1-A4 and B1-B6). Ex-1005, Fig. 5.

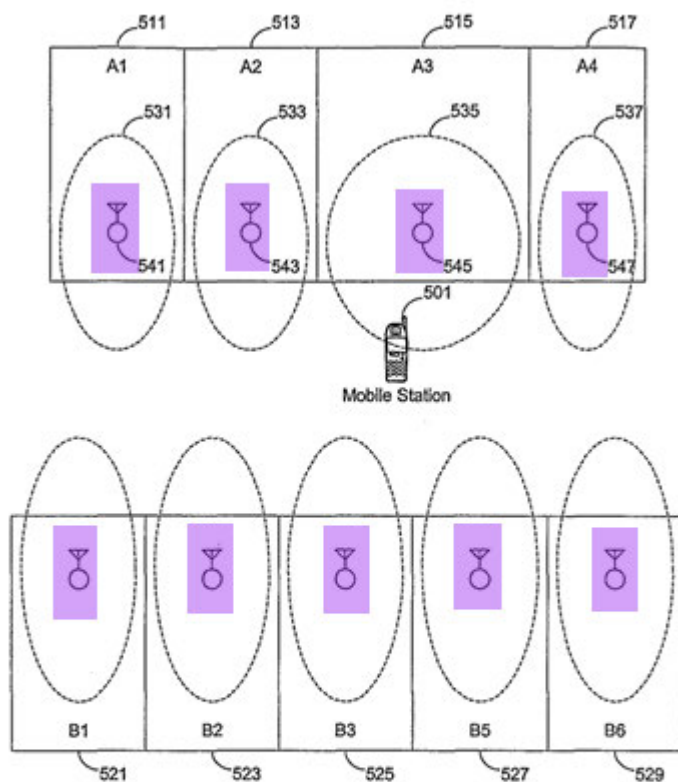


Fig. 5

216. Wrappe also teaches “the transponders including a transmitter and receiver and wherein at least one of the transponders permits communication with a mobile device of a user” for the same reason discussed in Section. XIII.B.2.a. Further, Wrappe explains that “[m]icrocell beacon 410 includes transmitter and modulator 411 for transmission according to wireless local area data communication standards (e.g., WiFi or Bluetooth).” Ex-1005 ¶48. Wrappe discloses that “the microcell beacon station may receive data from a mobile station

through a wireless local area data communication link (e.g., WiFi or Bluetooth) to relay the data to a remote service station (e.g., through Internet).” *Id.* Also, “[t]he user may then have to the option of further use the wireless local area data communication link (e.g., Bluetooth or WiFi) to obtain further information.” *Id.*

¶43.

- c. **6/29/30[B] – sending data communication between pluralities of the transponders in a network communication protocol with each other, applying the plurality of transponders in the network with each other to define the zone,**

217. Wrappe and Belcea in view of Christopher teaches Elements 6[B], 29[B], and 30[B].

218. Wrappe and Belcea teach “sending data communication between pluralities of the transponders in a network communication protocol with each other.” As discussed in Section XIII.A.2.d and XIII.B.1.a, in an example where the store footprint is larger than can be reasonably accommodated by a single beacon, multiple of Wrappe’s beacons would have been used to intercommunicate together as taught by Belcea. Belcea’s transponders (i.e., Intelligent Access Points, Vertical and Horizontal Routers, and Fixed References) “are capable of communicating with each other directly, or via one or more other devices operating as a router or routers for packets being sent between nodes.” Ex-1006, 5:59-6:1. Belcea also discloses that “Vertical Routers are [] used to successfully communicate between

levels, or floors.” *Id.* at Abstract. Specifically, the vertical routers in Belcea “will have very reliable communication with the closest neighbor device.” *Id.* at 6:27–31. By installing a horizontal router close by each vertical router, “[t]his proximity assures that the two radios, or Routers 124 and 128, can reliably communicate with one another.” *Id.* at 6:57–61. A POSITA would recognize this benefit and would thereby implement such techniques to support Wrappe’s teaching of using multiple microcell beacons within a larger store.

219. A POSITA would have been motivated to apply this teaching combined with Wrappe’s teachings for many reasons, including the reasons described in Belcea. For instance, as Belcea describes, close proximity improves reliability of communications which would have been useful for circumstances envisioned by Wrappe where multiple beacons are required to cover a larger store. A POSITA would have known that wireless communication signals attenuate over distance such that communications with close communication nodes, e.g., the beacons in Wrappe, is more reliable. *See, also, e.g.*, Section IX (technical background discussion). Thus, a POSITA would have been motivated to send communications between the nodes in Wrappe, for instance, to relay information to a mobile device, node, or control station that is farther away than the range of a single beacon, but still within the footprint of a larger store.

220. Another motivation for enabling communication between the beacons in Wrappe is to set up a smaller communication network within a particular zone, so that, for example, the same commercial messages could be used in a group of stores, if there was, for example, a coordinated sales effort between different stores, or so that location specific messages could be delivered by each microcell beacon together with more general store-wide information from each of the beacons. Wrappe also teaches “applying the plurality of transponders in the network with each other to define the zone.” As discussed in Section XIII.A.2.b, Wrappe’s microcell beacons define a geographical zone. Further, Wrappe’s microcell beacons “can provide information such as street address, identity of the site in which the microcell beacons are installed, zone identification information, etc., which can be directly used for the emergency response purpose (e.g., for fire, medical, or police responses).” Ex-1005 ¶45. Wrappe also states, “[i]t is understood that in general more than one microcell beacon station can be used to create a desirable coverage, depending on the size of the store, GPS signal blockage conditions, radio signal blockage conditions, desirability of coverage, and others.” *Id.* ¶46. Wrappe thus teaches that a group of multiple beacon stations can be applied with each other to define a zone, e.g., a store.

221. A POSITA would have implemented the beacons with a communication protocol, so that they are “in a network communication protocol

with each other.” A POSITA would have used a standard network communication protocol, such as such as BLUETOOTH or WLAN because such protocols were well-known, would have been applicable to serve the purpose of Wrappe, and would have enabled the beacons to receive and make use of the communications that they are sending to one another. *See* Ex-1009, 2:5-6. Wrappe also discloses that its beacons use the same communications protocols, e.g., WiFi, Bluetooth, cellular, and other types of communication protocols. *See, e.g.*, Ex-1005 ¶¶10, 12, 14.

- d. 6/29/30[C] – communicating between at least one transponder to the mobile user and between at least one transponder; the communication between the mobile device of the user and the least one transponder being effected by at least one of bluetooth or a wi fi protocol thereby to determine the location of the user in the zone through such communication;**

222. Wrappe and Belcea in view of Christopher teaches Elements 6[C], 29[C], and 30[C].

223. Wrappe teaches “communicating between at least one transponder to the mobile user and between at least one transponder.” As discussed in Section XIII.B.1, Wrappe-Belcea teaches that the microcell beacons send data communication between the each other where, for example, multiple of Wrappe’s beacons are meshed together to provide wider coverage than is possible with a single beacon, e.g. using Belcea’s transponder architecture.

224. Further, Wrappe teaches communication between the microcell beacons and the mobile device and teaches that “the communication between the mobile device of the user and the least one transponder being effected by at least one of bluetooth or a wi fi protocol thereby to determine the location of the user in the zone through such communication.” Wrappe discloses that “microcell beacons use short range data transmitters [] for local area data communication, such as Bluetooth or WiFi [to broadcast information].” Ex-1005 ¶35. For instance, Wrappe’s, “microcell beacon station may receive data from a mobile station through a wireless local area data communication link (e.g., WiFi or Bluetooth) to relay the data to a remote service station (e.g., through Internet).” *Id.* ¶48. Wrappe also explains that “microcell beacons can provide information such as street address, identity of the site in which the microcell beacons are installed, zone identification information, etc., which can be directly used for the emergency response purpose (e.g., for fire, medical, or police responses).” *Id.* ¶45. Thus, Wrappe’s microcell beacon receiving data from a mobile station via wireless data communication link can be used to determine the location of the user of the mobile station.

- e. **6/29/30[D] – arranging the transponders at locations in the zone, and the respective locations of the plurality of transponders in the zone being placed within a building structure;**

225. Wrappe and Belcea in view of Christopher teaches Elements 6[D], 29[D], and 30[D] for the same reasons discussed in Section XIII.A.2.c (Wrappe’s microcell beacons).

- f. **30[Di] – arranging the transponders in a multi-dimensional sense about the zone, the transponders being distributed in separate mesh networks, and the mesh networks being in different specific zones, and wherein different mesh networks of transponders are associated with a dedicated base station;**

226. Wrappe and Belcea in view of Christopher teaches Element 30[Di]. This claim element is specific to only Claim 30.

227. Wrappe teaches “arranging the transponders in a multi-dimensional sense about the zone” for the same reason discussed in Section XIII.A.2.c.

228. Wrappe also teaches that “microcell beacons use short range data transmitters [] for local area data communication, such as Bluetooth or WiFi [to broadcast information].” Ex-1005 ¶35. At the time of the ’203 Patent, it was known that in a mesh network, for example in which “each node communicates directly only with neighbouring nodes, which in turn relay transmissions to more distant nodes.” Ex-1024, 1:26-28. Such networks may be used “for communicating between members of a wireless network of computer systems.” *Id.* at 1:35-36.

Wrappe's Figure 5 "illustrates a situation where each store (e.g., 511-517) has only one microcell beacon station (e.g., 541-547) [annotated purple]." Ex-1005 ¶47.

But Wrappe also teaches that "[i]t is understood that in general more than one microcell beacon station can be used to create a desirable coverage, depending on the size of the store, GPS signal blockage conditions, radio signal blockage conditions, desirability of coverage, and others." *Id.* ¶47.

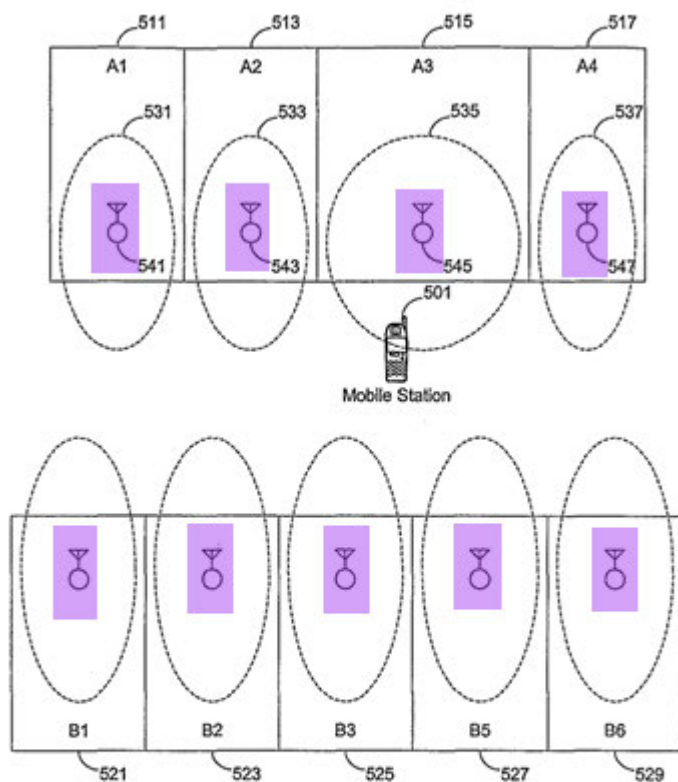


Fig. 5

Id. at Fig. 5.

229. Thus, Wrappe-Belcea teaches placing multiple microcell beacons in a large store to ensure coverage of a large area. Further, to the extent there are multiple stores, which themselves are separate from each other and other adjacent or across from to each other in Rows A and B (A1-A4 and B1-B6) each store may have a different group of microcell beacons associated with it. *See* Ex-1005, Fig. 5 above.

230. Wrappe-Belcea also teaches “wherein different mesh networks of transponders are associated with a dedicated base station.” Wrappe discloses that the network includes “the cellular switching center or multiple cellular switching centers 225, the land based phone system switches 223, cellular base stations (not shown in Figure 2), other GPS receivers 227, or other processors or location servers 221” Ex-1005 ¶58. As described in Section IX.H, a POSITA would have understood that the cellular base station within which a site as described in Wrappe was located would be the base station that handles cell communications from the Wrappe site, and this would be a dedicated base station.

231. Belcea also teaches mesh networks “wherein different mesh networks of transponders are associated with a dedicated base station.” For instance, Belcea teaches a mesh network of vertical and horizontal routers in a building. Ex-1006, 6:47–67. As shown in Figure 4, Belcea discloses “a number of Vertical Routers (VR) 124-1 to 124-n, and Horizontal Routers 128-1 to 128-n, dispersed across a

single floor” *Id.* at 6:47-49, Fig. 4. The vertical routers in Belcea “will have very reliable communication with the closest neighbor device.” *Id.* at 6:27–31. By installing a horizontal router close by each vertical router, “[t]his proximity assures that the two radios, or Routers 124 and 128, can reliably communicate with one another.” *Id.* at 6:57–61. Belcea further teaches that the vertical routers are used to “achieve communication between the Local Control and each floor of the building,” wherein “Local Control (LC) 126 [] handles the information regarding the whole system.” *Id.* 6:15–21. The location control as maintains location and performance information. *Id.* at Cl. 21. Belcea also discloses a mesh network that includes a group of vertical and horizontal routers. A POSITA would have understood that Belcea discloses a mesh network because the group of vertical and horizontal routers are wireless routers that communicate directly with neighboring nodes and communicate between members of a wireless network. A POSITA would have also understood that each floor of Belcea’s horizontal routers forms a mesh network and each vertical router is the dedicated base station of that horizontal mesh network that communicates information from that horizontal mesh network to the Local Control.

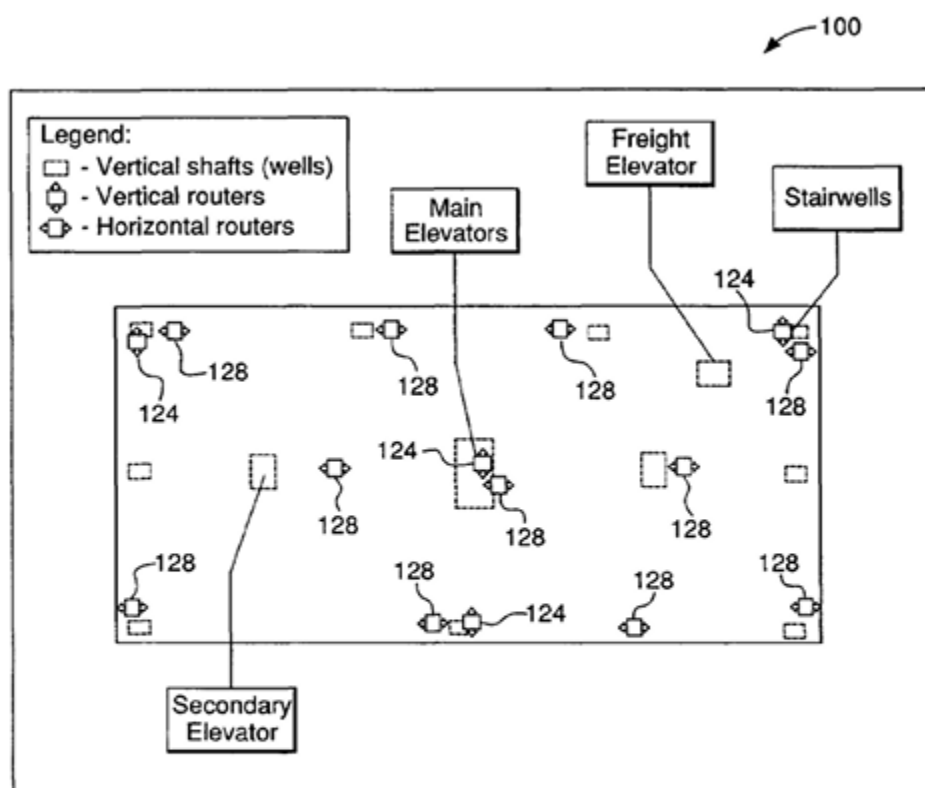


FIGURE 4

Id. at Fig. 4

232. A POSITA would have been motivated to apply such techniques from cellular networks and Belcea to the system described in Wrappe, such that each mesh network in Wrappe, which is formed by meshed together nodes as described in Belcea to form a larger area for a larger store, is associated with a dedicated base station. For instance, the mesh network covering a store in Wrappe would have one dedicated base station that collects information from the beacons in that larger store and can also manage communications from the beacon, so that all of the

beacons in the same store can send out a coordinated commercial message. Setting up the Wrappe system in such manner would provide the benefit that there is one centralized communication node for each mesh network to collect and manage communications and information, such that the commercial message of a store larger than can be practicably covered with a single node could still be coordinated and efficiently distributed to all of the beacons in the same store. Such centralized communication node would also naturally be a good point from which to receive and transmit information to and from the mesh network. This type of network setup with adjacent or overlapping smaller networks that communicate through a central or common point is well-known in computing and communications technology. *See, e.g.*, Section IX (discussing technical background), above.

g. 6/29/30[E] – obtaining and analyzing data related to the location of the mobile user according to the placement of the transponders in the zone;

233. Wrappe and Belcea in view of Christopher teaches element 6[E], 29[E] and 30[E]. Wrappe teaches obtaining and analyzing data related to the location of the mobile user for the same reason discussed in Section XIII.A.2.d, e, and g.

- h. 6/29/30[F] – enabling selected mobile communication devices to be in communication with at least one selected communication transponder when the devices are within range of the selected transponder;**

234. Wrappe and Belcea in view of Christopher teaches element 6[F], 29[F] and 30[F]. Wrappe teaches that select mobile devices, e.g., user devices with WiFi or Bluetooth capabilities, are able to be in communication with a select transponder when the devices are within a range of the transponder. For instance, Wrappe teaches sending communications to and from a beacon in a store when a mobile station enters the site. Ex-1005 ¶¶15, 44, 46, 52, Cl. 31. *See also* Sections XIII.A.2.d-e.

- i. 6[G] – the mobile user receiving selection parameter data from multiple transponders, and utilizing the selection parameters, such that the system narrows the plurality of transponders to the most practically near transponder, such most practically near transponder not necessarily being the transponder physically closest to the mobile user;**

235. Wrappe and Belcea in view of Christopher teaches Element 6[G]. This claim element is specific to only Claim 6. Wrappe teaches this element for the similar reasons as discussed in Section XIII.A.2.g. Specifically, Wrappe teaches targeting a user's mobile device via a beacon of a store when the user device enters the store. Wrappe thus teaches identifying a beacon of the store that the user entered. Further, Wrappe discloses that “[t]he coverage areas of the microcell beacons for different stores may overlap with each other” Ex-1005 ¶46, and that

”the signal transmission strength of the microcell beacons are adjusted so that the coverage of the dominant beacon signals substantially covers the store. *Id.* “Thus, when the mobile station enters the store, the dominant beacon signals received at the mobile station identifies the store.” *Id.* A POSITA would have understood that in Wrappe, the selection parameter data include, for example, the strength of the signals of the microcell beacons that are sent to the mobile station, altitude information and other location and identification of the beacons of the store. And thus, the signal transmission strength of the dominant beacon signal may be further used to narrow to the most practically near microcell beacon or transponder of the store that the user entered.

236. This is further taught by Belcea for the same reason discussed in Section XIII.A.2.g. Belcea explains that “[t]he Mobile Terminals can determine their respective locations using algorithms” such as those described in U.S. Patent Application Ser No. 10/861,121, published as U.S. Patent Publication No. 2004/0246926 to Belcea (“Belcea ’926”), and which is incorporated by reference in its entirety. Ex-1008, 11:26-33. For example, Belcea teaches to use “Time of Flight (TOF) data and Received Signal Strength Indicator (RSSI) data and a scoring process to identify the correct floor on which they are located.” *Id.* at 11:35-38. Thus, using Time of Flight (TOF) data and Received Signal Strength

Indicator (RSSI) data which is the selection parameters along with the algorithm(s) allow the system to determine closest wireless router or transponder.

237. A POSITA would have implemented these teachings with Wrappe so that users of Wrappe's mobile stations could also be monitored and tracked to further achieve Wrappe's purpose of providing users with the best and most current information about their commercial experience. Further, implementing the teachings of Belcea with Wrappe's teachings would further Wrappe's goal "to improve the precision of position solutions in a wide area position determination system." Ex-1005 ¶10. A POSITA would have been motivated to implement these teachings of Belcea, such as a floor scoring operation, in Wrappe for the same reasons described above in Section XIII.A.1 and .2.g. This is because Belcea teaches that having the "Mobile Terminals [] use Time of Flight (TOF) data and Received Signal Strength Indicator (RSSI) data and a scoring process to identify the correct floor on which they are located" improve the accuracy of location determination. A POSITA would have been motivated to include this advantage in Wrappe to improve the accuracy of location determination.

238. A POSITA would have also been motivated to implement such process on the mobile station of Wrappe as opposed to, for instance, the microcell beacons of Wrappe, because the mobile stations of Wrappe are described as sophisticated communication devices that have, e.g., WiFi, Bluetooth, and cellular

capabilities and further can “receive a web page.” See Ex-1005 ¶15. A POSITA would have understood that such devices are better equipped to receive and apply selection criteria than, for instance, the microcell beacon in Wrappe. And implementing such process on the mobile device as opposed to a remote server would have been an obvious design choice that would allow the mobile station to directly use information and signals obtained from the beacons without having to relay such information back and forth to a remote server.

- j. **29[G] – effecting a location transponder selection by a general wireless communication of multiple location transponder located within communication range in the zone, obtaining unique location transponder radio addresses, searching for wireless devices of at least one subclass, the subclasses being selected to include specific types of wireless communication devices, selectively cell phones, pagers, PDAs, and laptop computers, or by searching for at least one specific wireless device operating in a specific mode;**

239. Wrappe and Belcea in view of Christopher teaches Element 29[G].

This claim element is specific to only Claim 29.

240. Wrappe and Belcea teaches “effecting a location transponder selection by a general wireless communication of multiple location transponder located within communication range in the zone” for the same reason discussed in Section XIII.B.2.i.

241. Wrappe also teaches “obtaining unique location transponder radio addresses.” Wrappe explains that microcell beacons “broadcast[] identification

information (e.g., the unique ID of the transmitter).” Ex-1005 ¶33. Wrappe further teaches that the microcell beacons use, for example, Bluetooth or WiFi to transmit their data: “Microcell beacon 410 includes transmitter and modulator 411 for transmission according to wireless local area data communication standards (e.g., WiFi or Bluetooth).” *Id.* ¶48. A POSITA would have understood that using either Bluetooth or WiFi to transmit data requires discovering an address of the user device(s), for example, as explained in Section IX.I, both Bluetooth and WiFi use at least the MAC address of the device in order to send data packets to them. Wrappe also explains that that the microcell beacon’s identification information can be used to look up location information of the site or the mobile station. *Id.* ¶¶41, 44, 49. Thus, the identification number is a unique location transponder address because it can be used to look up location information about the site and the mobile station.

242. Wrappe also teaches “searching for wireless devices of at least one subclass, the subclasses being selected to include specific types of wireless communication devices, selectively cell phones, pagers, PDAs, and laptop computers.” As noted above, Wrappe teaches searching for a cell phone or PDA because mobile station can communicate via “cellular communication” or various types of data communications including “IEEE 802.11 or WiFi, IEEE 802.15 or Bluetooth.” Ex-1005 ¶¶15, 44, 48. A POSITA would have understood that a user

mobile device in a shopping area would be a cell phone or PDA because at the time of the invention those were common mobile user devices that could communicate via Bluetooth and WiFi. See Ex-1021, 4:26-29, 5:17-19 (Bluetooth is a “lighter” standard, highly ubiquitous [embedded in most phones, PDAs, PC peripherals, etc.]). And a POSITA would have understood that the Wrappe system searches for such devices because Wrappe discloses sending communications upon a mobile station entering a site. Ex-1005 ¶¶15, 44, 46, 52, Cl. 31, and sending this communication would have been accomplished by discovering the device by, for example pairing (Bluetooth), or associating (WiFi), as described in Section IX.

243. Christopher also discloses searching for wireless devices of subclasses including “specific types of wireless communication devices, selectively cell phones, pagers, PDAs, and laptop computers.” For instance, Christopher discloses computer system 1320, also referred to as the ViewPoint system 1320. As shown in Figure 13, Christopher’s Viewpoint system is “designed to interface with mobile device 1350 and PDA 1360 to collect device related data such as the device's present location, identification data and communications capabilities (802.11, Bluetooth, etc.).” Ex-1007 ¶71. And Christopher teaches searching for such devices, for instance, disclosing that “once PDA 1360 is within the communication range of RFID tag 1310, RFID tag 1310 will transmit its location data to PDA 1360.” *Id.* ¶73.

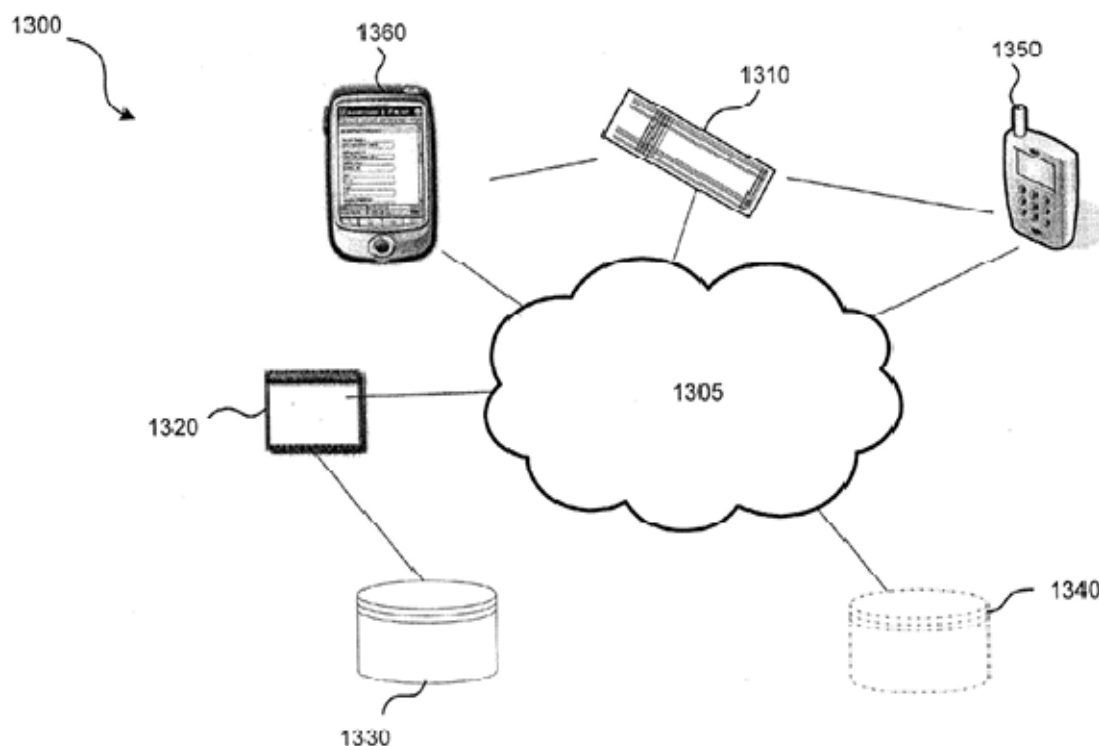


FIG. 13

Id. at Fig. 13.

- k. 6/29/30[H] – associating respective users of respective mobile devices with a respective profile of the respective user of the respective mobile device;**

244. Wrappe and Belcea in view of Christopher teaches element 6[H], 29[H], and 30[H].

245. Wrappe discloses that “when the mobile station enters the site, the base station may transmit information (e.g., coupon, special of the day, or a web page) about the site to the mobile station (e.g., according to the preferences of the user of the mobile station).” Ex-1005 ¶44.

246. Christopher also teaches “associating respective users of respective mobile devices with a respective profile of the respective user of the respective mobile device.” In fact, Christopher provides even more details about saving data to, creating, and utilizing such user profiles. Christopher discloses that “mobile device 1350 or 1360 transmits its location information along with its identification data to computer system 1320, also referred to as the ViewPoint system 1320.” Ex-1007 ¶69. Christopher explains that in order to provide better customer service, “ViewPoint system 1320 may keep records of mobile device behavior such as purchase history and past searches.” *Id.* ¶76. For example, Christopher’s ViewPoint system “may [] monitor the mobile device's travel pattern, search history, etc., and record the activities into [a]database [].” *Id.* ¶87. Christopher explains that “[t]his allows the ViewPoint system to learn the behavior of mobile device [], which will enable the ViewPoint system to better serve the user of mobile device [] when he/she returns to the store in the future.” *Id.* A POSITA would have understood that the records would be a respective profile for the user of the mobile device to help keep track of the mobile device behavior.

247. As discussed in Section XIII.B.1, Christopher teaches the feature of “tracking traffic pattern in a store or other venue.” Ex-1007 ¶2. Christopher explains that “[t]argeted advertisement is an effective strategy for selling products.” *Id.* ¶3. Further, Christopher teaches placing “plurality of RFID tags

distributed within a structure” to implement a tracking system that can “generate a shopping behavior report that may include statistics such as, for example, ten most frequently purchased items, average spending per transaction, traffic pattern the customer [], average time at various locations in the store, average time in the store, hours and day of week the customer usually visit the store, etc.” *Id.* ¶100.

248. As described in other sections above, a POSITA would have been motivated to seek out additional teachings regarding sending targeted commercial messages to the mobile device in Wrappe because, among other things, Wrappe itself suggests sending commercial messages based on a user profile: “For example, when the mobile station enters the site, the base station may transmit information (e.g., coupon, special of the day, or a web page) about the site to the mobile station (e.g., according to the preferences of the user of the mobile station).” Ex-1005 ¶44. As described in other sections above, a POSITA would have been motivated to implement the teachings of Christopher, which include tracking many different factors and criteria to target users, because a POSITA would have recognized, as Christopher explains, “targeted advertisement is an effective strategy for selling products.” Ex-1007 ¶3. The teachings of Wrappe and Christopher regarding storing and using profile information for targeting users is similar, but Christopher provides additional implementation details regarding, e.g., specifically what types of data to track. A POSITA would have had a reasonable

expectation of success implementing such teachings into the system of Wrappe because Christopher, like Wrappe, teaches storing and applying such data at a remote server. Thus, implementing the suggestions from Christopher would merely have meant storing and applying certain types of information about the user.

- l. 6/29/30[I] – sending a targeted message to a selected mobile device of a selected user from the selected communication transponder when the selected mobile device is in range; and**

249. Wrappe and Belcea in view of Christopher teaches element 6[I], 29[I], and 30[I] for the same reason discussed in Section XIII.B.2.k.

- m. 6/29/30[J] – tailoring the targeted message to the profile of the user associated with the mobile device.**

250. Wrappe and Belcea in view of Christopher teaches element 6[J], 29[J], and 30[J] for the same reason discussed in Section XIII.B.2.k-l.

3. Dependent Claims 7-28

- a. Claim 7 – The method of claim 6, wherein the transponders are arranged in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates.**

251. Claim 7 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

252. Wrappe and Belcea in view of Christopher teaches Claim 7 for the same reasons discussed in Section XIII.A.2.c.

- b. Claim 8 – The method of claim 6, including employing at least one Bluetooth™ equipped mobile personal device associated with at least one user, the at least one device communicating with Bluetooth™ enabled location transponders in a network.**

253. Claim 8 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

254. Wrappe and Belcea in view of Christopher teaches Claim 8 for the same reasons discussed in Section XIII.B.2.b.

- c. Claim 9 – The method of claim 6, wherein the at least one Bluetooth™ equipped mobile personal device contains at least one specific algorithm to determine the relatively precise location of the at least one user within the network.**

255. Claim 9 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

256. Wrappe and Belcea in view of Christopher teaches Claim 9 for the same reasons discussed in Section XIII.B.2.i.

257. Wrappe discloses that “the mobile station may perform the position calculation using the positioning information derived from the GPS signals, cellular communication signals and the microcell beacon signals.” Ex-1005 ¶41. Wrappe’s mobile station is also Bluetooth equipped. *Id.* ¶15. Wrappe also discloses that “[t]he user may then have to the option of further use the wireless local area

data communication link (e.g., Bluetooth or WiFi) to obtain further information.”

Id. ¶44.

258. As discussed in Section XIII.B.2.i, Belcea explains that “[t]he Mobile Terminals can determine their respective locations using algorithms” such as those described in U.S. Patent Application Ser No. 10/861,121, published as U.S. Patent Publication No. 2004/0246926 to Belcea (“Belcea ’926”), and which is incorporated by reference in its entirety. Ex-1008, 11:26-33. Belcea teaches to use “Time of Flight (TOF) data and Received Signal Strength Indicator (RSSI) data and a scoring process to identify the correct floor on which they are located.” *Id.* at 11:35-38. Thus, Belcea teaches using an algorithm “to determine the relatively precise location of the at least one user within the network.” A POSITA would have incorporated Belcea’s algorithm into Wrappe’s mobile station for the same reason discussed in Section XIII.B.2.i.

d. Claim 10 – The method of claim 6, wherein when the at least one Bluetooth™ equipped mobile personal device is within the range of certain location transponders, specified events are triggered.

259. Claim 10 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

260. Wrappe and Belcea in view of Christopher teaches Claim 10 for the same reasons discussed in Section XIII.B.2.i. Specific events may include, for example, sending a targeted advertisement as a user enters the store.

e. Claim 11 – The method of claim 6, including the downloading of at least one message, to the at least one Bluetooth™ equipped mobile personal device.

261. Claim 11 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

262. Wrappe and Belcea in view of Christopher teaches Claim 11 for the same reasons discussed in Section XIII.B.2.k, 1 (transmit information e.g., coupon, special of the day, or a web page). As described in that Section, Wrappe’s mobile station receives a message, e.g., a coupon, special of the day, or web page. A POSITA would know that means that the message is downloaded to the mobile station so that the device can open and display it. Wrappe also discloses that “[t]he user may then have to the option of further use the wireless local area data communication link (e.g., Bluetooth or WiFi) to obtain further information. Ex-1005 ¶44. Thus, Wrappe’s mobile station equipped with Bluetooth would have downloaded the message so that it could be viewed and ultimately used by the user.

f. Claim 12 – The method of claim 6, including transmitting to selected transponders the location data of the at least one user, the selected transponders transmitting the data to a control center via other transponders within selectively at least one of a network, or intermediate stations.

263. Claim 12 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

264. Wrappe and Belcea in view of Christopher teaches Claim 12 for the same reasons discussed in Sections XIII.B.2.c, d, f, g, h. As described in those sections, Wrappe in combination with Belcea teaches networks of transponders, e.g., the microcell beacons of Wrappe, that transmit data to and via each other to a central node that can collect and process the collected data. For instance, Wrappe teaches “Further, the microcell beacon station may receive data from a mobile station through a wireless local area data communication link (e.g., WiFi or Bluetooth) to relay the data to a remote service station (e.g., through Internet).” Ex-1005 ¶48. In some examples, the positioning information derived from “the microcell beacon signals is transmitted to location server 621 for the calculation of the position of the mobile station.” *Id.* ¶42. Wrappe also discloses that “[t]he location server then computes the position of the mobile station using at least the information that is transmitted from the mobile station to the location server through the cellular communication link.” *Id.* ¶38. By doing so, the system can create and update a user profile of the mobile device, which is useful for sending targeted messages, as described in Section XIII.B.2.k. A POSITA would have implemented these teachings by using information transmitted or relayed from Wrappe’s microcell beacons because Wrappe teaches that this is a potential way to relay that information to a control center. *Id.* ¶48. A benefit of doing so, instead of relying on transmission by the user device, would be to maintain control over the

transmissions, and ensure communication with the control station in the event that communication with a mobile devices was lost or restricted.

- g. Claim 13 – The method of claim 6, wherein the location data of the at least one user is processed and analyzed at selectively at least one of a control center or an intermediate station.**

265. Claim 13 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

266. Wrappe and Belcea in view of Christopher teaches Claim 13 for the same reasons discussed in Section XIII.A.2.d and Section XIII.B.2.f. Thus, Wrappe's location server processes location data and is the control center because it controls operations of the system.

- h. Claim 14 – The method of claim 6 including using a geographical zone, the zone being multi-dimensional, and messaging a movable entity that has a transponder or subscriber device, the device being selectively a cell phone, PDA, computer, or device which is configured to be in wireless communication with other devices through a suitable network.**

267. Claim 14 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

268. Wrappe and Belcea in view of Christopher teaches Claim 14 for the same reasons discussed in Section XIII.B.2.b, e, h, j, l.

i. Claim 15 – The method of claim 6, wherein messages are communicated with entities according to the location of the entities as mapped in the multi-dimensional space.

269. Claim 15 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

270. Wrappe and Belcea in view of Christopher teaches Claim 15 for the same reasons discussed in Section XIII.B.2.j and XII.B.2.1. Wrappe discloses that “a mobile station at one location may be associated with more than one site entity, each of which may be of interest to a user of the mobile station.” Ex-1005 ¶51. Wrappe explains that “[t]he location server then computes the position of the mobile station using at least the information that is transmitted from the mobile station to the location server through the cellular communication link.” *Id.* ¶38. Wrappe also discloses “when the mobile station enters the site, the base station may transmit information (e.g., coupon, special of the day, or a web page) about the site to the mobile station (e.g., according to the preferences of the user of the mobile station).” *Id.* ¶44. A POSITA would have understood that Wrappe discloses sending messages to the mobile station based on mapping of the geographic zone because Wrappe’s location server knows the mapping and knows the user or mobile station is near the site. Further, a POSITA would have understood that Wrappe communicates to the mobile station according to the location of the entity

associated with the microcell beacon as they are mapped or located by the location server.

271. Wrappe also teaches that the microcell beacon may receive data from a mobile station nearby through the local area data communication link. Ex-1005 ¶48 (““microcell beacon station may receive data from a mobile station through a wireless local area data communication link (e.g., WiFi or Bluetooth)”). Wrappe therefore also teaches that the entity that is associated with or controls the beacon receives a message based on location. A POSITA would have understood that because such messages are based on location and proximity to the mobile device, the message is communicated according to the location of the entities within the multi-dimensional space, e.g., as compared to or with respect to the location of the mobile device or other entities.

272. To the extent Claim 15 requires rendering a map, Belcea teaches rendering a map as described in Section XIII.A.2.a, e with respect to Claim 1 above.

- j. Claim 16 – The method of claim 6, including defining a geographical zone, the zone being multi-dimensional, and messaging or regulating a movable entity that has a transponder or subscriber device, the device being selectively a cell phone, PDA, computer or device which is configured to be in wireless communication with other devices through a suitable network.**

273. Claim 16 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

274. Wrappe and Belcea in view of Christopher teaches Claim 16 for the same reasons discussed in Section XIII.B.2.b, e, h, j, l.

- k. Claim 17 – The method of claim 6, including a three-dimensional shape for the geographical zone.**

275. Claim 17 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

276. Wrappe and Belcea in view of Christopher teaches Claim 17 for the same reasons discussed in Section XIII.A.2.e and Section XIII.A.3.

- l. Claim 18 – The method of claim 6, including downloading messages, and wherein the messages are directed to a user when the user is determined to be a particular location in the multidimensional space, and not when the user is outside the particular location.**

277. Claim 18 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

278. Wrappe and Belcea in view of Christopher teaches Claim 18.

Specifically, Wrappe discloses “location based service information can be provided to the mobile station depending whether or not the mobile station is within the site through the cellular communication link of the mobile station.” Ex-1005 ¶44. For example, Wrappe explains that “when the mobile station enters the site, the base station may transmit information (e.g., coupon, special of the day, or a web page) about the site to the mobile station.” *Id.* Thus, the location based message is downloaded to the mobile station when the user is determined to be in a particular location, e.g., a store, and not when the user is outside the store.

m. Claim 19 – The method of claim 6, wherein the profile of the user includes the behavior of the user, and includes the length of time the user spends in the vicinity of different transponders in the zone.

279. Claim 19 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

280. Wrappe and Belcea in view of Christopher teaches Claim 19.

Christopher’s ViewPoint system may monitor and learn the behavior of the user of the mobile device. For example, Christopher’s ViewPoint system “may [] monitor the mobile device's travel pattern, search history, etc., and record the activities into [a]database [].” Ex-1007 ¶87. Christopher explains that “[t]his allows the ViewPoint system to learn the behavior of mobile device [], which will enable the ViewPoint system to better serve the user of mobile device [] when he/she returns

to the store in the future.” *Id.* Christopher explicitly teaches that a user’s profile should include the length of time that the user spends in the vicinity of different transponders, by teaching that “traffic tracking system 1620 can generate a shopping behavior report that may include statistics such as, for example, ten most frequently purchased items, average spending per transaction, traffic pattern the customer or the traffic pattern of the IRU being associated to the transaction, *average time at various locations in the store, average time in the store*, hours and day of week the customer usually visit the store, etc.” *Id.* ¶100.

n. Claim 20 – The method of claim 6, including the downloading of at least one commercial message, selectively an advertisement, to the at least one Bluetooth™ equipped mobile personal device.

281. Claim 20 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

282. Wrappe and Belcea in view of Christopher teaches Claim 20 for the same reason discussed in Section XIII.B.2.1 and Section XIII.B.3.e, 1 with respect to Claim 11 and Claim 18. Wrappe discloses that a coupon, special of the day, or web site are downloaded to the mobile device. Ex-1005 ¶44. A POSITA would have understood that those messages are commercial messages and advertisements that are sent to Wrappe’s mobile station from a remote server. And as described above, Wrappe teaches that those messages are downloaded by the device.

Furthermore as described above the mobile station in Wrappe is Bluetooth equipped.

283. Further, Christopher's ViewPoint system "sends a customized data package to the new user." Ex-1007 ¶86. Christopher explains that "[t]he customized data package may include store hours, upcoming events, promotional materials, and/or a welcome message to welcome the new customer." *Id.* Also, Christopher discloses that the ViewPoint system "may transmit information such as advertising materials related to shoes directly to the mobile device." *Id.* ¶69. Christopher thus also discloses sending to and downloading on the user mobile device commercial messages, including an advertisement. As described in Sections XIII.B.1 and XIII.B.2.k-m above, a POSITA would have been motivated to implement the techniques of sending targeted commercial messages taught in Christopher into the system of Wrappe.

- o. Claim 21 – The method of claim 6, including the downloading of a commercial message, selectively an advertisement, to the Bluetooth™ equipped mobile personal device.**

284. Claim 21 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

285. Wrappe and Belcea in view of Christopher teaches Claim 21 for the same reasons discussed in Section XIII.B.3.n.

- p. Claim 22 – The method of claim 6, including transmitting to selected transponders the user’s location data, the selected transponders transmitting the data to a control center via other transponders within selectively at least one of a network, relay station, or intermediate supplementing stations.**

286. Claim 22 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

287. Wrappe and Belcea in view of Christopher teaches Claim 22 for the same reasons discussed in Section XIII.B.3.f with respect to Claim 12.

- q. Claim 23 – The method of claim 6, wherein the profile of the user includes the behavior of the user includes at least one of the length of time the user spends in the vicinity of different transponders in the zone, the purchasing patterns of the user, the product or service preferences of a user; the commercial enquiries of a user, and the dining or entertainment preferences of the user.**

288. Claim 23 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

289. Wrappe and Belcea in view of Christopher teaches Claim 23 for the same reasons discussed with Section XIII.B.3.m and XIII.B.2.k. Further, Christopher discloses that the ViewPoint System “may keep records of mobile device behavior such as purchase history and past searches.” Ex-1007 ¶76.

- r. Claim 24 – The method of claim 6 including creating multiple networks, each network communicating with a respective base station, and the respective base stations communicating with each other and a control station, these communications being effected at least in part by at least one of blue tooth or wi fi.**

290. Claim 24 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

291. Wrappe and Belcea in view of Christopher teaches Claim 24 for the same reasons discussed in Section XIII.B.2.a, d, f and Section XIII.A.2.d. Specifically, as described in those sections, Wrappe teaches that the devices in its system communicate via Bluetooth and WiFi, among other protocols. And, as described in Section XIII.B.2.f, Wrappe in combination with the teachings of Belcea teaches creating multiple networks, each associated with a base station, and wherein the base stations communicate to a centralized control station, e.g., the location server of Wrappe or the Local Control of Belcea.

- s. Claim 25 – The method of claim 6 wherein the multi-dimensional zone is such that there are networks at discreet and separate floors of a building, and there being a physical ceiling/floor barrier between each separate floor, and the network being such that with the multiple transponders utilizing selection parameters, the system narrows the plurality of transponders to the most practically near transponder to a user.**

292. Claim 25 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

293. Wrappe and Belcea in view of Christopher teaches Claim 25 for the same reasons discussed in Section XIII.A.2.e-g and Section XIII.B.2.e, i.

- t. Claim 26 – The method of claim 6, wherein the profile of the user includes the purchasing patterns of the user.**

294. Claim 26 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

295. Wrappe and Belcea in view of Christopher teaches Claim 26 for the same reasons discussed in Section XIII.B.3.g with respect to Claim 23.

- u. Claim 27 – The method of claim 6, wherein the profile of the user includes the dining or entertainment preferences of the user.**

296. Claim 27 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

297. Wrappe and Belcea in view of Christopher teaches Claim 27 for the same reasons discussed in Section XIII.B.3.g with respect to Claim 23.

- v. Claim 28 – The method of claim 6, wherein a transponder on one floor of a building, even though physically closer to a user is excluded as being a transponder being the most practically near to that user, and that physically further transponder on a different floor to the user is the most practically near to that user.**

298. Claim 28 depends from Claim 6. As described above, Wrappe and Belcea in view of Christopher teach Claim 6.

299. Wrappe and Belcea in view of Christopher teaches Claim 28 for the same reasons discussed in Section XIII.A.2.e-g and Section XIII.B.2.e, i. As explained in Sections XIII.A.2.e-g and XIII.B.2.e, i Wrappe-Belcea-Christopher teaches excluding a transponder on one floor of a building that may be physically closer to a user than other transponders. As explained in Sections XIII.B.1 and XIII.B.2.f, Wrappe-Belcea-Christopher teach the use of mesh networks to cover a store that spans a large area, e.g., a large department store. Wrappe further teaches that motivation to communicate to a user from a beacon of the store that the user is in. In the scenario that the store that the user is in is a department store of a mall, which is typically a multi-floor anchoring store, then the beacon that may be most “practically near” to the user (in the sense that it is closest to the user, but still within the same store), may be on a different floor of that department store. *See, e.g.,* Ex-1035 (describing multi-story malls). A POSITA would know that in such system, it would be desirable to exclude the beacons that are not of the store that the user is in and to identify and communicate from the nearest beacon of the correct store—even if that beacon is on a different floor.

300. Implementing the Wrappe system this way would be desirable so that the targeted advertisements would actually be relevant to the user as they are shopping within that store. Thus, programming the Wrappe system to prioritize

beacons of the store in which the user is located over, e.g., the floor that the user is on, would have been an obvious design choice.

C. Ground 3: Wrappe and Belcea in view of Kinnunen Disclose and Render Obvious Claims 6-30 of the '203 Patent

301. A POSITA would have been motivated to combine the teachings of Wrappe, Belcea, and Kinnunen and would have had a reasonable expectation of success for the same reason discussed in Section XIII.B.1. Kinnunen teaches implementing location dependent services and targeting users based on data collected regarding a user's current location, location history, ages, or other demographic or historical information collected about the user. Kinnunen discloses a system for providing location dependent service for mobile terminals "[that] targets services to suitable mobile terminals or users by using profiles." Ex-1009, 6:10-11, 6:43-44. Kinnunen explains that "[p]rofiles are applied to the mobile terminal which is carried by a user, to the user (a personal profile) and also to a service." *Id.* at 6:44-46. Kinnunen also explains that "[t]he user profile enables the network [] to determine if the user of a particular terminal is a suitable target for any of the services provided by the network []." *Id.* at 7:8-10.

302. A POSITA would further have recognized the benefit of incorporating Kinnunen's teachings of tracking a user's movement or purchase patterns into a system like Wrappe to improve the sending of location-based, targeted commercial

communications, for the same reasons described above in connection with Ground

2. *See* Section XII.B.1

1. Independent Claims 6, 29, and 30

- a. 6/29/30[Pre] – A method of communicating data between at least one selected communication transponder and at least one selected mobile communication device comprising:**

303. Wrappe and Belcea in view of Kinnunen teaches the preamble of Claims 6, 29, and 30 for the same reasons discussed in Section XIII.B.2.a.

- b. 6/29/30[A] – using a [preconfigured] geographical zone, wherein the zone includes a plurality of spaced apart communication transponders; the transponders including a transmitter and receiver and wherein at least one of the transponders permits communication with a mobile device of a user;**

304. Wrappe and Belcea in view of Kinnunen teaches Elements 6[A], 29[A], and 30[A] for the same reasons discussed in Section XIII.B.2.b.

- c. 6/29/30[B] – sending data communication between pluralities of the transponders in a network communication protocol with each other, applying the plurality of transponders in the network with each other to define the zone,**

305. Wrappe and Belcea in view of Kinnunen teaches Elements 6[B], 29[B], and 30[B] for the same reasons discussed in Section XIII.B.2.c.

- d. 6/29/30[C] – communicating between at least one transponder to the mobile user and between at least one transponder; the communication between the mobile device of the user and the least one transponder being effected by at least one of bluetooth or a wi fi protocol thereby to determine the location of the user in the zone through such communication;**

306. Wrappe and Belcea in view of Kinnunen teaches Elements 6[C], 29[C], and 30[C] for the same reasons discussed in Section XIII.B.2.d.

- e. 6/29/30[D] – arranging the transponders at locations in the zone, and the respective locations of the plurality of transponders in the zone being placed within a building structure;**

307. Wrappe and Belcea in view of Kinnunen teaches Elements 6[D], 29[D], and 30[D] for the same reasons discussed in Section XIII.B.2.e.

- f. 30[Di] – arranging the transponders in a multi-dimensional sense about the zone, the transponders being distributed in separate mesh networks, and the mesh networks being in different specific zones, and wherein different mesh networks of transponders are associated with a dedicated base station;**

308. Wrappe and Belcea in view of Kinnunen teaches Element 30[Di] for the same reasons discussed in Section XIII.B.2.f. This claim element is specific to only Claim 30.

- g. 6/29/30[E] – obtaining and analyzing data related to the location of the mobile user according to the placement of the transponders in the zone;**

309. Wrappe and Belcea in view of Kinnunen teaches Elements 6[E], 29[E], and 30[E] for the same reasons discussed in Section XIII.B.2.g.

- h. 6/29/30[F] – enabling selected mobile communication devices to be in communication with at least one selected communication transponder when the devices are within range of the selected transponder;**

310. Wrappe and Belcea in view of Kinnunen teaches Elements 6[F], 29[F], and 30[F] for the same reasons discussed in Section XIII.B.2.h.

- i. 6[G] – the mobile user receiving selection parameter data from multiple transponders, and utilizing the selection parameters, such that the system narrows the plurality of transponders to the most practically near transponder, such most practically near transponder not necessarily being the transponder physically closest to the mobile user;**

311. Wrappe and Belcea in view of Kinnunen teaches Element 6[G] for the same reasons discussed in Section XIII.B.2.i. This claim element is specific to only Claim 6.

- j. **29[G] – effecting a location transponder selection by a general wireless communication of multiple location transponder located within communication range in the zone, obtaining unique location transponder radio addresses, searching for wireless devices of at least one subclass, the subclasses being selected to include specific types of wireless communication devices, selectively cell phones, pagers, PDAs, and laptop computers, or by searching for at least one specific wireless device operating in a specific mode;**

312. Wrappe and Belcea in view of Kinnunen teaches Element 29[G] for the same reasons discussed in Section XIII.B.2.j. This claim element is specific to only Claim 29.

- k. **6/29/30[H] – associating respective users of respective mobile devices with a respective profile of the respective user of the respective mobile device;**

313. Wrappe and Belcea in view of Kinnunen teaches element 6[H], 29[H], and 30[H].

314. As discussed in Section XIII.B.2.k, Wrappe discloses that “when the mobile station enters the site, the base station may transmit information (e.g., coupon, special of the day, or a web page) about the site to the mobile station (e.g., according to the preferences of the user of the mobile station).” Ex-1005 ¶44.

315. Kinnunen teaches “[a] system for providing location dependent services to a plurality of mobile terminals within a coverage area.” Ex-1009, Abstract. Kinnunen’s system “comprises a profiling sub-system which keeps and/or compiles profiles related to one or more of a user, a mobile terminal and a

service.” *Id.* at 3:28-30. Kinnunen explains that “the profiles may contain information selected from terminal capabilities, such as the model, its screen size, its connection speed, user characteristics, such as the user’s gender, age and the category of user, for example whether a gold or a silver user, and preferences of the user selected list, such as expressed interest in music, clothes or electronics or other matters.” *Id.* at 3:31-37. Kinnunen also discloses that “[t]he user and mobile terminal profiles can be used to determine targeting of advertisements.” *Id.* at 3:41-43.

- l. 6/29/30[I] – sending a targeted message to a selected mobile device of a selected user from the selected communication transponder when the selected mobile device is in range; and**

316. Wrappe and Belcea in view of Kinnunen teaches Elements 6[I], 29[I], and 30[I] for the same reasons discussed in Section XIII.B.2.1.

- m. 6/29/30[J] – tailoring the targeted message to the profile of the user associated with the mobile device**

317. Wrappe and Belcea in view of Kinnunen teaches element 6[I], 29[I], and 30[I] for the same reason discussed in Section XIII.C.2.k-1 and XIII.B.2.k-1.

2. Dependent Claims 7-28

- a. Claim 7 – The method of claim 6, wherein the transponders are arranged in a three-dimensional sense, selectively being a three-dimensional sense in the x, y, and z axes or coordinates.**

318. Claim 7 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 7 for the same reasons discussed in Section XIII.A.2.c and XIII.B.3.a.

- b. Claim 8 – The method of claim 6, including employing at least one Bluetooth™ equipped mobile personal device associated with at least one user, the at least one device communicating with Bluetooth™ enabled location transponders in a network.**

319. Claim 8 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 8 for the same reasons discussed in Section XIII.B.2.b and XIII.B.3.b.

- c. Claim 9 – The method of claim 6, wherein the at least one Bluetooth™ equipped mobile personal device contains at least one specific algorithm to determine the relatively precise location of the at least one user within the network.**

320. Claim 9 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 9 for the same reasons discussed in Section XIII.B.2.i and XIII.B.3.c.

- d. Claim 10 – The method of claim 6, wherein when the at least one Bluetooth™ equipped mobile personal device is within the range of certain location transponders, specified events are triggered.**

321. Claim 10 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 10 for the same reasons discussed in Section XIII.B.2.1 and XIII.B.3.d.

- e. Claim 11 – The method of claim 6, including the downloading of at least one message, to the at least one Bluetooth™ equipped mobile personal device.**

322. Claim 11 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 11 for the same reasons discussed in Section XIII.B.2.k (transmit information e.g., coupon, special of the day, or a web page) and Section XIII.B.3.e.

- f. Claim 12 – The method of claim 6, including transmitting to selected transponders the location data of the at least one user, the selected transponders transmitting the data to a control center via other transponders within selectively at least one of a network, or intermediate stations.**

323. Claim 12 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 12 for the same reasons discussed in Sections XIII.B.2.c, d, f, Section XIII.B.2.k, and Section XIII.B.3.f.

- g. Claim 13 – The method of claim 6, wherein the location data of the at least one user is processed and analyzed at selectively at least one of a control center or an intermediate station.**

324. Claim 13 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 13 for the same reasons discussed in Section XIII.A.2.d, Section XIII.B.2.f, and Section XIII.B.3.g.

- h. Claim 14 – The method of claim 6 including using a geographical zone, the zone being multi-dimensional, and messaging a movable entity that has a transponder or subscriber device, the device being selectively a cell phone, PDA, computer, or device which is configured to be in wireless communication with other devices through a suitable network.**

325. Claim 14 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 14 for the same reasons discussed in Section XIII.B.2.b, e, j, l and Section XIII.B.3.h.

- i. Claim 15 – The method of claim 6, wherein messages are communicated with entities according to the location of the entities as mapped in the multi-dimensional space.**

326. Claim 15 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 15 for the same reasons discussed in Section XIII.B.2.j,l and Section XIII.B.3.i.

327. To the extent Claim 15 requires rendering a map, Belcea teaches rendering a map as described in Section XIII.A.2.a with respect to Claim 1 above.

- j. Claim 16 – The method of claim 6, including defining a geographical zone, the zone being multi-dimensional, and messaging or regulating a movable entity that has a transponder or subscriber device, the device being selectively a cell phone, PDA, computer or device which is configured to be in wireless communication with other devices through a suitable network.**

328. Claim 16 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 16 for the same reasons discussed in Section XIII.B.2.b, e, j, l and Section XIII.B.3.j.

- k. Claim 17 – The method of claim 6, including a three-dimensional shape for the geographical zone.**

329. Claim 17 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 17 for the same reasons discussed in Section XIII.A.2.e, Section XIII.A.3, and Section XIII.B.3.k.

- l. Claim 18 – The method of claim 6, including downloading messages, and wherein the messages are directed to a user when the user is determined to be a particular location in the multidimensional space, and not when the user is outside the particular location.**

330. Claim 18 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 18 for the same reason discussed in Section XIII.B.3.l.

m. Claim 19 – The method of claim 6, wherein the profile of the user includes the behavior of the user, and includes the length of time the user spends in the vicinity of different transponders in the zone.

331. Claim 19 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 19.

332. Kinnunen teaches “wherein the profile of the user includes the behavior of the use.” Kinnunen discloses a system that “track[s] the mobile terminal relative to the service locations so that the presence of the mobile terminal at a particular service location of a service can be determined.” Ex-1009, 2:25-28. Kinnunen explains that “[w]hen the location information is received by the network [], particularly by the location server [], location meta-information is attached, indicating its source and the time of its receipt.” *Id.* at 8:62-65. Moreover, “[t]he meta-information is attached so that a service can assess the reliability of the location information.” *Id.* at 9:1-2. Kinnunen also teaches that its tracked data “includes the length of time the user spends in the vicinity of different transponders in the zone.” Kinnunen also explains that “[t]his involves the trustworthiness of a source, its accuracy or precision and its timeliness (older location information might be less reliable).” *Id.* at 9:2-5. Thus, a POSITA would have understood that determining the presence of the mobile terminal at a particular location includes determining the length of time the user spends in the vicinity as this is directly related to the timeliness of the data (e.g. how long it has been since the present

time when the data first received the message, e.g. upon entering the store). Ex-1007, 8:62-9:11; 13:35-65, 14:13-23, 15:55-65. The length of time the user is in a location is relevant to determine whether the user was actually there, whether there was a data detection or reporting error, or whether the user was merely passing through a location. This context would be important and particularly for systems like Wrappe and Kinnunen that send targeted advertisements so that they know which store the user is actually visiting and thus which advertisements to send. For instance, if a user spent a very short time in a series of locations on a path to a store where the user spent a longer amount of time, then the user was likely merely walking that path to get to the store. The relevant messages for the user would thus be for the store where the user spent a longer time, as opposed to anything in the path that the user quickly walked through. As another example, duration can be relevant to detect data errors. For instance, if the data shows that the user spent less than a second in a location that is very far away from where all of the data shows the user was, then the far away data point is likely an error. In other words, the duration that the user “spent” in that location and the distance of that location would be considered to determine the relevance of that datapoint.

- n. Claim 20 – The method of claim 6, including the downloading of at least one commercial message, selectively an advertisement, to the at least one Bluetooth™ equipped mobile personal device.**

333. Claim 20 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 20 for the same reason discussed in Section XIII.B.2.1 and Section XIII.B.e, h with respect to Claim 11 and Claim 18. Further, Kinnunen discloses using advertisements to “advertise the existence of specific services in specific locations to the user.” Ex-1009, 6:28-29. Kinnunen explains that “[a]dvertisements may be sent to users as they are travelling along, for example walking along the street or travelling in a car, or may be sent when a user enters a particular location, for example a building or a particular part of a building.” *Id.* at 6:30-34. As described above, a POSITA would have been motivated to implement the techniques of sending targeted commercial messages taught in Kinnunen into the system of Wrappe.

- o. Claim 21 – The method of claim 6, including the downloading of a commercial message, selectively an advertisement, to the Bluetooth™ equipped mobile personal device.**

334. Claim 21 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 21 for the same reasons discussed in Section XIII.B.3.n and Section XIII.B.3.o.

- p. Claim 22 – The method of claim 6, including transmitting to selected transponders the user’s location data, the selected transponders transmitting the data to a control center via other transponders within selectively at least one of a network, relay station, or intermediate supplementing stations.**

335. Claim 22 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 22 for the same reasons discussed in Section XIII.B.3.f with respect to Claim 12 and Section XIII.B.3.p.

- q. Claim 23 – The method of claim 6, wherein the profile of the user includes the behavior of the user includes at least one of the length of time the user spends in the vicinity of different transponders in the zone, the purchasing patterns of the user, the product or service preferences of a user; the commercial enquiries of a user, and the dining or entertainment preferences of the user.**

336. Claim 23 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 23 for the same reasons discussed with Section XIII.B.3.m, Section XIII.B.2.k, Section XIII.C.3.m, and Section XIII.C.2.k.

- r. Claim 24 – The method of claim 6 including creating multiple networks, each network communicating with a respective base station, and the respective base stations communicating with each other and a control station, these communications being effected at least in part by at least one of blue tooth or wi fi.**

337. Claim 23 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 24 for the same reasons discussed in Section XIII.B.2.a, d, f, Section XIII.A.2.d, and Section XIII.B.3.r.

- s. **Claim 25 – The method of claim 6 wherein the multi-dimensional zone is such that there are networks at discreet and separate floors of a building, and there being a physical ceiling/floor barrier between each separate floor, and the network being such that with the multiple transponders utilizing selection parameters, the system narrows the plurality of transponders to the most practically near transponder to a user.**

338. Claim 24 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 25 for the same reasons discussed in Section XIII.A.2.e-g, Section XIII.B.2.e, i, and Section XIII.B.3.s.

- t. **Claim 26 – The method of claim 6, wherein the profile of the user includes the purchasing patterns of the user.**

339. Claim 25 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 26 for the same reasons discussed in Section XIII.B.3.g with respect to Claim 23 and Section XIII.B.3.t.

- u. **Claim 27 – The method of claim 6, wherein the profile of the user includes the dining or entertainment preferences of the user.**

340. Claim 27 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 27 for the same reasons discussed in Section XIII.B.3.g with respect to Claim 23 and Section XIII.B.3.u.

- v. **Claim 28 – The method of claim 6, wherein a transponder on one floor of a building, even though physically closer to a user is excluded as being a transponder being the most practically near to that user, and that physically further transponder on a different floor to the user is the most practically near to that user.**

341. Claim 28 depends from Claim 6. Wrappe and Belcea in view of Kinnunen teaches Claim 28 for the same reasons discussed in Section XIII.A.2.e-g, Section XIII.B.2.e, i, and Section XIII.B.3.v.

XIV. CONCLUSION

342. For at least these reasons, Claims 1-30 are invalid over the prior art.

343. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

344. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and

the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

345. I declare under penalty of perjury that the foregoing is true and correct.

Respectfully Submitted,



/s/

Scott Andrews _____ Date