

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ROCKET MEDIA, LLC (D/B/A LAUNCH LABS)  
Petitioner

v.

FULLTHROTTLE TECHNOLOGIES, LLC  
Patent Owner

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Case Nos. 2025-00148, 2025-00149

U.S. Patent Nos. 11,556,947, 11,823,219

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**DECLARATION OF DAVID HILLIARD WILLIAMS IN SUPPORT OF  
PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NOS.  
11,556,947 AND 11,823,219**

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**EXHIBIT LIST**

| <b>Exhibit No.</b> | <b>Document</b>                                                                                                                                                                                              |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1001               | U.S. Patent No. 11,556,947 (“the ’947 patent”)                                                                                                                                                               |
| 1002               | File History of the ’947 patent                                                                                                                                                                              |
| 1003               | U.S. Patent No. 11,823,219 (“the ’219 patent”)                                                                                                                                                               |
| 1004               | File History of the ’219 patent                                                                                                                                                                              |
| 1005               | U.S. Patent No. 12,051,083 (“the ’083 patent”)                                                                                                                                                               |
| 1006               | File History of the ’083 patent                                                                                                                                                                              |
| 1007               | Declaration of Mr. David Williams                                                                                                                                                                            |
| 1008               | U.S. Patent No. 8,898,074 to Doughty et al. (“Doughty”)                                                                                                                                                      |
| 1009               | European Patent Pub. No. 2,938,045 to Van Boucq (“Van Boucq”)                                                                                                                                                |
| 1010               | U.S. Patent No. 10,311,465 to Maginnis (“Maginnis”)                                                                                                                                                          |
| 1011               | The History of Web Browsers, <a href="https://www.mozilla.org/en-US/firefox/browsers/browser-history/">https://www.mozilla.org/en-US/firefox/browsers/browser-history/</a> (last visited September 17, 2024) |
| 1012               | Web Tracking: Mechanisms, Implications, and Defenses by Bujlow et al., July 28, 2015 (“Bujlow”)                                                                                                              |
| 1013               | RFC 2109: HTTP State Management Mechanism, February 1997 (“RFC 2109”)                                                                                                                                        |
| 1014               | Apple to ad industry: Tough luck, privacy comes first, by S. Shankland, September 15, 2017                                                                                                                   |
| 1015               | HIGH BROWSE Apple introduces update to Safari browser which could change the internet FOREVER, by J. Hamill, September 19, 2017                                                                              |
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| 1020        | Python code for reverse Geo-coding using Google API, <a href="https://stackoverflow.com/questions/54320931/python-code-for-reverse-geo-coding-using-google-api">https://stackoverflow.com/questions/54320931/python-code-for-reverse-geo-coding-using-google-api</a> , January 23, 2019 (last visited September 19, 2024)                                                                                  |
| 1021        | Can I use Google Maps API to reverse geocode a lat/long value in a Service?, <a href="https://community.ptc.com/t5/ThingWorx-Developers/Can-I-use-Google-Maps-API-to-reverse-geocode-a-lat-long-value-in/td-p/521908">https://community.ptc.com/t5/ThingWorx-Developers/Can-I-use-Google-Maps-API-to-reverse-geocode-a-lat-long-value-in/td-p/521908</a> , April 3, 2017 (last visited September 19, 2024) |
| 1022        | API Keys for Map and Geocoding Vendors, <a href="https://www.photools.com/imatch-retired/api-keys-explained/">https://www.photools.com/imatch-retired/api-keys-explained/</a> , 2020 (last visited September 19, 2024)                                                                                                                                                                                     |
| 1023        | Geocoding and Routing Improvements Added to Bing Maps, <a href="https://www.microsoft.com/en-us/maps/news/geocoding-and-routing-improvements-added-to-bing-maps">https://www.microsoft.com/en-us/maps/news/geocoding-and-routing-improvements-added-to-bing-maps</a> , January 3, 2018 (last visited September 19, 2024)                                                                                   |
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| 1025        | HERE SDK for iOS, Developer's Guide, Version 4.0.0.0, 2019                                                                                                                                                                                                                                                                                                                                                 |

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| 1026        | <i>Fullthrottle Technologies, LLC v. Rocket Media, LLC (d/b/a Launch Labs)</i> , No. 1:24-cv-00314 (M.D.N.C.), Dkt. 24 (“FAC”)                                                                                                                                                                                   |
| 1027        | Federal Court Management Statistics – Comparison Within Circuit (Mar. 31, 2022), <i>available at</i> <a href="https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2022/03/31-3">https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2022/03/31-3</a> . |
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| 1030        | <i>Fullthrottle Technologies, LLC v. Rocket Media, LLC (d/b/a Launch Labs)</i> , No. 1:24-cv-00314 (M.D.N.C.), Dkt. 25 (“MTD”)                                                                                                                                                                                   |
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| 1032        | U.S. Patent No. 8,682,714 to Smith et al. (“Smith”)                                                                                                                                                                                                                                                              |
| 1033        | <i>History of the Web</i> , available at <a href="https://webfoundation.org/about/vision/history-of-the-web">https://webfoundation.org/about/vision/history-of-the-web</a> (last visited Oct. 14, 2024).                                                                                                         |
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| 1036        | <i>What are Browser Cookies? The History of Cookies in Digital Advertising</i> , by M. Bober, available at <a href="https://zeropark.com/blog/what-are-browser-cookies-in-digital-advertising/">https://zeropark.com/blog/what-are-browser-cookies-in-digital-advertising/</a> (last visited Oct. 14, 2024).     |

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| 1037        | Stephen Lawson, <i>Worker tracking service coming to Nextel phones</i> , <i>IDG News Service</i> (Mar. 4, 2003), <a href="https://www.networkworld.com/article/2340456/worker-tracking-service-coming-to-nextel-phones.html">https://www.networkworld.com/article/2340456/worker-tracking-service-coming-to-nextel-phones.html</a> (last visited Oct. 14, 2024).                   |
| 1038        | Gary Krakow, <i>Two new cellular phones built for abuse</i> , <i>NBC News</i> (Apr. 14, 2004), <a href="http://www.nbcnews.com/id/4324939/ns/technology_and_science-tech_and_gadgets/t/two-new-cellular-phones-built-abuse/">http://www.nbcnews.com/id/4324939/ns/technology_and_science-tech_and_gadgets/t/two-new-cellular-phones-built-abuse/</a> (last visited Oct. 14, 2024). |
| 1039        | Nicole Lee, <i>Verizon launches Chaperone child-monitoring service</i> , <i>CNET</i> (June 12, 2006), <a href="https://www.cnet.com/news/verizon-launches-chaperone-child-monitoring-service/">https://www.cnet.com/news/verizon-launches-chaperone-child-monitoring-service/</a> (last visited Oct. 14, 2024).                                                                    |
| 1040        | <i>AT&amp;T launches AT&amp;T Navigator</i> , <i>PhoneArena Team</i> (Apr. 3, 2008), <a href="https://www.phonearena.com/news/AT-T-launches-AT-T-Navigator_id2643">https://www.phonearena.com/news/AT-T-launches-AT-T-Navigator_id2643</a> (last visited Oct. 14, 2024).                                                                                                           |
| 1041        | <i>Sprint Launches GPS-Based Child-Locator Service</i> (Apr. 13, 2006), <a href="https://www.cio.com/article/257110/mobile-sprint-launches-gps-based-child-locator-service.html">https://www.cio.com/article/257110/mobile-sprint-launches-gps-based-child-locator-service.html</a> (last visited Oct. 24, 2024)                                                                   |
| 1042        | <i>What Are Push Notifications?</i> (Sep. 13, 2021), <a href="https://www.howtogeek.com/751954/what-are-push-notifications/#:~:text=There%20are%20several%20different%20types%20of%20%22push">https://www.howtogeek.com/751954/what-are-push-notifications/#:~:text=There%20are%20several%20different%20types%20of%20%22push</a> (last visited Oct. 24, 2024).                     |
| 1043        | <i>Now websites can send push notifications—not just apps</i> (June 10, 2013), <a href="https://www.niemanlab.org/2013/06/now-websites-can-send-push-notifications-not-just-apps/">https://www.niemanlab.org/2013/06/now-websites-can-send-push-notifications-not-just-apps/</a> (last visited Oct. 24, 2024).                                                                     |
| 1044        | <i>Apple Push Notification Service</i> (July 24, 2024), <a href="https://theapplewiki.com/wiki/Apple_Push_Notification_Service">https://theapplewiki.com/wiki/Apple_Push_Notification_Service</a> (last visited Oct. 24, 2024).                                                                                                                                                    |

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| 1047        | <i>What is Targeted Advertising, and How Does It Work?</i> , RGB House Editorial Team (May 13, 2024), available at <a href="https://blog.rtbhouse.com/what-is-targeted-advertising-and-how-does-it-work/">https://blog.rtbhouse.com/what-is-targeted-advertising-and-how-does-it-work/</a> (last visited Nov. 4, 2024).                                                         |
| 1048        | <i>What are cookies? What are the differences between them (session vs. persistent)?</i> (July 17, 2018), available at <a href="https://www.cisco.com/c/en/us/support/docs/security/web-security-appliance/117925-technote-csc-00.html">https://www.cisco.com/c/en/us/support/docs/security/web-security-appliance/117925-technote-csc-00.html</a> (last visited Nov. 6, 2024). |
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| 1050        | <i>The evolution of pixel tracking in digital marketing</i> (Feb. 2, 2023) available at <a href="https://www.adlucent.com/resources/blog/the-history-and-evolution-of-pixel-tracking-in-digital-marketing/">https://www.adlucent.com/resources/blog/the-history-and-evolution-of-pixel-tracking-in-digital-marketing/</a> (last visited Nov. 6, 2024).                          |
| 1051        | Tanya Kant, <i>A History of the Data-Tracked User</i> (Oct. 8, 2021), available at <a href="https://thereader.mitpress.mit.edu/a-history-of-the-data-tracked-user/#_edn2">https://thereader.mitpress.mit.edu/a-history-of-the-data-tracked-user/#_edn2</a> (last visited Nov. 6, 2024).                                                                                         |
| 1052        | Catalin Cimpanu, <i>Apple blocks third-party cookies in Safari</i> (Mar. 24, 2020), available at <a href="https://www.zdnet.com/article/apple-blocks-third-party-cookies-in-safari/">https://www.zdnet.com/article/apple-blocks-third-party-cookies-in-safari/</a> (last visited Nov. 6, 2024).                                                                                 |
| 1053        | Aimee Picchi, <i>Google reneges on plan to remove third-party cookies in Chrome</i> (July 22, 2024), available at                                                                                                                                                                                                                                                               |

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| 1055        | <i>Nautical Flags: Origins, Meanings, and Resources</i> , available at <a href="https://asa.com/news/2023/06/14/nautical-flags-origins-uses-meanings/#:~:text=Nautical%20Flag%20Origins%20and%20History&amp;text=The%20use%20of%20flags%20for,actions%20to%20other%20fleet%20members">https://asa.com/news/2023/06/14/nautical-flags-origins-uses-meanings/#:~:text=Nautical%20Flag%20Origins%20and%20History&amp;text=The%20use%20of%20flags%20for,actions%20to%20other%20fleet%20members</a> (last visited Nov. 6, 2024). |
| 1056        | Codrut Neagu, <i>What is the MAC address, and how is it used?</i> (Feb. 20, 2019), available at <a href="https://www.digitalcitizen.life/simple-questions-what-mac-address-how-change-it-windows/">https://www.digitalcitizen.life/simple-questions-what-mac-address-how-change-it-windows/</a> (last visited Nov. 6, 2024).                                                                                                                                                                                                |
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| 1058        | CloudFlare, <i>What is an autonomous system?   What are ASNs?</i> , available at <a href="https://www.cloudflare.com/learning/network-layer/what-is-an-autonomous-system/">https://www.cloudflare.com/learning/network-layer/what-is-an-autonomous-system/</a> (last visited Nov. 6, 2024).                                                                                                                                                                                                                                 |
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| 1063        | <i>What is an Instance</i> , Lenovo US, available at <a href="https://www.lenovo.com/us/en/glossary/what-is-instance/?orgRef=https%253A%252F%252Fwww.google.com%252F&amp;srsltid=AfmBOooi6PnP-Pci7VF4p71hXGcKiOXpz6vFjcXD89yz7A1rms_FWIAw">https://www.lenovo.com/us/en/glossary/what-is-instance/?orgRef=https%253A%252F%252Fwww.google.com%252F&amp;srsltid=AfmBOooi6PnP-Pci7VF4p71hXGcKiOXpz6vFjcXD89yz7A1rms_FWIAw</a> (last visited Nov. 6, 2024). |
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| 1065        | <i>Clear Channel Outdoor Launches Its First Indoor Digital Billboard Network</i> (Feb. 8, 2007), available at <a href="https://investor.clearchannel.com/news/detail/465/clear-channel-outdoor-launches-its-first-indoor-digital-billboard-network">https://investor.clearchannel.com/news/detail/465/clear-channel-outdoor-launches-its-first-indoor-digital-billboard-network</a> (last visited Nov. 6, 2024).                                        |

I, David Hilliard Williams, declare as follows:

**I. Introduction**

1. I have been retained on behalf of Rocket Media, LLC (d/b/a Launch Labs) (“Launch Labs”) for the above-captioned petitions for *inter partes* review (“IPR”). I am being compensated for my time in connection with these IPRs at my standard hourly consulting rate. My compensation is in no way dependent upon my testimony or the outcome of either of the IPRs.

2. I understand that these IPRs involve two related patents: U.S. Patent Nos. 11,556,947 (“the ’947 patent”) and 11,823,219 (“the ’219 patent”) (collectively, the “Challenged Patents”). The Challenged Patents are both titled “Location Determination Using Anonymous Browser Data.” The named inventors of the ’947 patent are Amol Waishambayan, Pat O’Flaherty, and Alexey Yakovlev. The ’219 patent lists the same inventors as the ’947 patent, but also add Louis David DiGiacomo as a named inventor. Both patents are assigned to Patent Owner FullThrottle Technologies, LLC.

3. I have reviewed and am familiar with the specification of the Challenged Patents, both of which have substantially the same specification. I understand that the Challenged Patents have been provided as follows:

- a. ’947 patent (Ex. 1001);
- b. ’219 patent (Ex. 1003).

4. I will cite to the Challenged Patents using the following format: Ex. 1001, '947 patent, 1:1-10. This example citation points to the '947 patent specification at column 1, lines 1-10.

5. I have reviewed and am familiar with the file histories of the Challenged Patents. I understand that the file histories have been provided as follows:

- a. '947 patent file history (Ex. 1002);
- b. '219 patent file history (Ex. 1004).

6. I understand that the Challenged Patents have the following filing dates:

- a. '947 patent – March 7, 2022;
- b. '219 patent – November 10, 2022.

7. I understand that these two patents claim priority back to the same provisional application, filed on June 8, 2021. I have not been asked to consider the proper priority date for the patents, but I understand that the earliest possible priority date that can be afforded to the claims in the Challenged Patents is the date of this provisional application, June 8, 2021. For the purposes of this declaration, I will assume that the claims in the Challenged Patents are entitled to the priority date of the provisional application. My analysis would not change if any claim is found not to be entitled to the date of the provisional application.

8. In preparing this declaration, I have also reviewed and am familiar with the following prior art used in the Petition for *Inter Partes* Review of the '947 patent and/or in my declaration below:

- a. U.S. Patent No. 8,898,074 to Doughty et al. ("Doughty") (Ex. 1008);
- b. European Patent Pub. No. 2,938,045 to Van Boucq ("Van Boucq") (Ex. 1009);
- c. U.S. Patent No. 10,311,465 to Maginnis ("Maginnis") (Ex. 1010); and
- d. U.S. Patent No. 8,682,714 to Smith et al. ("Smith") (Ex. 1032).

9. I have been asked to provide my technical review, analysis, insights, and opinions regarding the Challenged Patents and the above-noted references that form the basis for the grounds of rejection set forth in the Petitions for *Inter Partes* Review of the Challenged Patents.

## II. Qualifications

10. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. A copy of my current *curriculum vitae* is provided as Exhibit 1 to this declaration, and it provides a comprehensive description of my academic and employment history over the last thirty-plus years.

11. I am President and Founder of E911-LBS Consulting, which was founded in 2002. My firm provides consulting, research, forensics, and litigation support services in the fields of telecommunications, mobile, location-based services, and Internet-of-Things (IoT) technologies application, device, infrastructure, and network design and implementation.

12. Prior to founding my company in 2002, I spent fifteen years as a senior technology design and implementation consultant for world-leading technology consulting firms Accenture, Booz Allen & Hamilton, and Deloitte Consulting. I started my career in 1983 as an electrical design engineer for Hughes Aircraft Company's Radar Systems Group, working on that system's analog signal-to-digital converter and control unit for the F-15 fighter jet radar system and associated capabilities including target identification, tracking and targeting, as well as communications with other aircraft, ground control, aircraft carriers, navigation beacons, etc. My relevant experience for this matter utilizes experience and expertise gained across this timeframe.

13. I obtained a BS in Electrical Engineering from Purdue University in 1983, with an emphasis on Digital System Design, graduating with top honors including the National Engineering Honor Society and National Electrical Engineering Honor Society. In 1987, I also obtained an MBA, focusing on Information Systems Management, from the University of Texas at Austin, graduating first in my class.

14. The fields of the Challenged Patents are described in their specifications as follows:

- G06Q 30/0205 - INFORMATION AND COMMUNICATION TECHNOLOGY [ICT] SPECIALLY ADAPTED FOR ADMINISTRATIVE, COMMERCIAL, FINANCIAL, MANAGERIAL OR SUPERVISORY PURPOSES; SYSTEMS OR METHODS SPECIALLY ADAPTED FOR ADMINISTRATIVE, COMMERCIAL, FINANCIAL, MANAGERIAL OR SUPERVISORY PURPOSES, NOT OTHERWISE PROVIDED FOR
  - Location or geographical consideration
- G06F 16/955 - ELECTRIC DIGITAL DATA PROCESSING (computer systems based on specific computational models G06N)
  - using information identifiers, e.g. uniform resource locators [URL]
- H04L 63/0421 - TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (arrangements common to telegraphic and telephonic communication H04M)

- Anonymous communication, i.e. the party's identifiers are hidden from the other party or parties, e.g. using an anonymizer
- H04L 67/52 - TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (arrangements common to telegraphic and telephonic communication H04M)
  - specially adapted for the location of the user terminal

15. These fields, as well the specific subject matter covered/utilized by the patent claims, in turn include/encompass the below technical topics/disciplines, each of which I explore in more detail in the Background of the Technology Section:

- Internet Browsers;
- Cookies;
- Location Services;
- Identifiers; and
- Anonymity Techniques.

16. I have over thirty years of experience related to wireless location services, including experience designing, implementing, and managing numerous location-based service ("LBS") applications, such as navigation, mobile social networking, family tracking, and worker and asset tracking management, as well as working in all fields within the location services ecosystem including all forms of location determination technologies, map data, handset technologies, user interfaces, and associated Information Technology systems including identification,

authentication, privacy, security, and other related capabilities such as network engineering and operations.

17. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002, as well President of E911-LBS Forensics Engineering, a criminal and civil forensics engineering firm. 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.

18. I have extensive expertise in all aspects of product and service delivery across the wireless location ecosystem including enabling network, map data, geospatial platform, chipset, data management, device, user interface, and location determination infrastructure and integration providers. I am an expert in all related aspects of mobile location services, including use of various communications networks and associated frequencies and protocols involved in the creation, processing, and delivery of information, and key associated enablers of such device

hardware and software design, use/deployment of sensors, local and centralized control systems, and underlying communications and computing architectures.

19. For example, in the 1983 to 1985 timeframe, I was a Microprocessor system design engineer on the digitization project of the F-15 fighter jet radar system. Specifically, I designed a system for converting analog signals (radar pings, sensor measurements, etc.) to digital form, and for feeding the converted signals to various parties and localized and centralized control subsystems, including pilots, carriers, and ground control stations. The converted signals corresponded to data relating to navigational and directional information, aircraft status, the location of other aircraft/targets relative to the pilot's position, and associated images.

20. In the 1987 to 1995 timeframe, as a senior consultant/manager for Deloitte Consulting and Booz Allen & Hamilton, I designed and deployed a variety of computer centers and communications networks supporting industries including hospitality/retail, transportation, and financial services.

21. 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. From 1998 to 2000, I led the development of the LBS product/technology strategy and roadmap for Nextel Communications, Inc. (later acquired by Sprint, and now part of T-Mobile). 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. Many of the Nextel products selected for development and implementation included various forms of worker and asset tracking that matched—based on their location—workers with other workers, or workers with assets (e.g., field equipment, vehicles, etc.), tracked worker/asset locations on a map, and provided navigation directions from one point to another. My work developing the product concept and initial requirements sets heavily emphasized the tracking and alert capabilities for those applications. My work also included leading the development of the underlying network and Information Technology architectures that would be required to support the LBS applications product strategy and roadmap, including the future incorporation of other capabilities including Wi-Fi.

22. From 2000 to 2002, still as an Associate Partner at Accenture, I helped lead the business and technical development of several “dot-com” startups. Several of these startups heavily relied on the internet and internet browser capabilities as core parts of their technical and business platforms, including using the use of cookies for various purposes, particularly user-specific/personal data collection. In addition, my work included assisting several of these startups in developing/implementing their marketing/advertising campaigns (often a critical

component of the success of a dot-com startup), from macro techniques (e.g., mass marketing) to micro techniques (targeted at particular demographics or even individuals).

23. In 2003 and 2004, 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. This work also generated the accuracy data associated with determining the location of a portable electronic device that could then be used as supplemental information (e.g., how accurate the location was) to location-based applications, such as asset tracking, navigation, POI information, or people-finding services.

24. From 2005 to 2007, I worked with NAVTEQ (now called HERE)—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 and associated user interface and associated data population options available to successfully develop and launch their LBS applications. For example, I developed content for highlighting key types of map data and for providing technical details on how NAVTEQ tools could be used in LBS design for various consumer and business applications, for example, data product packages focused on shopping and consumer Points-of-Interest, such as retail/retail locations, restaurants and entertainment spots, which could be used by application developers for a variety of purposes, such as retail location local search, and navigation packages focused on different levels of navigation granularity (e.g., malls vs. highways vs. backroads vs. trails) and modes of transportation (e.g., walking, truck, car, bike) across many forms of tracking and user interface platforms. Much of this map data productization involved links to/dependencies upon the types of location determination technology/techniques, including GPS, cellular network-based techniques, Wi-Fi positioning/networks, Cell ID-based, and other networks/techniques.

25. I also have extensive LBS application product design and implementation experience, including related disciplines including data privacy and security management. For example, from 2007 to 2010, in the role of lead Product Realization Manager, I managed the design, implementation, and launch of several

consumer and business-oriented LBS applications for AT&T (then, AT&T Mobility). These LBS applications included navigation, mobile social networking, family tracking, local search, 411-with-LBS, games, mobile resource management, fleet management and tracking, and asset tracking. I also developed corporate-wide location data privacy policies and associated system implementation for all LBS customers. The app had to work within the constraints and capabilities of the literally dozens of phone/device platforms, and also within the constraints and capabilities of the rest of the AT&T IT, network, and operational (sales, customer service, etc.) systems, architecture and processes. I am a named inventor on several patents involving location and associated data privacy.

26. Many of the above apps involved extensive alerts associated with location-related triggers, such as entering/exiting an area (also referred to as “geofencing”), as well as using multiple location determination technologies and techniques. For example, my work in AT&T’s implementation of mobile social networking focused on finalizing the design of the Loopt social networking application, an app being adapted into AT&T’s network and product line. This role and work required extensive knowledge of how the app worked (including its use of location data sharing mechanisms and associated capabilities such as geofences). The role required design modifications to ensure successful implementation across multiple users/friends using different device platforms (and thus differing screen and

functional capabilities) so that friends' shared user experience was as accurate and complete as possible. This would include synchronization/coordination of location-alerts, enabling for example joint alerts when friends were nearby or at a certain POI, and provided directions for enabling the friends/users to meet, as well as development and implementation of location sharing privacy policies to ensure location information was shared with the correct people at the correct level of detail. Many of these applications utilized mobile browsers to collect data and deliver key capabilities to users.

27. My work in asset and fleet tracking and management also extensively used location-based alerts and boundary area/geofence-type capabilities. For example, the fleet management systems could alert centralized dispatch, and local control systems, when certain location, location area/geofence, and driving-related behavior events occurred, such as speeding in a certain speed limit area, or notifying dispatch (and the driver) when the driver/vehicle was within a certain distance of its destination or were in areas they should not be in and vice versa. The AT&T apps above utilized various forms of location determination, including GPS, WiFi, Cell Tower, and TDOA.

28. Further, these applications had to be tied into (and be used by) AT&T's network, AT&T's location infrastructure, and various AT&T IT systems used for functions including Sales, Customer Care, Fulfillment, Billing/Accounts

Receivable, and various network and IT operations. The work also included extensive work with AT&T Legal to develop and implement AT&T's location privacy and data security policies. The integration of the application into the above required extensive authorization-related design work to ensure that a given user could appropriately access the various AT&T systems and subsystems, as well as the application, under the appropriate conditions/circumstances, including appropriately authorizing the use of and the sharing of a user's location with other users and/or systems. This work in location-related data security and privacy networking 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 also hold other patents involving location privacy.

29. Finally, as part of my Lead Product Realization manager and Product Owner for several of these products, I worked extensively with Marketing to develop and implement marketing/advertising campaigns for these products—a particularly critical activity for a new product launch, particular products based on a new technology capability (e.g., the products being the first location products launched by AT&T).

30. Since 2010, I have served/am serving as a mobile/wireless and location technology and application/system expert in patent matters involving over 175

patents ranging from short- and long-range network design, usage and authentication, privacy and security to local and centralized control systems to safety, security, and surveillance systems, and have been deposited in approximately 70 such matters. I have testified over a dozen times in ITC court, the Eastern and Western Districts of Texas, and international (Canada and Trinidad and Tobago) venues, as well as various U.S. criminal courts.

31. Since 2015, I have served/am serving as a mobile location forensics expert in over 50 criminal (homicide, arson, robbery, etc.) and civil (trade secrets, product liability, etc.) cases, many involving various forms of vehicle telematics and otherwise tracking of individual movements and associated behaviors, using a variety of devices and platforms, possibly associated with the committing of a crime or other infraction, utilizing a variety of data including location information, video/camera data, and various sensor-based data.

32. In addition to the above applications, enabling location technologies, wireless communications, and privacy and security experience and expertise and other topical 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, operating systems and user interfaces.

33. I also led the design and development of a number of different communications networks associated with the above computing systems, including wide- and local-area networks, utilizing both wired and wireless technologies, involving private and public (e.g., internet-based) communications backbones.

34. 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 (2004, 2005 versions); and
- The Definitive Guide to Mobile Positioning and Location Management (co-author).

35. I have written numerous articles on wireless location, describing numerous aspects of the various disciplines/fields involved in this matter. I am also the primary/sole inventor of several patents extensively determining, tracking, and utilizing the locations and contexts of networks of devices, platforms, people, places, and entities in supporting those attempting to control/modify/correct/improve various undesired activities and behaviors, such as those suffering from addiction or those in difficulty with the law on issues related to such behaviors, utilizing a wide array of sensor systems and long and short-range networks to collect and transmit

data, and to locally and centrally generate alerts and various responses under a wide variety of contextual and location-based events and triggers.

36. My *curriculum vitae* attached as Exhibit 1 to this declaration contains further details on my education, experience, publications, and other qualifications to render an expert opinion. My work on this case is being billed at my normal hourly rate of \$485 per hour, with reimbursement for actual expenses. My compensation is not contingent upon my testimony or the outcome of these *inter partes* review proceedings.

### **III. Legal Understanding**

#### **A. My Understanding of Claim Construction**

37. I understand that during an *inter partes* review proceeding, claims are to be construed in light of the specification as would be read by a person of ordinary skill in the relevant art at the time the application was filed. I understand that claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the relevant art in the context of the entire disclosure. A claim term, however, will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In that case, the claim term will receive the definition set forth in the patent.

**B. My Understanding of Obviousness**

38. I understand that a patent claim is invalid if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the application was filed. This means that even if all of the requirements of the claim cannot be found in a single prior art reference that would anticipate the claim, the claim can still be invalid.

39. To obtain a patent, a claimed invention must have, as of the priority date, been non-obvious in view of the prior art in the field. I understand that an invention is obvious when the differences between the subject matter sought to be patented 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 having ordinary skill in the art.

40. I understand that to prove that prior art or a combination of prior art renders a patent obvious, it is necessary to: (1) identify the particular references that, singly or in combination, render the patent obvious; (2) specifically identify which elements of the patent claim appear in each of the asserted references; and (3) explain how the prior art references could have been combined in order to create the inventions claimed in the asserted claim.

41. I also understand that when considering the obviousness of a patent claim, one should consider whether a teaching, suggestion, or motivation to

combine the references exists so as to avoid impermissibly applying hindsight when considering the prior art. I understand this test should not be rigidly applied, but that the test can be important to avoiding such hindsight.

42. I understand that certain objective indicia can be important evidence as to whether a patent is obvious or non-obvious. Such indicia include: (1) commercial success of products covered by the patent claims; (2) a long-felt need for the invention; (3) failed attempts by others to make the invention; (4) copying of the invention by others in the field; (5) unexpected results achieved by the invention as compared to the closest prior art; (6) praise of the invention by the infringer or others in the field; (7) the taking of licenses under the patent by others; (8) expressions of surprise by experts and those skilled in the art at the making of the invention; and (9) that the patentee proceeded contrary to the accepted wisdom of the prior art.

43. I also understand that “obviousness” is a legal conclusion based on the underlying factual issues of the scope and content of the prior art, the differences between the claimed invention and the prior art, the level of ordinary skill in the prior art, and any objective indicia of non-obviousness. For that reason, I am not rendering a legal opinion on the ultimate legal question of obviousness. Rather, my testimony addresses the underlying facts and factual analysis that would support a legal conclusion of obviousness or non-obviousness, and when I use the term

obvious, I am referring to the perspective of one of ordinary skill in the art at the time of invention.

**C. Level of Ordinary Skill in the Art**

44. I understand that a person of ordinary skill in the relevant art (“POSA”) 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.

45. 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.

46. My opinion below explains how a POSA would have understood the technology described in the references I have identified herein around the June 2021 timeframe.

47. Based on the disclosure of the ’947 patent, a POSA would have had either: (1) a Bachelor of Science degree in Electrical Engineering, Computer Science, or an equivalent field plus at least one year of experience working on computer networking; or (2) at least three years of experience working on

computer networking. This description is approximate, and a higher level of education or skill may make up for less experience, and vice versa. I met these qualifications as of the assumed priority date for the Challenged Patents.

#### **IV. Background of the Technology**

48. I understand that analyzing the state of the art at or leading up to the priority date of the Challenged Patents is helpful in understanding more fully the grounds put forth in the Petition in assessing the (in)validity of the Challenged Patents. To facilitate this, I understand it is helpful to break down this history into the key fields, disciplines, and problems. In this matter, it is my view that the Challenged Patents can be viewed from the perspective of the following disciplines/fields/alleged problems solved:

- History of Internet Browsers;
- History of Browser-Based Personal Data Collection and Use of Cookies;
- History of Anonymization of Personal Data;
- History of Location Determination;
- History of Unique Identifiers; and
- History of Usage of Location and Integration with Internet Browsers and Other Applications Using APIs.

49. In total, the history of the capabilities and individual component parts demonstrate that the capabilities associated with the Challenged Patents were well-known prior to the assumed priority date of June 8, 2021.

**A. The Use of Internet Browsers Was Known Well Over Two Decades Before the Assumed Priority Date**

50. The World Wide Web is generally considered to be invented in 1989 by a researcher in the CERN (Tim Berners-Lee), the European research entity, in response to, among other issues, needing an easier way to navigate the internet than the tools initially used. Ex. 1033. Actually called the *WorldWideWeb*, it was the first-ever web browser and editor, allowing users to view web pages and create and edit various content. *Id.* It was later renamed “*Nexus*” to avoid confusion with the increasing use of “World Wide Web” as a popular synonym for the internet. This original browser was focused on a specific computer design (“Next”) and generally used by academics and technologists. Ex. 1035.

51. This browser was followed by *Mosaic* in 1993, geared towards the general public, and had a user-friendly graphical interface that enabled for example supporting text and images in a single document. *Netscape Navigator* followed in 1994, which became the dominant web browser in the mid-1990s. It introduced several key innovations, such as JavaScript, SSL encryption for secure data transfer, and the ability to handle multimedia content. Ex. 1034.

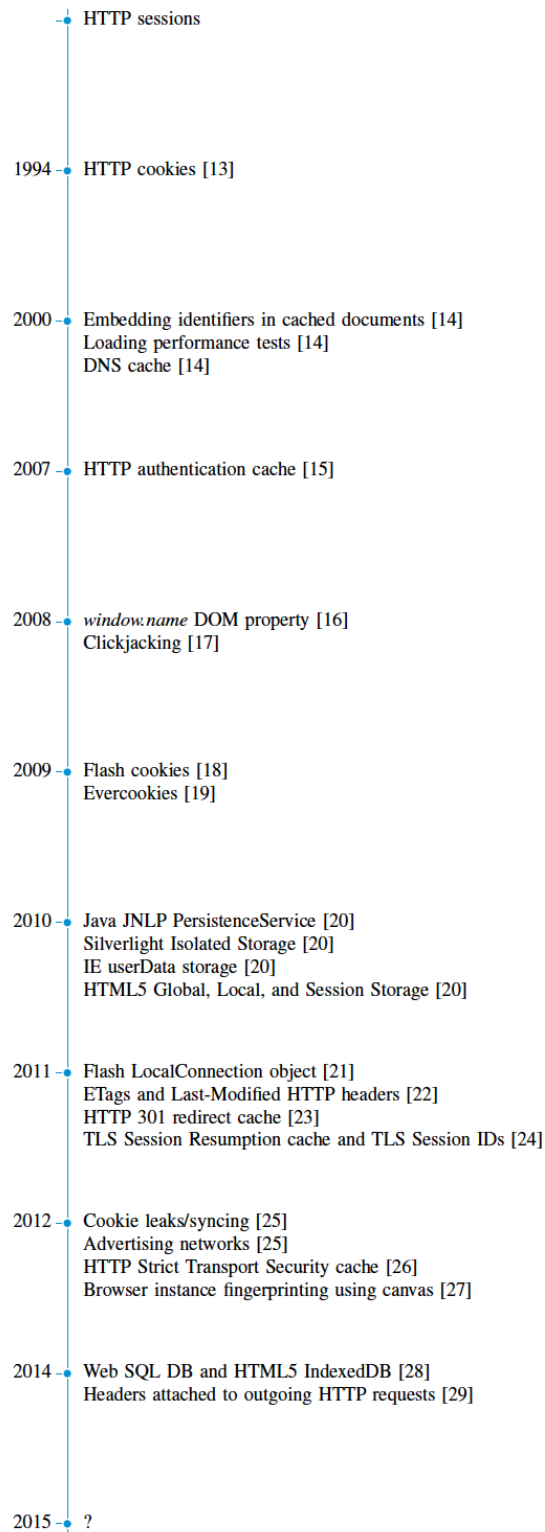
52. In 1995, Microsoft made its entrance into the browser space with its *Internet Explorer* (IE), which was based on Mosaic's code. Microsoft bundled IE with its Windows operating system (initially Windows 95), which facilitated it becoming the dominant web browser, overtaking Netscape by the early 2000s. Ex. 1034.

53. Over the next several years, other browsers came on the market to address numerous not-yet-addressed opportunities, such as *Apple Safari* in 2003 (focused on Apple systems), and *Mozilla Firefox* in 2004, created using open-sourced code that facilitated add-ons/extensions). In 2008, Google launched its own browser, *Google Chrome*, introducing features like automatic updates and isolated browser tabs to enhance performance and security. Chrome's market share rapidly grew, and by 2012, it overtook Internet Explorer as the world's most-used browser. In response (in 2015), Microsoft launched *Microsoft Edge*, initially proprietary but later open sourced. Concurrently throughout most of this timeframe browser providers launched mobile versions of their browsers, particularly Safari (on iOS) and Chrome (on Android systems). Ex. 1034. Indeed, a substantial amount of web traffic today comes from mobile browsers, which among other capabilities focuses on making sure web pages render well across different device sizes.

54. The potential for collecting personal information was known almost from the start of browser usage in the early 1990s, as was its usage in various monetization mechanisms, discussed next. Ex. 1036.

**B. History of Browser-Based Personal Data Collection and Use of Cookies and Other Tracking Mechanisms**

55. The ability to collect personal information for/about people using internet browsers was recognized soon after the launch of the earliest browsers, particularly Netscape and its expansion of the use of browsers beyond academic sites to ones more commercially oriented, using cookies as a key mechanism. Below is a rough timeline related to browsers tracking user information that is consistent with my understanding.



Ex. 1012 at 2.

56. Cookies, sometimes called HTTP cookies, web cookies, internet cookies, or browser cookies, were invented in 1994 by a Netscape programmer, Lou Montulli, and a patent application filed in 1995. Ex. 1029. As he stated in the patent application, the problem addressed was that in a client-server environment (the architecture most used by internet browsers), “clients do not retain information of a session after the session is closed. In many systems, the ability to retain information after the systems become inactive is crucial to the functioning of the systems.” *Id.* at [0009]. To solve this, Mr. Montulli described his invention upon which a server, responding to a request for data by a client (e.g., a person’s computer), had the “server send a piece of state information that the client system will store, . . . the state information is [being] referred to as a ‘cookie.’” *Id.* at [0052].

57. There are a variety of uses for a cookie. Mr. Montulli’s original application described it as including “user identification information and billing information.” *Id.* at [0120]. as well as providing “a description of a range of URLs for which that state information should be repeated back to,” *id.* at [0052], e.g., when a familiar URL is visited by a user, the user’s computer automatically sends the user’s personal information to the server supporting the website URL. Mr. Montulli specifically envisioned such cookies being used for e-commerce purposes. As he states:

One of the applications of the present invention is an on-line shopping system. A customer can browse information delivered by a merchant server using a browser running on a client. The customer can also select products to be placed in a virtual shopping basket. The server then sends state information related to the selected products to the browser on the client for storage. When the customer wants to purchase the products in the virtual shopping basket, the browser sends the corresponding state information to a specified check-out Web page for processing.

*Id.* at [0013].

58. Cookies were soon recognized to serve a variety of useful and sometimes essential functions. In addition to storing information on user preferences, e-commerce applications (such as items added in the shopping cart in an online store) and tracking the user's browsing activity (including clicking particular buttons, logging in, or recording which pages were visited in the past),<sup>1</sup> they were also used to save information that the user previously entered into form fields, such as names, addresses, passwords, and payment card numbers for subsequent use.

59. The public started becoming aware of cookies around 1996, when the media started reporting on the potential threat to privacy. Concerns focused on the fact that cookies were storing information on user's computers without their knowledge or consent.

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<sup>1</sup> Ex. 1048.

60. For example, a February 1996 article in the *Financial Times* described both privacy concerns about cookies:

[M]any PC users may take a dim view of Netscape's failure to draw their attention to the fact that their behaviour may be tracked in this way. Moreover, there appears to be only one way to disable the facility: by manually amending or deleting the COOKIE.TXT file containing all the cookies.

Ex. 1045 at 2.

61. But this same article also explained the potential uses and benefits that cookies could provide, particularly for marketing and advertising purposes:

[Cookies] increase(s) the power of companies to find out who their customers are and what they are up to. It allows companies to track which Web pages an individual looks at, when, for how long, and in what order... **Yet the tale of these cookies is an illustration of the possibilities that Internet marketing opens up.** In the old days, placing an **advertisement** was like firing a blunderbuss: remember the old quip that half the money spent on advertising was wasted, but that no-one knew which half. Today, technology has created silver bullets **that allow companies to target people individually.**

*Id.* (emphasis added).

62. One of the privacy concerns around cookies stemmed from cookies being generally accessible to a number of third-party websites, leading to cookies sometimes being called "third-party cookies." Ex. 1014.

63. By 2017, some browsers began deprecating the use of third-party cookies due to privacy concerns. Ex. 1014; Ex. 1015. Even with third-party cookies

disabled, however, websites would still be able to use cookies specific to a website, so long as they were not generally accessible to third-party websites. Ex. 1014.

64. Knowing the preferences and obtaining information about the e-commerce transactions of users helped tremendously to target internet advertising. The more advertisers knew about the user and her browsing preferences, the better they could tailor ad content for that user's interests. However, one key element was missing from cookies in the mid-1990s, particularly for mobile users: their location. How location was added to tracking capabilities is discussed shortly.

65. Another mechanism for tracking users on the internet is by using "pixel tags." First used in the late 1990s, pixel tags are invisible images (which are made up of pixels) that are sent to the user by the server with a web page. The pixel tags will be stored in the user's browser cache with other images that may be stored there. Pixel tags typically include information about the user, like a unique identifier and location for the user.

66. Technically, a "tracking pixel" is a small image embedded in the HTML code of an email, ad or website. Tracking pixels can also be called "pixel tags." Such tags can be used for marketing purposes, e.g., monitoring traffic, ad conversions, or user behavior (e.g., when a user clicks on an ad and/or makes a purchase). These tags can be used by companies like social media companies to track

ad conversions and build and optimize targeted marketing campaigns for other ads.

Cookies and tracking pixels are similar in objective but differ in some specific ways:<sup>2</sup>

| <b>Cookies</b>                                                               | <b>Tracking pixels</b>                                   |
|------------------------------------------------------------------------------|----------------------------------------------------------|
| User experience and marketing purposes (tracking user activity and behavior) | Marketing purposes (tracking user activity and behavior) |
| Cannot follow users across devices                                           | Can follow users across devices                          |
| Information is placed on users' browser                                      | Information is sent directly to web servers by pixels    |
| Can be blocked or cleared by users from the browser settings                 | Not easily disabled by end-user                          |

67. While technically a tracking pixel can be a 1x1 (e.g., a single pixel) on a screen, they can be any size, with the number of potentially unique characteristics captured the larger the image, such as the below. The size of these images can be made less apparent to the consumer by using transparent shapes and colors.<sup>3</sup>

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<sup>2</sup> *The History of Cookies and Their Effect on Privacy*, Digital Trends (Ex. 1049).

<sup>3</sup> *The History and Evolution of Pixel Tracking in Digital Marketing*, adlucent (Ex. 1050).



### **C. Anonymizing User Personal Data Tracking**

68. The concept of “anonymizing” user information ironically was embedded as a core purpose of the internet, with founders such as Howard Rheingold viewing the World Wide Web as “an anonymous, noncommercial space that exists for the common good.” As marketing interest in the internet (via browsers) began to grow, innovations such as “click-through” advertising, grew, with initial manifestations of such “click-through” banner ads such as 1994’s AT&T ad on HotWired magazine enabling advertisers to see when an anonymous user had clicked on their advertisement.

69. However, advertisers were quick to see the “benefit” of knowing as much about the user as possible, which resulted in various enabling capabilities such as the 1998 Open Profiling Standard that allowed user profiles to be exchanged.

70. As cookies and associated privacy concerns grew, various attempts to block such user-specifying capabilities also grew, such as the launch of Adblock ad-blocking software in 1996. Facebook attempted to ban user data collection by apps in 2014, even promising an “Anonymous Login” capability (which never launched).<sup>4</sup>

71. In 2018, the European Union announced new laws to protect personal data, albeit with loopholes. In 2020, Apple banned third-party cookies,<sup>5</sup> with Google promising to follow (though as of the date of the report that has not yet happened).<sup>6</sup> Thus a cat-and-mouse game continues between parties wanting to limit the use of personal information, and those who wish to profit from its use.

#### **D. History of Location Determination**

72. There are two pertinent location history overviews relevant to this matter: 1) determining the location of a fixed location (e.g., desktop) computer, and 2) determining the location of a mobile device (e.g., phone, PDA, etc.).

##### **1. History of Location Determination in Fixed Location Computers**

73. The ability to locate a desktop computer or other fixed computerized device was desired almost from the inception of the internet. While the IBM PC for

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<sup>4</sup> *A History of the Data-Tracked User*, adlucent (Ex. 1051).

<sup>5</sup> *Apple blocks third-party cookies in Safari*, zdnet (Ex. 1052).

<sup>6</sup> *Google reneges on plan to remove third-party cookies in Chrome*, cbsnews.com (Ex. 1053).

example was invented in 1981, these and other pre-2000 PCs generally had no location determination technology built into the systems, such as GPS.<sup>7</sup>

74. However, recognition that the Internet Protocol (IP) address associated with a desktop computer or similar could be used to locate, with varying degrees of accuracy, that computer. This ability was based on the standardization of the TCP/IP Protocol Suite in 1983. This standardization of TCP/IP led to the use of IP addresses as unique identifiers for devices, which in turn created the potential for tracking devices based on their assigned IP addresses.

75. A March 2000 patent, U.S. Patent No. 6,757,740 titled *Systems and methods for determining collecting and using geographic locations of internet users* was one of the first patents related to the use of IP address for geolocating a device/system. Ex. 1016 (the “’740 patent”). It describes its method as follows:

A method of determining a geographic location of an Internet user involves determining if the host is on-line, determining ownership of the host name, and then determining the route taken in delivering packets to the user. Based on the detected route, the method proceeds with determining the geographic route based on the host locations and

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<sup>7</sup> The United States GPS system had its initial GPS satellite launched in 1978, but did not achieve full operational status until 1993. In addition, GPS did not (and still does not) work well or at all indoors, limiting its effectiveness for desktop computers. Further, the Selective Availability distortion built into non-military GPS signals (causing up to 100 meters inaccuracy in any location calculation) was not removed until 2000. Further, wireline-connected computers (e.g., not using wireless signals) were not subject to the 911 mandate resulting from the 1996 Telecommunications Act. These factors combined necessitated an alternative approach to locating desktop computers pre-2000.

then assigning a confidence level to the assigned location. A system collects the geographic information and allows web sites or other entities to request the geographic location of their visitors. The database of geographic locations may be stored in a central location or, alternatively, may be at least partially located at the web site.

*Id.*, Abstract.

76. At the core of this capability was that each device connected to the internet had a unique address associated with it. The ’740 patent describes this unique number:

The Internet consists of a network of interconnected computer networks. **Each of these computers has an IP address** that is comprised of a series of four numbers separated by periods or dots and each of **these four numbers** is an 8-bit integer which collectively **represent the unique address of the computer within the Internet**. The Internet is a packet switching network whereby a data file routed over the Internet to some destination is broken down into a number of packets that are separately transmitted to the destination. Each packet contains, inter alia, some portion of the data file and the IP address of the destination.

*Id.*, 1:30-40 (emphasis added).

77. While initially there were no geographical-related inherent properties built into the IP address, that they were unique, and that the numbers were managed/coordinated/assigned consistently, enabled geographical properties to be incorporated into their structure and usage. For example, that blocks of IP addresses could be (uniquely) assigned to an Internet Service Provider (ISP) meant that the ISP for a given address could be known, and if the location of the ISP could be

determined, that location could be used as a proxy for the location of the system with one of that ISP's IP addresses, as seen below:

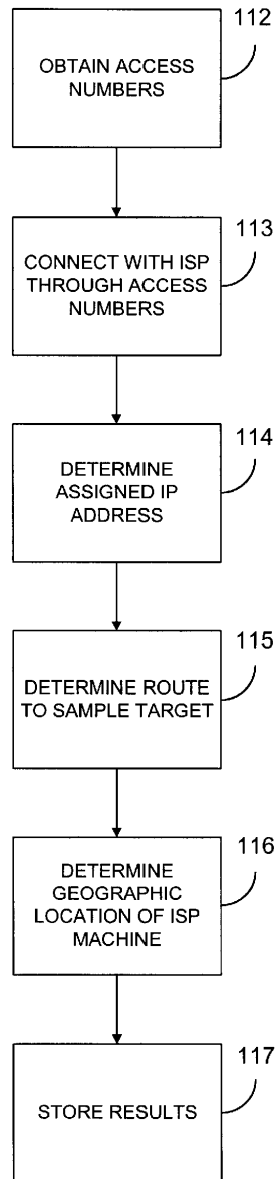


FIGURE 3

*Id.*, Sheet 3.

78. The patent describes this process as follows:

At 112, the collection system 10 obtains access numbers for the ISP. The access numbers in the preferred embodiment are dial-up numbers and may be obtained in any suitable manner, such as by establishing an account with the ISP. Next, at 113, the collection system 10 connects with the ISP by using one of the access numbers. When the collection system 10 establishes communications with the ISP, the ISP assigns the collection system 10 an IP address, which is detected by the collection system 10 at 114.

The collection system 10 at 115 then determines the route to a sample target host and preferably determines this route through a traceroute. The exact target host that forms the basis of the traceroute as well as the final destination of the route is not important so any suitable host may be used. At 116, the collection system 10 analyzes the route obtained through traceroute to determine the location of the host associated with the ISP. Thus, the collection system 10 looks in a backward direction to determine the geographic location of the next hop in the traceroute. At 117, the collection system 10 **stores the results of the analysis in the database 20**.

*Id.*, 9:54-10:8 (emphasis added).

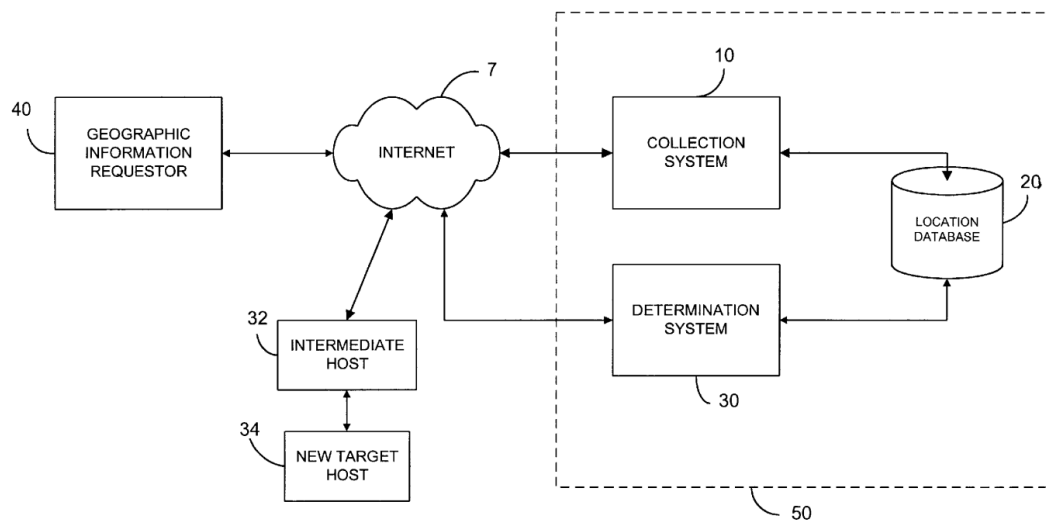


FIGURE 4

*Id.*, Sheet 4.

79. In turn the location of the user's computer could be used for various purposes such as advertising. For example, the '740 patent uses the term "advertising" nine (9) times, while being cited thirteen (13) times in other patents with that term in the patent title, while citing four (4) patents with "advertising" in the title of the patent/patent application. *See id.*

## **2. History of Location Determination in Mobile Devices**

80. As seen above, determining the location of fixed computer devices such as desktop PCs was relatively straightforward, though possibly somewhat inaccurate if they lacked specialized technology such as GPS receivers connected to the PC. However, determining the location of mobile devices was an entirely different matter, with all manner of obstacles.

81. The catalyst for overcoming these obstacles, and indeed the creation of the modern mobile Location-Based Services ("LBS") industry in the United States, was triggered by the 1996 Telecommunications Act. This Act resulted in a mandate requiring wireless carriers (along with Public Safety Answering Points (PSAPs)) to provide the location of a wireless caller when they dialed 911 (referred to as "Enhanced" 911 or E911). The mandate set up a series of deadlines for the carriers (and PSAPs) to meet a set of accuracy and subscriber penetration requirements. For example, it established a 2-phased approach to locating a wireless 911 caller. Phase 1 used the location of the cell tower the caller was connected to while calling 911 as

a “proxy” for the caller’s location, as well as identifying the sector (e.g., which direction from the tower the caller was in). Phase 2 determined the caller’s location more precisely, using either Global Positioning System (GPS) or network Time Difference of Arrival (TDOA) (a type of time difference of arrival triangulation), depending on the strategy of the wireless carrier. It was also the main catalyst for jump-starting the market for Location-Based Services (LBS) in the United States, as well as driving many of the key technology choices used in delivering such services. Together, the technology and regulatory developments in the late 1990s and early 2000s set the stage for many specific LBS applications and associated capabilities that came later in that decade and the next one.<sup>8</sup>

82. The first ramification of this mandate was for the wireless carriers (six major ones at that time) to select a technology approach to provide location information. Three carriers (Verizon Wireless, Sprint, and Nextel) chose to implement a GPS-based solution, which required a complete overhaul and swap-out of nearly their entire existing device base. The other three (AT&T Wireless, Cingular Wireless, and T-Mobile), chose an approach that did not require designing GPS into

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<sup>8</sup> While the mandate said nothing about commercial LBS, certain financial realities drove interest in it. Particularly, since E911 was a cost center (and costly) for carriers, several of them explored the possibility of making money on the commercialization of the E911-related technology in the form of a number of LBS applications in the 2000 to 2001 time period.

all their phones and getting their subscriber base to swap out their existing phones. This was achieved via a “network-based” solution that used a kind of cell-tower triangulation technology.

83. Either type of technology, though varying in accuracy, could theoretically enable reasonably accurate commercial location applications, including geofences. In fact, in a number of these early carrier commercial LBS planning efforts, geofencing was examined for its potential applicability. For example, Nextel assessed the possibility of its use in various potential Mobile Resource Management (MRM) applications for tracking workers and assets.<sup>9</sup>

84. LBS in the United States began to take off in 2003 to 2005, with the launch of Nextel’s worker tracking product in 2003 (*see* Ex. 1037) and Mobile Locator search app in 2004 (*see* Ex. 1038), and a variety of LBS applications by Sprint starting in 2005 to 2006, such as its Child Locator (*see* Ex. 1041). Verizon followed closely afterward with its child-tracking Chaperone product in 2006 (Ex. 1039), and AT&T with its Navigator product in 2008 (Ex. 1040), followed shortly by a variety of apps including children tracking and mobile social networking.<sup>10</sup>

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<sup>9</sup> I was personally involved in planning for LBS in 1998-2000 timeframe, working with Nextel.

<sup>10</sup> It should be noted that each of these products took at least one year from beginning implementation efforts to market launch.

85. While there were a variety of technical constraints on very sophisticated early LBS applications, such as small screen sizes and limited graphics capabilities in phones (particularly feature phones), these early LBS apps were fully functional and achieved significant market success.

86. New applications and location determination technologies continued to develop during the decade starting in 2010, driven by ever-increasing awareness of the potential of utilizing location as well as the continued explosion in the proliferation of wireless device adoption. Further, new location determination technologies and techniques continued to develop for various commercial purposes as well as to meet a 2015 update to the FCC's 9-1-1 mandate, requiring improved indoor location accuracy.

87. It should be noted that location determination capabilities of all types, from very accurate technologies/techniques such as GPS down to less accurate ones such as cell tower and IP address, have "confidence levels" that describe to what degree a latitude and longitude should be relied on as accurate. An example confidence level for a location might be 25 meters, which would mean that for a latitude X and longitude Y taken at time Z, that there is an AA% chance that the device being located is actually within a 25-meter radius circle drawn around lat/long X/Y. The specific values would depend upon the location determination technologies involved, as well as the statistical approach used by the reporting

vendor. There are a variety of different statistical methodologies associated with different technologies and techniques, even vendors.

### **3. Location or Map APIs**

88. Further, the ever-evolving location-related application enhancements contributed to the attractiveness and useability of not only location-intensive apps like navigation and finding people/places/things as well as location to previously non-location apps. For example, numerous applications, such as Google Maps, Apple Maps, and interfaces to mapping Application Programming Interfaces (“APIs”), greatly facilitated turning highly technical, user-unfriendly latitudes and longitudes to graphics intensive, user friendly icons and pin to simplify yet enhance users understanding of physical addresses.

89. One of the first widely used such APIs for translating latitude and longitude into a physical address was the Google Maps Geocoding API, launched in 2006.<sup>11</sup> These APIs that translated latitude and longitude coordinates to actual addresses used a process commonly referred to as “reverse geocoding.” Ex. 1010, 9:19-25 (“In one embodiment, the location module 240 is configured to convert the raw location data received from a client device 110 to an entity or object of interest, which is determined to be a location visited by a user. For example, the location

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<sup>11</sup> *History of APIs – Google Maps API*, apievengelist.com (Ex. 1054).

module 240 may access map data to identify, by reverse geocoding, an address corresponding to a location received from a client device 110.”); *see also* Ex. 1020 (showing reverse geocoding API call for Google in 2019); Ex. 1021 (discussing reverse geocoding in Google Maps in 2017); Ex. 1022 (stating that reverse geocoding is possible on Google and other map vendors); Ex. 1023 (discussing reverse geocoding on Bing Maps by 2018); Ex. 1024 (showing that reverse geocoding via Microsoft Azure was available by 2017); Ex. 1025 at 35 (reverse geocoding for Apple Location Services by 2019).

90. These APIs allowed developers to convert geographic coordinates into human-readable addresses, and vice versa, greatly enhancing location-based services and applications. The Challenged Patents readily acknowledge these existing (at the time) capabilities in its specification:

For example, the computing device may generate, at **1518**, the physical address using a map API (e.g., such as Bing Maps API, Mapbox API, OpenStreetMap API, Leaflet API, OpenLayers API, Google Maps API, and/or another map API). For example, the computing device may translate, at **1514**, the received latitude and longitude coordinates into the physical address using the map APL.

’947 patent, 41:2-8.

**E. History of the Use of Unique Identifiers in Computing and Communications**

91. The role of identifiers—particularly unique identifiers—has been critical in computing and communications since computers and electronic

communications were invented, even before. For example, the use of signaling flags to uniquely identify sailing ships at long distance was essential to naval strategies and tactics in the centuries before computers, indeed, dating back to the 17th century.<sup>12</sup> In modern computers and communications, the use of unique identifiers to uniquely identify components of a computer and computer-centric communications (e.g., the internet) has played a key, and very well-known, role in its design and operation. Indeed, the use of IP addresses and more broadly their use in location determination and inclusion in cookies for providing user information, as described above, were (and are) not the only way of uniquely identifying a device, or a component of a device, through the use of various hardware and/or software identification capabilities. These include:

- **MAC Address (Media Access Control Address)** – A MAC Address is a unique identifier assigned to network interfaces for communication at the data link layer. Every network interface card (NIC) has a unique MAC address, which is a 12-digit hexadecimal number assigned to each device connected to the network, and typically specified as a unique identifier during device manufacturing. A MAC address can be used when trying to locate a device or when performing diagnostics on a network device.<sup>13</sup>
- **Serial Number** – A serial number is a unique identifier given to hardware by the manufacturer. Each device has its own serial number to differentiate it from other similar devices.

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<sup>12</sup> *Nautical Flags: Origins, Meanings, and Resources*, asa.com (Ex. 1055).

<sup>13</sup> *What is the MAC address, and how is it used?* (Ex. 1056).

- **Autonomous System Number** – An autonomous system (AS) is a very large network or group of networks with a single routing policy. Each AS is assigned a unique ASN, which is a number that identifies the AS.<sup>14</sup>
- **UUID/GUID (Universally Unique Identifier / Globally Unique Identifier)** – UUIDs (also known as GUIDs) are 128-bit numbers often used in software systems or databases to uniquely identify information across systems. Some hardware components, like a motherboard, may also use UUIDs.<sup>15</sup>
- **Device ID** – A device ID (device identification) is an anonymous string of numbers and letters that uniquely identifies a mobile device such as a smartphone, tablet or smartwatch. Such IDs are stored inside a mobile device, and are used by mobile apps and programs to retrieve the device ID while interacting with servers to identify themselves.<sup>16</sup>
- **IMEI (International Mobile Equipment Identity)** – A unique number assigned to mobile phones. It helps identify the device on a network and is used for tracking stolen devices.
- **SIM Card ICCID (Integrated Circuit Card Identifier)** – A unique number assigned to a SIM card in mobile phones. It identifies the specific SIM, which links to the user’s mobile network account.
- **MSISDN (Mobile Station International Subscriber Directory Number)** – The phone number associated with a SIM card, uniquely identifying a user’s mobile subscription.
- **Hashing/Hash Function/Hash Values** – *Hashing* refers to the process of generating *hash values* by applying a *hash function* to input data. The resulting hash value is a unique identifier or “digital fingerprint”—one that will change with even the smallest change to the input data—that

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<sup>14</sup> *What is a MAC address and how do I find it?* (Ex. 1057).

<sup>15</sup> *What is an autonomous system? What are ASNs?* (Ex. 1058).

<sup>16</sup> Ex. 1059.

plays an integral role in computer and information science, particularly making the identification, comparison, and storage of data faster and secure.<sup>17</sup>

- **Application-specific Identifiers** – Some applications or services create unique identifiers for users or devices. For example, Google uses Android ID on phones.
- **User ID** – A User ID is unique identifier assigned to users by an operating system, software, or online service (like Google, Apple, or Facebook).
- **Session ID** – A session ID, also called a session token, is a unique identifier that a web server assigns to a user for the duration of the current session.<sup>18</sup>
- **Instance ID** – An Instance ID is unique across all app instances across the world, so a database can use it to uniquely identify and track app instances, and in particular recognize the particular instance of a browser or an operating system. An *instance* typically refers to a specific, individual occurrence or deployment of a virtual resource, such as a server, application, or service, and is often used in cloud computing environments or virtualized systems. Technically, an instance in the context of technology and computing refers to a single occurrence of an object or a class.<sup>19</sup>

92. As seen in the below table from the 2015 article *Web Tracking: Mechanisms, Implications, and Defenses*,<sup>20</sup> many of these unique identifiers were well-known in the use of web tracking, with the red boxes highlighting the

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<sup>17</sup> Ex. 1060.

<sup>18</sup> Ex. 1062.

<sup>19</sup> Ex. 1012; Ex. 1063.

<sup>20</sup> Ex. 1012.

intersection of various unique identifiers for tracking purposes with their deployment  
utilizing cookies or related browser-based techniques:

Table II  
KNOWN TRACKING SCOPE

| Section    | Tracking mechanisms                                        | Scope                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>II</b>  | <b>Session-only</b>                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| A          | Session identifiers stored in hidden fields                | Session id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| B          | Explicit web-form authentication                           | User id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| C          | window.name DOM property                                   | Session id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>III</b> | <b>Storage-based</b>                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| A          | HTTP cookies                                               | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B          | Flash cookies and Java JNLP PersistenceService             | Operating system instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C          | Flash LocalConnection object                               | Operating system instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| D          | Silverlight Isolated Storage                               | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| E          | HTML5 Global, Local, and Session Storage                   | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| F          | Web SQL Database and HTML5 IndexedDB                       | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| G          | Internet Explorer userData storage                         | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>IV</b>  | <b>Cache-based</b>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>A</b>   | <b>Web cache</b>                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1          | Embedding identifiers in cached documents                  | Browser instance id, browsing history                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2          | Loading performance tests                                  | Browsing history                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3          | ETags and Last-Modified headers                            | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>B</b>   | <b>DNS lookups</b>                                         | Browsing history                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>C</b>   | <b>Operational caches</b>                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1          | HTTP 301 redirect cache                                    | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2          | HTTP authentication cache                                  | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3          | HTTP Strict Transport Security cache                       | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4          | TLS Session Resumption cache and TLS Session IDs           | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>V</b>   | <b>Fingerprinting</b>                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| A          | Network and location fingerprinting                        | IP address, user's country, city, and neighborhood                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| B          | Device fingerprinting                                      | Device id, IP address (entire or a part), operating system, screen resolution, timezone, list of system fonts, web browser, information about hardware (mouse, keyboard, accelerometer, multitouch capability, microphone, camera), TCP timestamps                                                                                                                                                                                                                                                                      |
| C          | Operating System instance fingerprinting                   | Operating system instance id, operating system version and architecture, system language, user-specific language, local timezone, local date and time, list of system fonts, color depth, screen dimensions, audio capabilities, access to the user's camera, microphone, and hard disk, printing support, hard disk identifiers, TCP/IP parameters, computer name, Internet Explorer product id, Windows Digital Product Id, installed system drivers, operating system instance id stored by a Java privileged applet |
| D          | Browser version fingerprinting                             | Detailed browser version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| E          | Browser instance fingerprinting using canvas               | Browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| F          | Browser instance fingerprinting using web browsing history | Browser instance id, browsing history                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| G          | Other browser instance fingerprinting methods              | Browser instance id, detailed browser version, supported formats of images and media files, preferred and accepted languages, list of browser plugins, browser user's language, browser dimensions, Flash version, screen resolution, color depth, timezone, system fonts, IP address, accepted HTTP headers, cookies enabled, supercookies limitations                                                                                                                                                                 |
| <b>VI</b>  | <b>Other tracking mechanisms</b>                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| A          | Headers attached to outgoing HTTP requests                 | Customer's id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| B          | Using telephone metadata                                   | Health (including mental) condition, religious beliefs, and addictions of a specific real person                                                                                                                                                                                                                                                                                                                                                                                                                        |
| C          | Timing attacks                                             | Boolean values dependent on the look of the website (e.g., if the user is logged in to a particular service), stealing any graphics embedded or rendered on the screen                                                                                                                                                                                                                                                                                                                                                  |
| D          | Using unconscious collaboration of the user                | Browsing history, browser instance id, user's location                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| E          | Clickjacking                                               | User's email and other private data, Paypal credentials, spying on a user by a webcam                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| F          | Evercookies (supercookies)                                 | Operating system instance id, browser instance id                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

93. Thus, the use of unique identifiers for tracking purposes and their associated use of cookies was well-known by 2015, as the above highlights indicate. For example, the use of identifiers in cached documents was known as early as 2000. Ex. 1012, Fig. 1.

**F. History of Usage of Location and Integration with Internet Browsers and Other Applications Using APIs**

94. Introduced earlier, the March 2000 patent, U.S. Patent No. 6,757,740, titled *Systems and methods for determining collecting and using geographic locations of internet users*, provided not only the ability to determine the physical location of a device and utilized a unique identifier in the process, but the system also stored that information for future use. Part of that use was via browsers.

95. As described earlier, through the use of a unique identifier, the system stores the location of the end-user device using one of the nodes in the ISP network as a proxy for the end-user device.

96. Figures 4 and 5 below provide further information on this location storing method/process.

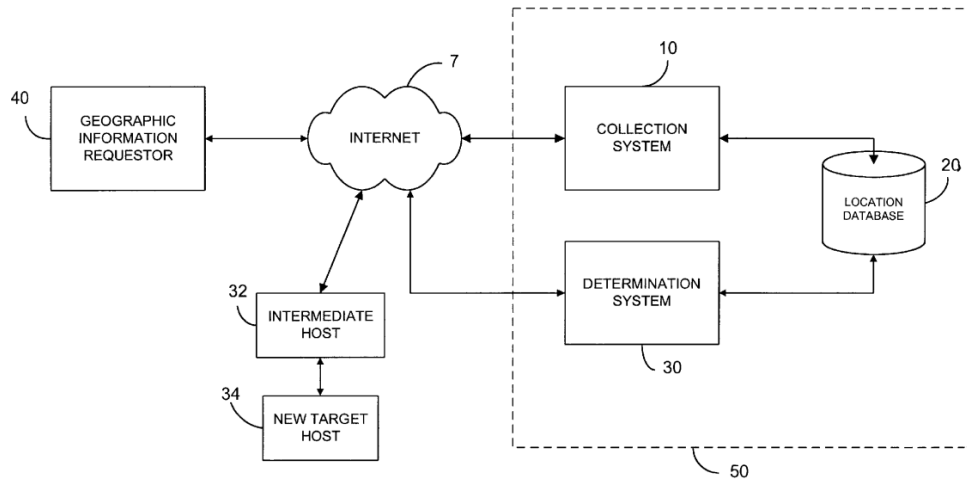


FIGURE 4

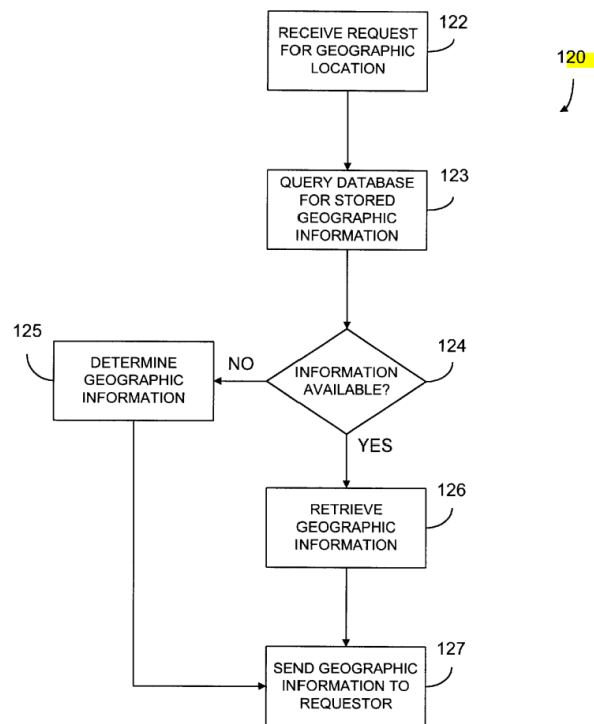


FIGURE 5

Ex. 1016.

97. Figure 4 above shows where the location information for the unique IP address is stored (Database 20). Figure 5 shows how a requester of information (e.g., a website being visited by an end-user) will first see if there is already some location information stored for the end-user, and if not initiates a process to obtain that (IP address-based) location.

98. The utility and usage of the location information obtained via the '740 was also described, with the first and foremost use case being advertising. Indeed, the '740 patent below describes in detail how an advertiser or someone looking to provide location-sensitive content to an end-user would use the invention, such as a “position targeter” being used by a website to customize content based on location:

a position targeter can be associated with web sites to target the delivery of information based on the geographic location information. **The web sites can selectively deliver content or advertising based on the geographic location of its visitors.** The geographic location information can also be used in the routing of Internet traffic. A traffic manager associated with a number of web servers detects the geographic locations of its Internet visitors and routes the traffic to the closest server.

*Id.*, 3:33-41 (emphasis added).

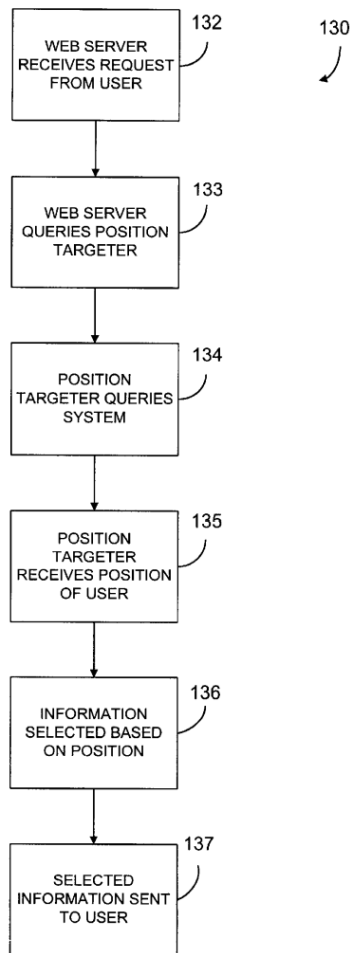


FIGURE 7

99. Interestingly, this year 2000 patent specifically addressed the use-of-cookies issue that the Challenged Patents do twenty-plus years later:

**Significantly, this method of profiling does not require the use of any cookies that have been found to be highly objectionable by the users.** While cookies are not preferred, due to difficulties induced by network topology, cookies may be used to track certain users **5** after carefully considering the privacy issues of the users **5**.

*Id.*, 16:10-15 (emphasis added).

100. In other words, the '740 patent discloses that, in the past, location data and other user data would be stored in cookies, but purports to provide the same functionality without requiring the use of cookies. *See id.*

101. Instead of using cookies, a browser in the '740 patent could use an applet (e.g., a small computer program that performs a specific task), typically embedded in a larger program or software platform such as a browser, as seen below:<sup>21</sup>

At 157, **the user's 5 browser then executes the Java Applet, passing along the unique parameter tag.** Since by default applets have rights to access the host from which they came, the applet on the user's 5 browser opens a direct connection to the client web server 60, such as on, but not limited to, port 5000. The web server 60, such as through a separate server program, is listening for and accepts the connection on port 5000. At 158, the Java applet then **sends back the unique parameter tag** to the web server 60. Since the connection is direct, the web server 60 at 159 can determine the correct IP address for the user 5, **so the web server 60 now can associate the session tag with that IP address** on all future requests coming from the proxy server 38.

*Id.*, 13:35-48 (emphases added).

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<sup>21</sup> Ex. 1064.

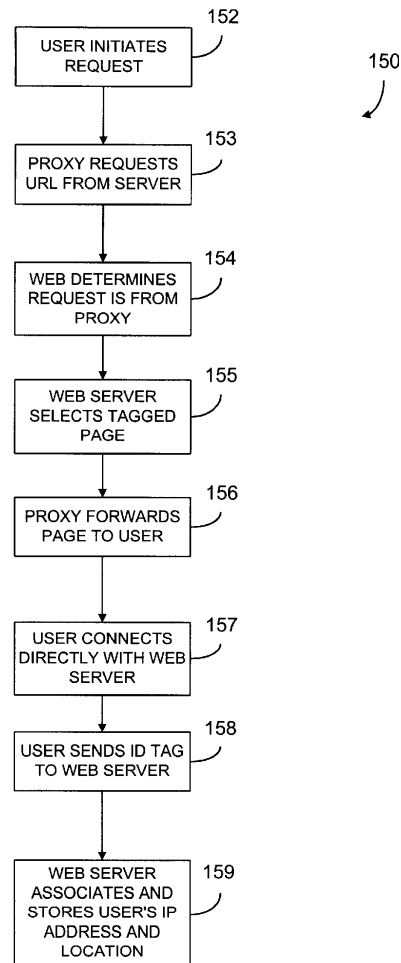


FIGURE 11

102. Thus, the '740 patent, filed in March 2000, contains many of the key elements of the Challenged Patents: using a unique identifier associated with a location of a user device using a browser, including determining if a stored location already exists and if not initiating a location determination capability.

103. Overall, as seen above, it was well-known by the time of the priority date that:

- Internet browsers were commonly used on desktop and mobile devices;
- That personal data collection from browsers could be highly useful for a broad range of uses and applications, particularly e-commerce marketing and advertising;
- That “cookies” were an efficient and effective way of collecting, storing, and using this this personal information in interacting with websites;
- That cookies were viewed almost from their inception as potentially invasive;
- That there were other ways of collecting/using personal information that did not use cookies;
- Location determination could be done across a variety of mobile and fixed devices and platforms;
- Location APIs existed that could convert latitude and longitude into a physical address (reverse geocoding);
- This location information could be used by browsers, including obtaining geographical information for the browser by websites by

first detecting whether or not location information has been previously stored;

- Location information could be stored in third-party cookies and/or other tracking mechanisms by at least 2000;
- Such browser-related user information, including location, could be “anonymized” while still being useful;
- Unique identifiers for a device or browser were viewed as highly useful, and if one did not exist (was not stored) one could be generated, including using location information;
- Location-related confidence levels of various forms and were used in location-based advertising; and
- The capabilities above were useful in and were sought out for key applications such as advertising.

## **V. The '947 Patent**

### **A. Overview of the '947 Patent**

104. The '947 patent, specifically U.S. Patent No. 11,556,947, is entitled “*Location Determination using Anonymous Browser Data.*” Its supposed goal is to improve audience identification and lead generation by utilizing anonymous data already present on the user’s browser to determine user locations and enhance

marketing efforts. The supposed core innovation of the patent involved capturing and processing data in a way that allowed advertisers to target specific households.

105. The '947 patent abstract describes the patent as follows:

[A] computing device may receive anonymous data associated with a browser session initialized by a user via a browser on a user computing device. The computing device may determine that the user has not been assigned a unique identifier. The computing device may determine whether the user opted-in to location tracking. If the user opted-out of location tracking, the computing device may determine a latitude coordinate and a longitude coordinate of the user computing device during the browser session. The computing device may identify a physical address for the user based on the latitude coordinate and the longitude coordinate, for example, using a map application programming interface (API). The computing device may assign the unique identifier to the user. The computing device may associate the unique identifier to the physical address.

Ex. 1001, Abstract.

106. Claim 1 for example describes the following:

A method comprising:  
receiving first anonymous data associated with a first browser session initialized by a user via a browser on a user computing device, wherein the first anonymous data comprises one or more of a time, a date, one or more uniform resource locators (URLs), a referring URL, a browser type, a language, an internet protocol (IP) address, or location data;  
determining that the user accessed a URL during the first browser session;  
determining that the user has not been assigned a unique identifier based on a lack of stored location data for the user computing device;  
assigning the unique identifier to the user;  
determining whether the user opted-in to or out of location tracking, based on whether a location tracker is installed on the user computing device;  
sending, upon determining that the user opted-out of location tracking, the unique identifier to the user computing device for storage in a local browser cache;

determining a latitude coordinate and a longitude coordinate of the user computing device, during the first browser session, wherein the latitude coordinate and the longitude coordinate are determined based on the first anonymous data upon determining that the user opted-out of location tracking[.]

*Id.*, 47:44-58:2.

107. There are other aspects of the patent, including determining a confidence rating, that “may be an indication of the user’s interest in a product,” based on “a frequency of visits to a specific URL, the physical address, demographics associated with the user, and/or psychographics associated with the user.” *Id.*, 1:59-62.

108. Much of how the ’947 patent works depends on whether there is an existing unique identifier, particularly one based on location tracking and whether or not the user previously opted-in to location tracking. Figure 5 below describes this process:

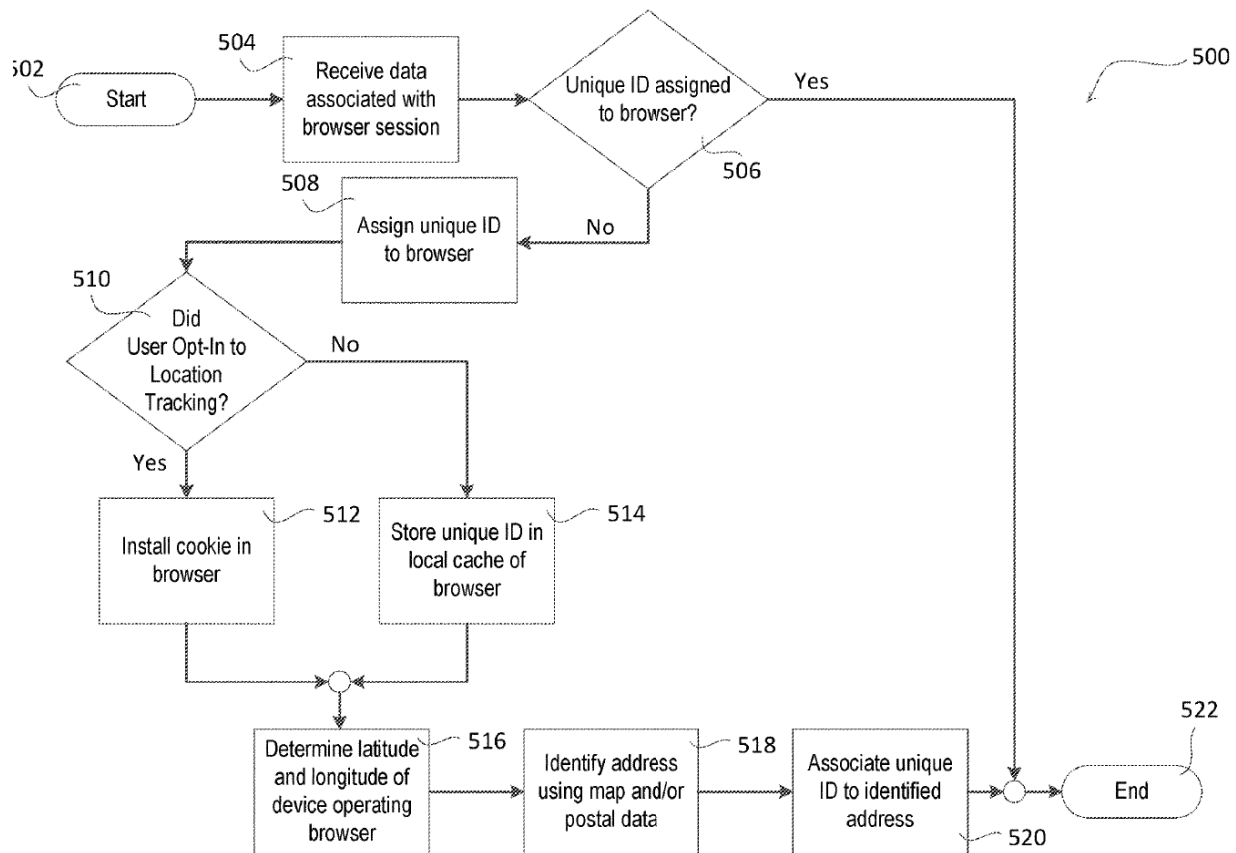


FIG. 5

109. The system was designed to determine the user's location using latitude and longitude coordinates, even if the user had opted-out of traditional location tracking, by using the user device's Internet Protocol (IP) address or other methods (if available and permitted by the user) such as GPS. Then, by leveraging mapping APIs, the technology identifies a physical address and assigns a unique identifier to the user. This identifier allows for future engagement and targeting of the user.

## **B. Prosecution History of the '947 Patent**

110. I have reviewed the prosecution history for the '947 patent. Ex. 1002. The examiner initially rejected the claims over a number of prior art references. In response to that rejection, Patent Owner added two limitations and contended that the “asserted references do not teach or suggest identifying a second visit to the URL during the second browser session using the unique identifier stored in the local browser cache.” *Id.*, 65. The two limitations Patent Owner added to overcome the rejection are: “determining that the user accessed a URL during the first browser session” and “identifying a second visit to the URL during the second browser session using the unique identifier stored in the local browser cache.” *Id.*, 30 & 56, respectively. The rest of the limitations remained the same and the examiner subsequently allowed the claims after this amendment. *Id.*, 31.

## **VI. The '219 Patent**

### **A. Overview of the '219 Patent**

111. The '219 patent, specifically U.S. Patent No. 11,823,219, entitled “*Location Determination Using Anonymous Browser Data*” (same as the '947 patent), issued on November 21, 2023, focuses on systems, methods, and apparatuses for determining the location of a user based on anonymous browser data. The '219 patent shares the same specification as the '947 patent, and claims other alleged improvements described in the '219 patent, supposedly focusing on

improving the connection between retailers, websites, and consumers and tracking marketing campaign engagement.

112. After serving the ad as discussed in the context of the '947 patent, the '219 patent continues to explain that the system receives data about the user's interactions with the campaign to determine the probability that the ad was successful. More specifically, the '219 patent discloses determining how likely it is that the user's browser session was "initiated in response to watching/listening to media associated with the campaign" at **1010**. *Id.*, 25:13-62 & Fig. 10. According to the patent, the probability can be based upon different factors, including the location of the user (e.g., user's zip code) and how the user initiated the browser session. *Id.*

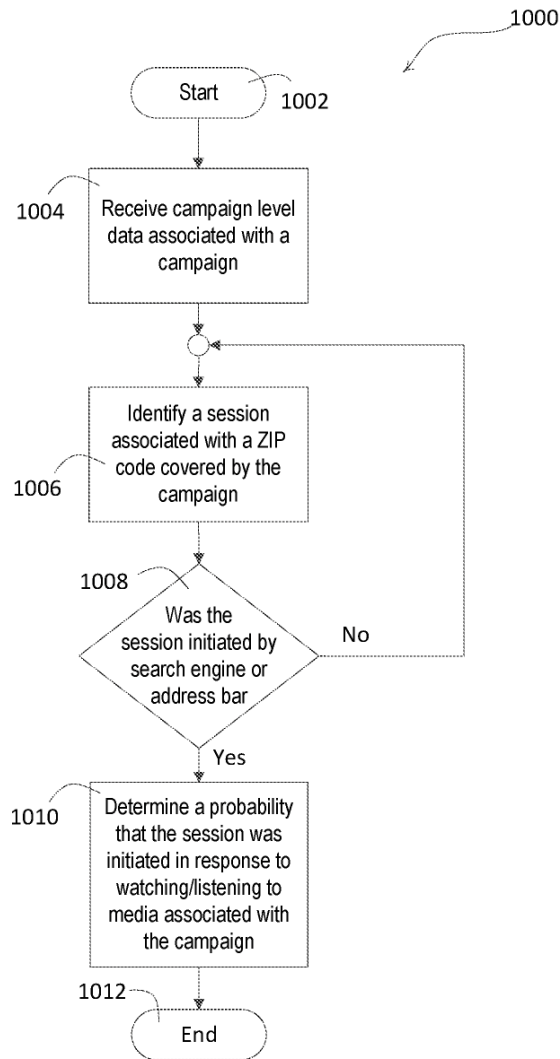


FIG. 10

113. For example, Independent Claim 1 of the '219 patent claims the following:

A method comprising:  
receiving campaign level data associated with a campaign;  
receiving anonymous data associated with a browser session initialized by  
a user via a browser on a user computing device;

- determining that the user accessed a uniform resource locator (URL) during the browser session;
- determining a latitude coordinate and a longitude coordinate of the user computing device, during the browser session, wherein the latitude coordinate and the longitude coordinate are determined based on the anonymous data upon determining that the user opted-out of location tracking, and wherein the latitude coordinate and the longitude coordinate are determined based on geo-location data retrieved from the user computing device upon determining that the user opted-in to location tracking;
- identifying a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);
- determining that the physical address is within a ZIP code covered by the campaign;
- determining that the browser session was initiated by the user with an intent to visit the URL; and
- determining a probability that the browser session was initiated in response to watching or listening to media associated with the campaign using the campaign level data.

Ex. 1003, 47:48-48:12.

114. Per the '219 patent, by associating an anonymous user with a marketing campaign, users and retailers/websites benefit because they can further interact with respect to a product or service involved in the marketing campaign. An (anonymous) user can be associated with a marketing campaign, and in turn retailers, brands, and website owners can track the effectiveness of the campaign, as a whole or with respect to individuals.

115. The below diagram, Figure 10, is described in the '219 patent as “a flow diagram illustrating an example method for determining a probability that a

browsing session was initiated in response to watching and/or listening to media associated with a campaign.”

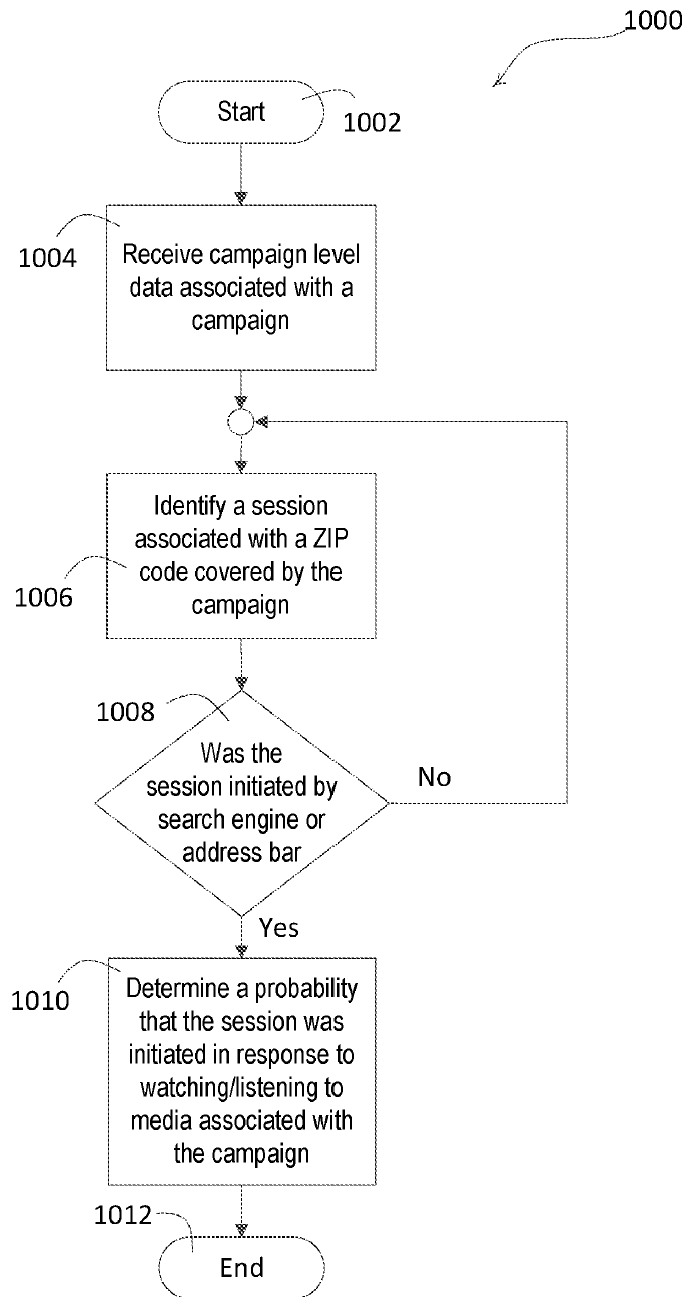


FIG. 10

**B. Prosecution History of the '219 Patent**

116. I have reviewed the file history of the '219 patent. Ex. 1004. The examiner initially rejected the claims on double patenting grounds over the '947 patent. Patent Owner amended the claims and submitted a terminal disclaimer to overcome those claims.

**VII. Claim Construction**

117. I have been instructed that the challenged claims (“Challenged Claims”) of the Challenged Patents 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.

118. I understand that, in opposition to a motion to dismiss in the corresponding litigation, Patent Owner advocated for the following constructions:

| <b>Term</b>                                                         | <b>Patent Owner’s Proposed Construction</b>                                                                                     |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| (1) “location tracker”                                              | “the third-party tracking cookie described in the patent specification (‘tracker (e.g., cookie)’)” (Ex. 1031 at 15-16)          |
| (2) “upon determining that the user opted-out of location tracking” | “upon determining that the user opted-out of location tracking by the lack of a (‘tracker (e.g., cookie)’)” ( <i>id.</i> at 16) |

| Term                                                                      | Patent Owner's Proposed Construction                                                                                                                            |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (3) "unique identifier"                                                   | "unique to the user and whose correlation to the user is known by the assignor" ( <i>id.</i> at 16)                                                             |
| (4) "determining that the user has not been assigned a unique identifier" | "a 'unique identifier' that was not previously assigned when it was previously determined that the user had opted out of location tracking" ( <i>id.</i> at 16) |

119. **"location tracker"** – Patent Owner's proposed construction for this term limits a "location tracker" to a third-party tracking cookie described in the specification. Ex. 1031 at 15-16. This limitation makes sense to me and I agree with Patent Owner's proposed construction. I will use this proposed construction in my analysis below.

120. **"upon determining that the user opted-out of location tracking"** – Patent Owner's proposed construction here seems to just integrate the construction for "location tracker" and rearrange some of the other words. Although I do not think this construction is necessary, it is my opinion that Patent Owner's proposal is consistent with the plain and ordinary meaning and therefore will adopt it in my analysis below.

121. **"unique identifier"** – It is not clear to me how Patent Owner's proposed construction for this term departs from the plain and ordinary meaning. A

unique identifier for a user is, by definition, unique to the user. Furthermore, a POSA would understand, or common sense dictates, that the assignor of the unique ID must track the correlation between unique ID and user, or else there would be no point in assigning the unique ID. Although I do not think this construction is necessary, it is my opinion that Patent Owner's proposal is consistent with the plain and ordinary meaning and therefore will adopt it in my analysis below.

122. **"determining that the user has not been assigned a unique identifier"** – As I understand Patent Owner's proposed construction, the determination that the user has not been assigned a unique identifier must be based upon whether the user was previously assigned a unique identifier when the user opted-out of location tracking. Given the other language in the claims, this construction makes sense and I agree with Patent Owner's proposed construction. I will use this proposed construction in my analysis below.

123. I am not aware of any other terms that require an explicit construction, but I reserve the right to respond to the extent Patent Owner seeks a construction of any of the terms.

### **VIII. Grounds of Unpatentability of the '947 Patent ('947 Grounds)**

124. In this section, I will explain why it is my opinion that all claims of the '947 patent are rendered obvious by the disclosures of Doughty (Ex. 1008) in combination with Van Boucq (Ex. 1009) or Doughty (Ex. 1008) in combination with

both Van Boucq (Ex. 1009) and Maginnis (Ex. 1010). 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. I have endeavored to provide a mapping between these identical or substantially identical claims below as well.

| <b>'947 Ground</b> | <b>Claims</b> | <b>Basis</b> | <b>Prior Art</b>                    |
|--------------------|---------------|--------------|-------------------------------------|
| 1                  | 1-20          | § 103        | Doughty over Van Boucq              |
| 2                  | 1-20          | § 103        | Doughty over Van Boucq and Maginnis |

#### **A. Overview of Doughty**

125. I have reviewed the Doughty reference, which is a United States Patent titled “Creation of a Universal Profile of a User by Identifying Similar User-Managed Assets on a Plurality of Devices of the User.” Based upon my review of Doughty, it issued on November 25, 2014. As a result, Doughty predates the '947 patent by nearly seven years. In my opinion, Doughty is in the same technological field as the '947 patent. This field roughly includes tracking information about a user on a web browser to send targeted advertisements.

126. Doughty describes a system for creating a “universal profile” for internet users. This profile can store a lot of information about the user, including the URLs the user visits. The profile then may be updated each time the user visits a website. Ex. 1008, 6:1-34. According to Doughty, the system “assigns a unique

identifier” for each user/profile. *Id.*, 10:45-50. Doughty explains that other information from the browser may be stored in the profile, such as the user’s “location,” “age, age range, or birthdate,” “zip code,” “gender,” “home address.” *Id.*, 8:13-56. Doughty further discloses determining and storing the geographic location of the user. Doughty explains that the location may be determined using a number of different methods, such as “GPS, triangulation, Wi-Fi triangulation, and the like.” *Id.*, 19:26-47. These locations are determined by “geographic coordinates.” But Doughty explains that the location can then be stored as part of the user’s profile as a physical address (home or work). *Id.*, 8:35-56.

127. Based on all of the information stored in the user’s profile, Doughty explains that the system can select and send ads to the user. The system will choose the ads based on a “relevancy score between the universal profile and advertisements.” *Id.*, 12:45-65. As one example, the Doughty explains that the system may decide to send the advertisement when the “relevancy score” reaches a particular threshold. *Id.*, 12:61-65.

## **B. Overview of Van Boucq**

128. I have reviewed the Van Boucq reference, which is a European patent publication titled “Geolocation Method.” Ex. 1009. I understand that Van Boucq was published October 28, 2015. This means that Van Boucq predates the ’947 patent by almost six years. Again, just like Doughty, Van Boucq is in the same

technological field (targeted advertisements on the internet using information about the user) as the '947 patent.

129. Van Boucq details multiple ways of locating the user. One such disclosure by Van Boucq explains how to determine the user's location depending upon whether the user opted-in to or opted-out of location tracking. For example, Van Boucq explains that, when the user has consented to be geolocated, the system may look for a "connection cookie" associated with the browser to determine the location. *Id.*, ¶ 60. Van Boucq continues that, if the "Internet user refuses to be geolocated or ignores the pop-up" (i.e., opts out), "the communication system will still locate the Internet user according to the IP address 290 of that user's connection to a computer network." *Id.*, ¶ 63.

### **C. Motivation to Combine Doughty and Van Boucq**

130. In my opinion, a POSA would have been motivated to combine Doughty and Van Boucq and would have had a reasonable expectation of success. As an initial matter, Doughty and Van Boucq are in the same technological field: using information about an internet user to generate targeted ads. In my opinion, a POSA would have naturally looked at other references in the same field of art and would have seen that Doughty and Van Boucq could easily be combined.

131. As mentioned above, Doughty discloses determining the user's location to help with targeted advertisements, but does not provide much detail about how to

determine the user's location. I explained above how location determination techniques were well known, but a POSA would have also recognized that Van Boucq provided additional detail about determining the location of a user in the context of targeted advertising on the internet. It is my opinion that a POSA would have found it obvious to implement those geolocation methods described in Van Boucq to determine the user's location in the system described in Doughty. In my opinion, it would have been simple for a POSA to do so.

132. It is also my opinion that a POSA would have had a reasonable expectation of success in making that combination. A POSA would have recognized and understood that many different geolocation methods could be used to determine the user's location and, indeed, Doughty recognizes as much, including using "a previous location; a current location; coordinates of a mobile communication facility; location determined by GPS, triangulation, Wi-Fi triangulation, and the like; location determined by a user entering a region, a state, a city, or the like; location determined according to a distance from a specified location, a location associated with a mobile content; and the like." Ex. 1008, 19:38-45. In my opinion, in light of that recognition in Doughty, a POSA would have known that they could use the geolocation methods in Van Boucq and would have expected to succeed in such a combination. It is further my opinion that this implementation would have been

easily within a POSA's abilities and my opinion is bolstered by the fact that Van Boucq teaches how to implement those methods.

133. It is therefore my opinion that a POSA would have been motivated to combine Doughty and Van Boucq and would have had a reasonable expectation of success in doing so. The analysis I have provided above applies to each of the limitations below, but I may also provide some further detail about the motivation to combine and expectations of success as I discuss each of the limitations below.

**D. '947 Ground 1: The Combination of Doughty and Van Boucq Discloses or Suggests Every Feature of Claims 1-20.**

134. Based on the following analysis, I conclude that a POSA at the relevant time would have understood that each of the limitations of the claims of the '947 patent was expressly disclosed, described, or taught by Doughty in combination with Van Boucq.

**1. Overview**

135. Doughty in combination with Van Boucq renders obvious every element of claims 1-20 of the '947 patent.

**(a) Claim 1**

**(i) 1[pre]: "A method comprising:"**

136. In my opinion, Doughty and Van Boucq render this limitation obvious. Both disclose methods and, when combined as I detail below, render obvious the entire method. For example, Doughty discloses "improved *methods*" "directed to

targeting advertising to mobile and non-mobile communication facilities accessed by the same user.” Ex. 1008, 5:26-29 (emphasis added). And, Van Boucq discloses “a geolocation *method* for delivering advertisements.” Ex. 1009, ¶ 1 (emphasis added). I detail the specific steps of the method below.

- (ii) 1[a]: “receiving first anonymous data associated with a first browser session initialized by a user via a browser on a user computing device, wherein the first anonymous data comprises one or more of a **time**, a **date**, one or more uniform resource locators (URLs), a referring URL, a **browser type**, a language, an **internet protocol (IP) address**, or **location data**;

137. In my opinion, Doughty and Van Boucq render this limitation obvious. Specifically, Doughty describes “receiv[ing] information relating to the user’s activity.” Ex. 1008, 10:34-40. As detailed by Doughty, this information includes the information recited in 1[a]. I added color to the claim to make it easier to identify how the disclosure in Doughty matches up with the limitations recited in 1[a]. First, Doughty discloses receiving anonymous “information, such as the *IP address*” and “the *type of browser*.” *Id.*, 17:17-18. Next, Doughty discloses that the system receives information related to specific browser sessions, including “one or more of: (a) a *URL* of each respective web page; (b) a *time* of visiting each respective web page; (c) a duration of visiting each respective web page; (d) an order in with each

web page is visited; and (e) a *geographic location* of the first and second device at the time of visiting each respective web page.” *Id.*, 6:19-25.

138. It is further my opinion that a POSA would have understood that, by tracking the “time” of a website visit, the system in Doughty would also have tracked the *date* as part of the time.

139. It is also my opinion that Doughty discloses tracking all of this information for a specific browsing session for two reasons. First, Doughty describes tracking the URL, time of visiting, duration of visiting for each web page, and an order in which each page is visited. In my opinion, a POSA would have understood that this means Doughty is tracking browsing sessions because, by tracking the time and order of each URL, the system is necessarily tracking the user’s browser session that includes the web pages opened while the user’s browser is open.

140. Second, Doughty describes tracking information about a user over a “plurality of devices of the user.” Ex. 1008, Title. A POSA would have understood that each of these devices of the user would have its own browsing session. For example, a user may have one browser open on his mobile device and another on his laptop. It is therefore my opinion that a POSA would have understood that Doughty tracks the user information for particular browser sessions.

141. As a result, it is my opinion that Doughty discloses receiving anonymous information about a user’s browser session and that anonymous

information includes at least 6 of the claimed examples in 1[a], which more than meets the required “one or more.”

142. In the alternative, in my opinion, it would have been obvious to a POSA to track the same information about the user disclosed by Doughty for the user’s browsing session. My opinion is supported because, as I explained above, Doughty discloses tracking information about the user’s browsing session (URL, time, duration, order) and tracking information across multiple devices, each of which has a different browsing session.

143. Additionally, a POSITA would have understood that the user initializes browsing sessions and that the initializing a browsing session is typically done by the user clicking a link or otherwise causing the browser to open.

**(iii) 1[b]: “determining that the user accessed a URL during the first browser session;”**

144. In my opinion, Doughty and Van Boucq render this limitation obvious. For example, Doughty describes tracking the URLs of “each respective web page,” including “an order in which each web page is visited.” Ex. 1008, 6:19-25. In my opinion, a POSA would have understood this to mean that the system is determining that the user accessed a URL during a particular browsing session. As I explained in connection with 1[a], Doughty discloses tracking information about the user’s browsing session (URL, time, duration, order) and tracking information across

multiple devices, each of which has a different browsing session. It is my opinion that a POSA would have understood this disclosure to mean that Doughty is tracking URLs accessed during a first browsing session.

145. In the alternative, it is my opinion that it would have been obvious to a POSA to determine that the user accessed a URL during a first browsing session for those same reasons: Doughty discloses tracking information about the user's browsing session (URL, time, duration, order) and tracking information across multiple devices, each of which has a different browsing session.

**(iv) 1[c]: “determining that the user has not been assigned a unique identifier based on a lack of stored location data for the user computing device;”**

146. In my opinion, this limitation is rendered obvious in at least two separate ways: (1) the disclosure in Doughty alone; and (2) the disclosure in Doughty combined with Van Boucq. I also separately address Patent Owner's proposed construction, which applies to both.

**1) Doughty Alone**

147. According to Doughty, the system first “determin[es] that a pre-existing universal profile has not been created.” Ex. 1008, 6:25-30. If the system determines that there is no preexisting universal profile created, Doughty discloses setting up

the user's profile by assigning a unique identifier. I go into more detail about the unique identifier in the context of 1[d] (the next limitation).

148. In my opinion, it would have been obvious to a POSA that, to check if the user has been assigned a unique identifier, the system would check the user's computing device for a cookie or other tracking mechanism. If the user already had a unique identifier, there would already be a cookie or other tracking mechanism on the user's computer in the local browser cache. A POSA would have understood that these types of tracking files are commonly stored in the local browser cache on the user's computer.

149. My opinion is bolstered by the fact that Doughty acknowledges that the user's device may include cookies or pixel tags previously served by advertisers that need to be matched to a unique ID. Ex. 1008, 16:51-17:26. In my opinion, a POSA would have understood that these cookies typically contained location data by June 2021.

150. In the alternative, in my opinion, it would have been obvious to a POSA to check for a previously stored location to determine whether the user has been assigned a unique identifier. A POSA would have understood that location information is usually stored in cookies or other tracking mechanisms in the browser cache on the user's computer along with the unique identifier assigned to the user. As a result, if the system determines that the user's location has already been stored,

a POSA would have understood that the system already determined the location and therefore would have already assigned a unique ID.

151. In my opinion, a POSA would have been motivated to check for a previously determined location because one of the purposes of the system in Doughty is to consolidate all information about the user in a universal profile. It is my opinion that a POSA would have understood the system must determine if the user already has an associated profile and unique ID and this could be done by checking for a previously determined location. It is therefore my opinion that Doughty's system determines a profile does not exist based upon the "lack of stored location data for the user computing device."

## **2) Doughty Over Van Boucq**

152. As an alternative, if it is determined that Doughty alone does not render obvious this limitation, it is my opinion that a POSA would have been motivated to look for methods of determining whether the user has already been assigned a unique ID. In my opinion, Van Boucq provides one such method. Specifically, Van Boucq discloses that the system can determine whether the user has a profile and unique ID by checking if the internet user already has a geolocation cookie on the computing device. Ex. 1009, ¶ 60 ("the HTTP (hypertext transfer protocol) communication protocol 220 is verified by the Web browser to determine whether *the Internet user*

*has already previously geolocated him/herself and already has a cookie (connection cookie)”).*

153. It is my opinion that a POSA would have found it obvious to check for a similar cookie or other tracking mechanism on the user’s computer as described in Van Boucq to determine whether the user has been assigned a unique ID. In my opinion, a POSA would have realized this is an efficient and commonly used means to determine whether the user has already been assigned a unique ID and would have been motivated to use it in the system described by Doughty. My opinion is supported by the fact that Doughty already contemplates storing a cookie or pixel tag with the unique ID on the user’s computer, and it is my opinion that a POSA would have recognized could have been used for determining if the user has already been assigned a unique ID. Ex. 1008, 16:59-17:31.

### **3) Proposed Construction**

154. As I detailed above, Patent Owner proposed that “determining that the user has not been assigned a unique identifier” means “a ‘unique identifier’ that was not previously assigned when it was previously determined that the user had opted out of location tracking.” Ex. 1031, 24. It is my opinion that the prior art still renders obvious this limitation under that construction because a POSA would have understood that the unique ID in the cookie or pixel tag in Doughty over Van Boucq

was assigned based upon the determination that the user opted-out of location tracking. I will explain this process in more detail in connection with 1[e].

155. In the alternative, in my opinion, it would have been obvious to a POSA that, when the system determines that the user opted-out of location tracking as in 1[e], the system would then assign a unique ID. That unique ID would be the one that is included in the cookie or other tracking mechanism (like a pixel tag) that is checked for in this step, as I explained above.

**(v) 1[d]: “assigning the unique identifier to the user;”**

156. In my opinion, Doughty and Van Boucq render this limitation obvious. Doughty explains that it “assigns a unique identifier” to a user and stores that unique identifier with the other user information in the profile. Ex. 1008, 10:45-50. Furthermore, according to Doughty and, as introduced earlier in the Background of the Technology section, that unique identifier may be created by hashing information about the user, which would then be assigned to the user. *Id.*, 17:27-31.

157. And, as already explained, it is my opinion that Patent Owner’s proposed construction is consistent with the plain and ordinary meaning of “unique identifier.” To be specific, however, it is my opinion that the unique ID described in Doughty would necessarily have been unique to a user because, if it were not, it could not be used to later identify the user. Furthermore, any POSA would have

understood that the system in Doughty that assigned the unique ID would track the correlation between the unique ID and the user. Without tracking that correspondence, the system would not be able to identify the user later and consolidate user profiles as described in Doughty.

**(vi) 1[e]: “determining whether the user opted-in to or out of location tracking, based on whether a location tracker is installed on the user computing device;”**

158. In my opinion, this limitation is rendered obvious in at least two separate ways: (1) the disclosure in Doughty alone; and (2) the disclosure in Doughty combined with Van Boucq.

**1) Doughty Alone**

159. Doughty explains, for example, that the system will determine and store the user’s geographic location with the user’s profile. Ex. 1008, 6:19-25, 15:49-16:27. I have not seen explicit disclosure in Doughty that explains how to determine if the user opted-out of location tracking. It is my opinion, however, that a POSA would have understood that more and more users were opting not to share location data with websites due to privacy concerns. I explained this above in the technological background.

160. My opinion is supported by the fact that Doughty acknowledges that users can choose to turn off browser cookies, and, as explained above, cookies

commonly store location data. *Id.*, 17:23-26. It is therefore my opinion that Doughty discloses determining whether the user opted-out of location tracking by determining whether the browser enabled storing cookies, which would commonly contain location data. And it is my opinion that a POSA would have understood that this means Doughty contemplates location tracking without cookies.

161. My opinion is further supported by the fact that Doughty explains that location tracking is important to the profile consolidation system. *Id.*, 15:18-48, 17:55-57, 20:52-64. In my opinion, a POSA would have therefore understood how important it was to determine the user's location for the system in Doughty. As a result, a POSA would have recognized that it is still desirable to determine the user's location even if the user opted-out of sharing location data. It is therefore my opinion that it would have been obvious to a POSA to determine when the user has opted-out of location sharing so that the system can find another way of locating the user when she has opted-out. In my opinion, it would have been obvious to a POSA that the system could send a request to the user's browser to determine whether the user has allowed location sharing. A POSA would have understood that the browser would store and share that information so that websites will know whether they have access to the user's location.

**2) Doughty Over Van Boucq**

162. In the alternative, it is my opinion that a POSA would have been motivated to look for references that determine whether the user has opted-out of location sharing. In my opinion, this would have included references in the same technological field, like Van Boucq. Van Boucq explains that “*if said Internet user refuses to be geolocated or ignores the pop-up*, the communication system will still locate the Internet user according to the IP address 290 of that user’s connection to a computer network.” Ex. 1009, ¶ 63 (emphasis added).

163. In my opinion, it would have been obvious to a POSA that, given the fact that Van Boucq contemplates locating the user via a different method when he has opted-out of location tracking, the system needs to first determine whether the user opted-out. And, Van Boucq explains that the system checks whether the browser “already has a cookie (connection cookie).” *Id.* In my opinion, this is an alternative way of determining that the user opted-in to location tracking, separate from whether the user refused or ignored a popup. A POSA would have understood that this determination indicates whether the user has opted-in to location tracking. *Id.* In sum, Van Boucq discloses determining the user opted-in to location tracking based upon whether a location tracker (like a third-party cookie) was installed on the user’s device. But a POSA would have also understood that the location tracker

could be either a first-party cookie or a third-party cookie because those were two types of commonly used cookies.

164. Furthermore, in my opinion, a POSA would have understood that checking for this location tracker was an efficient means of determining whether the user opted-out of location tracking. It is further my opinion that a POSA would have been motivated to combine the Van Boucq method of determining whether a user opted-out of location sharing with the system in Doughty. This is because a POSA would have understood the importance of determining the user's location for profile consolidation in Doughty, as I explained further above. Ex. 1008, 19:36-47.

**(vii) 1[f]: “sending, upon determining that the user opted-out of location tracking, the unique identifier to the user computing device for storage in a local browser cache;”**

165. In my opinion, Doughty and Van Boucq render this limitation obvious. In connection with 1[e], I explained how Doughty alone or with Van Boucq renders obvious determining whether a user has opted-out of location tracking. In my opinion, Van Boucq also explains that, upon determining that the user opted-out of geolocation, the system “result[s] in the creation of a cookie.” Ex. 1009, ¶ 63. It is my opinion that a POSA would have understood that the “creation of a cookie” is typically accomplished by a server sending a cookie or other tracking mechanism to the user's device as explained in the Background of the Technology section above.

And, it is my opinion that a POSA would have understood that the cookie or other tracking mechanism would have had the unique ID for the user so the user could be identified in the future and the user's profile could be consolidated across devices. Furthermore, it is my opinion that a POSA also would have known that cookies and other tracking mechanisms are stored in the local browser cache on the user's computer. And, in my opinion, it would have been obvious to a POSA that the cookie could be a first-party cookie or other tracking mechanism if third-party cookies were disabled.

166. As further evidence to support my opinion, Doughty discloses "serv[ing]" a cookie or other tracking mechanism to be stored on the user's device. Ex. 1008, 16:59-17:5. Additionally, as I already explained, a POSA would know that cookies and similar files (e.g., pixel tags) are stored in the user's local browser cache and would include the user's unique identifier. Given these disclosures, in my opinion, a POSA would have found it obvious to send the cookie with the user's unique identifier to the user's device so that it would be stored in the user's local browser cache when it determines the user opted-out of location tracking.

167. In the alternative, it is my opinion that a POSA would have found it obvious that the cookie or other file from Van Boucq and Doughty must include the user's unique identifier or else the system would not be able to identify the user by that unique ID later, making any data stored about that unidentifiable user useless.

- (viii) **1[g]: “determining a latitude coordinate and a longitude coordinate of the user computing device, during the first browser session, wherein the latitude coordinate and the longitude coordinate are determined based on the first anonymous data upon determining that the user opted-out of location tracking, and wherein the latitude coordinate and the longitude coordinate are determined based on geo-location data retrieved from the user computing device upon determining that the user opted-in to location tracking;”**

168. In my opinion, Doughty over Van Boucq renders this limitation obvious. As I explained above in 1[e], Doughty alone or Doughty over Van Boucq renders obvious determining whether the user opted-in to or opted-out of location tracking. I address the location determination in both scenarios below.

169. *The user opted-in to location tracking.* If the system in Doughty and Van Boucq detects that the user opted-in to location tracking, Van Boucq discloses that there are many ways the user’s location may be determined, such as “via a Web browser geolocation service” or in a “cookie” where the user has already previously been geolocated. Ex. 1009, ¶¶ 8, 63. It is my opinion that, for both options, POSA would have understood that the location is “determined based on geolocation data retrieved from the user’s computing device” because both the browser and cookie are stored on the user’s computer. I detailed in connection with 1[f] where the cookie is stored on the user’s computer.

170. ***The user opted-out of location tracking.*** If, on the other hand, the system in Doughty and Van Boucq detects that the user opted-out of location tracking, Van Boucq states that the user can be geolocated “according to the IP address 290 of that user’s connection to a computer network.” *Id.*, ¶ 63. A POSA would have understood that the location is therefore determined based upon the IP address of the user’s connection, which the patent claims as “anonymous data.” *See* 1[a]. And, the IP address was received by the system in Doughty as set forth in 1[a]. Ex. 1008, 17:16-20. Furthermore, as I explained in the technological background, a POSA would have understood that there were known ways to use the user’s IP address to determine the geolocation of the user.

171. ***The determined location includes a latitude coordinate and longitude coordinate of the user’s computing device.*** In my opinion, a POSA would have understood that, when a user’s location is determined based on the web browser’s location service or a cookie (opt-in) or the IP address (opt-out), the geolocation will normally be returned as geographic coordinates in latitude or longitude. Both Van Boucq and Doughty specifically mention receiving these coordinates. For example, Van Boucq discloses that the geolocation is returned as a latitude and longitude. Ex. 1009, ¶¶ 9, 56. And Doughty discloses receiving “geographic coordinates” (i.e., latitude and longitude coordinates) as location data. Ex. 1008, 6:55-7:10, 16:9-27.

**(ix) 1[h]: “identifying a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);”**

172. In my opinion, Doughty and Van Boucq render this limitation obvious. I explained in 1[g] how Doughty over Van Boucq describes determining the latitude and longitude of the user. Van Boucq further recognizes that determining a user’s location commonly involves application programming interfaces, or APIs, such as those associated with a browser like “Google Service Location,” “Microsoft Service Location,” and “Apple Location Service.” Ex. 1009, ¶¶ 31-36.

173. In my opinion, a POSA would have known that those same services can be used to convert latitude and longitude coordinates into physical addresses. Determining a physical address from latitude and longitude coordinates was a well-known process called “reverse geocoding” by at least the date of the provisional application. Ex. 1010, 9:19-25 (“In one embodiment, the location module 240 is configured to convert the raw location data received from a client device 110 to an entity or object of interest, which is determined to be a location visited by a user. For example, the location module 240 may access map data to identify, by *reverse geocoding*, an address corresponding to a location received from a client device 110.”); *see also* Ex. 1020 (showing reverse geocoding API call for Google in 2019); Ex. 1021 (discussing reverse geocoding in Google Maps in 2017); Ex. 1022 (stating

that reverse geocoding is possible on Google and other map vendors); Ex. 1023 (discussing reverse geocoding on Bing Maps by 2018); Ex. 1024 (showing that reverse geocoding via Microsoft Azure was available by 2017); Ex. 1025, 35 (reverse geocoding for Apple Location Services by 2019).

174. In my opinion, a POSA would have been motivated to make that conversion because Doughty specifically discloses storing home, work, and billing addresses. Knowing that Doughty discloses determining geographic coordinates, but storing addresses, a POSA would have been motivated to use these well-known reverse geocoding APIs to change the geographic coordinates into physical addresses. It is further my opinion that it would have been obvious for a POSA to make these reverse geocoding API calls to do the conversion given how common those reverse geocoding APIs were. My opinion is supported by the explicit disclosure of these location services APIs in Van Boucq.

**(x) 1[i]: “associating the unique identifier to the physical address;”**

175. In my opinion, Doughty and Van Boucq render this limitation obvious. I already explained in connection with 1[a] and 1[c] that Doughty discloses creating a user profile that includes a unique ID for the user. I note that Doughty further explains that the profile and unique ID are associated with other information in the profile, which includes “home address,” “work address,” and “billing address,” each

of which are physical addresses. Ex. 1008, 8:13-56. Based upon these the disclosures, it is my opinion that a POSA would have understood that the system associates physical addresses (e.g., home, work, billing) with the unique ID because both are stored in the user's profile.

176. In the alternative, it is my opinion that it would have been obvious to a POSA that the system associates the physical addresses (e.g., home, work, billing) with the user's unique ID based upon the fact that Doughty discloses storing all this information in the user's profile. *Id.*, 8:13-56.

(xi) 1[j]: “generating a user profile for the user using the unique identifier and physical address, the user profile comprising profile information that comprises one or more URLs the user has accessed, a frequency with which the user accessed the URL(s), demographics associated with the user, the physical address(es) associated with the user, or devices associated with the user;”

177. In my opinion, Doughty and Van Boucq render this limitation obvious. I explained above for limitation 1[c] that, if the user does not yet have a unique ID, the system in Doughty creates a universal profile for that user and generates a unique ID to associate with the profile. I use color coding here to match up the disclosures in Doughty with the claim limitations for convenience.

178. Doughty also details information that is stored in the profile, including the specific information in this limitation. For example, Doughty explains that the

profile includes: the addresses for multiple locations associated with the user, as I explained in 1[i].

179. Doughty details that the user profile will also include: “(a) *a URL of each respective web page*; (b) a time of visiting each respective web page; (c) *a duration of visiting each respective web page*; (d) an order in which each web page is visited; and (e) a *geographic location of the first and second device at the time of visiting each respective web page*.” *Id.*, 6:19-25. It is my opinion that a POSA would have understood that, by tracking this information about the user’s browsing history, the system is therefore tracking the frequency with which the user accessed the URLs.

180. The profile in Doughty also includes demographic information like age, gender, race, religion, and marital status, as well as *information about the model of the user’s devices*. *Id.*, 8:35-56. This is further evidenced by the fact that Doughty discloses tracking the user across a plurality of devices. It is my opinion that a POSA would have understood that the profile contains information about the devices associated with the user, including the model number, because the system in Doughty would naturally track the different devices associated with the user.

181. It is therefore my opinion that Doughty discloses generating a profile for the user using the unique ID and physical address that includes all of the specific information listed for this claim limitation.

- (xii) **1[k]: “updating the profile information based on second anonymous data associated with a second browser session initialized on the user computing device or another user computing device associated with the physical address;”**

182. In my opinion, Doughty discloses and/or renders obvious this limitation. For example, Doughty explains that the user’s profile “may be updated to add or delete further correlation between data, devices, etc.” *Id.*, 16:28-37. It is my opinion that a POSA would have understood that this would often happen in a browsing session that is separate or distinct from the first browsing session, or a second browsing session. This opinion is substantiated by the fact that Doughty acknowledges that the same user may use multiple devices. A POSA would have understood that each of these devices would have its own browsing session. And Doughty discloses updating the same profile even where the user is using a different device. For example, Doughty describes using the location information from each of the devices, such as the user’s location being the same or the device types being consistent, to consolidate the user’s profile across devices. *Id.*, 8:35-56, 15:18-48, 16:38-50.

183. In the alternative, it is my opinion that it would have been obvious to a POSA that the user’s profile will be updated with information from a second browsing session based upon those same disclosures I detailed in the previous paragraph. Furthermore, in my opinion, a POSA would have understood that the

more information collected about the user, the better the system can serve relevant ads, and therefore a POSA would have been motivated to update the user's profile even if the user starts a new browsing session.

**(xiii) 1[l]: “identifying a second visit to the URL during the second browser session using the unique identifier stored in the local browser cache;”**

184. In my opinion, Doughty and Van Boucq render this limitation obvious. I explained in connection with 1[b] that Doughty describes tracking the URLs of “each respective web page,” including “an order in which each web page is visited.” *Id.*, 6:19-25. In my opinion, a POSA would have understood that, by tracking respective web pages and the order in which they are visited, the system can determine when the same URL visited in a first browsing session then is re-visited in a second browsing session. For example, as I explained in 1[k], each session could be on a different device because the user's profile is consolidated across those devices.

185. Moreover, as I explained for limitation 1[k], Doughty explains that the user's profile can be updated to identify “further correlations between data.” In my opinion, a POSA would have understood that a second visit to the same URL in a subsequent browsing session would have been data tracked by the profile associated with the user, including the unique identifier, as described in Doughty.

186. It is also my opinion that a POSA would have understood that the unique ID of the user, which is stored in the local browser cache, was used to attribute the two separate browsing sessions to the same user. A POSA would have recognized that the unique ID would have been the same even across devices.

187. In the alternative, it is also my opinion that it would have been obvious to a POSA to use the unique ID (which is stored in the local browser cache) to attribute the two separate browser sessions to the same user, whether or not those browsing sessions occurred on the same devices so information in both browsing sessions can be consolidated/attributed to the same user.

**(xiv) 1[m]: “determining, using the updated profile information, a confidence rating for the user, the confidence rating indicating a quantifiable measure of the user’s interest in a product;”**

188. In my opinion, Doughty discloses and/or renders this limitation obvious. For example, Doughty describes determining a “relevancy score” based upon the user’s profile and the set of advertisements in the sponsor database. *Id.*, 13:4-33. It is my opinion that this “relevancy score” is the same as the claimed confidence rating. In my opinion, a POSA would have understood that the relevancy score in Doughty is a quantifiable measure of the user’s interest in the product or service in the advertisement because it is supposed to be a measure of how relevant

the ad is to the user: “selecting a sponsored content based on a relevancy thereof with the universal profile.” *Id.*, 8:35-56.

189. In the alternative, it is my opinion that it would have been obvious to a POSA that the relevancy score in Doughty is a quantifiable score (i.e., number) and is calculated in a way that it indicates the measure of the user’s interest in a product from the sponsor database (i.e., the “relevanc[e]” to the user) because that is the purpose of the “relevancy score.” And, Doughty discloses that the relevancy score is based upon the user’s profile and the set of advertisements in the sponsor database. *Id.*, 13:4-33.

**(xv) 1[n]: “generating one or more notifications  
based on one or more of the updated profile  
information or the confidence rating; and”**

190. In my opinion, Doughty discloses or renders this limitation obvious. Specifically, Doughty discloses “selecting a sponsored content based on a relevancy thereof with the universal profile” and then generating a “push” notification to send to the user. *Id.*, 8:35-56, 13:4-33. In my opinion, a POSA would have understood that “push” refers to notifications that are “pushed” or sent from a server to the device, e.g., Apple Push Notification Service (“APNs”). Indeed, push notifications were well known in the industry and to a POSA well before 2020. Ex. 1042; Ex. 1043; Ex. 1044.

**(xvi) 1[o]: “determining when to send the one or more notifications to the user.”**

191. In my opinion, Doughty discloses and/or renders this limitation obvious. For example, Doughty describes determining when to send the push notification to the user based upon the relevancy score: “advertisements are sent *only when the relevancy score is above a predetermined value or threshold.*” Ex. 1008, 12:61-65. In other words, Doughty discloses determining when to send an ad as a push notification when the relevancy score meets a certain threshold.

**(b) Claim 2:**

**(i) 2[pre]: “The method of claim 1, wherein the physical address is a first physical address, the method further comprising:”**

192. It is my opinion that this limitation is rendered obvious by Doughty and Van Boucq for the same reasons I explained in connection with limitation 1[h].

**(ii) 2[a]: “determining a second physical address for the user computing device while accessing the URL during the second browser session based on the second anonymous data; and”**

193. In my opinion, Doughty over Van Boucq renders this limitation obvious. As I explained in connection with limitations 1[g] and 1[h], it is my opinion that Doughty over Van Boucq renders obvious determining a physical address for the user while accessing the URL during the first browsing session. It is also my opinion that a POSA would have recognized that these exact same steps would have

been performed every time the URL is accessed during a subsequent browsing session. Doughty says as much: the system will determine the location of the device “*at the time of visiting each respective webpage.*” *Id.*, 6:19-25. In my opinion, a POSA would have understood this passage to mean that the system locates the user in the same manner every time the user accesses a URL.

194. I note that Doughty further describes identifying multiple physical addresses associated with the user (e.g., home address, work address). *Id.*, 8:35-56. In my opinion, a POSA would have understood that, to determine multiple addresses associated with the user, the system would have to determine the user’s location multiple times. With that information, a POSA would have understood that the system can check the user’s location against the time of day and frequency the user appears in that location to determine if the address can be mapped to the user’s home address or work address.

195. Furthermore, I explained in connection with limitation 1[h] that a POSA would have understood that geographic coordinates could be turned into a physical address via a reverse geocoding API call to well-known location services. It is my opinion that a POSA would have found it obvious to determine the location and physical address of the user every time he accesses the URL, thereby determining a second address during a second browsing session.

196. Furthermore, according to Doughty, the system uses the user's location to help consolidate the user's universal profile even if the user has multiple different devices. *Id.*, 15:18-48, 16:38-50. In my opinion, a POSA would have understood that, given the importance of location to this profile location consolidation, the system will determine the location of the user every time he accesses a URL. This would mean the system will determine a second address during a second browsing session. I explained the second browsing session in more detail in 1[k] and 1[l].

197. In the alternative, it is my opinion that it would have been obvious to a POSA to determine the user's location every time he accesses the URL, using the same steps. In my opinion, this is supported by the same disclosures in Doughty I highlighted above given the importance of knowing the location that I set forth in 1[e].

**(iii) 2[b]: “associating the second physical address to the user profile based on the unique identifier stored in the local browser cache.”**

198. In my opinion, Doughty and Van Boucq render this limitation obvious. I explained in connection with limitations 1[i] and 1[k] that Doughty over Van Boucq renders obvious associating the user's physical addresses with his universal profile, which has a unique identifier. That information is stored in the user's local browser cache in a cookie or other file. Ex. 1008, 8:13-56. It is my opinion that this limitation is met for the same reasons I explained for 1[i] and 1[k].

- (c) **Claim 3: “The method of claim 1, further comprising, installing, upon determining that the user opted-in to location tracking, the location tracker in the browser.”**

199. In my opinion, Doughty and Van Boucq render this claim obvious. As I explained in connection with 1[e] and 1[f], it is my opinion that Doughty over Van Boucq renders obvious determining that the user opted-in to or out of location tracking. Van Boucq also discloses storing a cookie with the location in the user’s browser upon the determination that the user opted-in to location tracking. Ex. 1009, ¶¶ 8, 60, 63. In my opinion, based upon this disclosure, a POSA would have understood that storing the cookie (e.g., third-party cookie) with the user’s location in the local browser cache is an example of installing a location tracker in the browser.

- (d) **Claim 4: “The method of claim 1, further comprising determining personal information associated with the user, the personal information comprising one or more of an address type, a name of the user, an age of the user, a gender of the user, the demographics associated with the user, or psychographics associated with the user, wherein the personal information is used to generate the user profile and determine the confidence rating.”**

200. In my opinion, Doughty and Van Boucq render this claim obvious. As I explained in connection with 1[j], it is my opinion that Doughty over Van Boucq renders obvious determining and storing personal information about the user. I use

color coding here to match up the disclosures in Doughty with the claim limitations for convenience. This information stored in the user's profile includes, for example: "(a) *age, age-range, or birthdate*; (b) *gender*; (c) *race*; (d) *religion*; (e) *marital status*; (f) area code of the phone number assigned to one of the first and second mobile or non-mobile communication devices; (g) zip code; (h) *home address*; (i) *work address*; (j) *billing address*; (k) type of credit card used to pay a carrier providing service to the mobile or non-mobile communication devices; (l) birthplace; (m) employer; (n) employment position; (o) income bracket of the user; (p) model of one of the first and second mobile or non-mobile communication devices; and (q) operating system of one of the first and second mobile or non-mobile communication devices." Ex. 1008, 8:35-56.

201. Doughty also describes storing the *user's name* in the profile. *Id.*, 16:44-50. Doughty also discloses storing the "*use-pattern*" of the user in the user's profile. This use-pattern includes "psychographic information," including the user's installed applications, like "ESPN ScoreCenter" and "NBA JAM." *Id.*, 7:11-37, 14:48-67; *see* Ex. 1001, 10:30-32 ("The psychographics associated with the user may include personality traits, lifestyles, interests, opinions, beliefs, values, etc.")

202. It is therefore my opinion that Doughty discloses or renders obvious determining and storing all of the claimed personal information listed and generating or updating the user's profile to include that personal information. Furthermore, it is

also my opinion that a POSA would have understood based upon the disclosure in Doughty set forth in limitation 1[m], that the user's profile (with the personal information listed in this claim) is used to determine the relevancy score (or confidence rating).

- (e) **Claim 5: “The method of claim 4, wherein the address type comprises one or more of a residential address, a single family home, an apartment building, or a commercial address, wherein when the address type is a residential address, the user profile is associated with the residential address such that information associated with the residential address is used to generate the user profile.”**

203. In my opinion, Doughty over Van Boucq renders this claim obvious. I explained in limitations 1[g] and 1[h] and claim 4 that Doughty over Van Boucq renders obvious determining physical addresses for the user, including a home address or work address. It is also my opinion that a POSA would have recognized that, when the system determines an address is the person's home address, the system determines that an address associated with the user is a residential address. And, it is my opinion that, by determining an address is a user's “work address,” that determination is necessarily determining that the address is a commercial address. In my opinion, moreover, a POSA would have understood that the user's profile must be associated with those addresses based upon the storage of the addresses in the user's profile. By storing the residential and/or commercial address(es) (e.g.,

home address and/or work address) in the user's profile, it is my opinion that the address(es) is used to generate the user's profile.

**(f) Claim 6: "The method of claim 1, wherein the one or more notifications comprise one or more of an email, a text message, a mobile phone notification, a phone call, or a digital display."**

204. In my opinion, Doughty and Van Boucq render this claim obvious. As I described for limitations 1[n] and 1[o], it is my opinion that Doughty discloses or renders obvious generating "push" notifications with ads that are sent to the user when the relevancy score reaches a threshold. Ex. 1008, 8:35-56, 13:4-33. It is further my opinion that a POSA would have comprehended that "push" refers to notifications that are "pushed" or sent from a server to the device. Apple Push Notification Service ("APNs") is one of the most common examples of push notifications. Ex. 1043; Ex. 1044. It is therefore my opinion that Doughty discloses sending mobile phone notification (e.g., push notifications).

205. In the alternative, it is my opinion that it would have been obvious to a POSA that the targeted advertisements necessarily must be sent to the user. And, a POSA would have known that, on the internet, the most obvious ways to ensure the user receives the ad would be to send an email, text, mobile notification, or otherwise display the ad on the user's digital device (e.g., phone, tablet, or laptop).

**(g) Claim 7:**

**(i) 7[pre]: “The method of claim 1, further comprising:”**

206. It is my opinion that Doughty and Van Boucq render this limitation obvious for the reasons I detailed in connection with claim 1.

**(ii) 7[a]: “determining a specific product of interest based on the URLs that the user visited; and”**

207. In my opinion, Doughty over Van Boucq renders this limitation obvious. I explained in connection with 1[m] that Doughty over Van Boucq renders obvious determining a relevancy score (confidence rating), which is a quantifiable measure of the user’s interest in a product. I explained in connection with 1[l] and 1[a] that this relevancy score is based on the user’s profile, which includes information about the URLs visited by the user. Doughty also discloses that the relevancy score is for specific products of interest because it is calculated using the user’s profile plus the relevant advertisement. It is my opinion that a POSA would have understood that the advertisements often promote specific products and/or services. Ex. 1008, 12:61-65. Given this disclosure, in my opinion, it would have been obvious to a POSA that the relevancy score was a determination of a user’s specific product of interest and was based upon the URLs the user visited in the user’s profile.

**(iii) 7[b]: “generating the one or more notifications based on the specific product of interest.”**

208. In my opinion, Doughty over Van Boucq renders this limitation obvious. I explained in connection with 1[n] that Doughty over Van Boucq renders obvious generating notifications based upon the relevancy score for the specific advertisements. And, as I explained above, a POSA would have understood that these advertisements can advertise specific products and the advertisement will then be sent to the user in a push notification, which, naturally, first requires generating that notification to send.

**(h) Claim 8: “The method of claim 1, further comprising updating the determined confidence rating upon subsequent visits to the URL to indicate an increase in the user’s interest in the product.”**

209. In my opinion, Doughty and Van Boucq render this claim obvious. As I explained in connection with limitation 1[k], it is my opinion that Doughty over Van Boucq discloses updating the user’s profile upon subsequent visits to a URL. In my opinion, a POSA would have understood that the relevancy score will be updated upon subsequent visits to a URL because Doughty discloses that the “relevancy score” (confidence rating) is based upon the user’s profile, which was updated. *Id.*, 8:35-56, 12:61-65.

210. Furthermore, it is my opinion that a POSA would have understood that additional visits would indicate an increase in the user’s interest in the products sold

at that URL because, the more often the user visits a page, the more likely the user is interested in the products on that page. As an example, if a user visits a website that sells laptops many times, the user is likely to have an increased interest in buying a laptop. As such, the relevancy score would be adjusted to indicate that the user has increased interest because the profile will be updated with each visit to that page.

**(i) Claim 9: “The method of claim 1, wherein the first anonymous data comprises the latitude coordinate and the longitude coordinate.”**

211. In my opinion, Doughty and Van Boucq render this claim obvious. As I explained in limitation 1[a], Doughty over Van Boucq renders obvious receiving location data associated with the user and the location data is anonymous data claimed in 1[a]. Furthermore, as I explained in limitation 1[g], Doughty over Van Boucq discloses that location data will typically be received as latitude and longitude coordinates. It is therefore my opinion that Doughty over Van Boucq renders obvious receiving latitude and longitude coordinates as part of the first anonymous data in 1[a].

**(j) Claim 10: “The method of claim 1, wherein the location tracker is stored in a folder associated with the browser.”**

212. In my opinion, Doughty and Van Boucq render this claim obvious. I explained in connection with 1[f] that Doughty over Van Boucq renders obvious storing a location tracker in the browser cache of the user’s computer. It is my

opinion that a POSA would have known that the browser cache is a folder on the user's computer and that folder would naturally be associated with the browser.

**(k) Claim 11:**

213. I have carefully reviewed claim 11 and compared it against claim 1. In my opinion, there are no material differences between the two. Claim 11 is simply claiming a machine-readable storage device that executes the steps of the method steps in claim 1. It is therefore my opinion that Doughty over Van Boucq renders obvious claim 11 for the same reasons as I discussed in connection with claim 1. I explain the mapping of limitations a bit more in the table below.

| Claim                                                                                                                                                             | Corresponding analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11[pre]: "A non-transitory, machine-readable storage device that includes instructions that, when executed by a computing device, cause the computing device to:" | In my opinion, a POSA would have understood that the method claimed in claim 1 would have been stored as on a non-transitory, machine readable device with source code that performs that method. Indeed, Doughty discloses performing the method on computing devices. Ex. 1008, Fig. 1 & 10:15-25 (describing the server 104 that would contain non-transitory, machine readable code for performing the method). It is therefore my opinion that 11[pre] is rendered obvious for the same reasons as 1[pre], which I detailed above. |

| Claim                                                                                                                                                                                                                                                                                                                                                                   | Corresponding analysis                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 11[a]: “receive first anonymous data associated with a first browser session initialized by a user via a browser on a user computing device, wherein the first anonymous data comprises one or more of a time, a date, one or more uniform resource locators (URLs), a referring URL, a browser type, a language, an internet protocol (IP) address, or location data;” | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[a]. |
| 11[b]: “determine that the user accessed a URL during the first browser session;”                                                                                                                                                                                                                                                                                       | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[b]. |
| 11[c]: “determine that the user has not been assigned a unique identifier based on a lack of stored location data for the user computing device;”                                                                                                                                                                                                                       | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[c]. |
| 11[d]: “assign the unique identifier to the user;”                                                                                                                                                                                                                                                                                                                      | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[d]. |
| 11[e]: “determine whether the user opted-in to or out of location tracking, based on whether a location tracker is installed on the user computing device;”                                                                                                                                                                                                             | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[e]. |
| 11[f]: “send, upon determining that the user opted-out of location tracking, the unique identifier to the user computing device for storage in a local browser cache;”                                                                                                                                                                                                  | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[f]. |

| Claim                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Corresponding analysis                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <p>11[g]: “determine a latitude coordinate and a longitude coordinate of the user computing device, during the first browser session, wherein the latitude coordinate and the longitude coordinate are determined based on the first anonymous data upon determining that the user opted-out of location tracking, and wherein the latitude coordinate and the longitude coordinate are determined based on geo-location data retrieved from the user computing device upon determining that the user opted-in to location tracking;”</p> | <p>It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[g].</p> |
| <p>11[h]: “identify a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);”</p>                                                                                                                                                                                                                                                                                                                                         | <p>It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[h].</p> |
| <p>11[i]: “associate the unique identifier to the physical address;”</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[i].</p> |
| <p>11[j]: “generate a user profile for the user using the unique identifier and physical address, the user profile comprising profile information that comprises one or more URLs the user has accessed, a frequency with which the user accessed the URL(s), demographics associated with the user, the physical address(es) associated with the user, or devices associated with the user;”</p>                                                                                                                                         | <p>It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[j].</p> |

| Claim                                                                                                                                                                                                                           | Corresponding analysis                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 11[k]: “update the profile information based on second anonymous data associated with a second browser session initialized on the user computing device or another user computing device associated with the physical address;” | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[k]. |
| 11[l]: “identify a second visit to the URL during the second browser session using the unique identifier stored in the local browser cache;”                                                                                    | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[l]. |
| 11[m]: “determine, using the updated profile information, a confidence rating for the user, the confidence rating indicating a quantifiable measure of the user’s interest in a product;”                                       | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[m]. |
| 11[n]: “generate one or more notifications based on one or more of the updated profile information or the confidence rating; and”                                                                                               | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[n]. |
| 11[o]: “determine when to send the one or more notifications to the user.”                                                                                                                                                      | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[o]. |

**(I) Claims 12-20:**

214. I have carefully reviewed claims 12-20 and it is my opinion that these claims are substantially identical to claims 2-10. It is therefore my opinion that these claims are obvious over Doughty and Van Boucq for the same reasons. I detail the specific mapping for these claims below.

| Claim | Corresponding analysis                                                                              |
|-------|-----------------------------------------------------------------------------------------------------|
| 12    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 2.  |
| 13    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 3.  |
| 14    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 4.  |
| 15    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 5.  |
| 16    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 6.  |
| 17    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 7.  |
| 18    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 8.  |
| 19    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 9.  |
| 20    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 10. |

**E. '947 Ground 2: The Combination of Doughty with Van Boucq and Maginnis Discloses or Suggests Every Feature of Claims 1-20.**

215. As set forth above, it is my opinion that Doughty over Van Boucq renders obvious all of the Challenged Claims. I offer the following additional opinion. Nothing I say below should be construed as contrary to my analysis for '947

Ground 1. Based on the following analysis, I conclude that a POSA at the relevant time would have understood the limitations of claims of the '947 patent were rendered obvious by Doughty in combination with Van Boucq and Maginnis.

216. I already explained how Doughty over Van Boucq renders each limitation of the Challenged Claims invalid in '947 Ground 1. In this '947 Ground, I only address combining Doughty and Van Boucq with Maginnis to meet limitation 1[h]. I incorporate my analysis for 1[h] and all of the other claims and limitations into this '947 Ground 2 as if fully set forth herein.

### **1. Overview of Maginnis**

217. I have reviewed Maginnis, which is a United States Patent titled “Estimating Foot Traffic Lift in Response to an Advertisement Campaign at an Online System.” Ex. 1010. Based upon my review, I understand that Maginnis was published December 22, 2016, and therefore predates the earliest date for the '947 patent by almost five years.

218. Maginnis is in the same general field of online advertisements as the '947 patent, Doughty, and Van Boucq. Maginnis describes a method and system for analyzing “the effectiveness of an advertisement campaign at an online system.” *Id.*, 1:38-39. Maginnis discloses tracking users' locations to measure an increase in foot traffic in response to an online advertising campaign. *Id.*, 1:38-63. Maginnis explains that each user's device has a location module, which can locate the user. The user's

location will then be stored as part of the user's profile. *Id.*, 9:5-18. Furthermore, Maginnis discloses that the location module will change "raw location data" (latitude and longitude coordinates) by "access[ing] map data to identify, by reverse geocoding, [into] an address corresponding to a location." *Id.*, 9:19-26. This supports the opinions I rendered above that reverse geocoding APIs were well-known. It is my opinion that, in light of the disclosure in Maginnis, a POSA would have understood that reverse geocoding API calls could be to any of the known location services, including Apple, Google, or Microsoft. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35.

219. In other words, Maginnis explicitly discloses determining the address corresponding to geographic coordinates by using a reverse geocoding API call to map data.

## **2. Motivation to Combine Doughty and Van Boucq with Maginnis**

220. As I described above for '947 Ground 1, it is my opinion that it would have been obvious to a POSA to combine Doughty and Van Boucq. It is also my opinion that it would have also been obvious to combine Doughty and Van Boucq with Maginnis. I explained above that Doughty over Van Boucq discloses finding the user's location to help with the targeted advertising, including how to determine the user's location depending upon whether they opt-in to or out of location sharing.

Although Doughty and Van Boucq do not explicitly detail how to translate the geographic coordinates to physical addresses, Doughty describes storing the user's address, not his latitude and longitude coordinates. Although it is my opinion that this translation was well-known and would have been obvious, it is also my opinion that a POSA would have been motivated to seek out similar references that explicitly disclose this type of translation—e.g., reverse geocoding. In my opinion, implementing the well-known reverse geocoding API calls described in Maginnis with the system described in '947 Ground 1 for Doughty over Van Boucq would have been obvious because it would have simply required applying a known technique to a known system ready for improvement to yield predictable results. Indeed, Doughty encourages seeking modifications and combinations like these. Ex. 1008, 26:44-54.

221. As I already explained, Doughty discloses receiving “geographic coordinates” as the location, not addresses. *Id.*, 6:55-7:10, 16:9-27. But Doughty also describes storing physical addresses (e.g., home address, work address) with the user's profile. In my opinion, a POSA would have naturally been motivated to look for references, like Maginnis, in the same field of online advertising that explain how to translate geographic coordinates to physical addresses. And, a POSA would have found it obvious to implement the reverse geocoding APIs described in Maginnis because these reverse geocoding API calls were well-known years before

the alleged invention. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35. In my opinion, it would have been simple and trivial for a POSA to add an API call to one of these well-known location services to get the physical address to the system described in Doughty. Further supporting my opinion is the fact that Van Boucq already discloses using location services from companies like Google, Apple, and Microsoft, which all had reverse geocoding APIs. Ex. 1009, ¶¶ 31-36. And, in my opinion, given the reverse geocoding discussion in Maginnis, it would have been obvious to a POSA to use a reverse geocoding API call to these location services to get the physical address from the latitude/longitude.

222. It is also my opinion that a POSA would have had a reasonable expectation of success. This is based upon the fact that these location services with reverse geocoding API calls were ubiquitous and known to work. And, as I already explained, since Doughty receives geographic coordinates and stores physical addresses, a POSA would have been motivated to translate geographic coordinates to physical addresses and use reverse geocoding API calls that were known to be used for that exact purpose in view of the express disclosure in Maginnis. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35.

**3. 1[h]: “identifying a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);”**

223. I already explained in '947 Ground 1 that Doughty over Van Boucq renders obvious 1[h]. To the extent it is found that those references do not render obvious this limitation, it is also my opinion that 1[h] is rendered obvious by Doughty over Van Boucq and Maginnis. As I already explained, Maginnis discloses a location module, which determines and stores the location of the user. Ex. 1010, 9:5-18. This is similar to the disclosure of location determination in Doughty. Furthermore, Maginnis explains that the location module translates “raw location data” (latitude and longitude coordinates) by “access[ing] map data to identify, by reverse geocoding, [into] an address corresponding to a location.” *Id.*, 9:19-26. In my opinion, it would have been obvious to a POSA to add this reverse geocoding call to Doughty because Doughty describes receiving geographic coordinates, but storing physical addresses, so a POSA would have understood that using existing functions to make this translation would have been helpful. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35.

224. In addition, Van Boucq already discloses using known location services to help with the location determination, including mapping software from Apple, Google, and Microsoft. Ex. 1009, ¶¶ 31-36. In my opinion, a POSA would have been

motivated to use the reverse geocoding API calls for those location services disclosed in Van Boucq, particularly in light of the fact that Maginnis explicitly refers to those reverse geocoding APIs.

225. It is therefore my opinion that Doughty over Van Boucq and Maginnis renders obvious using a reverse geocoding API call to identify a physical address based upon the determined latitude and longitude coordinates.

#### **F. Secondary Considerations**

226. I am not aware of any secondary considerations that would be relevant to the Challenged Claims. I reserve the right to address any alleged secondary considerations raised by Patent Owner.

### **IX. Grounds of Unpatentability of the '219 Patent ('219 Grounds)**

227. In this section, I will explain why all claims of the '219 patent are rendered obvious by the disclosures of Doughty (Ex. 1008) in combination with Van Boucq (Ex. 1009) and Smith (Ex. 1032) or, in the alternative, Doughty in combination with Van Boucq, Smith, and Maginnis (Ex. 1010). 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.

| <b>'219 Ground</b> | <b>Claims</b> | <b>Basis</b> | <b>Prior Art</b>                 |
|--------------------|---------------|--------------|----------------------------------|
| 1                  | 1-20          | §103         | Doughty over Van Boucq and Smith |

| '219 Ground | Claims | Basis | Prior Art                                   |
|-------------|--------|-------|---------------------------------------------|
| 2           | 1-20   | §103  | Doughty over Van Boucq, Smith, and Maginnis |

**A. Overview of Doughty**

228. I have already provided an overview of Doughty above in connection with the '947 patent. I incorporate that overview herein.

**B. Overview of Van Boucq**

229. I have already provided an overview of Van Boucq above in connection with the '947 patent. I incorporate that overview herein.

**C. Overview of Smith**

230. I have reviewed the Smith reference, which is a United States Patent titled "Location analytics systems and methods." Based upon my review of Smith, it issued on March 25, 2014. As a result, I understand that Smith predates the '219 patent by over seven years. Smith is in the same technological field as the '219 patent: advertising based upon location determinations.

231. Smith discloses determining whether a particular advertising campaign or advertisement in a campaign was successful using a determination of the user's location. As one example, Smith explains that ads may be "provided through media outlets, such as *television, radio, and the internet* via television commercials, radio commercials and webpage advertisements." Ex. 1032, 1:13-15. Smith also discloses that, as another example, "*promotions are provided at specific geographic*

*locations*, such as billboards, visible signs (e.g., store-front banners), in-store displays, presentations, and the like.” *Id.*, 1:20-22.

232. Smith reveals that the system can determine the probability that an ad provided at specific geographic locations triggered the desired result, e.g., the user visited a website. Per Smith, the system can determine the geographic location of the user when he accesses the required content, such as by using GPS coordinates or “a reverse lookup based on a device’s internet protocol (IP) address.” *Id.*, 5:2-3. Smith discloses that the location of the user can then be used to figure out the “effectiveness” of an advertisement. This effectiveness can be based on “the proximity of the geographic location of the visitor to the” geographic location of the advertisement or the time that he accesses the ad. *Id.*, 2:5-16.

**D. Motivation to Combine Doughty and Van Boucq with Smith**

233. I already explained in the context of the ’947 patent the motivation to combine Doughty and Van Boucq. I incorporate that analysis herein.

234. In my opinion, a POSA further would have also been motivated to combine Doughty and Van Boucq with Smith. As explained above, Doughty discloses using a “relevancy score” to determine *when* to send an advertisement to the user based upon how relevant an advertisement is to the user’s profile. Ex. 1008, 12:45-65 (emphasis added). And, Van Boucq explicitly recognizes that the system

should deliver “the ***most relevant ads possible***, namely ads from advertisers whose points of sale are close to the user’s geolocation.” *Id.*, ¶ 4 (emphasis added).

235. I note that Smith discloses a system in this same general field: advertising based upon a determined location of the user’s internet device. Smith explains that advertisers “often use various forms of marketing,” which sometimes “require a large financial investment.” Ex. 1032, 1:6-24. As an example, Smith recites that an advertising campaign could span different mediums, like television, radio, and the internet. *Id.*, 1:13-15. And, according to Smith, advertisers “often desire to track the effectiveness of their marketing techniques.” *Id.*, 1:29-30. Smith continues that advertisers “may desire to know how many customers visit a website as ***a result of a particular advertisement***.” *Id.*, 1:31-33 (emphasis added).

236. Indeed, in my experience with helping develop and implement marketing and advertising strategies and campaigns, as well as my business administration experience and other experience such as a product manager for location products while at AT&T, a “portfolio” approach, involving different mediums and demographics, is often viewed as a strategic necessity, particularly when the target markets cover a variety of demographic and geographical targets and/or the product is new and has to be explained to its markets. Such portfolio approaches also follow the obvious strategy of “not-putting-all-your-eggs-in-one-marketing/advertising-basket.” However, individual components of such a strategy

may not work as effectively as planned/desired, thus a need exists to monitor the effectiveness of the individual campaigns to potentially make adjustments in the overall marketing/advertising portfolio.

237. In my opinion, because Smith acknowledges that there are sometimes different mediums associated with an advertising campaign—including the internet, TV, radio, billboards, in-store displays—a POSA would have understood that the success of the whole advertising campaign could be due to any of the different components of the campaign. As one example, the user may either: (1) click on an internet ad to be taken to website; or (2) view a billboard with an ad and then navigate to the website in his browser. Further, a POSA would recognize that, by the time of the '219 patent's priority date, and indeed well before, all of the above medium channels had been digitized, lending themselves to the teachings in Smith. For example, digital billboards—both outdoors and indoors—had been introduced by the mid-2000s.<sup>22</sup> Based upon these teachings in Smith, in my opinion, a POSA would have understood that, since there are different financial costs associated the different advertising mediums, and potentially different demographics and/or volumes reached, advertisers would have wanted to know how successful each one is. Ex. 1032, 1:31-33.

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<sup>22</sup> Ex.1046; Ex. 1065.

238. I note further that, according to Smith, website clicks on internet advertisements can be tracked, but it was more difficult to track how successful other advertising components are, like a “roadside billboard, a visible sign (e.g., a store-front banner), an in-store display, a presentation, or the like.” *Id.*, 1:48-50. To address this issue, Smith discloses a method for advertisers to determine the probability that their advertising campaign was successful based upon the user’s location. Smith recites that its system determines the effectiveness of the ad “based at least in part on the proximity of the geographic location of the visitor” to the advertisement. *Id.*, 2:12-15.

239. In my opinion, because Doughty and Van Boucq disclose determining the user’s location for each web site visit, a POSA would have found it obvious to use the determined location to figure out the probability a particular advertisement was successful, including by using the proximity of the user’s location to an advertisement as disclosed in Smith. It is my opinion that a POSA would have understood that advertisers would want to know how successful each of their advertisements were and, as such, figuring out the probability that a user’s behavior is triggered by an ad is desirable and a POSA would naturally have wanted to extend a system to include this capability. In addition, since Doughty discloses the creation of a “universal profile” for a user that is not limited to a single device, a POSA would have been motivated to provide global information about the user’s browsing

behavior, such as by figuring out what ad triggered his behavior. I note that Doughty actually encourages a POSA to seek out modifications such as these. Ex. 1008, 26:44-51.

240. It is further my opinion that a POSA would have been motivated to provide advertisers with this information about the probability that each of the different components in their advertising campaign were successful. In my opinion, a POSA would have understood that this type of information would be valuable to advertisers since it would tell advertisers which types of ads generated the most interest and were worth the cost. In my opinion, a POSA would have therefore been motivated to combine the teachings disclosed above in Doughty and Van Boucq with those in Smith.

241. Furthermore, it is my opinion that a POSA would have had a reasonable expectation of success because Doughty already discloses tracking all of the information needed for determining advertising success in Smith. This includes the URL visited, the location of the user when it is visited, and the order in the browsing session the URL is visited. *Id.*, 6:19-25. In my opinion, a POSA would have found it obvious to use that information to determine the probability that the user initiated a browsing session because of a specific advertisement based upon “the proximity of the geographic location of the visitor to the” geographic location of the ad as disclosed in Smith. Ex. 1032, 2:5-16.

242. It is also my opinion that a POSA would have understood that Doughty over Van Boucq and Smith render obvious a targeted advertising method comprising the following steps. These same motivations to combine apply to each of the limitations below, but further motivations to combine are described in connection with specific limitations.

**E. '219 Ground 1: The Combination of Doughty with Van Boucq and Smith Discloses or Suggests Every Feature of Claims 1-36.**

243. Based on the following analysis, I conclude that a POSA at the relevant time would have understood the limitations of claims of the '219 patent was expressly disclosed, described, or taught by Doughty in combination with Van Boucq and Smith.

**1. Overview**

244. In my opinion, Doughty in combination with Van Boucq and Smith teaches every element of claims 1 through 36 of the '219 patent.

**(a) Claim 1**

**(i) 1[pre]: “A method comprising:”**

245. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[pre] of the '947 patent. I incorporate that analysis herein.

246. Furthermore, I note that Smith also discloses a method for determining the geographic location of a user to determine the effectiveness of an advertising campaign. Ex. 1032, Abstract (“The *method* includes receiving a geographic

location of interest, receiving access information including a location corresponding to a geographic location of a visitor at or near a time of the visitor accessing content associated with the geographic location of interest, determining, by a computer, an effectiveness of the geographic location of interest based at least in part on the proximity of the geographic location of the visitor to the geographic location of interest, and storing the effectiveness determined.”).

247. In other words, just like the ’219 patent, the combination of Doughty, Van Boucq, and Smith discloses a method of delivering targeted advertisements using the user’s location and determining the effectiveness thereof.

**(ii) 1[a]: “receiving campaign level data associated with a campaign;”**

248. In my opinion, Doughty and Smith render obvious this limitation.

249. First, I observe that Doughty discloses “selecting a sponsored content based on a relevancy thereof with the universal profile,” and then “transmitting the sponsored content to the second communication device for display thereon.” Ex. 1008, 8:35-39. It is my opinion that a POSA would have understood that, to select and transmit “sponsored content” or an advertisement, the system must have first received campaign level data for the advertising campaign such that the system knows which users to target. As one example, Doughty discloses that ads are sent to users based upon a number of different factors, such as the age of the user, marital

status, religion, zip code, employment, and/or income. *Id.*, 8:39-56. In my opinion, a POSA would have understood, or it would have been obvious to a POSA, that the system had to receive this target demographic information about the advertising campaign so that the system could match that information to each user.

250. I further observe that Doughty additionally discloses receiving campaign level data for the users' interactions with an ad. As an example, Doughty discloses charging for ads on a number of different types of user interactions, such as "impression-based (e.g., cost per thousand impression, or CPM), cost-per-click (CPC), cost-per-action (CPA), cost-per-engagement (CPE), time-based, based on a shared revenue of user transactions, shared with a wireless operator whose data is being accessed, shared with a publisher, shared with an ad network, or otherwise arranged." *Id.*, 22:47-53. In my opinion, a POSA would have understood that, for the system to charge based upon those interactions, the system would have to receive that data for each campaign. To take one example, a POSA would have understood that the system in Doughty would have to receive the number of user impressions to charge an advertiser based upon those impressions.

251. Additionally, I note that Smith discloses a system for determining the "effectiveness of one or more promotions at one or more promotion locations." Ex. 1032, 4:34-36. Furthermore, Smith recites that these promotions (or ads) are part of an "advertising campaign." *Id.*, 1:23-36. It is my opinion that, based upon these

disclosures, a POSA would have understood that, for the system to determine the effectiveness of ads in an advertising campaign, the system must first receive information about the ads at a campaign level. For example, the system would need to know all of the different promotions and their locations.

252. In the alternative, it is my opinion that it would have been obvious to a POSA that Smith's system must receive campaign level information about an advertising campaign so that it can determine the effectiveness of the different components in that campaign as Smith discloses. In my opinion, the reason for this is that, without information about the whole campaign, the system would not have the information required to determine the effectiveness of promotions within the overall campaign because there could be confusion if two ads are relatively close together, or if there are also ads on different mediums, like the internet, TV and radio.

253. Additionally, just like Doughty, I observe that Smith also discloses receiving campaign level data associated with users' interactions with the ads. As an example, Smith discloses tracking interactions with a website so that the system can later figure out if an interaction is attributable to an ad, or the probability the ad was successful. Ex. 1032, 12:54-13:56. I observe that Smith at least discloses tracking the time, date, and location of the interaction.

- (iii) **1[b]: “receiving anonymous data associated with a browser session initialized by a user via a browser on a user computing device;”**

254. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[a] of the '947 patent. I incorporate that analysis herein.

- (iv) **1[c]: “determining that the user accessed a uniform resource locator (URL) during the browser session;”**

255. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[b] of the '947 patent. I incorporate that analysis herein.

- (v) **1[d]: “determining a latitude coordinate and a longitude coordinate of the user computing device, during the browser session, wherein the latitude coordinate and the longitude coordinate are determined based on the anonymous data upon determining that the user opted-out of location tracking, and wherein the latitude coordinate and the longitude coordinate are determined based on geo-location data retrieved from the user computing device upon determining that the user opted-in to location tracking;”**

256. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[g] of the '947 patent. I incorporate that analysis herein.

257. I further observe that, just like Doughty and Van Boucq, Smith contemplates receiving “geographic coordinates.” Ex. 1032, 4:65-67 (“For example, location data 108 may include geographic coordinates (e.g., latitude and longitude) of a user and/or a device associated with the user.”).

- (vi) **1[e]: “identifying a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);”**

258. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[h] of the '947 patent. I incorporate that analysis herein.

- (vii) **1[f]: “determining that the physical address is within a ZIP code covered by the campaign;”**

259. In my opinion, this limitation is rendered obvious in at least two separate ways: (1) the disclosure in Doughty and Van Boucq; and (2) the disclosure in Doughty and Van Boucq combined with Smith.

**1) Doughty and Van Boucq**

260. As I explained in connection with limitation 1[e], Doughty and Van Boucq disclose determining the physical address for a user, which POSA would understand to include the user's zip code. Ex. 1009, ¶¶ 31-36. I observe further that Doughty discloses selecting an advertisement *based on the user's zip code*. Ex. 1008, 8:39-56. In my opinion, a POSA would have understood, or it would have been obvious, that deciding whether to serve an ad based upon the user's zip code would have required figuring out whether or not the user is in a particular zip code or zip codes associated with (or “covered by”) the ad campaign. My opinion is also supported by the fact that Doughty discloses that there are advertising campaigns for limited geographic areas (e.g., local movie theaters). *Id.*, 17:60-18:3. In my opinion,

this means that a POSA would have been motivated to determine if the user's address is within a zip code covered by the campaign to figure out if the user should be sent the ad. This determination would then be used in the context of 1[g] and 1[h], which I address next.

**2) Doughty and Van Boucq with Smith**

261. I observe that Smith also discloses determining whether the user is located "within a specified region" when he visits a website. Ex. 1032, 13:19-26. And, I note that that Smith also explains that the location determination of a user can be based upon "a zip code." *Id.*, 4:65-5:6. In my opinion, based upon these disclosures in Smith, POSA would have understood, or it would have been obvious, that the system would determine whether the user is located within a specified zip code to figure out if they are within a specified region. This, combined with the fact that Doughty discloses that the system may use the user's zip code to determine the appropriateness of an ad, a POSA would have been motivated to determine if the user's address is within a zip code covered by the campaign to figure out if the user should be sent the ad.

**(viii) 1[g]: "determining that the browser session was initiated by the user with an intent to visit the URL; and"**

262. In my opinion, Doughty/Van Boucq with Smith render this limitation obvious.

263. As I explained in connection with limitation 1[b], Doughty and Van Boucq render obvious the collection of anonymous data for a browser session, which includes the location of the user, the websites visited during the browser session, and the order of websites visited.

264. I note that Smith discloses an “effectiveness processing module” that “assess[es] an effectiveness of a promotion 110 at [a] geographic location (e.g., promotion location) 112.” Ex. 1032, 4:32-42. Furthermore, according to Smith: “[a] roadside billboard at a given geographic location may be viewed as effective (or at least more effective) where analytics data indicates a large number [of] users visits to a web site advertised by the billboard, and *the user’s [sic] are in close proximity to the billboard at or near the time of initiating the website visit* and/or during the website visit.” *Id.*, 3:40-45.

265. In sum, it is my opinion that Smith discloses determining whether the user initiated a browser session with an intent to visit the website based upon how close the user’s location is to an ad. In my opinion, a POSA would have understood that Smith discloses determining that a browser session was initiated by the user with an intent to visit that specific URL, such as a URL on the billboard.

266. I further observe that Smith also discloses that the effectiveness module can assess whether the browser session was initiated with an intent to visit a website based upon whether the visit occurred “within a given time period (e.g., five

minutes).” Ex. 1032, 3:57-64. In my opinion, while this disclosure is tied to geographic-specific advertisements in Smith, a POSA would have been motivated to apply the same timing analysis for all types of advertisements, including “presentations and the like,” which are other types of advertisements described in Smith. *Id.*, 1:51-54. It is therefore my opinion that it would have been obvious that, if the user visits a website within a specified time period after viewing an ad, it would have been more likely that the user initiated the browser session in response to the ad. For example, the sooner after the user views a video commercial or a product placement in a TV show or movie, the more likely the website visit was in response to those presentations. In my opinion, a POSA would have understood that the effectiveness module disclosed by Smith could be applied in these examples I describe above and would have been motivated to do so as Smith contemplated by Smith. *Id.*, 1:51-54.

**(ix) 1[h]: “determining a probability that the browser session was initiated in response to watching or listening to media associated with the campaign using the campaign level data.”**

267. It is my opinion that Doughty/Van Boucq with Smith render this limitation obvious.

268. As I explained in connection with limitation 1[g], Smith discloses an effectiveness module that determines the effectiveness of a particular advertisement.

I observe that Smith discloses that the effectiveness module calculates an “effectiveness index,” which may take many different forms. Smith continues that the effectiveness index can be based upon “a geographical region of interest (e.g., within a one mile radius of a billboard), a time frame (e.g., during the time period of Apr. 1, 2011 to Apr. 9, 2011), weighting of data (e.g., assign higher weight to activities of a purchase type and assign higher weights to activity that occurs closer to promotion location 110), and so forth.” Ex. 1032, 16:37-47. And, Smith further discloses that the system can assign weight to the effectiveness index score based upon how far the user is from the advertisement (campaign level data). *Id.*, 17:27-47 (“For example, user activity that occurs closer to promotion location 112 may be assigned more weight than user activity that occurs farther way from promotion location 112.”).

269. It is my opinion that it would have been obvious to a POSA that this weight is based on the probability that the user’s browser session was initiated in response to watching or listening to media tied to the campaign—e.g., watching a billboard. As Smith explains, the closer to the advertisement (based upon the campaign level data), the higher the probability that the user initiated the browser session in response to the ad. As such, the system will assign a higher effectiveness index. *Id.*, 17:27-47.

270. It is further my opinion that it would have been obvious to a POSA to use the same weighting scheme for the elapsed time since the user saw a presentation or other advertisement. As an example, in my opinion, a POSA would have understood that the more quickly the user visited a website after seeing an ad (based upon the campaign level data), the higher the probability that the user initiated the browser session because of the ad. As such, the system will assign a higher effectiveness index or weight/probability. *Id.*, 17:27-47. And, as I explained above in connection with limitation 1[g], a POSA would have been motivated to use elapsed time.

**(b) Claim 2: “The method of claim 1, wherein the anonymous data comprises one or more of a time, a date, one or more uniform resource locators (URLs), a referring URL, a browser type, a language, an internet protocol (IP) address, or location data.”**

271. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[a] of the '947 patent. I incorporate that analysis herein.

**(c) Claim 3:**

**(i) 3[pre]: “The method of claim 2, further comprising:”**

272. In my opinion, this limitation is rendered obvious for the reasons I already detailed for claims 1 and 2. I incorporate that analysis herein.

**(ii) 3[a]: “determining that the user has not been assigned a unique identifier based on a lack of**

**stored location data for the user computing device;”**

273. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[c] of the '947 patent. I incorporate that analysis herein.

**(iii) 3[b]: “assigning the unique identifier to the user;”**

274. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[d] of the '947 patent. I incorporate that analysis herein.

**(iv) 3[c]: “determining whether the user opted-in to or out of location tracking, based on whether a location tracker is installed on the user computing device; and”**

275. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[e] of the '947 patent. I incorporate that analysis herein.

**(v) 3[d]: “sending, upon determining that the user opted-out of location tracking, the unique identifier to the user computing device for storage in a local browser cache.”**

276. It is my opinion that this claim is rendered obvious for the same reasons I explained for limitation 1[f] of the '947 patent. I incorporate that analysis herein.

**(d) Claim 4: “The method of claim 1, wherein the campaign comprises one or more messages or media that share a theme.”**

277. In my opinion, this limitation is rendered obvious in at least two separate ways: (1) the disclosure in Doughty alone; and (2) the disclosure in Doughty combined with Smith.

**(i) Doughty Alone**

278. I observe that Doughty discloses that advertisers may “retarget” users, leading to more successful advertisements. Ex. 1008, 20:9-26. In my opinion, a POSA would have understood, or it would have been obvious, that advertisers would typically use multiple messages or media that all promote the same product, service, or brand name in an advertising campaign. In other words, there would be one or more messages that all share the same theme because they promote the same product, service, or brand. This would allow the advertiser to send different content to the user each time the user is retargeted. It is further my opinion that a POSA would have understood that, by providing more than one message, the user’s exposure to the different products, services, or options associated with the advertiser’s brand would increase and the user would be more likely to purchase, subscribe, or otherwise convert to the advertiser. My opinion is bolstered by the fact that Doughty recognizes the need for multiple different messages or media because it acknowledges that studies “suggest that a company needs to have an average of

seven *different* contacts with a customer before they make a purchase.” Ex. 1008, 20:21-23.

**(ii) Doughty and Smith**

279. In the same vein, Smith recognizes that advertising campaigns often include multiple different messages and mediums, including TV, radio, internet, billboards, visible signs, and presentations. Ex. 1032, 1:6-22. I observe that Smith recognizes that there can be multiple advertisements, across these different advertising mediums, and Smith then attributes effectiveness to particular ads within the campaign, some of which can be tied to physical locations. *Id.*, 1:37-54. It is my opinion that, given that Smith differentiates between the effectiveness of different ads, a POSA would have understood, or it would have been obvious, that each of these different messages and mediums would share a common theme, for example, promoting a product, service, or brand.

280. And, it is my opinion that a POSA would have understood that the advertising campaigns I describe for this claim are consistent with those described in connection with claim 1.

**(e) Claim 5: “The method of claim 1, wherein the campaign is associated with a time period.”**

281. It is my opinion that Smith discloses this limitation. I observe that Smith recites checking the effectiveness of an advertising campaign for a specific “time

period,” for example, “Apr. 1, 2011 to Apr. 9, 2011.” Ex. 1032, 13:59-64. In my opinion, given this disclosure, a POSA would have understood, or it would have been obvious, that there could be many benefits to limiting effectiveness to a particular time period based upon a time period associated with the campaign. For example, the campaign can promote a limited-time sale or an ad may be only displayed for a limited time.

282. Furthermore, it is my opinion that a POSA would have understood that the advertising campaigns I describe for this claim are consistent with those described in connection with claim 1.

**(f) Claim 6: “The method of claim 1, wherein the campaign level data comprises a number of impressions for each of a plurality of days during the campaign.”**

283. As I explained in connection with limitation 1[a], Doughty and Smith describe receiving campaign level data associated with the user’s impressions or interactions with an advertising campaign. Furthermore, as I explained for claim 5, Smith discloses tracking these impressions or interactions for a limited time period, such as the days that a campaign is active. For example, Smith discloses tracking “(1) visitors that visited the location/content a given number of times (e.g., five or more times, only one time, and so forth), [and] (2) visitors that visited the location/content a given number of times within a given period (e.g., two times in

one day, five or more times in one week, one time per day during the times of 6 pm to 9 pm three consecutive days, and so forth).” Ex. 1032, 13:43-49. It is my opinion that a POSA would have understood that tracking these statistics would include tracking the number of impressions for each of a plurality of days during the campaign (e.g., “Apr. 1, 2011 to Apr. 9, 2011”). *Id.*, 13:59-64.

284. Furthermore, it is my opinion that a POSA would have understood that the campaign level data I describe for this claim is consistent with the data described in connection with claim 1.

**(g) Claim 7: “The method of claim 6, wherein the campaign level data comprises daypart blueprint data indicating aggregate daypart proportions of impressions for a plurality of campaigns.”**

285. As I explained in connection with claim 6, Smith discloses tracking impressions or interactions with an ad over the time the campaign is active. I observe that Smith also describes tracking those statistics for certain parts of the day (e.g., “6 pm to 9 pm”), or dayparts. *Id.*, 13:43-49. It is my opinion that a POSA would have understood, or it would have been obvious, that there are multiple dayparts like those disclosed in Smith and that the statistics would naturally be tracked for the other dayparts as well (daypart blueprint data). Furthermore, in my opinion, a POSA would have understood that the daypart statistics would be tracked for all advertising

campaigns and that the system in Smith would cover multiple advertising campaigns, or a plurality of campaigns.

286. Furthermore, it is my opinion that a POSA would have understood that the campaign level data I describe for this claim is consistent with the data described in connection with claims 1 and 6.

**(h) Claim 8: “The method of claim 7, wherein the daypart proportions are used to assign a daypart factor to each of a plurality of dayparts.”**

287. As I explained in connection with claim 7, Smith discloses tracking impressions or interactions with an ad for multiple different parts of the day (e.g., “6 pm to 9 pm”). *Id.*, 13:43-49. I note that Smith discloses factoring these daypart proportions into the effectiveness calculation, for example, by weighting those that visit a website “one time per day during the times of 6 pm to 9 pm three consecutive days.” *Id.* It is my opinion that a POSA would have understood that the system could vary the weight assigned for different dayparts. As one example, a visit to a website on a Friday evening may have a daypart factor that is higher than a visit to that same website the following Saturday morning based upon exposure to ads.

- (i) **Claim 9: “The method of claim 8, wherein the campaign level data comprises a date proportion and a daypart proportion associated with the browser session.”**

288. As I explained in connection with claims 7 and 8, Smith discloses tracking impressions or interactions with an ad for multiple different dayparts. I further note that Smith recites tracking the date as part of the campaign level data so that it can tell if the impression or interaction occurred during “a time frame (e.g., during the time period of Apr. 1, 2011 to Apr. 9, 2011).” *Id.*, 16:43-44. And, as I explained in connection with limitation 1[b], Doughty over Van Boucq and Smith discloses tracking user visits per browser session.

- (j) **Claim 10: “The method of claim 8, wherein the probability is determined using the date proportion associated with the browser session, the daypart proportion associated with the browser session, and the daypart factor associated with the daypart proportion.”**

289. As I explained in connection with claims 7, 8, and 9, Smith discloses tracking a date, daypart, and daypart factor as part of the campaign level data. And, as I explained in connection with limitation 1[h], Smith recites calculating the probability based upon a number of factors, which Smith explains could include the location of the user and the time the user visited the website. It is my opinion that a POSA would have understood that the time the user visited the website would

necessarily encompass the date, daypart, and daypart factor as disclosed in claims 7-9.

290. Furthermore, it is my opinion that a POSA would have understood that the probabilities I describe for this claim are consistent with the factor described in connection with claim 8.

**(k) Claim 11: “The method of claim 10, wherein the probability is determined using the number of impressions for each of the plurality of days during the campaign.”**

291. As I explained in connection with claim 6, it is my opinion that a POSA would have understood that the system tracks the number of impressions for each of a plurality of days during the campaign. Furthermore, as I explained in connection with limitation 1[h], Smith discloses tracking the visits (impressions) during a plurality of days. Ex. 1032, 16:37-50 (“e.g., during the time period of Apr. 1, 2011 to Apr. 9, 2011”). I also observe that Doughty discloses the importance of “retargeting” to expose the user to the advertising campaign more than once (impression). Ex. 1008, 19:61-20:64.

292. Based upon these disclosures in Doughty and Smith, it is my opinion that it would have been obvious to a POSA that the probability a browser session was initiated in response to an ad would go up when the user is “retargeted” or exposed to an ad more than once. It is therefore my opinion that a POSA would have

known that the probability a user initiated a browser session to view a website would go up when the user has more impressions of an ad, particularly within a limited time period as recognized by Smith. In my opinion, moreover, a POSA would have been motivated to adjust the probability calculations (weights) based upon the number of impressions for each of a plurality of days during the advertising campaign given the disclosures I excerpted above.

**(l) Claim 12: “The method of claim 1, wherein the probability is determined based on a time delay between watching or listening to the media and initialization of the browser session.”**

293. As I explained in connection with limitation 1[h], Smith discloses or renders obvious that the probability or weighting can be based upon the elapsed time since the user saw a presentation or advertisement on her device (the time delay between watching media and the initialization of a browser session).

**(m) Claim 13: “The method of claim 12, wherein the time delay represents a non-linear relationship with the probability.”**

294. In my opinion, a POSA would have understood, or it would have been obvious, to use a “non-linear relationship” between the probability (weight) and the time delay I explained in claim 12. This is based upon the fact that, the longer the delay, the less likely the user initiated the browser session based upon viewing the ad. On the other hand, if the user immediately visits a website after viewing a

billboard, the probability is very high that the visit was because of the ad. In my opinion, a POSA would have realized that the probability curve is unlikely to be a linear relationship, and therefore would have been motivated to apply a non-linear relationship between the time delay and probability.

295. It is also my opinion that a POSA would have understood, or it would have been obvious, that there are only two possibilities for the relationship between the time delay and the probability: (1) linear; or (2) non-linear. In my opinion, a POSA would have been motivated to try both of these possibilities to see which one more accurately modeled the relationship.

**(n) Claim 14: “The method of claim 12, wherein a first time delay results in a first time decay factor being applied to determine the probability and a second time delay results in a second time decay factor being applied to determine the probability.”**

296. As I explained in connection with claim 13, it is my opinion that a POSA would have understood that the probability would change based upon the time delay in a non-linear fashion. Furthermore, in my opinion, a POSA would have understood that, to calculate the probability, the system should use a weight (as disclosed by Smith) that is based upon the time delay—a time decay factor. It is further my opinion that a POSA would have recognized that the time decay factor would change depending upon the time delay—the factor would be different for different time delays—in a non-linear fashion.

297. It is also my opinion that a POSA would have understood, or it would have been obvious, that the system would use different time decay factors for different time delays based upon the fact that Smith discloses adjusting the probability/factor based upon the time delay.

**(o) Claim 15: “The method of claim 1, wherein the campaign uniquely identifies a set of ZIP codes covered by the campaign.”**

298. As I explained in connection with limitation 1[f], the system in Doughty over Van Boucq and Smith determines whether a user is located within a zip code covered by the campaign. It is my opinion that a POSA would have understood that, for the system to make this determination, the campaign necessarily would have uniquely identified the zip codes covered by the campaign so that the system knows which zip codes are covered. Furthermore, in my opinion, a POSA would have easily recognized that there can be more than one zip code covered by the campaign (e.g., neighboring zip codes).

**(p) Claim 16: “The method of claim 1, wherein the intent to access the URL comprises accessing the URL via a search engine or an address bar.”**

299. It is my opinion that this claim is obvious since a POSA would have understood that there are a small number of ways for a person to initiate a browser session. A POSA would have understood that the two main ways a user could initiate a browser session would have been: (1) type the URL into the address bar; or (2)

type the URL into a search engine. I observe, moreover, that, as of the date of the provisional application, a POSA would have known that the search engine and address bar were combined in many browsers. In other words, the user could run a search or type in a URL into the same input field in the browser.

**(q) Claim 17: “The method of claim 1, further comprising determining whether a household performed a transaction associated with the campaign.”**

300. I noticed that Doughty recites using the location of the device to determine a “household” associated with the user. Ex. 1008, 11:48-52. Furthermore, I observed that Doughty and Smith both disclose tracking when users perform transactions in addition to tracking impressions or interactions, which I explained in more detail in claim 6. Ex. 1008, 18:65-67 (“User transactions associated with a mobile communication facility may be recorded and stored within a separate database.”); Ex. 1032, 14:3-14 (“Analytics data for each listed visit may include an identification of a corresponding type of activity,” including a “Purchase.”). Given these disclosures, it is my opinion that a POSA would have understood, or it would have been obvious, that Doughty over Van Boucq and Smith renders obvious determining whether a particular household performed a transaction associated with the campaign.

**(r) Claim 18: “The method of claim 17, further comprising determining a success of the campaign based on whether the household performed a transaction associated with the campaign.”**

301. As I explained in connection with claim 17, it is my opinion that a POSA would have understood that the system determines when a household performs a transaction. It is further my opinion that it would have been obvious to a POSA that the determination of the success of the campaign would have been based upon these transactions by different households. As an example, Doughty discloses charging advertisers for specific user interactions (e.g., clicks, actions, engagements). Ex. 1008, 22:45-61. I also note that Smith discloses weighting certain interactions (e.g., purchases) differently from others (e.g., visits). Ex. 1032, 17:50-60. And, I already explained in limitations 1[g] and 1[h] that Smith discloses using weighting transactions differently to determine the success of the campaign.

**(s) Claim 19:**

302. I have carefully reviewed claim 19 and compared it against claim 1. In my opinion, there are no material differences between the two. Claim 19 is simply claiming a machine-readable storage device that executes the steps of the method steps in claim 1. It is therefore my opinion that Doughty over Van Boucq and Smith renders obvious claim 19 for the same reasons as I discussed in connection with claim 1. I explain the mapping of limitations a bit more in the table below.

| Claim                                                                                                                                                                                                                                                                                                                                                                               | Corresponding analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19[pre]: “A non-transitory, machine-readable storage device that includes instructions that, when executed by a computing device, cause the computing device to:”                                                                                                                                                                                                                   | In my opinion, a POSA would have understood that the method claimed in claim 1 would have been stored as on a non-transitory, machine readable device with source code that performs that method. Indeed, Doughty discloses performing the method on computing devices. Ex. 1008, Fig. 1, 10:15-25 (describing the server 104 that would contain non-transitory, machine readable code for performing the method). It is therefore my opinion that 11[pre] is rendered obvious for the same reasons as 1[pre], which I detailed above. |
| 19[a]: “receive campaign level data associated with a campaign;”                                                                                                                                                                                                                                                                                                                    | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[a].                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19[b]: “receive anonymous data associated with a browser session initialized by a user via a browser on a user computing device;”                                                                                                                                                                                                                                                   | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[b].                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19[c]: “determine that the user accessed a uniform resource locator (URL) during the browser session;”                                                                                                                                                                                                                                                                              | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[c].                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19[d]: “determine a latitude coordinate and a longitude coordinate of the user computing device, during the browser session, wherein the latitude coordinate and the longitude coordinate are determined based on the anonymous data upon determining that the user opted-out of location tracking, and wherein the latitude coordinate and the longitude coordinate are determined | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[d].                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Claim                                                                                                                                                                                      | Corresponding analysis                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| based on geo-location data retrieved from the user computing device upon determining that the user opted-in to location tracking;”                                                         |                                                                                                                 |
| 19[e]: “identify a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);” | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[e]. |
| 19[f]: “determine that the physical address is within a ZIP code covered by the campaign;”                                                                                                 | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[f]. |
| 19[g]: “determine that the browser session was initiated with an intent to visit the URL; and”                                                                                             | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[g]. |
| 19[h]: “determine a probability that the browser session was initiated in response to watching or listening to media associated with the campaign using the campaign level data.”          | It is my opinion that this limitation is rendered obvious for the same reasons I explained for limitation 1[h]. |

**(t) Claims 20-36:**

303. I have carefully reviewed claims 20 through 36 and it is my opinion that these claims are substantially identical to claims 2 through 18. It is therefore my opinion that these claims are obvious over Doughty and Van Boucq and Smith for the same reasons. I detail the specific mapping for these below.

| Claim | Corresponding analysis                                                                              |
|-------|-----------------------------------------------------------------------------------------------------|
| 20    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 2.  |
| 21    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 3.  |
| 22    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 4.  |
| 23    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 5.  |
| 24    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 6.  |
| 25    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 7.  |
| 26    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 8.  |
| 27    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 9.  |
| 28    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 10. |
| 29    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 11. |
| 30    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 12. |
| 31    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 13. |

| Claim | Corresponding analysis                                                                              |
|-------|-----------------------------------------------------------------------------------------------------|
| 32    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 14. |
| 33    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 15. |
| 34    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 16. |
| 35    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 17. |
| 36    | It is my opinion that this claim is rendered obvious for the same reasons I explained for claim 18. |

**F. 219 Ground 2: The Combination of Doughty Over Van Boucq, Smith, and Maginnis Discloses or Suggests Every Feature of Claims 1-36.**

304. As set forth above, it is my opinion that Doughty over Van Boucq and Smith renders obvious all of the Challenged Claims. I offer the following additional opinion. Nothing I say below should be construed as contrary to my analysis for '219 Ground 1. Based on the following analysis, I conclude that a POSA at the relevant time would have understood the limitations of claims of the '219 patent were rendered obvious by Doughty in combination with Van Boucq, Smith, and Maginnis.

305. I already explained how Doughty over Van Boucq and Smith renders each limitation of the Challenged Claims invalid in '219 Ground 1. In this '219 Ground 2, I only address combining Doughty and Van Boucq and Smith with

Maginnis to meet limitation 1[e]. I incorporate my analysis for 1[e] and all of the other claims and limitations into this '219 Ground 2 as if fully set forth herein.

**1. Overview of Maginnis**

306. I have already provided an overview of Maginnis above in connection with the '947 patent. I incorporate that overview herein.

**2. Motivation to Combine Doughty, Van Boucq, and Smith with Maginnis**

307. I have already detailed the motivation to combine Doughty with Van Boucq and Smith above. I incorporate that analysis herein.

308. In my opinion, it further would have been obvious to combine Doughty, Van Boucq, and Smith with Maginnis.

309. As I described above for '219 Ground 1, it is my opinion that it would have been obvious to a POSA to combine Doughty, Van Boucq, and Smith. It is also my opinion that it would have also been obvious to combine Doughty, Van Boucq, and Smith with Maginnis. I explained above that Doughty, Van Boucq, and Smith disclose finding the user's location to help with the targeted advertising, including how to determine the user's location depending upon whether they opt-in to or out of location sharing. And Smith adds detail about determining the probability that different parts of an advertising campaign were successful using the location.

310. Although Doughty, Van Boucq, and Smith do not explicitly detail how to translate the geographic coordinates to physical addresses, Doughty describes storing the user's address, not his latitude and longitude coordinates. Although it is my opinion that this translation was well-known and would have been obvious, it is also my opinion that a POSA would have been motivated to seek out similar references that explicitly disclose this type of translation—e.g., reverse geocoding. In my opinion, implementing the well-known reverse geocoding API calls described in Maginnis with the system described in '219 Ground 1 for Doughty over Van Boucq and Smith would have been obvious because it would have simply required applying a known technique to a known system ready for improvement to yield predictable results. Indeed, Doughty encourages seeking modifications and combinations like these. Ex. 1008, 26:44-51.

311. As I already explained, Doughty discloses receiving “geographic coordinates” as the location, not addresses. *Id.*, 6:55-7:10, 16:9-27. Van Boucq and Smith also describe receiving latitude and longitude coordinates. *See* '219 patent limitation 1[d]. But Doughty also describes storing physical addresses (e.g., home address, work address) with the user's profile. In my opinion, a POSA would have naturally been motivated to look for references, like Maginnis, in the same field of online advertising that explain how to translate geographic coordinates to physical addresses. And, a POSA would have found it obvious to implement the reverse

geocoding APIs described in Maginnis because these reverse geocoding API calls were well-known years before the alleged invention. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35. In my opinion, it would have been simple and trivial for a POSA add an API call to one of these well-known location services to get the physical address to the system described in Doughty. Further supporting my opinion is the fact that Van Boucq already discloses using location services from companies like Google, Apple, and Microsoft, which all had reverse geocoding APIs. Ex. 1009, ¶¶ 31-36. And, in my opinion, given the reverse geocoding discussion in Maginnis, it would have been obvious to a POSA to use a reverse geocoding API call to these location services to get the physical address from the latitude/longitude.

312. It is also my opinion that a POSA would have had a reasonable expectation of success. This is based upon the fact that these location services with reverse geocoding API calls were ubiquitous and known to work. And, as I already explained, since Doughty receives geographic coordinates and stores physical addresses, a POSA would have been motivated to translate geographic coordinates to physical addresses and use reverse geocoding API calls that were known to be used for that exact purpose in view of the express disclosure in Maginnis. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35.

**3. 1[e]: “identifying a physical address for the user based on the determined latitude coordinate and the determined longitude coordinate using a map application programming interface (API);”**

313. I already explained in '219 Ground 1 that Doughty over Van Boucq renders obvious 1[e]. To the extent it is found that those references do not render obvious this limitation, it is also my opinion that 1[e] is rendered obvious by Doughty over Van Boucq, Smith, and Maginnis. As I already explained, Maginnis discloses a location module, which determines and stores the location of the user. Ex. 1010, 9:5-18. This disclosure in Maginnis is similar to the disclosure of location determination in Doughty. Furthermore, Maginnis explains that the location module translates “raw location data” (latitude and longitude coordinates) by “access[ing] map data to identify, by reverse geocoding, [into] an address corresponding to a location.” *Id.*, 9:19-26. In my opinion, it would have been obvious to a POSA to add this reverse geocoding call to Doughty because Doughty describes receiving geographic coordinates, but storing physical addresses, so a POSA would have understood that using existing functions to make this translation would have been helpful. *See* Ex. 1020; Ex. 1021; Ex. 1022; Ex. 1023; Ex. 1024; Ex. 1025 at 35.

314. In addition, Van Boucq already discloses using known location services to help with the location determination, including mapping software from Apple, Google, and Microsoft. Ex. 1009, ¶¶ 31-36. In my opinion, a POSA would have been

motivated to use the reverse geocoding API calls for those location services disclosed in Van Boucq, particularly in light of the fact that Maginnis explicitly refers to those reverse geocoding APIs.

315. It is therefore my opinion that Doughty over Van Boucq, Smith, and Maginnis renders obvious using a reverse geocoding API call to identify a physical address based upon the determined latitude and longitude coordinates.

**G. Secondary Considerations**

316. I am not aware of any secondary considerations that would be relevant to the Challenged Claims. I reserve the right to address any alleged secondary considerations raised by Patent Owner.

**X. Conclusion**

317. 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 12<sup>th</sup> day of November 2024, in Edwards, Colorado.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "David Hilliard Williams".

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David Hilliard Williams

# **EXHIBIT 1**

# David Hilliard Williams

203-423-9015; [dwilliams@LBSGlobe.com](mailto:dwilliams@LBSGlobe.com); [www.E911-LBS.com](http://www.E911-LBS.com)

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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); Edge Computing; 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 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; Location Sharing Policies, Systems/Methods; 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
- Channel, Bandwidth Management; Network Design; Path Loss Management
- Location Data Aggregation, Anonymizing
- LIDAR/Radar Data Sourcing; Crowdsourcing
- Indoor Positioning & App Ecosystem Design
- Short/Longer-range Positioning Technologies
- LBS and IoT Enterprise/Consumer Product & Technical Strategy, Design and Buy/Build
- Mobile Devices/Systems Power Management
- Artificial Intelligence (AI), Machine Learning, Virtual/Augmented Reality in Mobile Apps
- Internet of Things (IoT), Cellular IoT (LTE-M, NB-IoT), LAN/PAN (WiFi, BLE), LPWAN (Sigfox, LoRaWAN, Mesh (Zigbee, RFID), Consumer/Industrial/Commercial/Govt. IoT
- Home, Office, and Industrial Automation System Design and Integration; Control System Design, including Remote Management, Monitoring, and Control; User Interface Design (visible, audible, tactile, virtual, augmented, context-sensitive, GUI-based, directional, wearables, implants, holographic, others)
- Health, Wearables Monitoring & Tracking
- Safety and Security, Surveillance Systems, Home Energy Management Systems
- Smart Card/Wallet/Purse, Contactless Payment Systems (e.g. Google Pay); SEs.
- Mobile Resource Management (MRM) Tracking and Management; Vehicle, Drone, Fleet/ELD/AOBRD, Worker/Driver, and Freight/Trailer & Asset Tracking/Mgmt.
- Telematics; ITS, Vehicle/Engine/ECM, PGN/SPN Tracking/Monitoring, V2V, V2I, V2N, Vehicle Communications Networks and Operating and Analytics Ecosystems including SAE standards (J1939, CAN, etc.)
- Connected Cars/Autonomous Vehicles (AV)
- Navigation Systems; PNDs; Geofencing; Route Optimization; Infotainment Apps/Interfaces
- Location-Based/Dependent Advertising, Search
- Map Data, Digital Mapping, Media/Advertising Interfacing/Management, GIS, & IoT IT
- Mobile Social/Business Networking;
- Location/Context-Centric Enterprise Process Reengineering, Integration, & Interoperability
- SMART location, Home, Wearables; SMART Buildings, Cities; All forms of location-related alerts, notifications, alarms; Barcodes, QR Codes
- Context/Presence-Based LBS and IoT; AI-based context determination and utilization
- M2M, Smart Grid/Energy Systems
- Engineering, Network, and IT Process Design and Organizational Capabilities Assessment
- LBS Big Data and Cloud Computing
- Blockchain and Cryptocurrency—Mobile Apps

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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 and E911-LBS Forensics Engineering, LLC. 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, Ericsson, 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, Motorola, Nextel, NAVTEQ, Overhead Door, Peschke, Prova, Qualcomm, Samsung, Snap, Sprint, Target, Tegriss, Toyota, Twilio, Verizon Wireless, VIVINT, Volkswagen, Zillow, and ZIM.

Mr. Williams has successfully served as an expert for plaintiffs, prosecutors and defendants in patent, ITC, and criminal litigation (including assisting State Public Defender entities including California, Florida, Maryland, New York, and Tennessee), as well as both sides of civil trade secrets, product liability, fraud, and other litigation. He has been deposed

approximately 40 times in approximately 70 matters, and has testified 13 times, including [successfully](#) in The Eastern District Court of Texas (winning both infringement and invalidity matters), and in [winning](#) in ITC Court. He has also testified in criminal court, such as State of Tennessee versus David Swift, winning on behalf of the defendant, **In total he has provided expertise in matters involving over 225 patents and over 50 criminal and civil matters**, with over 100 reports filed with the PTAB. His credentials in wireless/mobile/IT technologies and associated applications, infrastructure, systems, and enablers are established to the 1980s. Mr. Williams has testified in a variety of district and state courts, ITC, and international (Canada, Trinidad & Tobago).

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.

Further, Mr. Williams is expert on Big Data, data mining/analytics, the use of Machine Learning and Artificial Intelligence issues associated with location, context and IoT data, as well as its potential usage in the criminal forensics field. Nine (9) of Mr. Williams patents utilize machine learning and artificial intelligence, including some utilizing virtual reality and augmented reality, as well as blockchain and cryptocurrency.

With nearly forty (40) 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 named inventor on ten (10) patents involving mobile location and context, sensors, IoT, and various other technologies and associated methods (including artificial intelligence and machine learning, with several pending).

## Employment History

From: 2002      **E911-LBS Consulting; E911-LBS Forensics Engineering (2015+)**

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). For example, served as mobile location communications networks and computer design expert in State of Tennessee vs. David Swift.
- 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: 2023-2024 **Fisher Broyles**  
 Matter: Tegriss  
 Project: Providing expert analysis and declarations for Patent Owner of innovative system for life safety-related equipment inspections, testing, and maintenance facing IPR before the PTAB. Deposition.

Date: 2023-2024 **Baker Botts**  
 Matter: Motorola  
 Project: Providing expert support, analysis, and declarations for IPR matter involving prioritization of communications messages in overtalk and similar situations. Depositions (2).

Date: 2022-2024 **Spragins, Barnett & Cobb**  
 Matter: State of Tennessee vs. David Swift  
 Project: Provided expert consulting, analysis, and testimony in murder and related charges case. Provided both mobile phone and computer-related forensics analysis of victim and accused. Found Not Guilty in murder-related charges (other charges hung jury).

Date: 2021-2024 **Wittels Law**  
 Matter: Various vs. NY Paving  
 Project: Providing GPS/location-related expert consulting, analysis, and reports for employment-related case regarding underpayment of hours worked.

Date: 2023-2024 **Baker Botts**  
 Matter: Tile  
 Project: Providing expert consulting, support, analysis, declarations, and

testimony for IPR matter for patent involving systems and methods for finding lost or stolen property. Deposition and Testimony.

- Date: 2023-2024 **Buchanan**  
Matter: Google  
Project: Providing expert consulting, support, and declarations for 6 patents/4 groups involving indoor/outdoor location, signal strengths, rf fingerprinting and grid point analysis; use of network calibration data in location determination; and incorporating path loss with calibration, fingerprinting, and location determination/
- Date: 2023 **Jenner & Block LLP**  
Matter: Uber  
Project: Provided expert consulting, support, and declarations for matter involving Taxi/ride sharing systems and methods.
- Date: 2022-2023 **Vorys**  
Matter: BJ's Wholesale Club  
Project: Provided expert consulting, support, and declarations for matters involving location-related in-store ordering, fulfillment, and customer service aspects of e-commerce and m-commerce services. Deposition.
- Date: 2023 **Wilson Sonsini**  
Matter: Rocateq  
Project: Provided expert consulting, support, and declaration work involving connected shopping cart technology and applications IP.
- Date: 2023 **Finnegan, Henderson, Farabow, Garrett & Dunner, LLP**  
Matter: Google  
Project: Providing expert consulting, support, and declarations for IPR matters directions, video, wearables/spatial orientation detection.
- 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. Six IPRs instituted and in process. Depositions (2 covering 6 IPRs).
- 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 and Testimony (SDNY).
- 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; VIVINT trial 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 **XYVerify (3)**  
Projects: 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 **Civil and Criminal Forensics**  
Matters: Various  
Project: Provided/Providing cellphone, vehicle/telematics, 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 land), armed robbery, breaking and entering, assault (various types), and property crime. Civil matters include trade secrets, product liability, accident liability, fraud, contract disputes, 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, specialty 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      | <b>Sterne Kessler Goldstein Fox</b>                                                                                                                                                                                                                              |
| Matter:   |           | Volkswagen                                                                                                                                                                                                                                                       |
| Project:  |           | Provided expert support for IPR involving Location-Based Messaging in automotive related use matter/environments.                                                                                                                                                |
|           |           |                                                                                                                                                                                                                                                                  |
| Date:     | 2017-2018 | <b>Finnegan &amp; Henderson</b>                                                                                                                                                                                                                                  |
| Matter:   |           | Fed Ex                                                                                                                                                                                                                                                           |
| Project:  |           | 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 | <b>Polsinelli</b>                                                                                                                                                                                                                                                |
| Matter:   |           | Uber                                                                                                                                                                                                                                                             |
| Project:  |           | Provided expert support and reports for Trade Secrets matter involving major shared transportation provider.                                                                                                                                                     |
|           |           |                                                                                                                                                                                                                                                                  |
| Date:     | 2017-2018 | <b>Renner Otto</b>                                                                                                                                                                                                                                               |
| 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 | <b>Paul Hastings</b>                                                                                                                                                                                                                                             |
| 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 Partes 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 Thunte 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<br>(1 <sup>st</sup> in graduating class)            | MBA, Information Systems Management  |
| 1983        | Purdue University, West Lafayette, Indiana<br>(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).
- “Dynamic and adaptive systems and methods for rewarding and/or disincentivizing behaviors” (U.S. Patent Number 11,636,941, Issued April 25, 2023).
- “Systems and Methods for Conducting/Defending Digital Warfare or Conflict” (Notice of Allowance given, Patent # pending)
- Numerous other patents pending.

## **Publications**

### **Books:**

1. The Definitive Guide to IoT Sensors (In development)
2. The Definitive Guide to IoT Use Cases (In development)
3. The Practical Guide to The Internet of Things (IoT): Use Matters and Enabling Technologies (In development)
4. The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2 versions, plus version in development)
5. The Definitive Guide to Wireless E911
6. 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](http://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, Python, 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)