

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEXTRON SPECIALIZED VEHICLES INC.

Petitioner

v.

SZ DJI TECHNOLOGY CO., LTD.

Patent Owner

U.S. Patent No. 11,482,121

**DECLARATION OF DAVID HILLIARD WILLIAMS IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO.
11,482,121**

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EXHIBIT LIST

Exhibit No.¹	Description
1001	U.S. Patent No. 11,482,121 (“the ’121 Patent”)
1002	Prosecution History for the ’121 Patent.
1003	Declaration of David H. Williams
1004	U.S. Patent 7,164,986 (“Humphries”)
1005	U.S. Patent Pub. 2016/0189549 (“Marcus”)
1006	U.S. Patent Pub. 2014/0375480 (“Morgan”)
1007	U.S. Patent 9,078,098 (“Cronin”)
1008	U.S. Patent 6,718,235 (“Borugian”)
1009	Complaint, SZ DJI Technology Co. Ltd. v. Textron Specialized Vehicles Inc., Case No. 1:23-cv-00055 (DE), filed January 17, 2023
1010	PACER Docket Report, SZ DJI Technology Co. Ltd. v. Textron Specialized Vehicles Inc., Case No. 1:23-cv-00055 (DE), filed January 17, 2023 (as of August 4, 2023).
1011	U.S. Patent App. No. 62/098,968 (“Marcus Provisional”)

¹ Citations to patents are made by column and line cite; citations to U.S. patent publications are made by paragraph number; citations to International patent applications are made by page number; citations to other exhibits are made with reference to the Bates-stamped pagination.

I, David Hilliard Williams, declare as follows:

I. Introduction

1. I have been retained on behalf of Textron Specialized Vehicles Inc. (“Textron”) for the above-captioned *inter partes* review (IPR) proceeding. I am being compensated for my time in connection with this IPR at my standard hourly consulting rate. I understand that this proceeding involves U.S. Patent No. 11,482,121 (“the ’121 Patent”) titled “Open platform for vehicle restricted region” by Weifeng Liu, Jian Zhao, Yulong Deng, and Nanning Li, and that the ’121 Patent is currently assigned to SZ DJI Technology Co., Ltd.

2. I have reviewed and am familiar with the specification of the ’121 Patent filed on November 10, 2021. I understand that the ’121 Patent has been provided as EX1001. I will cite to the specification using the following format: EX1001, 1:1-10. This example citation points to the ’121 Patent specification at column 1, lines 1-10.

3. I have reviewed and am familiar with the file history of the ’121 Patent. I understand that the file history has been provided as EX1002.

4. I understand that the ’121 Patent has a filing date of November 10, 2021. I am informed by Textron’s counsel that the ’121 Patent has an earliest possible priority date of March 31, 2015 (the filing date of International Application

No. PCT/CN2015/075625), which I have used as the priority date for the purposes of formulating my opinions.

5. In preparing this Declaration, I have also reviewed and am familiar with the prior art used in the Petition for *Inter Partes* Review of the '121 Patent and/or in my declaration below.

6. The '121 Patent describes a computer-implemented system for receiving parameters of a designated region and storing them after authenticating a user to determine whether the user is authorized to designate a parameter of the region. Ex. 1001, Cl. 1.

7. I have been asked to provide my technical review, analysis, insights, and opinions regarding the '121 Patent and the above-noted references that form the basis for the grounds of rejection set forth in the Petition for *Inter Partes* Review of the '121 Patent.

II. Qualifications

8. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. I have summarized in this section my educational background, career history, publications, and other relevant qualifications. My full curriculum vitae is attached as Appendix A to this report.

A. Educational Background

9. I received a B.S. degree in Electrical Engineering from Purdue University in 1983 with top honors, with a minor in Mathematics. I received an MBA degree in Information Systems Management from The University of Texas at Austin in 1987, also with top honors.

B. Career History

10. I have over 30 years of experience in wireless location services, including experience designing, implementing, and managing numerous location-based service (LBS) applications such as mobile social networking, family tracking, and mobile resource management, as well as working in all fields within the location services ecosystem including all forms of location determination technologies, map data, handset technologies, and associated Information Technology systems including identification, authentication, privacy, security, and other related capabilities such as network engineering and operations.

11. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002. As the President of E911-LBS Consulting,

I provide services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design and development associated with LBS, Global Positioning Satellite (GPS) systems, E911, WiFi-Based and other medium/long-range Real-Time Location Systems (RTLS), Radio Frequency Identification (RFID), Bluetooth, Near Field Communications (NFC), and beacon-based and other short-range communications/location systems, and other location determination and sensing technologies and services.

12. I have extensive expertise in all aspects of LBS delivery across the wireless location ecosystem including enabling network, map data, geospatial platform, chipset, data management, device, and location determination infrastructure and integration providers. I am an expert in all related aspects of LBS, including data privacy and security management.

13. For example, in the 1995 to 2000 timeframe, as an Associate Partner in the Communications & High Technology Practice of Accenture (one of the world's leading technology companies), I focused on using wireless location technologies to provide services to the public sector and commercial markets. In particular, from 1998 to 2000, I led the development of the LBS product/technology strategy and roadmap for Nextel Communications, Inc. My work with Nextel resulted in some of the earliest LBS applications in the U.S. market and included extensive research into the potential use of various technologies in providing and enabling a wide array of

location-based services, including Mobile Resource Management (MRM) worker tracking and vehicle/fleet management applications. This work also including leading the development of the underlying network and Information Technology architectures that would be required to support the LBS applications product strategy and roadmap.

14. In 2003, I led the development of part of AT&T Wireless's E911 infrastructure, including the development of systems, processes, and reporting infrastructure to manage and track the deployment of time difference of arrival-based location determination technologies. I managed the testing and Federal Communications Commission reporting of network location inaccuracies, with a particular focus on detecting and troubleshooting out-of-norm technology deployment and inaccurate location conditions.

15. From 2005 to 2007, I worked with NAVTEQ—the leading provider of map data and services essential to creating LBS applications—to develop the company's web developer website content and tools. Specifically, I designed and managed the site map and overall content, including the development of comprehensive technical and business web content for all NAVTEQ map product and service lines. Through the developer site, application developers and business managers became intimately familiar with map data, Geographical Information System (GIS) platforms, and location-based services to successfully develop and

launch their LBS applications. For example, I developed the content to highlight key types of map data and to provide technical details on how NAVTEQ tools can be used in LBS design for various consumer and business applications. Also in 2007 I ghostwrote a study on Traffic/dynamic map data and system providers in the United States on behalf of ABI Research, a market research consultancy.

16. I also have extensive LBS application product design and implementation experience, which includes data privacy and security management. For example, from 2007 to 2010, I managed the design, development, and launch of several consumer and business-oriented LBS applications for AT&T Mobility. These LBS applications included navigation, mobile social networking, family tracking, local search, 411-with-LBS, mobile resource management, and asset tracking. I also developed corporate-wide location data privacy policies and associated system implementation for all LBS customers.

17. My AT&T work extensively involved various aspects of worker and vehicle/fleet management tracking. In particular, I was the Product Manager for the several of the joint AT&T-Telenav Mobile Resource Management applications, as well as various fleet management solutions. This role and work required extensive knowledge of how the various applications worked, and even required design modifications in order for it to “fit into” AT&T’s network and IT infrastructure, as well as to implement AT&T’s privacy and security policies. The work also included

designing/modifying AT&T's network and IT infrastructure to allow/enable the applications to seamless work with AT&T's location infrastructure and various IT systems used for functions including Sales, Customer Care, Fulfillment, Billing/Accounts Receivable, and various network and IT operations. Among associated activities, my efforts included closely working with AT&T Legal to develop and implement AT&T's location privacy policies. These efforts in both data privacy people tracking resulted in a patent: U.S. Patent 8,613,109, titled "Method and Apparatus for Providing Mobile Social Networking Privacy," that issued on December 17, 2013, of which I was the only non-employee inventor. I am also the inventor/co-inventor on 8 other patents involving wireless, location, and associated technologies.

18. In addition to the Location-Based Services applications, enabling location technologies, wireless communications, and privacy and security experience and expertise described above, I also have many years of Information Technology experience. For example, as a consultant in the Information Technology practices of Deloitte Consulting (originally Touche Ross), Booz Allen & Hamilton, and Andersen Consulting (now Accenture), I served in key technology development and technology leadership roles in numerous projects designing and implementing mainframe, mini-computer, and client/server-based computing systems across a wide variety of industries and a wide variety of functions/applications. I also led the

design and development of a number of different communications networks associated with those computing systems, including wide- and local-area networks, utilizing both wired and wireless technologies, involving private and public (e.g. Internet-based) communications backbones. This communications system expertise includes underlying expertise in the electrical characteristics of communications signals, extending back to the early 1980s with my Electrical Engineering degree from Purdue University in 1983 and my work as an electrical engineer in the design of the Analog-to-Digital Signal Converter unit for the F-15 fighter jet radar system digitization effort while with Hughes Aircraft Company Radar Systems Division from 1983-1985.

C. Publications

19. I have authored multiple books on wireless location, including:

- *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services* (2005 and 2009 versions);
- *The Definitive Guide to Wireless E911*; and
- *The Definitive Guide to Mobile Positioning and Location Management* (co-author).

20. My curriculum vitae contains further details on my education, experience, publications, and other qualifications to render an expert opinion. Appendix A. My work on this case is being billed at my standard consulting rate,

with reimbursement for actual expenses. My compensation is not contingent upon the outcome of this *inter partes* review proceeding.

D. Materials and Other Information Considered

21. I have considered information from various sources in forming my opinions. I have reviewed and considered each of the exhibits listed above in the Table of Exhibits in forming my opinions.

III. Legal Understanding

22. I have applied the following legal principles provided to me by counsel in arriving at the opinions set forth in this report.

A. Legal Standard of Claim Construction

23. I understand that a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to all of the limitations recited in the claim or claims from which it depends.

24. I understand that the purpose of claim construction is to understand how one skilled in the art would have understood the claim terms at the time the claimed invention was made. I also understand that claim construction is a matter of law for the Patent Trial and Appeal Board to decide.

25. I understand that a claim construction analysis begins with the plain meaning or the ordinary and customary meaning of the claim term in the context of the patent in which the term is used. The ordinary and customary meaning is the meaning that the term would have to a person of ordinary skill in the relevant art at the time of the invention in light of what the patent teaches. I understand that in this

proceeding, I am supposed to apply what is known as the *Phillips* standard for claim construction, described in the *Phillips v. AWH Corp.* decision.

26. In comparing the claims of the '121 Patent to the prior art, I have carefully considered the '121 Patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

27. I understand that to determine how a person of ordinary skill would understand a claim term, one should look to those sources available that show what a person of skill in the art would have understood disputed claim language to mean. The available sources may include both evidence intrinsic and extrinsic to the patent. Intrinsic evidence includes the words of the claims themselves, the remainder of the patent's specification, including materials incorporated by reference, and the prosecution history of the patent, including materials cited and statements made during the prosecution history. Extrinsic evidence, which is evidence external to the patent and the prosecution history, may include materials concern relevant scientific principles, the meaning of technical terms, and the state of the art.

28. I understand that, in construing a claim term, one looks first to the intrinsic patent evidence. The extrinsic evidence may also be useful in interpreting the claim term when the intrinsic evidence alone is insufficient to correctly resolve the meaning.

29. I understand that words or terms, which may include phrases, should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else. In making this determination, the claims, the patent specification, and the prosecution history are of paramount importance. Additionally, the specification and prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (i.e., provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

30. I understand that the claims of a patent define the scope of the rights conferred by the patent. Patentees are required to particularly point out and distinctly claim the subject matter which they regard as their invention. Because patentees are required to define precisely what they claim their inventions are, it is improper to construe claims in a manner different from the plain import of the terms used consistent with a patent's specification. Accordingly, a claim construction analysis must begin with, and remain centered on, the claim language itself. Additionally, the context in which a term is used in the challenged claim can be highly instructive. Likewise, other claims of the patent in question, both challenged and non-challenged, can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims.

Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.

31. I understand that a person of ordinary skill in the art is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. For this reason, the words of the claim must be interpreted in view of the entire specification. The specification is the primary basis for construing the claims and provides a safeguard such that correct constructions closely align with the specification. Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim as set forth in the patent itself.

32. I understand that it is improper to place too much emphasis on the plain or ordinary meaning of a claim term without adequate grounding of that term within the context of the specification of the challenged patent. Hence, claim terms should not be broadly construed to encompass subject matter that is not supported when the claims are read in light of the invention described in the specification.

33. I understand that the role of the specification is to describe and enable the invention. In turn, the claims cannot be of broader scope than the invention that is set forth in the specification. Care must be taken because a word-by-word

definition, removed from the context of the patent, leads to an overall result that departs significantly from the patented invention.

34. I understand that claim terms must be construed in a manner consistent with the context of the intrinsic record. In addition to consulting the specification, one should also consider the patent's prosecution history. The prosecution file history provides evidence of how both the Patent Office and the patentee understood the terms of the patent, particularly in light of what was known in the prior art. Further, where the specification describes a claim term broadly, arguments and amendments made during prosecution may require a narrower interpretation.

35. I understand that while intrinsic evidence is of primary importance, extrinsic evidence, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may help one better understand the underlying technology and the way in which one of skill in the art would understand the claim terms. Extrinsic evidence should not be considered, however, divorced from the context of the intrinsic evidence. Evidence beyond the patent specification, prosecution history, and other claims in the patent should not be relied upon unless the claim language is ambiguous in light of these intrinsic sources. Furthermore, while extrinsic evidence can shed useful light on the relevant art, it is less significant than the intrinsic record in determining the legally operative meaning of claim language.

36. I understand that in general, a term or phrase found in the introductory words of the claim, referred to as the preamble of the claim, should be construed as a limitation if it recites essential structure or steps, or is necessary to give life, meaning, and vitality to the claim. Conversely, a preamble term or phrase is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. In making this distinction, one should review the entire patent to gain an understanding of what the inventors claim they actually invented and intended to encompass by the claims.

37. I understand that language in the preamble may limit claim scope (i) if dependence on a preamble phrase for antecedent basis indicates a reliance on both the preamble and claim body to define the claimed invention; (ii) if reference to the preamble is necessary to understand limitations or terms in the claim body; (iii) if the preamble recites additional structure or steps that the specification identifies as important; or (iv) if the patentee relied on the preamble during prosecution to distinguish the prior art.

38. I understand that claim limitations may be stated in means-plus-function format in which a term is defined by functional language without a defined structure. In particular, I understand that a means-plus-function limitation should be interpreted to cover the recited function, and only the corresponding structure

described in the specification, and equivalents thereof. I also understand that a limitation will be presumed to be a means-plus-function limitation if (a) the claim limitation uses the phrase “means for”; (b) the “means for” is modified by functional language; and (c) the phrase “means for” is not modified by sufficient structure for achieving the specified function.

39. I understand that a structure will be considered structurally equivalent to the corresponding structure identified in the specification only if the differences between them are insubstantial. For example, a structure may be deemed to be a structural equivalent to the corresponding structure where the structure performs the same function in substantially the same way to achieve substantially the same result. I further understand that a structural equivalent must have been available at the time of the issuance of the claim.

40. I understand that an indefinite article “a” or “an” in patent parlance carries the meaning of “one or more” in open-ended claims containing the transitional phrase “comprising.” I understand that, unless the claim is specific as to the number of limitations, the article “a” receives a singular interpretation only in rare circumstances when the patentee evinces a clear intent to so limit the article, and thus, under this conventional rule, the claim limitation “a,” without more, requires “at least one.”

B. Legal Standard for Anticipation

41. I understand that, once the claims of a patent have been properly construed, the next step in determining anticipation of a patent claim requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

42. I understand that a patent claim is invalid based on anticipation if a single prior art reference discloses all of the features of that claim in a way that enables one of ordinary skill in the art to make and use the invention. Each of the claim features may be expressly or inherently present in the prior art reference. I understand that if the prior art necessarily functions in accordance with, or includes a claim's feature, then that prior art inherently discloses that feature. I have relied on this understanding in expressing the opinions set forth below.

43. I understand that a prior art reference describes the claimed invention if it either expressly or inherently describes each and every feature set forth in the claim; *i.e.*, in determining whether a single item of prior art anticipates a patent claim, one should take into consideration not only what is expressly disclosed in that item, but also what is inherently present as a natural result of the practice of the system or method disclosed in that item.

44. I understand that to establish inherency, the evidence must make clear that the missing descriptive matter is necessarily present in the item of prior art and

that it would be so recognized by persons of ordinary skill in the art. I also understand that prior art use of the claimed patented invention that was accidental, unrecognized, or unappreciated at the time of filing can still be an invalidating anticipation.

45. I understand that although multiple prior art references may not be combined to show anticipation, additional references may be used to interpret the allegedly anticipating reference and shed light on what it would have meant to those skilled in the art at the time of the invention. These additional references must make it clear that the missing descriptive matter in the patent claim is necessarily present in the allegedly anticipating reference, and that it would be so recognized by persons of ordinary skill in the art.

46. I have written this report with the understanding that in an *inter partes* review anticipation must be shown by a preponderance of the evidence.

C. Legal Standard of Obviousness

47. I understand that even if a patent is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the pertinent art.

48. I understand that a person of ordinary skill in the art provides a reference point from which the prior art and claimed invention should be viewed.

This reference point prevents a person of ordinary skill from using one's insight or hindsight in deciding whether a claim is obvious.

49. I also understand that an obviousness determination includes the consideration of various factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the challenged claims, (3) the level of ordinary skill in the pertinent art, and (4) the existence of secondary considerations, also referred to as objective considerations, of non-obviousness.

50. I am informed that objective considerations of non-obviousness may include (1) a long felt but unmet need in the prior art that was satisfied by the invention of the patent; (2) failure of others where the invention succeeds; (3) commercial success or lack of commercial success of processes covered by the patent; (4) unexpected results achieved by the invention; (5) praise of the invention by others skilled in the art; (6) taking of licenses under the patent by others; and (7) deliberate copying of the invention. I also understand that there must be a relationship or nexus between any such objective considerations and the claimed invention. I am aware of no such evidence relevant to this case. If any such evidence is introduced by the Patent Owner, I reserve the right to consider that evidence at such time. I further understand that contemporaneous and independent invention by others is an objective consideration supporting an obviousness determination.

51. I understand that an obviousness evaluation can be based on a combination of multiple prior art references. I understand that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but other times the nexus linking two or more prior art references may be the background knowledge of one of ordinary skill or simple common sense. I further understand that an obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

52. I understand that if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

53. I also understand that practical and common-sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I further understand that a person of ordinary skill in the art looking to overcome a problem will often be able to fit the teachings of multiple publications together like pieces of a puzzle, although the prior art need not be like two puzzle pieces that must fit perfectly together. I understand that obviousness analysis therefore considers the inferences and creative steps that a person of ordinary skill in the art would employ under the circumstances.

54. I understand that a particular combination may be proven obvious by showing that it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp because the result is likely the product not of innovation but of ordinary skill and common sense.

55. I understand that the combination of familiar elements according to known methods may be proven obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, obviousness likely bars its patentability.

56. It is also my understanding that there are additional considerations that may be used as further guidance as to when a claim is obvious, including the following:

- the claimed invention is a simple substitution of one known element for another to obtain predictable results;
- the claimed invention uses known techniques to improve similar devices or methods in the same way;

- the claimed invention applies a known technique to a known device or method that is ready for improvement to yield predictable results; and
- there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.

57. It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

58. I understand that a claim can be obvious in light of a single reference, without the need to combine references, if the limitations of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art.

59. I understand that a person of ordinary skill could have combined two pieces of prior art or substituted one prior art element for another if the substitution can be made with predictable results, even if the swapped-in element is different from the swapped-out element. In other words, the prior art need not be like two puzzle pieces that must fit together perfectly. The relevant question is whether prior art techniques are interoperable with respect to one another, such that that a person

of skill would view them as a design choice, or whether a person of skill could apply prior art techniques into a new combined system.

60. In sum, my understanding is that prior art teachings are properly combined where a person of ordinary skill in the art having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of limitations recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the limitations of multiple prior art references in the claimed manner.

61. I have been informed and understand that the obviousness analysis requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

62. I understand that in an *inter partes* review obviousness must be shown by a preponderance of the evidence.

D. Level of Ordinary Skill in the Art

63. I understand that a person of ordinary skill in the relevant art (“POSITA”) is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity—not an automaton.

64. I have been asked to consider the level of ordinary skill in the field that someone would have had at the time the claimed invention was made. In deciding the level of ordinary skill, I considered the following:

- the levels of education and experience of persons working in the field;
- the types of problems encountered in the field; and
- the sophistication of the technology.

65. My opinion below explains how a POSITA would have understood the technology described in the references I have identified herein around the March 2015 timeframe.

66. As of the earliest claimed priority date, a POSITA would be a person with a B.S. degree in electrical engineering, computer engineering, or equivalent training or job experience, along with 1-2 years of experience in the field of GPS-based object tracking, location-based-services, and/or geofencing. Additional education could compensate for less practical experience and vice versa.

IV. The '121 Patent

A. Overview of the '121 Patent

67. The '121 Patent contains four independent claims (Claims 1, 18, 24, and 28), and twenty-six dependent claims. The claims of the '121 Patent are directed to the concept of forming a restriction region and triggering an alarm or other automated response if a ground vehicle is determined to be near or within the restriction region.

68. The '121 Patent states that “it may be desirable to provide a platform for managing flight restriction regions for aerial vehicles” and purportedly provides a method of collecting information regarding a plurality of flight restriction regions. EX1001, 1:32-34; 1:46-47. The '121 Patent also purports to provide “centralized management for inputting, managing, and accessing flight restriction regions.” *Id.*, 1:34-36.

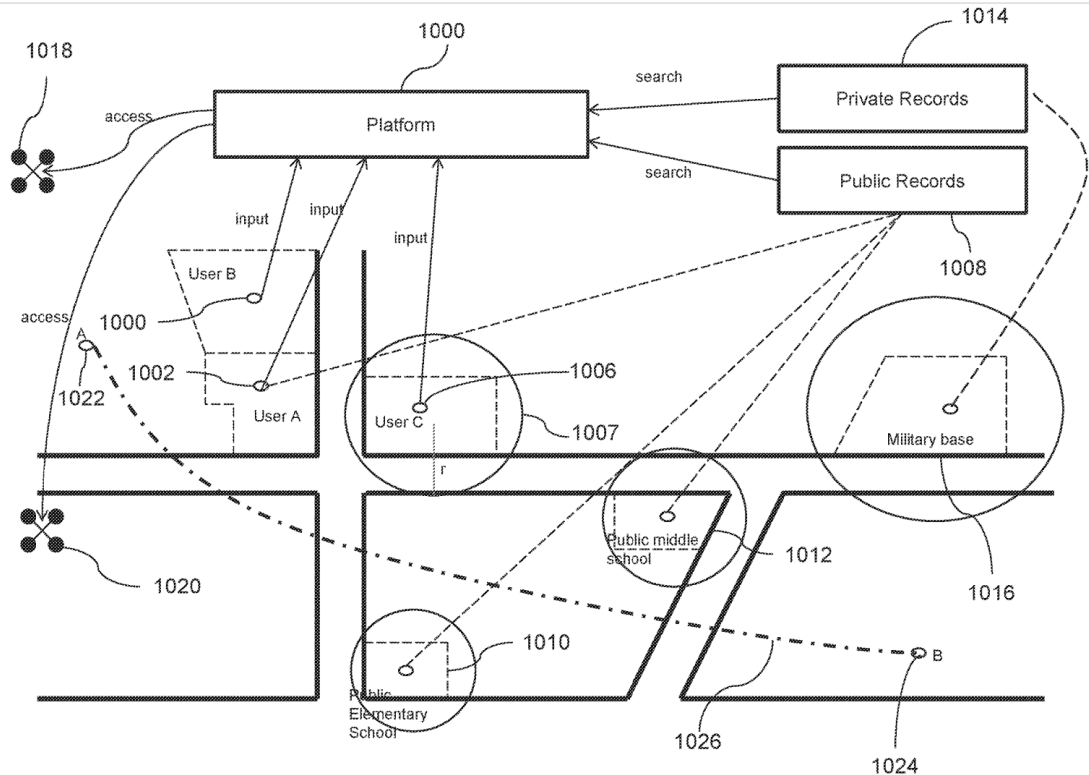


FIG. 10

69. As depicted in Fig. 10, the '121 Patent describes that the platform may interact with various users, external data sources, etc. EX1001, Fig. 10, 38:31-33. The platform may provide an interface for various users to input parameters of flight restriction regions. EX1001, 38:33-37. The platform comprises or is associated with an authentication mechanism, or an approval process. EX1001, 38:49-51. The '121 Patent also states that the platform may gather parameters of the user input flight restriction regions and may “aggregate the information” and store the parameters of flight restriction regions in a database. EX1001, 38:55-65; 39:16-27.

B. Prosecution History of the '121 Patent

70. The continuation application that led to the issuance of the '121 Patent was filed on November 10, 2021. EX1002, p.1. On January 31, 2022, the Examiner issued an office action rejecting then pending claims 1-30 for lack of patentable subject matter and obvious over U.S. Pub. No. 2014/0018979 (“Goossen”) in view of U.S. Pub. No. 2013/0269013 (“Parry”). EX1002, p.142.

71. In response to the Office Action, the Patent Owner responded on April 13, 2022, to amend the claims. The Patentee argued that the amended claims are patentable because Goossen and Parry did not teach “the designated restriction region include[ing] at least a location associated with a private property.” EX1002, p.332.

72. Given the Examiner’s objection and allowance of the amended and new claims, the Examiner apparently did not locate prior art teaching “the designated restriction region include[ing] at least a location associated with a private property.” As is disclosed herein, however, such features have been well-known and disclosed within the art for over ten years prior to the earliest conceivable priority date of the '121 Patent. See §VIII.C.3, §IX.C.3, §XII.C.4, §XII.F.3, *infra*. If the Examiner had the benefit of the art presented in this petition, Petitioner submits that the amended and new claims would never have been allowed.

V. The Challenged Claims

73. The '121 Patent has 30 claims. I understand that Petitioner is challenging the patentability of Claims 1-30 of the '121 Patent in the Petition for *Inter Partes* Review. I have considered the patentability of Claims 1-30.

VI. Claim Construction

74. For the purposes of the particular grounds of patentability in this petition, I have been instructed that the challenged claims of the '121 Patent are to be given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention in light of the specification and the prosecution history pertaining to the patent. I have followed these principles in my analysis set forth in this document.

VII. Overview of the Prior Art and Grounds of Unpatentability

A. Summary of the Grounds

75. Below I will explain why all claims of the '121 patent are anticipated or rendered obvious by the disclosures of Humphries (EX1004), Marcus (EX1005), Morgan (EX1006), Cronin (EX1007), and/or Borugian (EX1008). I note that in this discussion, I may focus on the particular language in specific claims, but it should be understood that my analysis applies to the corresponding limitations of all claims containing identical or substantially identical language. The grounds of unpatentability I present below are as follows:

Ground	Claims	Statutory Basis (35 U.S.C. §)	Prior Art
1A	1-3, 8, 10, 11, 16, 17, 18, 22, 23	102	<i>Humphries</i>
1B		103	
2	1-3, 8-11, 16-23	103	<i>Humphries, Marcus</i>
3A	4-7	103	<i>Humphries, Morgan</i>
3B		103	<i>Humphries, Marcus, Morgan</i>
4A	12-15	103	<i>Humphries, Cronin</i>
4B		103	<i>Humphries, Marcus, Cronin</i>
5	24-26, 28-30	103	<i>Humphries, Borugian</i>
6	27	103	<i>Humphries, Borugian, Morgan</i>

B. Overview of the Prior Art Used in the Grounds

1. Overview of Humphries (EX1004)

76. Humphries discloses a system for managing a restriction region as is claimed by the '121 Patent. Humphries discloses a device tracking location adherence and route adherence technology that provides a tracked device receiving “a set of coordinates associated with a boundary area.” See EX1004, Abstract. Humphries’s system comprises “tracked devices 120, a data center 140, and a client 160” and various applications, including location adherence application 124, route adherence application 126, and alert generation application 128:

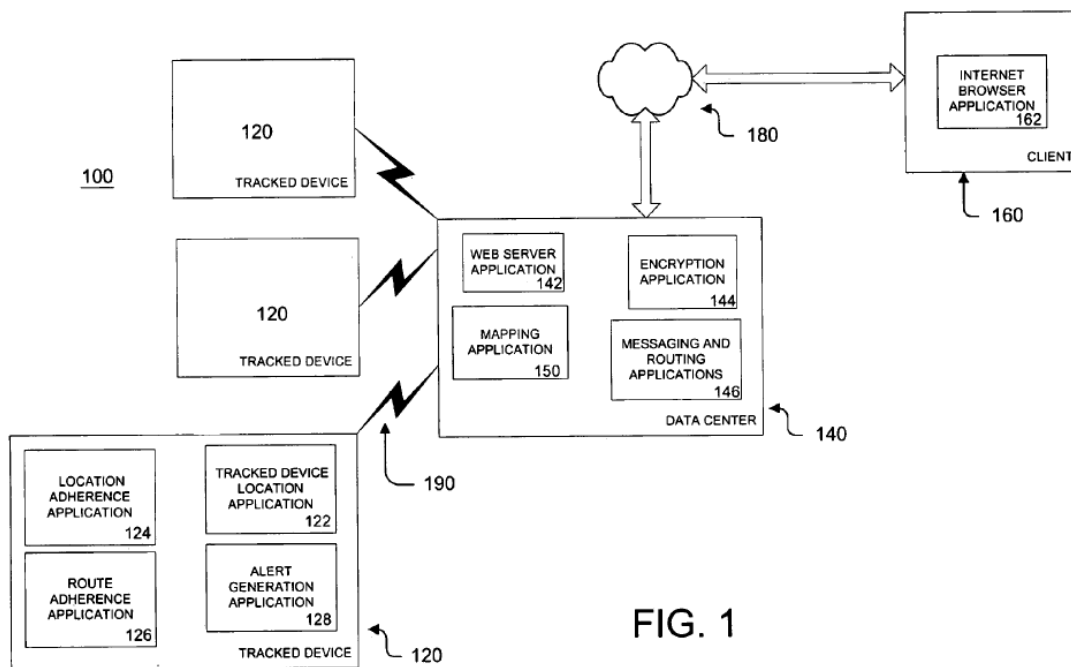


FIG. 1

See EX1004, 3:58-61, Fig. 1.

77. Humphries teaches that geofences can be created by a user of a mapping application, who can “create geofence object(s) that can be associated with the tracked devices 120 (*e.g.*, associated with a vehicle such as an automobile, truck or the like).” EX1004, 4:26-32; 5:18-29. The user can view or interact with the mapping application 150 via a “user interface display,” as depicted in Figure 2 (annotated):

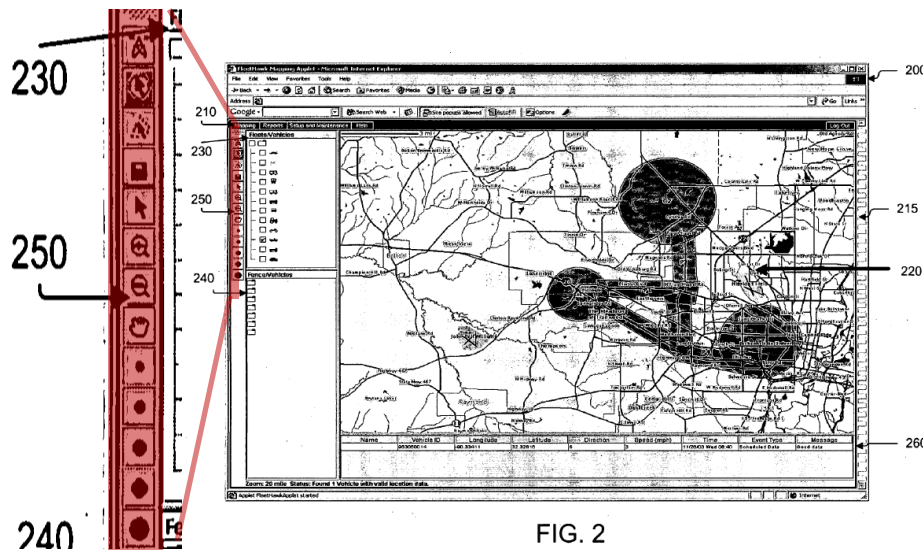


FIG. 2

EX1004, 2:60-62. Humphries’s geofence objects can include a region on the map that encompasses residential and commercial areas that include at least a location associated with a private property. EX1004, Fig. 2.

78. Humphries goes on to explain that “various securities for authentication and authorization can be employed to ensure that only authorized users are accessing the system.” EX1004, 6:35-38. For example, a login screen can be used “where the user enters a username and a password to gain access” and the username and password “are used to authenticate [the identity of] the user.” EX1004, 6:38-42.

79. Once the user creates the geofence objects, “the mapping application 150 resolves the boundaries into a set of coordinates (e.g., latitude and longitude).” EX1004, 5:30-33. Based on the coordinates and the tracked device’s location, Humphries explains that the system can determine “whether the tracked device is inside the boundary area or outside the boundary area,” or the tracked device has diverted from the specific routes. EX1004, 2:9-12; 11:18-12:3. If the device has crossed the geofence or diverted from the specific routes and left the geofence objects, “an alert signal is generated.” EX1004, at 13-15.

2. Overview of Marcus (EX1005)

80. Marcus discloses systems receiving position information from a user associated with a private property, and forming restricted airspace for drone operation near the private property based on the position information. EX1005, abstract, [0022]; EX1011, abstract, [0010]. Property owners “may prevent, control, calibrate, or monitor [the drone’s] access to a private area and/or a controlled area.” EX1005, [0017]; EX1011, [0005]. And property owners “may be required to verify ownership or control of the property” to input address or location information of the private property into a database. *Id.*

3. Overview of Morgan (EX1006)

81. Morgan teaches establishing geofences, receiving signals indicative of a location of the tracked vehicle, and sending an alert if it is determined that the

vehicle has crossed the geofence. EX1006, abstract, [0025], [0069]. Fig. 7 of Morgan describes “[t]he method of establishing a geo-fence at a predetermined time and for the duration of a preset duration.” EX1007, Fig. 7 (annotated); [0069].

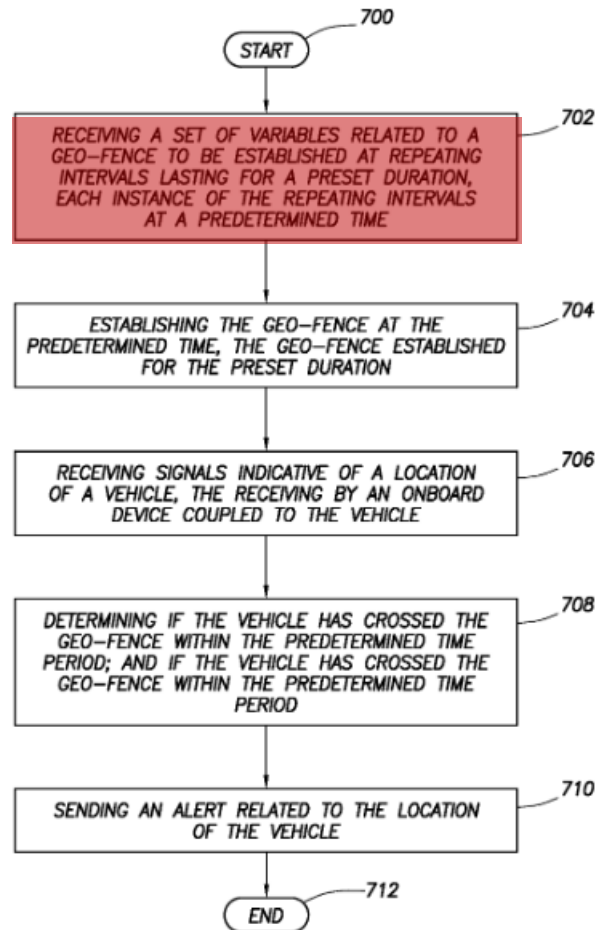


FIG. 7

82. Morgan further teaches that the geofence can be established at repeating intervals lasting for a preset duration, and each instance of the repeating intervals can start at a predetermined time. See *e.g.*, EX1006, abstract, [0035], [0040], [0044], [0051], [0069]. Morgan teaches that the geofence may establish “every day; every week day; every weekend day; every third day, or every work day.” EX1006, [0035].

4. Overview of Cronin (EX1007)

83. Cronin teaches a geo-function setting that sets boundaries relating to when alerts may be presented to a user, and the system may download information from a third-party database regarding one or more geographic locations that are associated with one or more geofences. EX1007, Abstract; 1:14-19; 3:20-23; 6:18-33. Cronin teaches that the geofencing can be defined as a user-defined location 104, user-defined route 116, third party defined-location (or route) 136, remote user-defined (location or route) 160, via a beacon 176, or via a contact card 172. EX1006, Fig. 1, 3:32-36.

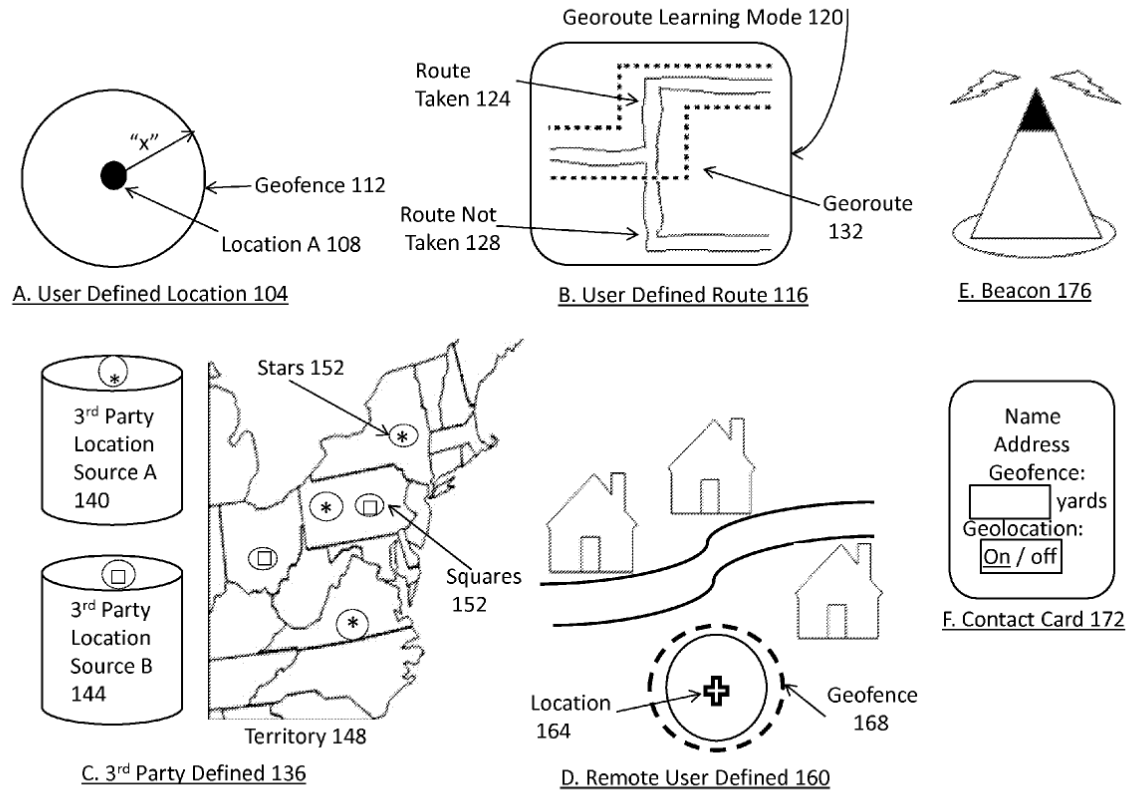


FIGURE 1

84. Cronin teaches that an example of third-party databases may include “a historical society,” “safety.org,” and “Offenderregistry.org.” EX1007, 5:1-4; 6:18-21.

5. Overview of Borugian (EX1008)

85. Borugian discloses methods for ensuring route adherence and does so by determining whether a “vehicle has deviated from the planned route.” EX1008, 2:56-60. Borugian discloses that the system may detect the vehicle (1) has deviated from a route more than an acceptable deviation radius, or (2) has entered or is

approaching a perimeter around a restricted area. EX1008, 3:34-48; 4:1-12; 12:1-8; 12:38-66. Borugian also discloses controlling a vehicle by defining a perimeter around a restricted area and “[w]hen it is determined that a location of the vehicle is inside the perimeter around the restricted area, the vehicle is shut down.” EX1008, 4:1-4; 1:55-60. If the vehicle has not returned to the authorized area within a predetermined time period (or entered an authorization code), vehicle shut down begins. EX1008, 12:1-31, 38-66.

VIII. Asserted Grounds 1(A) and 1(B) of invalidity: Claims 1-3, 8, 10, 11, 16, 17, 18, 22, and 23 are unpatentable as 1(A) Anticipated OR 1(B) Obvious over Humphries.

86. Based on the following analysis, I conclude that a POSITA at the relevant time would have understood the limitations of claims 1-3, 8, 10, 11, 16, 17, 18, 22, and 23 of the ’121 patent were expressly disclosed, described, or taught by Humphries. To the extent that an argument is made with reference to a particular element as not being “expressly” disclosed, I conclude that a POSITA at the relevant time would have found that element obvious.

A. Claim 1

1. [1pre] A system for managing a restriction region, the system comprising:

87. To the extent the preamble is limiting, Humphries discloses [1pre]. Humphries discloses systems for managing a restriction region. EX1004, Abstract (“A device tracking location adherence and route adherence technology, is disclosed

that provides a tracked device receiving, a set of coordinates associated with a boundary area, and obtaining a position of the tracked device.”); 3:58-61 (disclosing “a device tracking system 100 and related components” comprising “tracked devices 120, a data center 140, and a client 160.”).

88. The systems disclosed by Humphries can manage a restriction region by creating, editing, and grouping the restriction region. EX1004, 4:26-32 (disclosing that a user, “once the mapping application is accessed,” can create “geofence object(s) that can be associated with the one or more tracked devices 120 (e.g., associated with a vehicle such as an automobile, truck or the like) as boundaries for tracking the movements of the tracked device 120.”); 5:27-29 (“The user can then create and edit the specific geofence in accordance with the user’s desires.”); 7:4-9 (disclosing that the geofence objects “can be grouped in accordance with the user’s wishes”); 1:8-10; 1:44-50 (describing that “geofencing has been utilized . . . to depict areas in which tracked objects *are to be confined*.”).

89. Humphries discloses that a geofence object is a restriction region as claimed because it corresponds to a geographic region of a map and “*depicts areas in which tracked objects are to be confined*.” EX1004, 1:44-50; 5:23-25; 5:30-34. Humphries describes that a geofence object “is one or more sets of *geographic boundaries* used to monitor tracked device 120.” EX1004, 5:23-25.

90. Figure 2 illustrates **geofenced objects 220** (annotated below **red**), which represent a region of a map to which fleet vehicles may be confined:

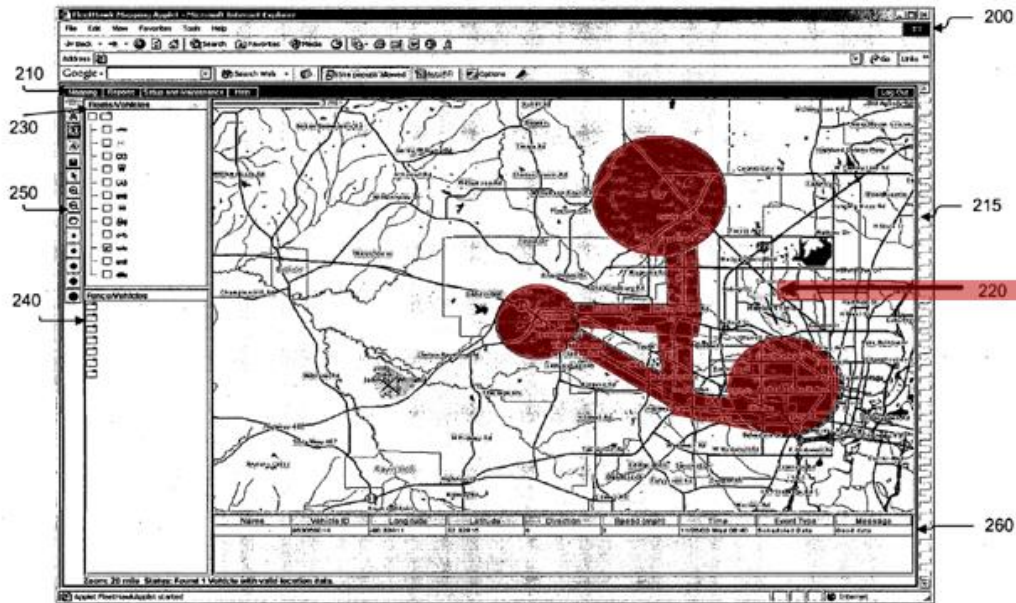


FIG. 2

EX1004, 7:1-3 (“The mapping window 215 shows the current **geofence objects 220** that are associated with the highlighted vehicle”).

91. Humphries discloses confining vehicles to the region encompassed by the geofence object (*e.g.*, object 220 above) by “ensuring route adherence” of one or more vehicles in a fleet. EX1004, 1:8-12; Figs. 4-6; 8. Humphries ensures route adherence of vehicles to their associated geofences with a “location adherence application 124,” “route adherence application 126,” and “alert generation application 128.” EX1004, 5:61-6:21; Figs. 4-6; 8:1-4; 9:6-8; 9:30-35.

92. Location adherence application 124 determines whether the tracked device moves “into a geofence object or out of a geofence object boundary since the

last location determination,” while route adherence application 126 “determine[s] if the tracked device is progressing along a predetermined route of geofenced objects.” EX1004, 5:61-6:5. Then, if the geofence object boundary has been violated, “alert generation application 128 acts in concert with transmission hardware . . . to generate and transmit an alert to data center 140 when either the location adherence application 124 or the route adherence application 126 determines that an alert should be sent.” EX1004:6:16-21. Accordingly, Humphries’s geofenced objects disclose the claimed “restriction region.”

2. [1a] one or more processors configured to:

93. Humphries discloses one or more processors that are configured to perform the claimed functions. For example, Humphries discloses details of computing system 700 employed within tracked device 120, including “processor 903” which executes the “instructions” of tracked device 120. EX1004, 12:14-51. Humphries also explains “[t]he tracked device 120 can be implemented using one or more general purpose computer systems, microprocessors, digital signal processors, micro-controllers, etc., programmed according to the teachings of the embodiments of the present invention (e.g., using the computer system of FIG. 9).” EX1004, 12:4-9. In addition, Humphries discloses a computer system 1000 that implements the data center 140 and the client 160, which can include a “processor 1003” for processing information. EX1004, 12:52-65. The processor 1003 executes “one or

more sequences of one or more instructions” and causes the computer system to “perform assigned processing steps of the invention.” EX1004, 13:42-51. Further, one or more processors in a multi-processing arrangement “also can be employed to execute the sequences of instructions” according to Humphries. EX1004, 13:51-54. It would have been understood and/or obvious to the POSITA that the “instructions” executed by the processors 903 and 1003 correspond to the functions recited in Claim 1, including those recited in claim elements [1b]-[1f], *infra*. For example, a POSITA would recognize that the operations of Humphries were to be performed by the one or more processors because it was well-known to use processors to execute software stored in the memory of the computer at the time of filing (and long before). Thus, a POSITA would recognize that the operation of receiving the coordinates at the processor to perform the remaining operations was obvious in Humphries. *See id.* 12:14-51; 4:43-45 (“it is to be appreciated that any of the various applications or components described above can be located on one or servers or processors”).

94. Therefore, Humphries discloses this claim limitation or at the very least renders it obvious, to the extent it is argued that the one or more processors are not expressly configured to perform the claimed functions.

3. **[1b] receive one or more parameters of a designated restriction region for a ground vehicle, the one or more parameters being input by a user via a user interface, wherein the one or more parameters of the designated**

restriction region include at least a location associated with a private property;

95. Humphries discloses that the one or more processors are configured to receive one or more parameters of a designated restriction region for a ground vehicle, the one or more parameters being input by a user via a user interface. For example, Humphries teaches that the processor 1003 can receive information from “input devices,” such as a keyboard, and a “pointing device,” such as a mouse, using which to interact with a computer user and communicate direction information and command selections. EX1004, 13:7-18. Further, the user can view or interact with the mapping application 150 via a “user interface display,” as depicted in Figure 2 (annotated):

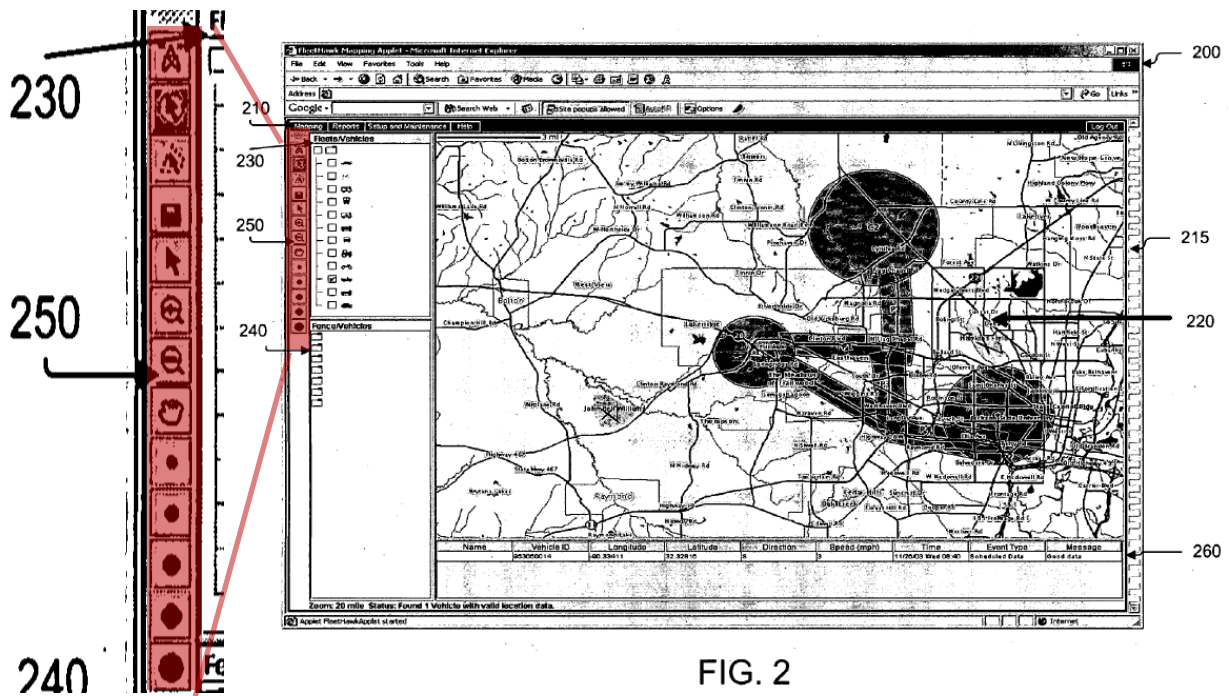
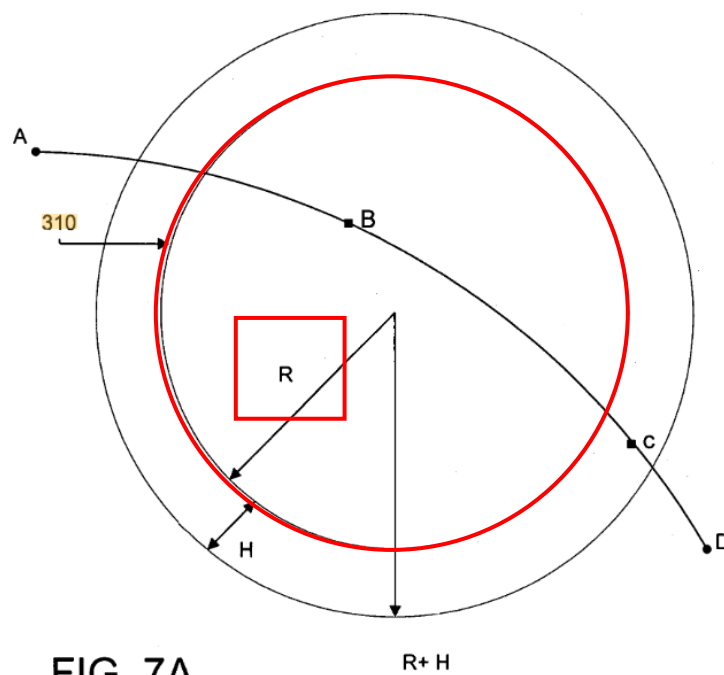


FIG. 2

EX1004, 2:60-62. The user can create and edit the geofence objects by using the mapping application 150. EX1004, 5:18-29. Specifically, the user can input one or more parameters, such as the boundaries of the geofence objects, by using **the tools** illustrated in the drawing window 250 to draw the boundaries. EX1004, 7:4-6 (The user can “utilize the tools located in the drawing window 250 to create geofence objects in the mapping section 210.”); 5:23-25 (“A geofence object . . . is one or more sets of geographic boundaries used to monitor tracked device 120.”).

96. The one or more parameters, such as boundaries of the geofence objects, designate a restriction region for a ground vehicle. EX1004, 4:26-32 (geofence object(s) “can be associated with the one or more tracked devices 120 (*e.g.*, associated with a *vehicle* such as an automobile, truck or the like) as boundaries for tracking the movements of the tracked device 120.”); 5:42-46 (The tracked device 120 “is associated with an object that is being tracked,” which “is a vehicle (*e.g.*, cars, boats, trucks, trains)”).

97. For example, Figure 7A of Humphries “depicts circular geofence 310.” EX1004, 10:20; Fig. 7A (annotated). A POSITA would have understood that the circular shape and the radius R are input by the user to define the boundary of this circular geofence object.



98. Figure 7B of Humphries, as shown below, “depicts [a] polygon geofence 350.” EX1004, 10:49. A POSITA would have understood that points ABCDEFG are input by the user to define the boundary of this polygon geofence object that has an irregular shape.

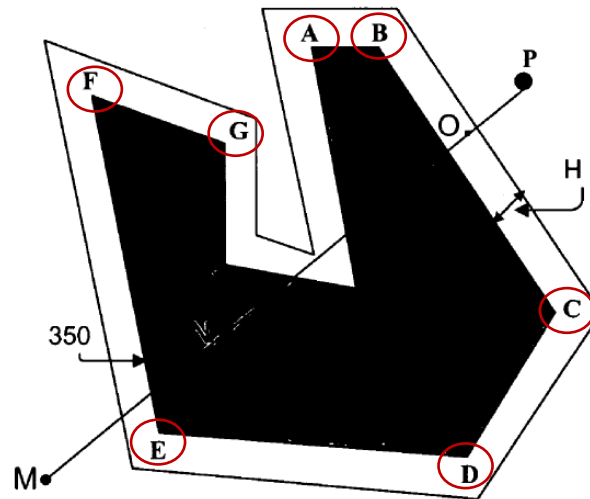


FIG. 7B

EX1004, Fig. 7B (annotated).

99. Further, the one or more parameters of the designated restriction region in Humphries include at least a location associated with a private property. The '121 patent does not define “private property,” although the specification uses “a residential or commercial building” as an example of private property whereas “parks” are given as an example of public property. EX1001, 15:17-19. Thus, Humphries discloses this claim element at least as illustrated in Figure 2, where the geofence objects represent a region on the map that encompasses residential and commercial areas that include at least a location associated with a residential or commercial building—such as those that a POSITA would have understood to exist, for example, within the city of Clinton, Mississippi, illustrated in the figure below. EX1004, Figure 2 (annotated).

4. [1c] authenticate an identity of the user to determine whether the user is authorized to designate the restriction region;

102. Humphries discloses this element. Humphries discloses that the mapping application 150 “can be employed by a user, at client 160, once logged into the data center via the web server 142.” EX1004, 5:18-21. Humphries discloses that “various securities for authentication and authorization can be employed to ensure that only authorized users are accessing the system.” EX1004, 6:35-38. For example, for the user to be authorized to access the mapping application 150, a login screen can be used “where the user enters a username and a password to gain access” and the username and password “are used to authenticate [the identity of] the user.” EX1004, 6:38-42. A POSITA would have understood that the user will not be able to use the mapping application 150 to designate the restriction region without being authorized (“logged into the data center”) to do so, and the user’s identity is authenticated during this process to determine whether the user is authorized to designate the restriction region.

103. Humphries further discloses that the one or more processors are configured to perform this step. EX1004, 12:14-51 (disclosing details of computing system 1000 that implements the data center 140 and the client 160, including “processor 1003” for “processing the information” and executing “instructions”). It would have been understood by a POSITA that the “information” may correspond

to the user's username and password, and the "instructions" may correspond to the authentication function described above.

104. Accordingly, Humphries teaches this claim element [1c].

5. **[1d] in response to determining the user is authorized to designate the restriction region, store the one or more parameters of the designated restriction region to a database;**

105. As noted in the above, Humphries teaches that "authentication and authorization can be employed to ensure that only authorized users are accessing" the mapping application 150 to designate the restriction region. §VIII.A.4. A POSITA would have understood that the one or more parameters would and could be stored only if it is determined that the user is authorized to designate the restriction region. Humphries also teaches that the one or more processors are configured to store the one or more parameters of the designated restriction region, *e.g.*, the boundaries of the geofence objects, to a database. EX1004, 7:9-12 ("once the geofence objects are created, they can be . . . saved to a database in the data center 140."). As discussed above, it would have been understood by a POSITA that the "instruction" processed by "processor 1003" may correspond to saving the boundaries of the geofence objects to a database in the data center 140.

106. Additionally, Humphries also teaches that "[o]nce the geofence objects are created" after determining the user is authorized to designate them, "the mapping application 150 resolves the boundaries into a set of coordinates" and the set of

coordinates can be transmitted and forwarded “to the associated tracked device 120 for storage and use.” EX1004, 5:30-38. A POSITA would have understood that the “processor 903” is configured to store the one or more parameters of the designated restriction region, *i.e.*, the boundaries of the geofence objects represented by the set of coordinates, to a database within the tracked device 120 where the coordinates are stored.

107. Accordingly, Humphries discloses the limitations of [1d].

6. [1e] associate one or more response measures with the designated restriction region based on the one or more parameters; and

108. Humphries discloses that the tracked device 120 is configured to send an alert if it is determined that the device’s status has changed with respect to being inside or outside the boundary of the geofence object (designated restriction region). EX1004, at 3:33-39; 5:39-44; 6:2-5; 6:12-15; 6:18-32; 11:13-17. Providing an alert is one of the claimed response. EX1001, Claim 1 (claiming that the one or more response types are implemented by at least “providing an alert”).

109. As disclosed in Figure 1 (annotated below), **tracked device 120** includes various applications, including location adherence application 124, route adherence application 126, and **alert generation application 128**:

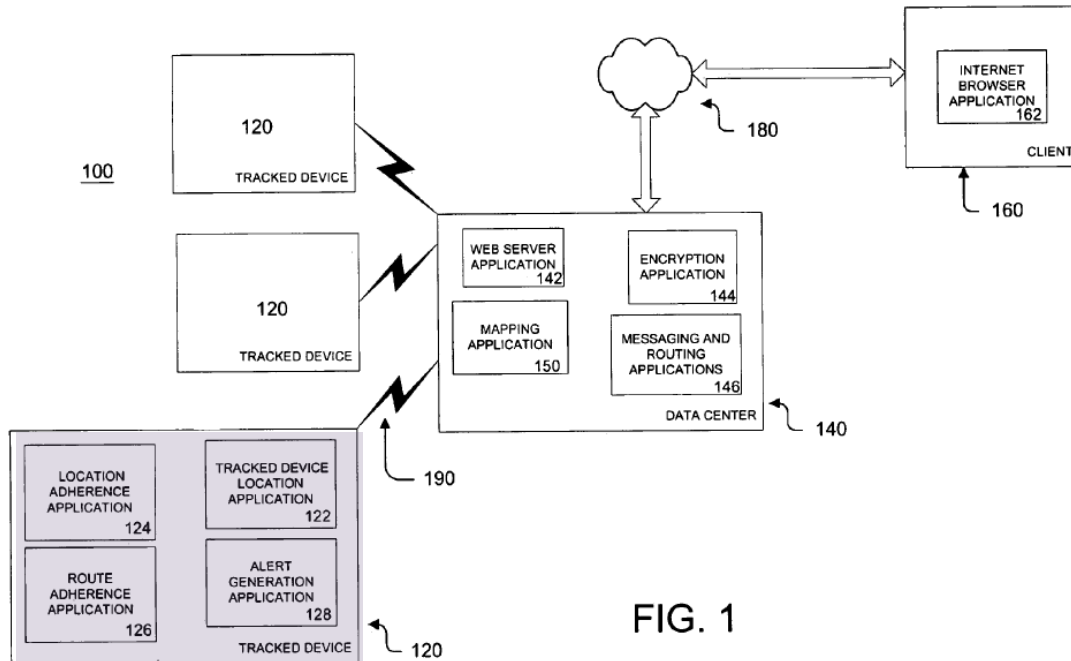


FIG. 1

110. Humphries discloses that after receiving the coordinates of a geofenced object, “a determination is made as to whether the tracked device is located inside the boundary area or outside the boundary area. An alert signal is then generated and transmitted if the result of the determining is different from an immediately previously obtained result.” EX1004, 3:33-39. Humphries thus discloses associating the generation of an alert with the geofence object based on the boundaries of the designated restriction region.

111. For example, “if the object has moved into or out of a geofence object, the alert generation application is able to send an alert message to the data center 140.” EX1004, 6:3-6. As another example, “if the object is determined to not be moving in accordance with the predetermined route of geofence objects, the alert

generation application is able to send an alert message to the data center 140.” EX1004, 6:12-15. More specifically, the alert generation application 128 (shown above to be part of tracked device 120), “acts in concert with transmission hardware . . . to generate and transmit an alert to datacenter 140 when either the location adherence application 124 or the route adherence application 126 determines that an alert should be sent.”

112. Additionally, Humphries discloses details of computing system 700 employed within the tracked device 120, including “processor 903” for “processing the information” and executing “instructions.” EX1004, 12:14-25. It would have been understood to the POSITA that the “instructions” correspond to the functions performed by the location or route adherence applications and the alert generation application described above, such as generating an alert after determining whether the tracked device is located inside or outside the boundary of the geofence object. Therefore, Humphries discloses claim element 1[e] by teaching that the one or more processors are configured to associate the alert message with the geofence object based on its boundaries.

7. **[1f] implement the one or more response measures to affect operation of the ground vehicle along a travel path when the ground vehicle is within or near the designated restriction region, by at least one of (a) forcing the ground vehicle to change direction and move away from the**

designated restriction region, (b) forcing the ground vehicle to stop, or (c) providing an alert.

113. Humphries teaches at least one alternative in the claimed Markush group, “providing an alert.”

114. As discussed above, Humphries discloses that the one or more processors are configured to implement the one or more response measures, *e.g.*, “providing an alert,” if it is determined that the device’s status has changed with respect to being inside or outside the boundary of the geofence object (designated restriction region). §VIII.A.6. To the extent that Patent Owner argues the claim requires the alert be actually used to affect operation of the vehicle (*e.g.*, by the vehicle operator receiving the alert), such an interpretation would be requiring an intended result or purpose of the alert and thus should not be required by this limitation. Regardless, a POSITA would have understood, or at least found obvious, that when a user of a vehicle is provided with an alert regarding the operation of the vehicle within a restriction region, such an alert would cause the vehicle operator to change the operation of the ground vehicle to comply with the alert. §VIII.A.3.

115. Humphries further discloses that an alert is provided when the ground vehicle moves into a geofence object. For example, Humphries discloses that if the tracked device is determined to be inside the geofence object(s), and the previous location is outside the geofence object(s), then the location adherence application
124 “concludes that the tracked device has changed status by moving inside a

geofence group,” and the alert generation mechanism 128 will generate and transmit an alert message to the data center 140. EX1004, 8:30-42; 8:60-9:5.

116. Alternatively, Humphries discloses that an alert is provided when the ground vehicle leaves a geofence object. For example, the route adherence application can monitor the tracked device as it travels a specific route of geofence objects, and an alert is generated when it is determined that the traced device has left the geofence object. EX1004, 11:18-12:3. Thus, Humphries discloses that an alert is provided when the tracked device, which is associated with a ground vehicle, diverts from the specific route, leaves the geofence objects, and becomes near the designated restriction region.

117. Accordingly, Humphries discloses claim element [1f].

B. Claim 2

1. [2] **The system of claim 1, wherein the one or more processors are further configured to: display the designated restriction region at the user interface.**

118. Humphries discloses Claim 2. As discussed in §VIII.A.3, the user can view or interact with the mapping application 150 via a “user interface display,” where the designated restriction region (the **geofence objects**) is displayed as shown in Figure 2 (annotated):

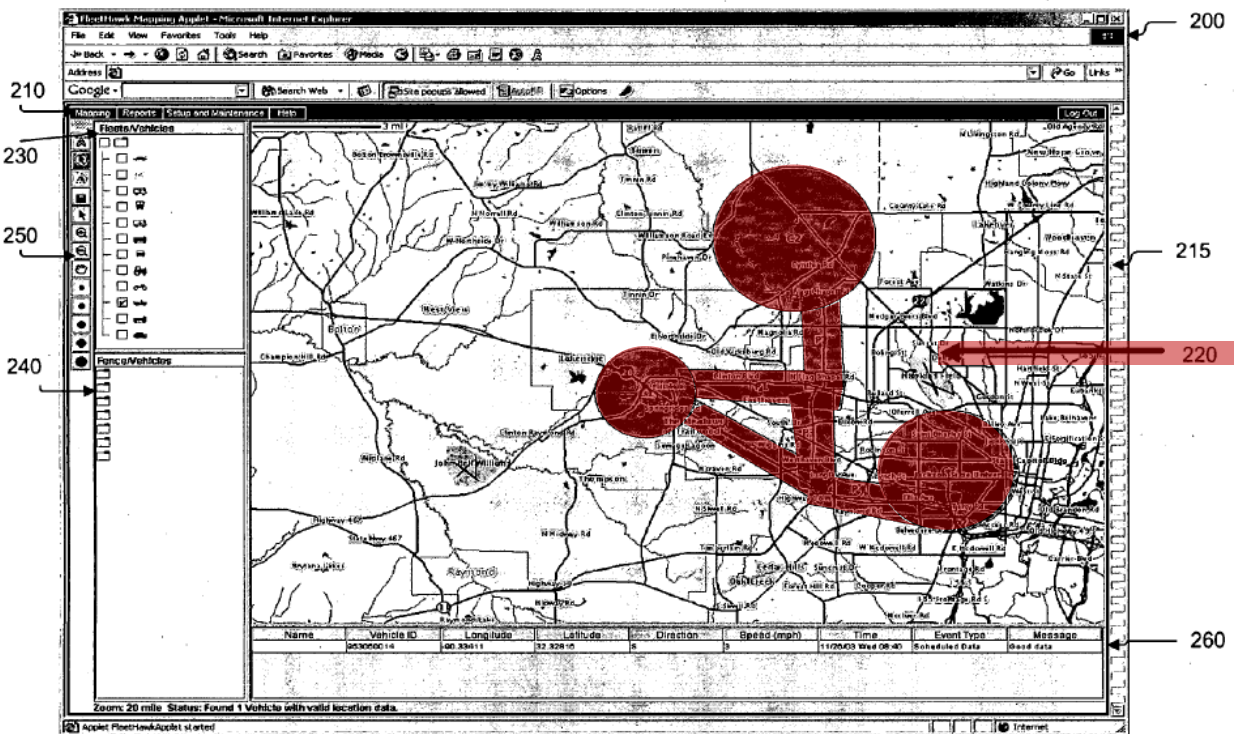


FIG. 2

119. A POSITA would have understood that the processor 1003 of Humphries is configured to execute the instructions correspond to the functions performed by the mapping application 150 to display the designated restriction region. Therefore, Humphries discloses Claim 2.

C. Claim 3

1. [3a] The system of claim 1, wherein: implementing the one or more response measures is performed when the ground vehicle is determined to be an unauthorized ground vehicle; and

120. Humphries discloses this claim element. See §VIII.A.7. For example, an alert message was sent to the data center 140 when it is determined that the ground vehicle has left the geofence object. EX1004, 11:18-12:3. A POSITA would have

understood that when the tracked device 120 is tracked in accordance with the route adherence application 126, the ground vehicle is only authorized to traverse a specific route of geofence objects. When the ground vehicle leaves the geofence objects, it becomes an unauthorized ground vehicle and an alert will be generated when the ground vehicle is determined to be unauthorized.

2. **[3b] the ground vehicle is allowed to operate within or near the designated restriction region when the ground vehicle is determined to be an authorized ground vehicle.**

121. Humphries discloses that the ground vehicle is allowed to operate when it is determined that the vehicle is within the geofence objects (designated restriction region). *See, e.g.*, EX1004, 11:54-56 (“once inside the first geofence object, the tracked device is merely being monitored to determine if it has exited the geofence object”). A POSITA would have understood that a vehicle is an authorized ground vehicle when it is allowed to operate within the designated restriction region. Accordingly, Humphries discloses Claim 3.

D. Claim 8

1. **[8] The system of claim 1, wherein the identity of the user is authenticated using a password, a phrase, or a code entered by the user, or using biometric input from the user.**

122. *See* claim element [1c] above. Humphries discloses that “various securities for authentication and authorization can be employed to ensure that only authorized users are accessing the system,” and one of the authentication methods is “where the user enters a username and a password to gain access,” with user entry

of a password being one of the claimed Markush group alternatives. EX1004, 6:35-42. Therefore, Humphries discloses Claim 8.

E. Claim 10

1. [10] The system of Claim 1, wherein the database is a temporary database.

123. The '121 Patent does not provide a definition of “a temporary database.” To the extent that this term is not indefinite and has met the written description and enablement requirements, a POSITA would have understood that “a temporary database” can be a database that stores data temporarily or whose data can otherwise be updated (*e.g.*, constantly). This is supported by the '121 Patent. *See* EX1001, 13:54-57 (“The platform may comprise one or more databases that can be constantly updated by various users that input and update flight restricted regions and/or parameters associated with the flight restriction regions.”); 16:7-9 (“The database may constantly be updated with user inputs or information regarding flight restriction regions acquired via other means.”); 29:20-21 (“The database may be constantly updated through the user of such software.”); 34:48-49 (“The database may be constantly updated.”).

124. Humphries discloses such a database. As discussed in §VIII.A.5, Humphries teaches that the boundaries of the geofence objects can be saved to a database in the data center 140, and a set of coordinates of the boundaries may be stored in a database within the tracked device 120. EX1004, 5:30-38; 7:9-12.

Humphries also discloses that the user can “create and ***edit*** the specific geofence in accordance with the user’s desires.” EX1004, 5:27-29. A POSITA would thus have understood that the databases disclosed in Humphries are temporary because they will be constantly updated whenever a user edits the geofence objects. Further, Humphries discloses that the main memories 905 or 1005 “can be used for storing temporary variables or other intermediate information during the execution of instructions by the processor.” EX1004, 12:26-29; 12:66-13:2. A POSITA would have understood that these temporary variables or other intermediate information taught by Humphries can also be stored within temporary databases. Therefore, Humphries discloses Claim 10.

F. Claim 11

- 1. [11] The system of claim 1, wherein the database is a private database that is privately accessible with granted access, or a public database that is publicly accessible over the Internet.**

125. The ’121 Patent does not define the terms “private database” and “public database.” Humphries discloses that a user can only privately access the “system,” including the database, after the user is authenticated and granted access when the user inputs the username and password. *See* EX1004, 6:35-42; §VIII.D. Therefore, a POSITA would have understood that Humphries discloses Claim 11 by teaching that the database is a private database that is privately accessible with granted access.

G. Claim 16

- 1. [16a] The system of claim 1, wherein the user is a first user and the one or more parameters are one or more first parameters, and the one or more processors are further configured to:**

126. See Elements [1a] and [1b] above. Humphries discloses the one or more processors, the first user, and the one or more first parameters.

- 2. [16b] receive one or more second parameters of the designated restriction region input by a second user; and**

127. Humphries teaches a second user because “the client 160 can include multiple individual users located on individual workstations.” EX1004, 4:31-33. Humphries also teaches that the second user can be “set up to access the applications provided by the data center 140.” EX1004, 4:33-36. A POSITA would have understood that one or more second parameters of the designated restriction region can be input by the second user via applications such as the mapping application 150. For example, a POSITA would have understood, and at the very least found it obvious, that the second user would input different parameters than the first user—*e.g.*, parameters for a new geofence or parameters modifying an existing geofence. A POSITA would also have understood that the one or more processors are further configured to receive the one or more second parameters. §VIII.A.3. Accordingly, Humphries discloses this claim element.

3. **[16c] authenticate an identity of the second user to determine whether the second user is authorized to designate the restriction region.**

128. As discussed in §VIII.A.4, Humphries discloses the authentication of users using a username and password. As with the user of Claim 1 (the “first user”), the one or more processors of Humphries are configured to authenticate the identity of the second user as well to determine whether the second user is authorized to designate the restriction region. Accordingly, Humphries discloses this claim element and Claim 16.

H. Claim 17

1. **[17a] The system of claim 16, wherein the one or more processors are further configured to: in response to determining the second user is authorized to designate the restriction region, determine a degree or type of authentication for the first user and the second user based on their identities;**

129. Humphries discloses this element. Humphries discloses that “one would understand that additional authorization schemes could be set up, for example, so that a specific process or person may only access or modify data that he/she has been authorized to process.” EX1004, 6:42-45. A POSITA would thus have understood that the first user and the second user may access or modify data based on their identities under the “additional authorized schemes” disclosed by Humphries. A POSITA would have further understood that Humphries discloses this

element because the one or more processors are configured to determine the degree or type of authentication. §VIII.A.4.

2. [17b] aggregate the one or more first parameters and the one or more second parameters to generate one or more aggregated parameters based on the degree or type of authentication for the first user and the second user; and

130. As discussed above, Humphries discloses the first user and the second user may only access or modify data based on the degree or type of their authentication, *e.g.*, “data that he/she has been authorized to process.” §VIII.H.1. A POSITA would have understood that the data that the users are authorized to process can be, for example, the geofence objects drawn on different areas of a map accessible to the users determined by the degree or type of their authentication.

131. Further, Humphries discloses that the geofence objects “can be created in a separate, stand-alone, manner or can be grouped together in various combinations of objects.” EX1004, 7:30-35; *see also* 7:6-9 (“the geofence objects can . . . be grouped in accordance with the user's wishes”); 7:55-68 (“the user can decide to group two or more geofence objects together in any manner deemed appropriate by the user”). A POSITA would thus have understood that the first user and the second user may create separate geofence objects in the area that they are authorized to do so, and these separate geofence objects can be grouped—in other words, the boundaries of the geofence objects can be aggregated—to form one or more geofence groups “in any manner deemed appropriate by the user.” A POSITA

would have understood, or at least found it obvious, that two users that are authorized to access the same database of geofences —*i.e.*, they have the same degree or type of authentication—would have their created geofences aggregated together in that same database. For example, Humphries emphasizes that its invention is “especially advantageous where a fleet of tracked devices are employed within a network.” EX1004, abstract; 3:43-45. A POSITA would have understood that two managers at a particular shipping company who manage such a fleet of tracked devices (*e.g.*, delivery trucks) can have the same degree or type of authentication to access the same geofence database of the company. A POSITA would have understood that the two managers can each create separate geofences for the fleet of vehicles, and these separate geofences are aggregated within the same database to generate an aggregated geofenced areas.

132. A POSITA would have further understood that the one or more processors are configured to perform this aggregation function to generate the boundaries of the geofence groups, *i.e.*, the one or more aggregated parameters. Accordingly, Humphries discloses or renders obvious this claim element.

3. [17c] store the one or more aggregated parameters of the designated restriction region to the database.

133. *See* §VIII.A.5. A POSITA would have understood that because the one or more processors are configured to store the one or more parameters of the designated restriction region to the database, Humphries also discloses that the one

or more processors are configured to store the one or more aggregated parameters discussed in §VIII.H.2. Humphries thus discloses this element and Claim 17.

I. Claim 18

134. Claim 18 is almost identical to Claim 1 except for the differences discussed below.

1. [18pre]-[18a] A system for managing a restriction region, the system comprising: a non-transitory computer readable medium having instructions that, when executed:

135. Humphries discloses a system for managing a restriction region. *See* §VIII.A.1. Humphries also discloses that the computer system 900 includes a data memory 905 and the computer system 1000 includes a main memory 1005, examples of both include “a random access memory (RAM), other dynamic storage devices (e.g., dynamic RAM (DRAM), static RAM (SRAM), synchronous DRAM (SDRAM)), flash memory, etc.,” coupled to the bus “for storing information and instructions to be executed by the processor.” EX1004, 12:19-25; 60-65. A POSITA would thus have understood that the data memory 905 and the main memory 1005 are the claimed non-transitory computer readable medium having instructions that when executed perform the recited functions.

136. Further, Humphries teaches that “computer readable medium” can refer to “any medium that participates in providing instructions to the processor 1003 for execution.” 14:18-20. Such a medium “can take many forms” that may include non-

volatile media, volatile media, and transmission media, and the various forms of computer-readable media that “can be involved in providing instructions to a processor for execution.” 14:20-29. Therefore, a POSITA would have understood that Humphries discloses the claimed non-transitory computer readable medium having instructions to be executed.

137. Accordingly, Humphries discloses claim elements [18pre]-[18a].

2. **[18b] receive one or more parameters of a designated restriction region for a ground vehicle operating on private property, the one or more parameters being input by a user via a user interface;**

138. Humphries discloses that the non-transitory computer readable medium has instructions that, when executed, receives one or more parameters of a designated restriction region for a ground vehicle, the one or more parameters being input by a user via a user interface. See §VIII.A.3. Because Humphries discloses that the designated restriction region includes at least a location associated with a private property, a POSITA would have understood that the received parameters for the designated restriction region would have been parameters of a private property on which a ground vehicle operates.

139. To the extent it is argued that Humphries does not expressly disclose this claim element, it would have been obvious for a POSITA that a restriction region can be designated for a ground vehicle operating on private property. The '121 Patent indicates that a property is either a private property or a public property.

EX1001, 15:17-19. Therefore, a POSITA would have understood that the geofence objects disclosed in Humphries can encompass a restriction region that include either public properties, private properties, or both. A POSITA would thus have found it obvious that a restriction region can be designated for a ground vehicle operating on private property.

140. Accordingly, Humphries discloses or renders obvious this claim limitation.

3. **[18c]-[18f] authenticate an identity of the user to determine whether the user is authorized to designate the restriction region; in response to determining the user is authorized to designate the restriction region, store the one or more parameters of the designated restriction region to a database; associated one or more response measures with the designated restriction region based on the one or more parameters; and implement the one or more response measures to affect operation of the ground vehicle along a travel path when the ground vehicle is within or near designated restriction region, by at least one of (a) forcing the ground vehicle to change direction and move away from the designated restriction region, (b) forcing the ground vehicle to stop, or (c) providing an alert.**

141. These claim limitations are substantively identical to those of claim 1, and are disclosed for the same reasons. *See* §§VIII.A.4-7. Further, as discussed above, a POSITA would have understood that a non-transitory computer readable medium having instructions that, when executed, would perform these claimed functions. *See* §VIII.I.1. Therefore, Humphries discloses claim elements [18c]-[18f] and Claim 18.

J. Claim 22

- 1. [22] The system of claim 18, wherein the non-transitory computer readable medium directs an application hosted on a platform.**

142. The '121 Patent does not explain how a computer readable medium “directs an application hosted on a platform.” As discussed in §VIII.I.1, Humphries discloses memories 905 and 1005 for storing information and instructions to be executed by the processor. To the extent that this claim is not indefinite and has met the written description and enablement requirements, a POSITA would have understood that the instructions to be executed by the processor include directing the functional applications such as the mapping application 150 and the route adherence application 126. Humphries also discloses that these applications are hosted on a platform, which is either the data center 140 or the tracked device module 120. *See* EX1004, Fig. 1 (annotated below); *see also* EX1004, 4:37-40 (“The data center 140 can include various functional applications including, for example, a web server application 142, a data encryption application 144, messaging and routing applications 146 and a mapping application 150.”); 5:39-42 (“The tracked device module 120 includes a tracked device location application 122, a location adherence application 124, a route adherence application 126, and an alert generation application 128.”).

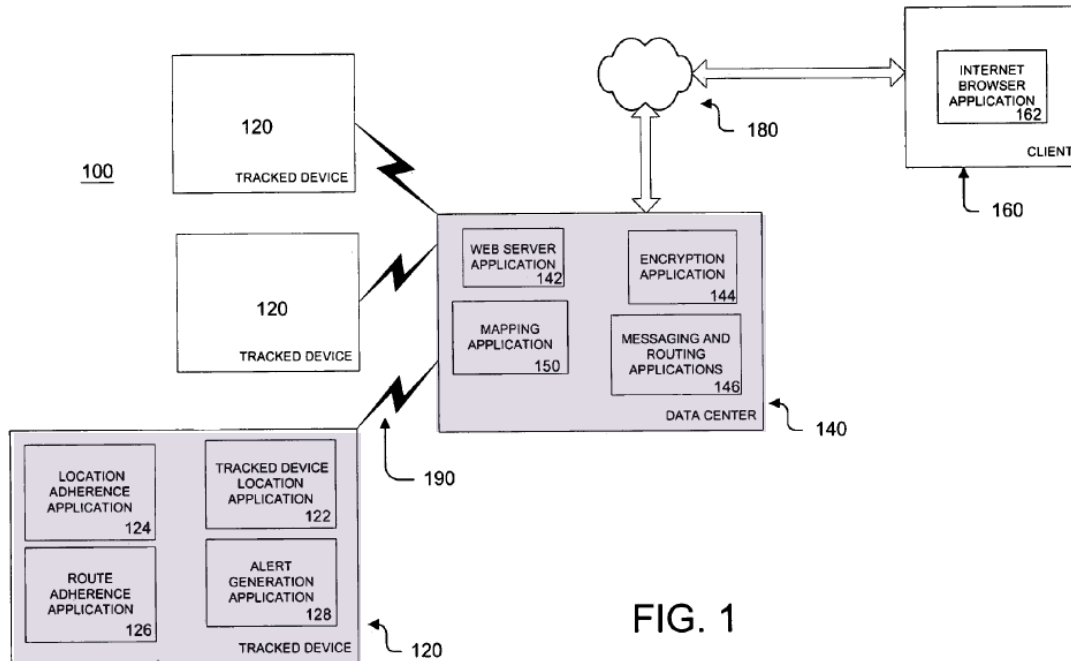


FIG. 1

143. Accordingly, Humphries discloses Claim 22.

K. Claim 23

1. [23] The system of claim 18, wherein the instructions, when executed, receive the one or more parameters via the user tracing on the user interface.

144. Humphries teaches that the instructions, when executed, receive the one or more parameters being input by the user on the user interface. See §VIII.I.1; see also EX, 1004, Fig. 2.

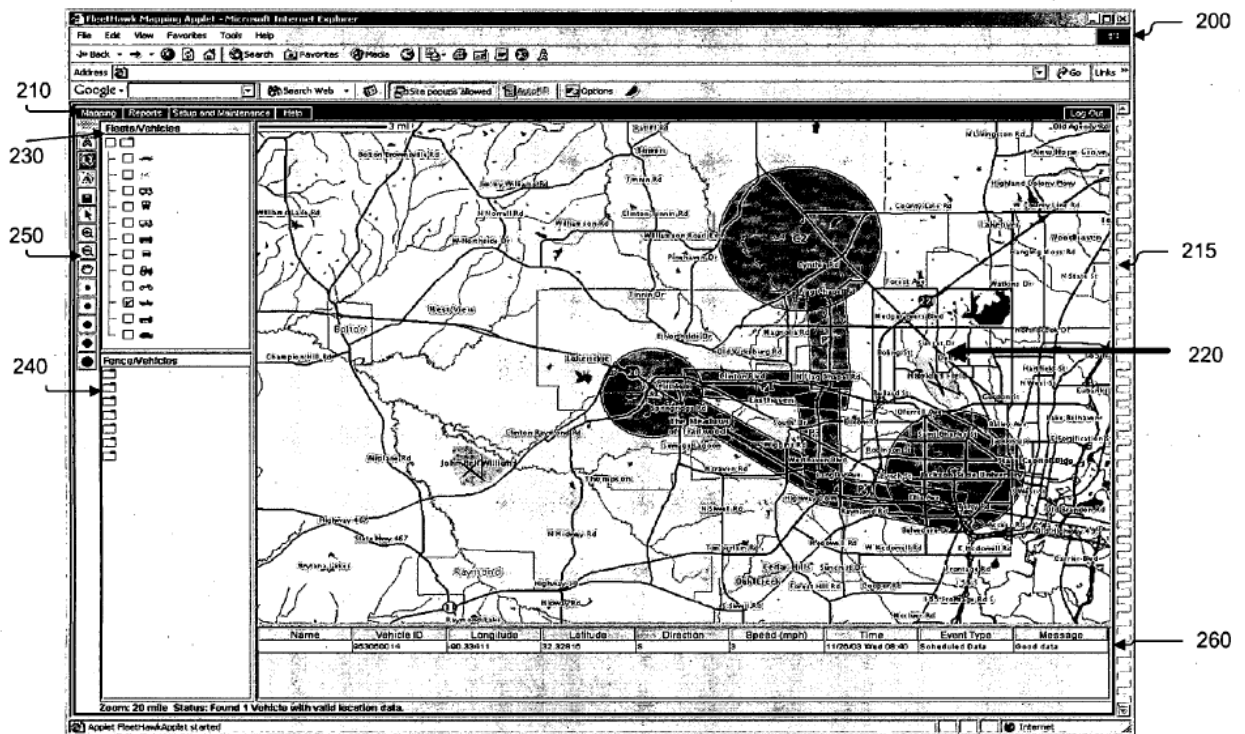


FIG. 2

145. Humphries teaches that the user can create and edit the specific geofence by using the mapping application 150, which “provides geographical maps of locations.” EX1004, 5:25-29. The geofence objects can either be circular or polygons or “other shapes such as ellipses” that can be employed to define a geofence object. EX1004, 7:6-16. The geofence map is superimposed on a geographical map in the geographical map window 215. EX1004, 6:49-52. Therefore, a POSITA would have understood that a user can create the geofence by tracing the boundaries of the desired area on the geographical map, as shown in Figure 2 where the geofences are created via the user tracing the boundaries of the cities and roads. A POSITA would have also understood, or at least found it obvious,

that the user can trace on the geographical map window 215 to obtain the boundaries of the geofence objects “in accordance with the user’s wishes.” For example, it is well understood at the time of the ’121 Patent that user input can be conducted via tracing in a touchscreen setting, and the boundaries of the restriction region can thus be obtained via user tracing on the touchscreen.

146. Accordingly, Humphries teaches or renders obvious Claim 23.

IX. Asserted Ground 2 of invalidity: Claims 1-3, 8-11, and 16-23 are unpatentable as obvious over Humphries in light of Marcus.

147. Ground 1, demonstrating that Humphries discloses or renders obvious the elements of Claims 1-3, 8, 10, 11, 16-18, 22, and 23, is incorporated herein by reference. *See* Section VIII, above.

A. Rationale and Motivation to Combine

148. Humphries discloses systems receiving one or more parameters input by a user designating a restriction region for a vehicle and determining whether a tracked device is located within or near the boundary of the restriction region. EX1004, 2:4-12; 5:18-29. Humphries also explains that “the present invention” can be employed with “airborne vehicles.” EX1004, 7:21-23. Similarly, Marcus discloses systems receiving location information from a user associated with a property such as a private property, creating a restriction region around the private property based on the received location information, and determining whether and/or when a drone is allowed in the restriction region based on further information

specified by the user (*e.g.*, allowed types of drones or allowed times of access). EX1005, abstract; [0022]; EX1011, abstract; [0010]. A POSITA would have found it obvious to modify Humphries's one or more parameters of the designated restriction region to include location information and additional restriction information relating to a private property, enabling more functionality with respect to controlling the boundary of the restricted region.

149. A POSITA would have been motivated to combine Humphries and Marcus because such a combination would apply a known technique to a known device ready for improvement to yield predictable results. For example, the known technique taught by Marcus "aggregate[s] the privacy preferences and/or access rights published and/or requested by many individuals and/or entities, and disburse[s] those preferences and/or rights to many nodes, for example drones." EX1005, [0020]; EX1011, [0008]. Humphries teaches that its system can transmit the boundary information of the restriction region to the "associated tracked device 120 for storage and use." EX1004, 5:30-38. Therefore, a POSITA would have been motivated to apply Marcus's known technique of disbursing privacy preferences of private property owners, such as designating a private property as the restriction region, to Humphries's known device. Because Humphries already teaches that its system can transmit the information of the restricted region, they are ready for the improvement to include the user's privacy preferences to yield predictable results.

Id. As another example, Marcus teaches to verify ownership or control of the property. EX1005, [0017]; EX1011, [0005]. Humphries teaches to authenticate the user's identity. EX1004, 6:35-38. A POSITA would thus have been motivated to apply Marcus's known technique of private property ownership or control verification to Humphries's known authentication step when being used to create a geofence encompassing private property, which is ready for improvement to include the additional verification step to yield predictable results.

150. Further, a POSITA would have recognized Marcus's location and further restriction information, such as information identifying the property as a private property, would have provided the same benefit to Humphries as is taught by Marcus—preventing an airborne vehicle (a drone) from trespassing, violating property rights, or otherwise accessing prohibited areas. The POSITA would have recognized the benefit of providing such information regarding private property, which would have helped to efficiently depict areas in which tracked objects are to be confined. This would have had the predictable result of the one or more processors in Humphries receiving one or more parameters of the designated restriction region including at least a location associated with a private property and would have been well-within the skill of a POSITA to do so.

B. Reasonable Expectation of Success

151. The POSITA would have had a reasonable expectation of success, as the combination of references discussed above would have merely involved the addition of the user's privacy preferences related to the user's private property and/or the step of verifying the user's ownership or control of the private property. Doing so would have involved, for example, merely modifying the mapping application 150 to have the user further verify her identity and designate a restriction region that includes the user's private property.

C. Claim 1

1. [1pre]-[1a]

152. Humphries discloses claim limitations [1pre]-[1a] for the same reasons above regarding Ground 1, [1pre]-[1a].

2. [1b] receive one or more parameters of a designated restriction region for a ground vehicle, the one or more parameters being input by a user via a user interface, wherein the one or more parameters of the designated restriction region include at least a location associated with a private property;

153. Humphries anticipates or renders obvious limitation [1b] for the same reasons above. §VIII.A.3.

154. Alternatively, Marcus discloses the one or more parameters of the designated restriction region include at least a location associated with a private property. For example, Marcus discloses a database that allows a user to specify a

restricted location that can include “land that any particular person or entity controls, for example a city, park authority, or a private property.” EX1005, [0014]; EX1011, Appendix. Marcus also discloses that users “may prevent, control, calibrate, or monitor [the drone’s] access to a private area and/or a controlled area.” EX1005, [0017]; EX1011, [0005].

155. To the extent it is argued that this claim element requires an association of the location with private property be included in the one or more parameters, a POSITA would have understood, or at least found it obvious, that Marcus teaches this claim element. When a restricted location that includes a private property is input by the user and received by the processor, that location information, including the information that the location is associated with private property, is included in the one or more parameters.

156. It would have been obvious to a POSITA to include the location associated with a private property in the one or more parameters configured to receive by the one or more processors of Humphries. §§IX.A-B. For example, it would have been apparent to the POSITA that to the extent that a user desires a geofence object encompassing a location that is a private property as taught by Marcus, that information can be input by the user and received by the one or more processors of Humphries. It would also have been obvious to a POSITA that the one or more processors would receive not only the location information, but also the

information that the location is associated with a private property. For example, Marcus teaches that its configurable flight zone database includes flight zones (*i.e.*, restricted areas) that can include both government-controlled flight areas and areas input by user (*i.e.*, private property). EX1005, [0020]; EX1011, [0009]. Marcus further discloses that the particular categories of restricted areas may be “selectable by a manufacturer,” so, for example, that “a drone produced for the military may not include the no-fly zones of military facilities.” EX1005, [0020]-[0021]; EX1011, [0009]-[0010]. A POSITA would have found it obvious that for the different categories of restricted areas to be “selectable,” the information received by the processor would have included information about the type of the property associated with the restricted areas—such as whether the property is a military facility or a private property. Humphries in view of Marcus thus renders obvious limitation [1b].

3. [1c]-[1f]

157. Humphries discloses claim limitations [1c]-[1f] for the same reasons above regarding Ground 1, [1c]-[1f]. Therefore, Humphries in light of Marcus renders obvious Claim 1.

D. Claims 2, 3, and 8

158. Humphries discloses Claims 2, 3, and 8 for the same reasons above regarding Ground 1, Claim 2, 3, and 8. See §§VIII.B-D. Therefore, Humphries in view of Marcus renders obvious Claims 2, 3, and 8.

E. Claim 9

- 1. [9] The system of claim 1, wherein the one or more processors are configured to determine the user is authorized to designate the restriction region when the identity of the user is authenticated as an owner, a manager, or an authorized personnel of the private property.**

159. Humphries in view of Marcus discloses at least one of the options set forth by Claim 9, rendering the entire Markush group invalid. Humphries discloses that the one or more processors are configured to authenticate an identity of the user to determine whether the user is authorized to designate the restriction region. §VIII.A.4. Marcus discloses that users “may prevent, control, calibrate, or monitor [the drone’s] access to a private area and/or a controlled area.” EX1005, [0017]; EX1011, [0005]. And users “may be required to verify ownership or control of the property” to input address or location information of the private property into a database. *Id.* Therefore, Marcus discloses that the user is authorized to designate the restriction region when the identity of the user is at least authenticated as an owner.

160. It would have been obvious to a POSITA to further configure the processor in Humphries to identify whether the user is authenticated as an owner as taught by Marcus. §VIII.A.4; §§IX.A-B. Humphries already teaches to authenticate the user’s identity. EX1004, 6:35-38; §VIII.A.4. Marcus teaches to verify ownership or control of the property. EX1005, [0017]; EX1011, [0005]. A POSITA would thus have been motivated to further configure the processor to verify the user’s ownership

or control of the private property. Doing so would have involved, for example, merely modifying the mapping application 150 to have the user further verify her ownership of the private property or access public property records database to verify the ownership. Asking the user to verify various identity-related parameters when performing transactions was well known at the time of the '121 patent. For example, it was common practice to configure a processor to ask a user to verify and confirm the user's age is over 21 when ordering alcoholic beverages from an online website. It was also well-known to have searchable on-line databases that include information about the owner of residential and commercial properties. Humphries in view of Marcus renders obvious Claim 9.

F. Claim 10

1. [10] The system of Claim 1, wherein the database is a temporary database.

161. Humphries discloses Claim 10. *See* §VIII.E. As discussed above, the '121 Patent does not define the term “temporary database.” *Id.* The '121 Patent merely states that “[a] flight-restricted region may be a permanent no-fly zone or may be a temporary area where flights is prohibited” and “[t]he flight restriction region may exist[] for a period of time.” EX1001, 2:45-46; 15:30-32. Marcus discloses the same temporary flight restriction region. EX1005, [0062] (“the drone can receive parameters for any given area for exclusion on TFR (temporary flight

restrictions) transmitted to database. Thus, the database can include both permanent entries and temporary entries (transient restrictions).”); EX1011, Appendix A.

162. It would have been obvious to a POSITA to further configure the database in Humphries to store temporary data as taught by Marcus. §§IX.A-B. For example, Humphries already discloses that the user can “create and edit the specific geofence in accordance with the user’s desires.” EX1004, 5:27-29. A POSITA would thus have been motivated to modify Humphries’s database and include temporary entries in the database as taught by Marcus when the user is editing the specific geofence “in accordance with the user’s desires.” Therefore, Humphries in view of Marcus renders obvious Claim 10.

G. Claims 11, 16, and 17

163. Humphries discloses Claims 11, 16, and 17 for the same reasons above regarding Ground 1, Claim 2, 3, and 8. *See* §§VIII.F-H. Therefore, Humphries in view of Marcus renders obvious Claims Claims 11, 16, and 17.

H. Claim 18

1. **[18pre]-[18b] A system for managing a restriction region, the system comprising: a non-transitory computer readable medium having instructions that, when executed: receive one or more parameters of a designated restriction region for a ground vehicle operating on private property, the one or more parameters being input by a user via a user interface;**

164. Humphries anticipates or renders obvious limitations [18pre]-[18b] for the same reasons above. §VIII.I.1.

165. Alternatively, Marcus discloses the one or more parameters of a designated restriction region for an airborne vehicle operating on private property. For example, Marcus discloses that “certain types of passage by a drone over private property may be permitted by a user designating the area a configurable flight zone area.” EX1005, [0022]; EX1011, [0010]. Marcus teaches that as an example, “a user may allow drones delivering packages to land and take off from the property when delivering packages there.” *Id.* As another example, Marcus teaches that the drone can be allowed to “fly over the location,” which could include “a private property,” at a specific time interval. EX1005, [0014], [0042]; EX1011, Appendix A. A POSITA would have understood that the user’s command allowing drones operating on private property, *e.g.*, delivering packages and taking off from the private property, is among the one or more parameters input by the user via a user interface and received by the system when executing instructions saved on the non-transitory computer readable medium.

166. It would have been obvious to a POSITA to combine Humphries and Marcus to obtain the one or more parameters of the designated restriction region for a ground vehicle operating on private property. §§IX.A-B. Humphries explains that its invention can be employed with “airborne vehicles.” EX1004, at 7:21-23. Therefore, a POSITA would have found it obvious to combine Humphries with

Marcus, which discloses airborne vehicles (*e.g.*, drones) operating on private property. Humphries in view of Marcus thus renders obvious these claim limitations.

2. [18c]-[18f]

167. Humphries discloses claim limitations [18c]-[18f] for the same reasons above regarding Ground 1, [18c]-[18f]. Therefore, Humphries in view of Marcus renders obvious Claim 18.

I. Claim 19

1. [19] The system of claim 18, wherein the identity of the user is an identity of an owner of the private property.

168. See above §§IX.E, H. Marcus discloses that users “may be required to verify ownership or control of the property.” EX1005, [0017].

169. Therefore, Humphries in view of Marcus renders obvious Claim 19.

J. Claim 20

1. [20] The system of claim 18, wherein the identity of the user is an identity of a renter of the private property.

170. Marcus discloses that “property owners or other responsible parties” may control the airborne vehicle’s access to a private area. EX1005, [0017]; EX1011, [0005]. And users “may be required to verify ownership or control of the property” to input address or location information of the private property into a database. *Id.* Therefore, a POSITA would have found obvious that the identity of the user taught by Marcus can be an identity of a renter of the private property. It would be apparent to a POSITA that “other responsible parties” to the private property can

be a renter of the property, and a renter also has “control of the property.” Given the finite number of types of persons that are “responsible parties” and have “control of” a property, it would have been obvious for a POSITA to try with a reasonable expectation of success to limit the identity of the user to be a renter of the private property, amongst other types of persons associated with a property that can designate a restriction region for that property. It would also have been obvious to combine Humphries and Marcus as discussed in §§IX.A-B, H. Therefore, Humphries in view of Marcus renders obvious Claim 20.

K. Claim 21

- 1. [21] The system of claim 18, wherein authenticating the identity of the user includes receiving an electronic transmission from a third party that indicates that the user is authorized.**

171. Marcus discloses that users “may be required to verify ownership or control of the property.” EX1005, [0017]. A POSITA would have found it obvious that to conduct this verification, the system can either compare the user identification with information saved within the system, *e.g.*, a set of username and password, or receive electronic transmission from a “third party” (the scope of which is unclear) that indicates that the user is authorized. For example, Marcus teaches that the system “may access a property database to determine property lines.” EX1005, [0038]; EX1011, [0011]. A POSITA would have understood that the system may use a property records database, such as those maintained by local authorities (*e.g.*,

county governments), to determine the property lines. Similarly, it would have been obvious to a POSITA that the same property record databases would also include the identity of the owner of the property, which would indicate that the owner is authorized to designate a restriction region/exclusion zone for the property. It would also have been obvious to combine Humphries and Marcus as discussed in §§IX.A-B, H. Therefore, Humphries in view of Marcus renders obvious Claim 21.

L. Claim 22

172. Humphries discloses Claim 22 for the same reasons above regarding Ground 1, Claim 22. *See* §VIII.J; §IX.H. Therefore, Humphries in view of Marcus renders obvious Claim 22.

M. Claim 23

- 1. [23] The system of claim 18, wherein the instructions, when executed, receive the one or more parameters via the user tracing on the user interface.**

173. Humphries discloses Claim 23. *See* §VIII.K. Additionally, Marcus discloses that the user input devices can include a touchscreen. EX1005, [0073]; EX1011, [0016]. A POSITA would have understood, or at least found it obvious, that the location of the restriction region can be input by the user via the user tracing on the touchscreen (*e.g.*, by the user creating boundary points, lines or other shapes of the region by touching a screen showing a map of the area in which the region to be created).

174. It would have been obvious to a POSITA to further modify the user input method in Humphries to include such user touch input as taught by Marcus. §§IX.A-B, H. Therefore, Humphries in view of Marcus also renders obvious Claim 23.

X. Asserted Grounds 3(A) and 3(B) of invalidity: Claims 4-7 are unpatentable as 3(A) obvious over Humphries in light of Morgan OR 3(B) obvious over Humphries and Marcus in light of Morgan.

175. Grounds 1 and 2, demonstrating that Humphries and Marcus disclose or render obvious the elements of Claim 1, are incorporated herein by reference. *See* §§VIII-IX, above.

A. Rationale and Motivation to Combine

176. As discussed above in Ground 1, Humphries teaches the use of geofenced objects to ensure route adherence and tracking a fleet of vehicles. EX1004, 3:29-45. Humphries also teaches that a tracked device may be configured to transmit an alert to a datacenter if the vehicle crosses a geofenced boundary. EX1004, 6:2-5. Similarly, Morgan teaches establishing geofences, receiving signals indicative of a location of the tracked vehicle, and sending an alert if it is determined that the vehicle has crossed the geofence. EX1006, abstract, [0025], [0069]. Morgan teaches that the geofence can be established at repeating intervals lasting for a preset duration, and each instance of the repeating intervals can start at a predetermined time. *See e.g.*, EX1006, abstract, [0035], [0040], [0044], [0051], [0069].

177. Morgan’s time-specific geofences would have been immediately recognized as an improvement to Humphries’s similar geofence system for tracking vehicles and ensuring route adherence. A POSITA would have been motivated by Morgan to improve Humphries’s similar system in the same way as is taught by Morgan—by adding the ability to establish the geofence at repeating intervals lasting for a preset duration and starting at a predetermined time. A POSTIA would have understood that such improvements to Humphries’s system would result in geofences with additional flexibility and ease of control. This would have had the predictable result of establishing a geofence at a predetermined time for a preset duration, and it would have been well-within the skill of a POSITA to do so. For example, it would have been well within the skill of a POSITA to add to Humphries’s mapping application 150 a requirement for the user to input a preset duration and a predetermined start time for the designated restriction region. Humphries’s base system would have been predictably improved by ensuring that the fleet being monitored adheres to the intended routes (taught by Humphries) within the intended duration (taught by Morgan).

178. Further, as discussed in §§IX.A-B, it would have been obvious to a POSITA to combine Humphries with Marcus. Just like Morgan, Marcus also teaches that an entity can restrict the operating time of the geofences. EX1005, [0014], [0042] (“the drone can fly over the location at night but not during the day”);

EX1011, Appendix A (“if an individual property owner wishes to allow flights at his property on a Saturday, that is possible”). A POSITA would thus have been also motivated to combine Morgan with the Humphries-Marcus combination to further the goal of privacy protection. For example, a POSITA would have found it obvious to modify the Humphries-Marcus system with the geofences taught by Morgan with the disclosed time restrictions to protect the privacy of the owner of the private property during the day, while only allowing the drones flying over the property during the night. Therefore, a POSITA would have been motivated to combine Morgan with Humphries or Humphries-Marcus.

B. Reasonable Expectation of Success

179. A POSITA would have had a reasonable expectation of success, as the combination of references discussed above would have involved the mere addition of an instruction to establish the geofence at a predetermined time with a preset duration as taught by Morgan to the system of Humphries or Humphries-Marcus. The POSITA would have had a reasonable expectation of successfully adding the programming to tracked devices 120 to account for the user’s additional input of the time-related information as taught by Morgan. It would have taken no more than ordinary skill to successfully incorporate the additional time-related information taught by Morgan into the geofence information of Humphries.

C. Claim 4

1. [4] The system of claim 1, wherein the one or more parameters include at least time-related information.

180. Morgan discloses the one or more parameters include time-related information. For example, Claim 1 of Morgan recites a method comprising receiving a set of variables related to a geofence to be established at repeating intervals lasting for a preset duration, each instance of the repeating intervals occurring at a predetermined time. EX1006, Claim 1. This is supported by Fig. 7 that shows “[t]he method of establishing a geo-fence at a predetermined time and for the duration of a preset duration.” EX1006, Fig. 7 (annotated); [0069]. A POSITA would have understood that the “repeating intervals lasting for a preset duration, each instance of the repeating intervals at a predetermined time” teaches the time-related information as recited in Claim 4.

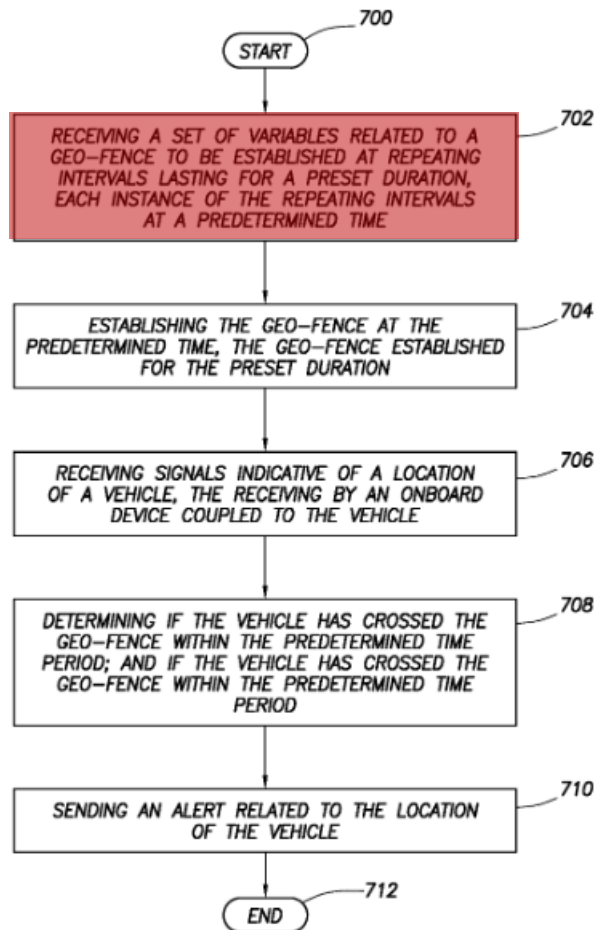


FIG. 7

181. Morgan further discloses that a user can define a geofence around a “restricted area” with a preset duration and a specific predetermined time. EX1006, [0040] (“the parent has previously defined a geo-fence around a ‘restricted area’ of neighborhood 200 which geo-fence will automatically establish from the hours of 11:00 p.m. until 6:00 a.m. on a nightly basis”). Therefore, a POSITA would have understood that the one or more parameters input by the user include, for example, the boundaries of the geofence and the time-related information—“11:00 p.m. until 6:00 a.m. on a nightly basis”; *see also* [0044], [0051], [0069].

182. It would have been obvious to the POSITA to modify the system of Humphries or Humphries-Marcus to include the time-related information taught by Morgan in the one or more parameters as discussed above. *See* Ground 3, §§X.A-B.

D. Claim 5

1. [5] **The system of claim 4, wherein the time-related information is associated with at least one of: a special or non-regular event, or a recurring or regular event having a corresponding predetermined length.**

183. Humphries or Humphries-Marcus in view of Morgan discloses at least one of the alternatives in the Markush group set forth by Claim 5. Morgan discloses the time-related information is associated with a recurring or regular event having a corresponding predetermined length. EX1006, [0035], [0040]. For example, Morgan discloses that the geofence may establish “every day; every week day; every weekend day; every third day, or every work day.” EX1006, [0035]. A POSITA would have understood that a geofence that is established, *e.g.*, “every work day,” is a recurring event having a corresponding predetermined length, such as from 9 am to 6 pm. Morgan also discloses that a parent can define a geofence that establishes “from the hours of 11:00 p.m. until 6:00 a.m. *on a nightly basis.*” EX1006, [0040]. A POSITA would thus have understood that this geofence with a predetermined length recurs every night.

184. It would have been obvious to a POSITA to modify the system of Humphries or Humphries-Marcus to associate the geofence’s time-related

information with a recurring or regular event having a corresponding predetermined length taught by Morgan as discussed above. *See* Ground 3, §§X.A-B.

E. Claim 6

1. **[6] The system of claim 4, wherein the time-related information indicates a duration or time period associated with the designated restriction region.**

185. Humphries or Humphries-Marcus in view of Morgan renders obvious Claim 6. A POSITA would have understood that Morgan discloses time-related information indicates a duration or time period (“*e.g.*, 11:00 pm to 6:00 am”) associated with the designated restriction region (“*e.g.*, the geofences”). *See* §§X.C-D. It would have been obvious to a POSITA to modify the system of Humphries or Humphries-Marcus to associate the geofence with a duration as taught by Morgan as discussed above. *See* Ground 3, §§X.A-B.

F. Claim 7

1. **[7] The system of claim 6, wherein the one or more parameters further include boundary information of the designated restriction region, and wherein the one or more processors are further configured to: associate the time-related information with the boundary information such that boundaries of the designated restriction region are removed or shrunk outside the duration or time period.**

186. Humphries teaches the one or more parameters include boundary information of the designated restriction region. *See* Ground 1, §VIII.A.3.

187. Morgan teaches that the boundaries of the designated restriction region are removed outside the duration or time period. For example, Morgan teaches that

“a geofence is established at a specific predetermined time and *remains established for a predetermined duration.*” EX1006, [0025]. A POSITA would have understood that because Morgan teaches the geofence only remains established for a predetermined duration, it will be removed outside the duration. This is further supported by the various scenarios described in Morgan, where in each scenario Morgan explains that outside of the “allowed hours,” the designated restriction region will no longer be a “restricted area.” *See, e.g.*, EX1006, [0043] (geofence is not established outside of the duration); [0047] (geofence is established until the end of the curfew time period); [0060], (“After the predetermined time period has expired, the geofence is no longer established.”).

188. Morgan also discloses the one or more processors are further configured to associate the time-related information with the boundary information. Morgan’s computer system comprises a processor that couples to a main memory. EX1006, [0068]. The memory stores a program that, when executed by the processor, causes the processor to “receive a set of variables related to a geo-fence to be established at repeating intervals lasting for a preset duration, each instance of the repeating intervals at a predetermined time; establish the geo-fence at the predetermined time, the geo-fence established for the preset duration.” EX1006, Claim 19. A POSITA would have understood that these steps disclosed by Morgan

associate the time-related information with the boundary information of the geofence.

189. It would have been obvious to a POSITA to modify the system of Humphries or Humphries-Marcus to further configure the one or more processors to associate the time-related information with the boundary information such that boundaries of the designated restriction region are removed outside the duration or time period taught by Morgan as discussed above. *See* Ground 3, §§X.A-B.

XI. Asserted Grounds 4(A) and 4(B) of invalidity: Claims 12-15 are unpatentable as 4(A) obvious over Humphries in light of Cronin OR 4(B) obvious over Humphries and Marcus in light of Cronin.

190. Grounds 1 and 2, demonstrating that Humphries or Humphries-Marcus disclose or render obvious the elements of Claim 1, are incorporated herein by reference. *See* §§VIII-IX, above.

A. Rationale and Motivation to Combine

191. Humphries's route adherence and vehicle tracking system teaches responding to the crossing of a geofenced boundary by sending an alert to a datacenter. Marcus teaches that its system may download information from a "property database" to determine property lines. EX1005, [0038]; EX1011, [0011]. Cronin teaches a similar geofence system where a geo-function setting sets boundaries relating to when alerts may be presented to a user, and the system may download information from a third-party database regarding one or more geographic

locations that are associated with one or more fences. EX1007, Abstract; 1:14-19; 3:20-23; 6:18-33.

192. A POSITA would have been motivated to modify Humphries or Humphries-Marcus to include the known technology of obtaining information of the geofence from a third-party database provided by Cronin to Humphries's vehicle tracking system, which would have provided the same improvements to Humphries in the same way as is taught by Cronin. For example, a POSITA would have been motivated to access a third-party database to obtain more information associated with the designated restriction information, such as whether the user is the owner of the restriction region and thus has authority to designate the restriction region. A POSITA would have been motivated to do so because such improvements may provide more reliable and accurate information from a third party, such as a government database. This would have had the predictable result of added capabilities in Humphries or Humphries-Marcus for providing the system with additional information associated with the designated restriction region, and it would have been well-within the skill of a POSITA to do so.

B. Reasonable Expectation of Success

193. A POSITA would have had a reasonable expectation of success, as the combination of references discussed above would have involved the mere addition of the step of inquiring information from a third party taught by Cronin to the tracked

devices 120 or the data center 140 of Humphries. A POSITA would have had a reasonable expectation of successfully adding the inquiry step. It would have taken no more than ordinary skill to successfully incorporate the inquiring step taught by Cronin to the system of Humphries or Humphries-Marcus.

C. Claim 12

- 1. [12] The system of claim 1, wherein the one or more processors are further configured to: access information associated with the designated restriction region from one or more third party data sources based on the location.**

194. Cronin teaches accessing information associated with the designated restriction region from one or more third-party data sources based on the location. For example, Cronin teaches that the smartphone, which is the system implanting the geofencing functions, “will download information from a third-party database regarding one or more geographic locations that are or will be associated with one or more fences.” EX1007, 3:20-23. A POSITA would have understood that the one or more fences in Cronin refers to the designated restriction region. Cronin also teaches that a variety of third parties can be the sources of the information, such as “safety.org” and “Offenderregistry.org.” EX1007, 6:18-21.

195. Cronin further teaches that “the present invention is implemented in a smartphone that includes . . . a processor that executes instructions from a memory. Communications received by the smartphone through the antenna will cause the processor to execute instructions when implementing functions consistent with the

invention.” EX1007, 3:14-20. A POSITA would have understood that “consistent with the invention,” the processor is configured to access information associated with the designated restriction region from one or more third-party data sources based on the location, which is a function of the invention.

196. It would have been obvious to the POSITA to modify the system of Humphries or Humphries-Marcus to include the function of accessing information from one or more data sources taught by Cronin. *See* Ground 4, §§XI.A-B.

D. Claim 13

- 1. [13] The system of claim 12, wherein the one or more third party data sources are private data sources that are privately accessible with granted access, or public data sources that are publicly accessible over the Internet.**

197. A POSITA would have understood that data sources can be either publicly or privately accessible, and this claim is thus non-limiting. To the extent that Patent Owner argues otherwise, Humphries or Humphries and Marcus in view of Cronin renders this claim obvious. *Id.* Cronin teaches that the third-party data source can be a public data source that is publicly accessible over the internet. For example, Cronin teaches that when safety.org, a database “may typically allow the user to view safe places or safety hazards,” is selected by a user, “a plurality of geo-routes and geofences relating to safety may be downloaded onto the user’s mobile electronic device.” EX1007, 6:22-27. A POSITA would have understood that a

source with a “.org” domain is a public data source, and it is publicly accessible over the internet because information can be downloaded onto the user’s mobile phones.

198. It would have been obvious to the POSITA to modify the system of Humphries or Humphries-Marcus to include the third-party data sources taught by Cronin. See Ground 4, §§XI.A-B.

E. Claim 14

1. **[14] The system of claim 12, wherein the one more third party data sources include government data sources, public records, or sources that list airport information, military bases, jurisdictional border, or public sensitive areas.**

199. Humphries or Humphries-Marcus in view of Cronin renders this claim obvious. Cronin teaches that the third-party data sources can include government data sources, public records, or sources that list public sensitive areas. For example, Cronin teaches third-party data sources such as “safety.org” and “Offenderregistry.org.” EX1007, 6:18-21. A POSITA would have understood that a source with a “.org” domain can be a government data source or a source of public records. Further, Cronin teaches that “Offenderregistry.org” can enable the user to download information “identifying locations where individuals with a criminal history are known to currently reside.” EX1007, 6:28-31. A POSITA would have understood that information such as the residence of individuals with a criminal history comes from a government data source or a source of public records. A POSITA would have also understood that the public is sensitive about their safety,

and areas with safe hazards or areas where certain individuals with criminal history live can be public sensitive areas.

200. It would have been obvious to the POSITA to modify the system of Humphries or Humphries-Marcus to include the third-party data sources taught by Cronin. See Ground 4, §§XI.A-B.

F. Claim 15

1. **[15] The system of claim 12, wherein the information includes one or more response measures associated with the designated restriction region that are extracted from the one or more third party data sources.**

201. Humphries or Humphries-Marcus in view of Cronin renders this claim obvious. As discussed in Ground 1, §VIII.A.7, “an alert” is one of the response measures recited by the ’121 Patent.

202. Cronin teaches that geofences can be defined by a user, a third party, or a remote user, etc. EX1007, 3:32-36. Cronin then teaches that geo-locations, such as “historical monuments identified by a historical society,” and associated geofences may be downloaded from third party location sources. EX1007, 4:56-5:4. And “an alert may be issued when the user’s cell phone is 1 mile” of a historical monument. EX1007, 5:4-5. A POSITA would have understood, or at least found it obvious, that the information downloaded from the third party includes the type of response measure (*i.e.*, an alert) when the user’s cell phone is close to the historical monument. For example, Cronin teaches that the third-party location source “may

be a website providing downloadable information regarding historic monuments.” EX1007, 4:57-59. A POSITA would thus have understood that the downloaded information itself may be part of a response measure, more particularly that the alert that is provided to the user may include information about the nearby monument (*i.e.*, providing the name of the monument in the alert, as opposed to a generic alert that some monument is nearby). *Id.* Similarly, a POSITA would have understood, or at least found it obvious, that the information obtained from third parties such as “safety.org” and “Offenderregistry.org” includes information to be included as part of the response measure (*e.g.*, an alert) when the user is near a safety hazard, both alerting the presence of a safety hazard to the user and identifying what that hazard is. §§XI.C-E. A POSITA would have further understood that such a response measure is associated with the designated restriction region (the historical monument or the area with safety hazards) that is extracted from the third-party data sources.

203. It would have been obvious to the POSITA to modify the system of Humphries or Humphries-Marcus to include receiving the one or more response measures associated with the designated restriction region from a third-party data source as taught by Cronin. *See* Ground 4, §§XI.A-B. Doing so would provide predictable improvements, such as better user satisfaction thanks to the more relevant and comprehensive information provided by the modified system.

XII. Asserted Ground 5 of invalidity: Claims 24-26 and 28-30 are unpatentable as obvious over Humphries in light of Borugian.

A. Rationale and Motivation to Combine

204. Humphries's route adherence and vehicle tracking system is a known device ready for improvement. For example, Humphries discloses responding to the crossing of a geofenced boundary by sending an alert to a datacenter. Borugian teaches the known technique of taking further responsive measures in response to crossing (or potential crossing) of a geofence, which could include providing a warning to the driver and/or shutting down the vehicle. EX1008, 12:30-31; 12:61-66; 13:1-3.

205. A POSITA would have been motivated to modify Humphries to include known features and techniques provided by Borugian's vehicle tracking system to Humphries's base vehicle tracking system. For example, a POSITA would have been motivated to extend the capabilities of Humphries's tracked devices to, in addition to transmitting an alert, provide "a response to the detected conditions that assures that the usage is not unauthorized or *shuts down the vehicle*." EX1008, 1:56-60.

206. The POSITA would have immediately recognized the benefit of Borugian's vehicle controls, including enforcing adherence of fleet vehicles to authorized routes and zones. The POSITA would have been motivated to include such controls as an optional capability in the system of Humphries, which is directed

to the same problem as Borugian—enforcing adherence to routes. Moreover, a POSITA would have been motivated to not only shut down the vehicle if it crosses a boundary, but to do so before it crosses the boundary to prevent encroachment into sensitive areas (*e.g.*, a sensitive military base or an area that could cause damage to the vehicle if entered) that might result in civil or even criminal penalties or fines and negative publicity, for example. This would have had the predictable result of providing the base system taught by Humphries with the added capability to shut down a vehicle that has crossed or is about to cross a geofence boundary, and it would have been well-within the skill of a POSITA to do so.

B. Reasonable Expectation of Success

207. The POSITA would have had a reasonable expectation of success, as the combination of references discussed above would have involved the mere addition of the vehicle controls taught by Borugian to the tracked devices 120 of Humphries. The POSITA would have had a reasonable expectation of successfully adding the programming to tracked devices 120 to account for the driver warnings and vehicle shutdown commands taught by Borugian. It would have taken no more than ordinary skill to successfully incorporate the additional vehicle controls and warnings taught by Borugian into the base system of Humphries.

C. **Claim 24**

1. **[24pre]-[24a] A system for managing a restriction region, the system comprising: one or more processors configured to:**

208. Humphries discloses these claim limitations, which are identical to claim limitations [1pre]-[1a]. *See* above Ground 1, §§VIII.A.1-2.

2. **[24b] receive one or more parameters of a designated restriction region for a ground vehicle, the one or more parameters being input by a user via a user interface; receive one or more parameters of a designated restriction region for a ground vehicle, the one or more parameters being input by a user via a user interface;**

209. Humphries discloses this claim limitation, which is identical to part of claim limitation [1b] without reciting the limitation “wherein the one or more parameters of the designated restriction region include at least a location associated with a private property.” *See* above Ground 1, §VIII.A.3.

3. **[24c]-[24d] authenticate an identity of the user to determine whether the user is authorized to designate the restriction region; in response to determining the user is authorized to designate the restriction region, store the one or more parameters of the designated restriction region to a database;**

210. Humphries discloses these claim limitations, which are identical to claim limitations [1c]-[1d]. *See* above Ground 1, §§VIII.A.4-5.

4. **[24e]-[24f] associate one or more response measures with the designated restriction region based on the one or more parameters; and implement the one or more response measures to affect operation of the ground vehicle along a travel path when the ground vehicle is within or near the**

designated restriction region by forcing the ground vehicle to stop movement.

211. The '121 Patent considers “forcing the ground vehicle to stop movement” as one of the recited response measures to affect operations of the ground vehicle along a travel path. *See* EX1001, Claim 1.

212. Borugian discloses that the driver is alerted, and the ground vehicle can be shut down if it is determined that the vehicle is within or near the designated restriction region or deviated from the authorized route. EX1008, 4:1-3 (“When it is determined that a location of the vehicle is inside the perimeter around the restricted area, the vehicle is shut down); 12:1-29 (explaining that the driver is notified that the vehicle may shut down within five minutes when the vehicle “has entered a restricted perimeter or is approaching a restricted perimeter”). A POSITA would have understood that the response measures in Borugian are associated with the designated restriction region based on the one or more parameters such as the boundaries of the restriction region. A POSITA would also have understood that the ground vehicle is forced to stop movement when it is shut down.

213. Borugian discloses that if the onboard computer 18 determines that the vehicle has not returned to a planned route (*i.e.*, left the restricted area) or entered a deviation code, “the system 10 begins vehicle shutdown 128.” EX1008, 12:49-65. And, in “one embodiment, vehicle shutdown begins immediately.” *Id.*, 12:65-66. A POSITA would have understood that one or more processors within the onboard

computer 18 or the system 10 need to be configured to implement the response measure of shutting down the vehicle in this situation.

214. As explained with respect to Ground 1, Humphries discloses that an alert may be sent whenever a geofence boundary is crossed. EX1004, 6:2-6. It would have been obvious to a POSITA to modify Humphries's base vehicle tracking and route adherence system to add the capability of shutting down the vehicle as taught by Borugian to enforce adherence to the designated routes and further increase safety in any hazardous situations. *See* §§IX.A-B, *supra*. The combined system would have predictably resulted in a system that comprises one or more processors configured to force the ground vehicle to stop movement when the ground vehicle is within or near the designated restriction region.

D. Claim 25

1. **[25] The system of claim 24, wherein the one or more processors are further configured to: display the designated restriction region at the user interface.**

215. Humphries discloses Claim 25 for the same reasons above regarding Ground 1, Claim 2. *See* §VIII.B; §XII.C. Therefore, Humphries in view of Marcus renders obvious Claim 22.

E. Claim 26

1. **[26] The system of claim 24, wherein: implementing the one or more response measures is performed when the ground vehicle is determined to be an unauthorized ground vehicle; and the ground vehicle is allowed to operate within or near**

the designated restriction region when the ground vehicle is determined to be an authorized ground vehicle.

216. Humphries discloses Claim 26 for the same reasons above regarding Ground 1, Claim 3. *See* §VIII.C; §XII.C. Therefore, Humphries in view of Marcus renders obvious Claim 26.

F. Claim 28

1. **[28pre]-[28b] A system for managing a restriction region, the system comprising: a non-transitory computer readable medium having instructions that, when executed:**

217. Humphries discloses these claim limitations, which are identical to the claim limitations of [18pre]-[18b] except that the latter do not recite the limitation “operating on private property.” *See* above Ground 1, §VIII.I.1.

2. **[28c]-[28d] authenticate an identity of the user to determine whether the user is authorized to designate the restriction region; in response to determining the user is authorized to designate the restriction region, store the one or more parameters of the designated restriction region to a database;**

218. Humphries discloses these claim limitations, which are identical to claim limitations [18c]-[18d]. *See* above Ground 1, §VIII.I.2.

3. **[28e]-[28f] associate one or more response measures with the designated restriction region based on the one or more parameters; and implement the one or more response measures to affect operation of the ground vehicle along a travel path when the ground vehicle is within or near the**

designated restriction region by forcing the ground vehicle to stop movement.

219. Humphries in view of Borugian renders obvious these claim limitations. *See* claim limitations [18e]-[18f], [24e]-[24f]. §VIII.I.3; §XII.C.4.

G. Claim 29

1. **[29] The system of claim 28, wherein the one or more processors are further configured to: display the designated restriction region at the user interface.**

220. Humphries discloses Claim 29 for the same reasons above regarding Ground 1, Claim 2. *See* §VIII.B; §XII.F. Therefore, Humphries in view of Marcus renders obvious Claim 29. EX1003, ¶220.

H. Claim 30

1. **[30] The system of claim 28, wherein: implementing the one or more response measures is performed when the ground vehicle is determined to be an unauthorized ground vehicle; and the ground vehicle is allowed to operate within or near the designated restriction region when the ground vehicle is determined to be an authorized ground vehicle.**

221. Humphries discloses Claim 30 for the same reasons above regarding Ground 1, Claim 3. *See* §VIII.C; §XII.F. Therefore, Humphries in view of Marcus renders obvious Claim 30. EX1003, ¶221.

XIII. Asserted Ground 6 of invalidity: Claim 27 is unpatentable as obvious over Humphries in light of Borugian and Morgan.

222. Ground 5, demonstrating that Humphries in light of Borugian discloses the elements of Claims 24-26, is incorporated herein by reference. *See* §XII, above.

A. Rationale and Motivation to Combine

223. As discussed above in Ground 5, it would have been obvious for a POSITA to modify Humphries's base system to include the additional known feature taught by Borugian to provide an alert or shut down the vehicle when it crosses or is about to cross a geofence boundary. §XII.A. Morgan also teaches establishing geofences and sending an alert if it is determined that the vehicle has crossed the geofence. EX1006, abstract, [0025], [0069]. Therefore, a POSITA would have been motivated by Morgan to improve the Humphries-Borugian's similar system in the same way as is taught by Morgan—by adding to the ability to establish the geofence at repeating intervals lasting for a preset duration and starting at a predetermined time. §X.A. It would have also been obvious to a POSITA to combine Humphries, Borugian, and Morgan to further enhance safety and provide additional flexibility and functionality with respect to the geofence control and management. *Id.*

B. Reasonable Expectation of Success

224. A POSITA would have also had reasonable expectation of success of such a combination because it would have involved the mere addition of an instruction to establish the geofence at a predetermined time with a preset duration as taught by Morgan to the system of Humphries-Borugian. *See* Grounds 3&5. §X.B; §XII.B.

C. Claim 27

- 1. [27] The system of claim 24, wherein the one or more parameters include at least time-related information.**

225. As discussed above with respect to Claim 4, Humphries in view of Borugian and Morgan renders obvious Claim 27. *See* Grounds 3&5. §X.C; §XII.C.

XIV. Conclusion

226. In signing this declaration, I recognize 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 also recognize that I may be subject to cross-examination in the 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.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that 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.

Executed this 7th day of August 2023, in St. Louis, Missouri.

Respectfully submitted

A handwritten signature in black ink, appearing to read "David H. Williams", written in a cursive style.

David H. Williams

David Hilliard Williams

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Expertise

- Location-Based Services (LBS)
 - GPS Systems; Network-Based Location Determination Systems
 - Wireless 911 (E911); NG911 Technology, Processes, Operations, and Funding
 - Internet of Things (IoT); Real-Time Location Systems (RTLS)
 - Non-Cellular/Indoor/Sensor-based Location Systems, including: RFID, Wi-Fi/WPS, BLE/Bluetooth, Beacon-based RTLS; NFC/DSRC; RF Fingerprint systems; Wearable systems; Hybrids/Combinations
 - Expert Witness Litigation Support, Patent/Intellectual Property Development and Protection Services
 - GPS/Cellphone Criminal and Civil Matter Forensics, using CDRs, RTT, PCMD, NELOS, EVDO, Geotab, Paraben, CellHawk, and Cellebrite
 - Accident/Incident Reconstruction
 - Internet of Things (IoT) Ecosystem (Sensors, Identification, Verification, Authentication, Interfaces, Edge, Network, Cloud, Data Network Management, Data Management, Analytics, Network Topologies, Integration)
 - Location & IoT Data Privacy and Security; Device/User ID, Verification, Authentication
 - Sensor Design; Sensor System Architecture and Interface Design; Sensor Arrays
 - Wireless Communications Standards, e.g. Bluetooth/BLE, Zigbee, Wi-Fi, WPAN, etc.
 - Microcontroller Design, Sensor Controls Design, IoT Design/Systems Integration
 - Location Data Aggregation, Anonymizing
 - LIDAR/Radar Data Sourcing; Crowdsourcing
 - Indoor Positioning & App Ecosystem Design
 - IoT, Home, Office, and Industrial Automation System Design and Integration; Control System Design, including Remote Management, Monitoring, and Control; User Interface Design
 - Safety and Security, Home Automation, Home Energy Management Application and Architecture Design/Implementation
 - Smart Card, Contactless Payment Systems
 - Mobile Resource Management (MRM) Tracking and Management; Vehicle, Fleet/ELD/AOBRD, Worker/Driver, and Freight/Trailer & Asset Tracking/Mgmt.
 - Telematics; Vehicle/Engine/ECM Tracking/Monitoring, Vehicle-to-Vehicle and Internal Vehicle Communications Networks and Operating and Analytics Ecosystems including CAN and other Protocols/Systems
 - Intelligent Transportation Systems
 - Connected Cars/Autonomous Vehicles (AV)
 - Navigation Systems; PNDs; Geofencing; Route Optimization; Device/App Personalization
 - Location-Based/Dependent Advertising, Search
 - Map Data, Digital Mapping, Media/Advertising Interfacing/Management, GIS, & IoT IT
 - Mobile Social/Business Networking;
 - LBS and IoT Enterprise/Consumer Product & Technical Strategy, Design and Build
 - Location/Context-Centric Enterprise Process Reengineering, Integration, & Interoperability
 - SMART location, SMART Home, SMART Wearables, SMART Buildings, SMART Cities
 - Context/Presence-Based LBS and IoT
 - M2M, Smart Grid/Energy Systems
 - Engineering, Network, and IT Process Design and Organizational Capabilities Assessment
 - LBS Big Data and Cloud Computing
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Professional Summary

David Hilliard Williams is an internationally-known expert in the wireless/mobile location and Internet of Things (IoT) fields and President and Founder of E911-LBS Consulting. He specializes in wireless and IoT-based product and technology development and implementation, as well as Intellectual Property (IP)/patent and forensics litigation services

involving technologies such as Global Positioning Satellite (GPS) systems; Network-based location determination technologies such as TDOA, ECID, and AFLT; Wireless 911 (E911) and Next Generation 911; Real-Time Location Systems (RTLS) including Radio Frequency Identification (RFID) systems, Wi-Fi-based positioning systems (WPS), BLE/Beacon-based location systems, Bluetooth, Near Field Communications (NFC), and alternative RTLS (Ultrasound, Infrared); Wearable Tags/Sensor tracking systems; Zigbee/Mesh networks; Pattern Matching; and various hybrids and combinations, as well as a broad array of IoT sensors and other systems, network (wireline and wireless, all generations), user interface, and technology enablers for management, monitoring, tracking, and control purposes, including in remote control/distributed ecosystems and associated use cases.

Mr. Williams is expert in the full range of business and consumer location-based services (LBS) and IoT applications enabled by these technologies, including safety, security, and intruder detection/monitoring, energy management, vehicle/fleet tracking/management, telematics and vehicle/engine/component/driver monitoring and analytics, local search, navigation systems, presence/context-aware apps, mobile resource management, asset and freight management, wearable tags/sensors, financial/mobile wallet, mobile hospitality/POS systems, supply chain management, family tracking, mobile social and business networking, proximity-based entertainment and leisure, gaming, and intelligent transportation systems.

Mr. Williams has extensive expertise in all aspects of LBS and IoT delivery across the mobile and IoT ecosystems including enabling sensors, network communications, location determination technologies, geofencing design, map data, location data/database management, geospatial platform/Geographical Information Systems, GPS and other chipsets, data management, control system design, remote management/utilization of such control systems, and device, infrastructure and integration provider integration and management. Mr. Williams has developed and implemented industry-leading product and technology solutions for numerous LBS and IoT applications and markets and provides consulting and research services to some of the leading carriers and enterprises in the U.S., Asia, and Europe. His client list includes Apple, AT&T, BJ's Wholesale Club, Draft Kings, Ecobee, FedEx, GE, Geotab, Green Mountain Grill, Google, Heil, the Houston Police Department, HP/Aruba, the L.A. County District Attorney's Office (both prosecution and public defender), Lyft, Macropoint, Nextel, NAVTEQ, Overhead Door, Peschke, Prova, Qualcomm, Samsung, Snap, Sprint, Target, Toyota, Twilio, Verizon Wireless, VIVINT, Volkswagen, Zillow, and ZIM.

Mr. Williams has successfully represented both prosecutors and defendants in patent, ITC, and criminal litigation (including assisting State Public Defender entities), as well as both sides of civil trade secrets, product liability, fraud, and other litigation. He has been deposed 31 times and has testified 10 times, including [successfully](#) in The Eastern District Court of Texas (winning both infringement and invalidity matters), and in [winning](#) in ITC Court. In total he has provided expertise in matters involving over 150 patents and over 50 criminal and civil matters. His credentials in wireless/mobile/IT technologies are established to the 1980s.

Mr. Williams is expert in smart location technology issues in the Internet of Things (IoT), telematics, and connected/driverless car fields, particularly in their utilization of sensor, location and context information through the practical envisioning and design of: consumer/enterprise use matters and associated application and user interface design; sensor

design and deployment strategies; process (re)engineering; IT integration; data aggregation, segmentation, analysis, and management; scalability; and security and privacy issues, requirements, collaboration structures, and ongoing management. He is expert on Big Data, data mining/analytics, and emerging AI issues associated with location and IoT data.

With over thirty-five years in location, networking/communications, control, and information technology solutions design, selection, implementation and ongoing management, Mr. Williams has extensive experience in the activities and issues needed to get applications to market, including planning and design at the application, system, interface/integration, network, IT, operational and customer facing levels. He has been published and quoted by leading magazines and newspapers about mobile services, including The New York Times, CBS News.com, The Columbus (Ohio) Dispatch, The Boston Globe, Computerworld, Directions Mag, Mission Critical Communications, Popular Mechanics, and RFID Journal. Mr. Williams has authored five books on wireless location, including *The Definitive Guide to IoT Sensors (In Development)*, *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (two versions, third in development)*, *The Definitive Guide to Wireless E911*, and (co-authored) *The Definitive Guide to Mobile Positioning and Location Management*. Mr. Williams has authored dozens of research reports, and tracks and analyzes leading companies in the LBS, IoT, and public safety industries particularly with respect to their product and technology strategies, competitive capabilities and implementation issues. He is expert on all public policy and technology issues related to emergency services/public safety, location data privacy and security, and LBS and IoT privacy protection policies, systems, and support infrastructure. He opines on location privacy issues in various forums. He is the sole or a named inventor on eight (8) patents involving mobile location and context, sensors, IoT, sensors, and various other technologies and associated methods.

Employment History

From: 2002 **E911-LBS Consulting**

To: Present

Position: *President and Founder*

Provides services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design, development, implementation, and ongoing management and operations, plus specialized services such IP/Patent litigation associated with Location Based Services and applications, GPS, E911, IoT, RTLS, RFID, Wi-Fi, NFC, BLE/Bluetooth, beacons, & other location technologies and associated ecosystems. Projects include:

- Provided expert witness, technical consulting, and research analysis services with respect to location-based services-related intellectual property/patent protection, licensing, and litigation (details in separate litigation support section).
- Provide forensics expertise in examination of mobile location-related events and associated data for civil and criminal matters (both prosecutor/plaintiff and defense entities).

- Developed, implemented, managed, and marketed a portfolio of LBS applications and broader offers for leading North American wireless carrier. Responsible for all dimensions of product lifecycle and associated budgets. Work included the development and launch of several LBS applications including mobile social networking, family tracking, local search, 411 w/ location, and mobile worker, fleet, and asset management. Location technologies utilized include GPS, Wi-Fi positioning, RFID, Bluetooth, Cell ID (CID), ECID, and TDOA. Worked extensively with network engineering to troubleshoot/refine new location-determination infrastructure to address/improve location accuracy, privacy and security issues.
- Conducted geofencing accuracy compliance analysis for ride-sharing company auditing their driver airport compliance record. Involved extensive use of JSON/GeoJSON records.
- Conducted comprehensive technical and intellectual property analysis of Real-Time Location Systems (e.g. RFID, Wi-Fi Positioning, Bluetooth, Infrared/Ultrasound, Others) market for European client looking to assert location-related patents.
- Provided technical guidance for mobile payments/wallet startup utilizing RFID, NFC and other technologies as key location enablers. Identified key issues and redeveloped successful patent application after initial USPTO rejection.
- Conducted technical and intellectual property analysis for Fleet Management/Telematics operator and service provider assessing potential infringement candidates.
- Conducted market research and developed market research on Telematics industry, both overall as well as tailored for specific auto manufacturers.
- Conducted analysis of location aggregation market for client interested in acquisition in that industry space.
- Ghost-wrote comprehensive study on Traffic data collection, processing, and reporting technologies, markets, and associated companies on behalf of ABI Research.
- Provided E911 consulting expertise in support of new spectrum regulatory approval and technical implementation issues for startup carrier.

- Managed the design, collection, and analysis of E911 infrastructure deployment of western region of major wireless carrier. Data collected focused on technical issues associated with TDOA (Time Difference of Arrival) technology implementation, and collection and reporting of location accuracy data for FCC reporting purposes.
- Developed the site map and primary content for the NAVTEQ (now HERE) Network for Developers (N4D) LBS web ecosystem – <http://developer.navteq.com>. Responsible for designing and managing the site map and overall content, identifying key contributors and materials, and utilizing a variety of fragmented information to develop broad and deep technical, digital media and business content to assist various expertise levels of application developers and business management to become intimately familiar with map data, GIS platforms, and LBS applications and underlying technologies and to provide the information and guidance to successfully develop and launch their LBS applications.
- Managed the development of the Nextel (now Sprint/T-Mobile) Location-Based Services strategy. Efforts included market and technical analysis of likely LBS offerings and integrating those findings with Nextel's broader wireless voice and data strategies. Work included prioritizing applications based on focus group findings, business matter attractiveness, ease of implementation, impact on network infrastructure, and synchronization and integration with GPS terminal and E911 mandate rollout plans. Managed network engineering and consulting team to design network modifications to best support the additional demands of LBS applications and underlying bandwidth-consuming digital media content. Product strategy including researching and incorporating context-aware/presence concepts into product/device and network engineering plans.
- Developed navigation platform strategy for major international auto manufacturer. Assessed direction and technology requirements of in-car and portable navigation device (PND) technologies; developed strategy for in-car navigation platform.
- Developed numerous LBS company research reports using proprietary multi-point "report card" addressing numerous business and technology strategy dimensions and issues.
- Authored multiple books on wireless location, including *The Definitive Guide to IoT Sensors and IoT Use Cases (In Development)*, *The Definitive Guide to GPS, RFID, Wi-Fi, and*

Other Wireless Location-Based Services (2005/2009 versions, new version in development), The Definitive Guide to Wireless E911, and (co-authored) The Definitive Guide to Mobile Positioning and Location Management.

- Advised numerous small companies and startups such as i360Hygiene, LOCAID, Finder Technologies, Orion GPS, and XYVerify on LBS-related issues to enhance value propositions on business, product and technology dimensions to enhance attractiveness to potential investors/acquisition candidates.

From: 2009 **AT&T Mobility**

To: 2010

Position: *Senior Product Manager – Enterprise LBS*

Led the development, implementation, and marketing of numerous enterprise location-based services across all sales, marketing and operational channels. Work included responsibility for all dimensions of product lifecycle and associated budgets. Products managed included telematics, fleet/vehicle management, asset/freight management, and mobile resource management GPS/LBS apps on a variety of platforms such as Telenav. Played key role in design of company-wide location services product and implementation roadmap.

From: 2007 **AT&T Mobility**

To: 2009

Position: *Consumer LBS Product Realization Manager (Consultant)*

Responsible for the design, development, implementation, and ongoing lifecycle management of several high-profile Consumer LBS applications and associated operational support. Overall application design and implementation responsibilities included AT&T FamilyMap, Loopt Mobile Social Networking, 411 with location, Slifter Local Search, and CaddyHawk Game systems. Work included design, troubleshooting, and implementation of AT&T location-related network, application, user interface, digital media and content delivery, and privacy infrastructure and associated issues such as accuracy and privacy (efforts resulted in patent co-invention).

From: 1993 **Accenture**

To: 2002

Position: *Associate Partner - Communications & High-Technology Strategy; Information & Technology Strategy practices*

Responsible for development of wireless location practice. Led development of business, technology, and product strategies for numerous communications and technology-centric companies looking to enter new markets. Specialized in new product design, development, and implementation, as well as network infrastructure design need to support next generation, high bandwidth-consuming digital media

content and associated infrastructure. Efforts included assisting AT&T (re)enter local service, (then) Bell Atlantic launch long distance services, (then) GTE design and implement Intelligent Network and High Value Network services, Nextel (later part of Sprint, and now T-Mobile) develop their location-based services product strategy and enabling network and IT architectures, and Omnipoint (later part of T-Mobile) network integration strategy, as well as leading the design and implementation of voice and data communications networks and associated data management capabilities in numerous industries including communications, computer, transportation, hospitality/retail, energy, agriculture, and banking/financial services. Worked with utilities such as Ameren, Georgia Power, and Duke Energy to identify strategic opportunities utilizing technology and communications in utility-associated infrastructure and other capabilities.

From: 1991 **Booz Allen & Hamilton**
 To: 1993
 Position: *Senior Associate – Information Technology Practice*
 Provided and led consulting services for communications industry and other Information Technology-intensive companies in developing technology strategies for addressing new marketing opportunities and internal operational issues.

From: 1987 **Deloitte Consulting (Originally Touche Ross)**
 To: 1991
 Position: *Senior Manager*
 Provided consulting services for technology-intensive companies in developing business and product strategies for addressing new marketing opportunities and internal operational issues.

From: 1983 **Hughes Aircraft Company**
 To: 1985
 Position: *Electrical Engineer – Radar Development*
 Microcomputer and digital system design engineer on the F-15 fighter radar system as part of analog to digital platform conversion and associated tracking and control systems design. System involved designing multi-microprocessor-based system to interface to/with wide array of on-board, ground control, and other in-flight communications/control sensors/sensor arrays and systems.

Litigation Support Experience

Date: 2022-2023 **Vorys**
 Matter: BJ's Wholesale Club
 Project: Providing expert consulting, support, and declarations for IPR matters involving location-related in-store ordering, fulfillment, and customer service aspects of e-commerce and m-commerce services.

Date: 2022-2023 **Kilpatrick Townsend & Stockton LLP**
Matter: Apple
Project: Provide expert consulting, support, and reports for IPRs, invalidity and non-infringement proceedings involving eight (8) patents involving sharing of location information between multiple devices for a variety of use cases.

Date: 2022-2023 **Venable LLP**
Matter: Verizon Wireless dba Cellco Partnership
Project: Provide expert consulting, support, and declaration for IPR matters involving georeferencing and specialty messaging techniques.

Date: 2022-2023 **Hall Griffin**
Matter: Ben's Asphalt
Project: Provided technical expertise in assessing technical aspects of telematics breach-of-contract lawsuit. Successfully settled.

Date: 2022-2023 **Wolf, Greenfield & Sacks, P.C.**
Matter: Snap
Project: Providing expert consulting, support, and report for IPR matter involving social-based location, mapping, matching, and display technologies. Deposition.

Date: 2022-2023 **Dreifuss Bonacci & Parker**
Matter: Pacific Controls Inc.
Project: Providing expert consulting, report, and testimony in regards to contractual dispute between Telematics Service Provider and equipment manufacturer. Deposition.

Date: 2021-2022 **Greenberg Traug**
Matter: HP Enterprises, Aruba
Project: Providing expert consulting, report, and testimony in support of non-infringement and invalidity analysis in EDTX matter involving beacons/beaconing technologies, methods, and associated systems. Depositions (2).

Date: 2021-2023 **Keker, Van Nest & Peters LLP**
Matter: Google, Ecobee, and VIVINT (v. Ecofactor) (WDTX)
Project: Provided/ing expert consulting, report, and testimony in support of invalidity analysis involving HVAC remote monitoring and control and associated sensors, systems, and communications capabilities. Deposition and Testimony; Ecobee and VIVINT trials pending.

Date: 2021-2022 **Baker Botts**
Matter: Lyft (multiple matters)
Project: Providing expert consulting, support, and report for matters involving location-related applications technologies including GPS,

Bluetooth, Wi-Fi positioning, RFID, and road sensors/readers.

- Date: 2022 **Winston & Strawn LLP**
Matter: ZIM Integrated Shipping
Project: Provided expert consulting in EDTX invalidity and non-infringement case involving method and apparatus for shipping information patents.
- Date: 2020-2021 **Lowe Graham Jones**
Matter: Green Mountain Grill (IoT Connected Grill) (ITC Court)
Project: Provided expert consulting, report, and testimony in ITC case involving Internet of Things (IoT), remote monitoring and control, cloud services, and various short-range communications technologies. Involves non-infringement, DI, Invalidity, and Inventorship. Deposition and Testimony.
- Date: 2021 **Munger, Tolles & Olson LLP**
Matter: Google
Project: Provided expert consulting and support for EDTX matter involving invalidity/non-infringement of smart cards and payment systems and associated capabilities such as Secure Elements.
- Date: 2021 **Jackson Walker L.L.P.**
Matter: Prova
Project: Provide expert consulting, support, and report for IPR involving buyer verification/tracking and inventory management/tracking utilizing RFID technology.
- Date: 2020-2023 **Latham & Watkins LLP**
Matter: Overhead Door (OHD-Garage Door Manufacturer) (ITC Court)
Project: Provided expert consulting, report, and testimony in ITC case involving Internet of Things (IoT), remote monitoring and control, and various short-range communications technologies. Deposition and Testimony in ITC court. Support in Customs and Enforcement.
- Date: 2020-2021 **Ropes & Gray LLP**
Matter: Target
Project: Providing expert consulting, support, and report for IPRs for several patents involving short-range communications technologies and associated identification and location determination methods and techniques including Bluetooth, RFID, and Wi-Fi. Depositions seven (7) involving nine (9) patents.
- Date: 2020-2022 **Baker Botts**
Matter: Draft Kings
Project: Providing expert consulting, support, and report for IPRs for several patents involving validating gaming customers location in

appropriate online gaming jurisdictions/geofencing. Depositions (2)

- Date: 2020 **Baker Botts**
Matter: Lyft
Project: Provided expert consulting, support, and report for IPRs involving Intelligent Transportation systems, geofences, and location technologies including GPS, Bluetooth, Wi-Fi positioning, RFID, and road sensors/readers. Deposition.
- Date: 2020-2023 **Finnegan & Henderson**
Matter: Google (3)
Project: Providing expert consulting, support, and report for IPRs involving user experience sharing, software registration, and device/user tracking involving a variety of location technologies.
- Date: 2019-2023 **Lynch Thompson LLP**
Matter: Heil
Project: Providing technical/engineering expertise in trade secrets matter involving Internet of Things, RFID, Telematics, Vehicle Sensors, & Big Data for waste vehicle manufacturer. Deposition.
- Date: 2018-2020 **Lawgivers (Trinidad and Tobago)**
Matter: A&V Oil and Gas
Project: Provided expert support, report, and testimony in arbitration matter involving government of T&T. Focused on (in)accuracies of GPS-based vehicle tracking system relative to a variety of key events. Testimony at trial.
- Date: 2019-2020 **Perkins Coie**
Matter: Zillow
Project: Provided expert support, report, and deposition for non-Infringement matter for major real estate services firm and associated subsidiaries involving a wide array of location determination technologies on smartphones.
- Date: 2019-2020 **Baker Botts**
Matter: Lyft
Project: Provided expert support, report, and deposition in support of Claim Construction brief associated with non-infringement matter.
- Date: 2016-2021 **Sterne Kessler Goldstein Fox**
Matters: Google (Multiple matters); Google (Nest, Multiple matters)
Projects: Providing expert support, reports, and deposition for several IPRs of location/context-related patents on behalf of leading Internet services company utilizing a wide variety of communications and location technologies.

- Date: 2013, 2019/2020
Projects: **XYVerify (3)**
Patent Re-Submission and Approval; Patent Application Creation (Re)wrote patent applications for LBS/financial verification system using multiple location determination methods including RFID, Bluetooth, WPS, and GPS. Efforts enabled patents to be approved after initial rejection by USPTO.
- Date: 2013-2023
Matters: **Civil and Criminal Forensics**
Project: Various
Provided/Providing cellphone, vehicle, specialty device, and computer-based location forensics expertise in over 50 criminal and civil matters involving numerous location determination technologies and associated applications and systems. Criminal matters include homicide, attempted murder, assault (multiple types), arson (building and field), armed robbery, breaking and entering, and property crime. Civil matters include trade secrets, product liability, accident liability, fraud, and employment matters.
- Applications/Platforms for criminal and civil forensics analysis include cellular records, 911 records, Facebook/Instagram/Messenger/social media apps, Google/search, Google tracking apps (e.g. Timeline, others), vehicle tracking systems, specialty GPS (e.g. GPS ankle bracelets, special devices) surveillance and safety systems, smart home systems, aviation, vehicle infotainment systems, and connected cars, Expert/knowledgeable in numerous forensic technologies, tools, and accident/incident reconstruction methods including CDR, NELOS, PCMD, RTT, EVDO, Cellebrite, Paraben, Google Earth/Timeline, and Hawk Analytics/CellHawk, as well as specialized knowledge on iOS and Android smartphone location determination techniques and data collection, analysis, and management of all types including KML/KMZ, (Geo)JSON, CSV, (E)WKT/WKB, Shapefile, ESRI, and other GIS vector/raster systems, technologies, formats, and models.
- Date: 2019
Matter: **Sterne Kessler Goldstein Fox**
Project: Volkswagen
Provided expert support for IPR involving Location-Based Messaging in automotive related use matter/environments.
- Date: 2017-2018
Matter: **Finnegan & Henderson**
Project: Fed Ex
Provided expert support, consulting, reports, deposition, and trial testifying for infringement and district court invalidity proceedings on behalf of leading transportation/shipping company in The Eastern District Court of Texas. Deposition and Testimony.
- Date: 2017-2018 **Polsinelli**

Matter:	Uber
Project:	Provided expert support and reports for Trade Secrets matter involving major shared transportation provider.
Date:	2017-2018 Renner Otto
Matters:	Macropoint; Timekeeping Systems Inc.
Projects:	Providing consulting, expert services, report and deposition in invalidity matters for transportation and employee tracking patents.
Date:	2016-2018 Paul Hastings
Matters:	Samsung (2 matters)
Project:	Provided expert services for Inter Partes Review (IPR) of multiple location, safety, and security patents on behalf of major telecommunications equipment and services provider.
Date:	2016-2017 European Firm
Matter:	Patent Infringement/Claim Chart Analysis
Project:	Provided consulting, market analysis, and claim chart development for patent holder involving RTLS-related repeater technologies, particularly using WPAN/Zigbee networks.
Date:	2016-2017 Baker Botts
Matter:	Twilio
Project:	Provided location/E911-related expert services, report, and deposition for IPR of mobile registration patent on behalf of Voice & Video, Messaging, and Authentication APIs provider.
Date:	2016 Los Angeles District Attorney's Office
Matter:	People v. Dawud Abdulwali
Project:	Provided expert services on location technologies used to identify and trace accused arsonist on behalf of L.A. District Attorney's (Prosecutors) office.
Date:	2016-2017 Fitzpatrick, Cella, Harper & Scinto
Matter:	Geotab
Project:	Providing expert support, reports, and deposition for infringement defense of multiple asserted patents on behalf of fleet management/telematics provider in EDTX.
Date:	2015-2016 The Ogg Law Firm PLLC
Matter:	City of Houston Police Department
Project:	Provided expert services/testimony regarding veracity of Automatic Vehicle Locator (AVL) systems in officer suspension matter.
Date:	2015-2016 Sterne Kessler Goldstein Fox
Matter:	VIVINT
Project:	Providing expert support, reports, and deposition for IPR involving

several location-related patents for home security/energy company.

Date:	2015	Hogan Lovells
Matter:		Apple
Project:		Provided expert support for multiple location-related patent Inter Parties Review (IPR) and infringement proceedings for leading mobile platform, application and services provider.
Date:	2015	Thompson Hine LLP
Matters:		Macropoint
Project:		Provided expert support for patent litigation efforts involving fleet management devices, software, and services.
Date:	2013-2014	Williams & Connolly
Matter:		State of Maryland
Project:		Provided expert services in assessing validity of GPS tracking bracelet/system in parole violation matter.
Date:	2013-2014	Cravath, Swaine & Moore
Matter:		Qualcomm
Project:		Provided expert litigation support, technical consulting, and advisory services in Anti-Trust matter regarding location services technologies, platforms, and standards.
Date:	2014	Patterson Thuenete Pedersen, P.A.
Matter:		Kaspersky Internet Security
Project:		Provided expert litigation support and technical consulting in patent countersuit involving internet security services.
Date:	2014	Sullivan & Cromwell LLP, others
Matter:		Peschke
Project:		Provided expert support and technical consulting in location services infringement patent dispute involving interactive mapping applications. Effort included providing deposition testimony.
Date:	2012-2013	Covington & Burling
Matter:		Samsung (ITC Court)
Project:		Provided expert litigation support and technical consulting and advisory services in International Trade Commission matter.
Date:	2011-2013	Connolly Bove Lodge & Hutz
Matter:		Enovsys
Project:		Provided expert litigation support and technical consulting and advisory services for pursuit of LBS patent royalties and infringement settlements.
Date:	2011-2013	Voxson

Matters:	Various
Project:	Provided expert litigation support and technical consulting and advisory services for pursuit of E911 and LBS patent infringement royalties and settlements.
Date:	2010-2012 Morrison & Foerster LLP
Matter:	Cellco Partnership (dba Verizon Wireless)
Project:	Provided expert advisory and report services in support of IPR re-examination process of E911 and LBS patents.
Date:	2011-2012 Dovel & Luner
Matter:	TrackBeam
Project:	Provided market/technical consulting, expertise and research analysis of LBS patents to identify potential licensing candidates.
Date:	2011 SNR Denton
Matter:	Wavemarket
Project:	Provided market and technical consulting and advisory services for defense of LBS patent lawsuits.
Date:	2010 State of New Jersey
Project:	Provided wireless location consulting expertise in development of economic growth strategy for State of New Jersey.
Date:	2007-2008 General Electric
Project:	Provided consulting research and guidance on LBS and E911 technology, GE-owned patents, prior artwork, technology direction.

Education

<u>Year</u>	<u>College/University</u>	<u>Degree</u>
1987	The University of Texas at Austin (1 st in graduating class)	MBA, Information Systems Management
1983	Purdue University, West Lafayette, Indiana (Top honors; Tau Beta Pi, Eta Kappa Nu)	BSEE, Digital System Design emphasis

Patents

- "Method and apparatus for providing mobile social networking privacy." (U.S. Patent Number 8,613,109, issued on December 17, 2013).
- "Systems and methods of using wireless location, context, and/or one or more communication networks for monitoring for, preempting, and/or mitigating pre-identified behavior." (U.S. Patent Number 10,477,342, Issued November 12, 2019).
- "Systems and methods for monitoring for and preempting pre-identified restriction violation-related behavior(s) of persons under restriction." (U.S. Patent Number 10,497,242, Issued December 3, 2019).
- "Systems and methods for providing location-based security and/or privacy for restricting user access." (U.S. Patent Number 10,555,112, Issued February 4, 2020).
- "Systems and methods for developing, monitoring, and enforcing agreements, understandings, and/or contracts." (U.S. Patent Number 10,853,897, Issued 12/1/2020).
- "Systems and methods for monitoring for and preempting pre-identified restriction violation-related behavior(s) of persons under restriction." (U.S. Patent Number 10,861,307, Issued December 8, 2020).
- "Systems and methods for monitoring for and lowering the risk of addiction-related or restriction violation-related behavior(s)." (U.S. Patent Number 11,388,546, Issued July 12, 2022).
- "Systems and methods for monitoring for and preempting the risk of a future occurrence of a quarantine violation." (U.S. Patent Number 11,412,353, Issued August 9, 2022).
- Numerous other patents pending.

Publications

Books:

1. The Definitive Guide to IoT Sensors (In development)
2. The Practical Guide to The Internet of Things (IoT): Use Matters and Enabling Technologies (In development)
3. The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2 versions, plus version in development)
4. The Definitive Guide to Wireless E911
5. The Definitive Guide to Mobile Positioning and Location Management (Co-authored)

Articles/Quotations:

1. Medium.com (Predict). January 31, 2023. "ChatGPT and Its Impact on Criminal Forensics (and Criminals).
2. Medium.com. October 3, 2022. "What if GPS Fails?"

3. Location Data Privacy posts/blog. Ongoing at www.E911-LBS.com.
4. Linked In. March 3, 2020. "Facial Recognition: Good, Bad, or Ugly?"
5. The Columbus Dispatch. February 17, 2017. "Experts: GPS monitors couldn't save OSU student's life"
6. E911-LBS.com. May 2012. "The Pacifier Generation – How Wireless is Impacting Our Society"
7. Nbizmag.com. Summer 2008. "How Will the Convergence of LBS Technologies Affect Business?"
8. Directions Magazine. November 30, 2005. "The Deadline for the E911 Mandate Approaches...Where Do Things Stand?"
9. Computerworld. May 23, 2005. "Beyond The Supply Chain: The Impact of RFID on Business Operations and IT Infrastructure"
10. RFID Journal. June 12, 2005. "IT's Impact on RFID"
11. Directions Magazine. July 29, 2004. "The Strategic Implications of the Wal-Mart RFID Mandate"
12. Directions Magazine. February 25, 2004. "RFID-Hot Technology with Wide-Ranging Applications"
13. WirelessDevNet.com. 1/30/2003. "It's The (Location-Based) Applications – Stupid!"

Languages/Tools

- C/C++, Java, Basic, Cobol, Fortran, Pascal, APL, Assembly, Others
- CDR, NELOS, PCMD, RTT, EVDO, Cellebrite, Paraben, Google Earth/Timeline, Hawk Analytics/CellHawk, as well as specialized knowledge on iOS and Android smartphone location determination techniques.
- Data collection, analysis, and management of all types including KML/KMZ, (Geo)JSON, CSV, (E)WKT/WKB, Binary, Shapefile, ESRI, and other GIS vector/raster systems, technologies, formats, and models.

Associations and Achievements

- IEEE, NENA, APCO. Certified in Emergency Management Response (CERT)