

# David Hilliard Williams

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## Expertise

- Location-Based Services (LBS)
- GPS Systems; Network-Based Location Determination Systems
- Wireless 911 (E911); NG911
- Internet of Things (IoT); Real-Time Location Systems (RTLS)
- Non-Cellular/Indoor/Sensor-based Location Systems, including: RFID, Wi-Fi/WPS, BLE/Bluetooth, Beacon-based RTLS; NFC/ DSRC; RF Fingerprint systems; Wearable systems; Hybrids/Combinations
- Expert Witness Litigation Support, Patent/Intellectual Property Development and Protection Services
- GPS/Cellphone Criminal and Civil Matter Forensics, using CDRs, RTT, PCMD, NELOS, EVDO, Geotab, Paraben, CellHawk, and Cellebrite
- Internet of Things (IoT) Ecosystem (Sensors, Identity, Interfaces, Edge, Network, Cloud, Data Network Management, Data Management, Analytics, Network Topologies)
- Location & IoT Data Privacy and Security; Device/User ID, Verification, & Authentication
- Sensor Design; Sensor System Architecture and Interface Design
- IoT and Home Automation System Design and Integration; Control System Design, Including Remote Management, Monitoring, and Control
- Safety and Security, Home Automation, Home Energy Management Application and Architecture Design/Implementation
- Smart Card, Contactless Payment Systems
- Mobile Resource Management (MRM) Tracking and Management; Vehicle, Fleet, Worker, and Freight & Asset Tracking/Mgmt.
- Telematics; Vehicle Monitoring Ecosystem
- Connected Car/Auto. Vehicle (AV) Ecosystem
- Navigation Systems; PNDs; Route Optimization; Device/App Personalization
- Indoor Positioning & App Ecosystem Design
- Location-Based/Dependent Advertising, Search
- Map Data, Digital Mapping, Digital Media Interfacing/Management, GIS, & IoT IT
- Mobile Social/Business Networking
- LBS and IoT Enterprise/Consumer Product & Technical Strategy, Design and Build
- Location/Context-Centric Enterprise Process Reengineering, Integration, & Interoperability
- SMART location, SMART Home, SMART Wearables, SMART Buildings, SMART Cities
- Context/Presence-Based LBS and IoT
- M2M, Smart Grid/Energy Systems
- Accident/Incident Reconstruction
- LBS Big Data and Cloud Computing

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## Professional Summary

David Hilliard Williams is an internationally-known expert in the wireless/mobile location and Internet of Things (IoT) fields and President and Founder of E911-LBS Consulting. He specializes in wireless and IoT-based product and technology development and implementation, as well as Intellectual Property (IP)/patent and forensics litigation services involving technologies such as Global Positioning Satellite (GPS) systems; Network-based location determination technologies such as TDOA, ECID, and AFLT; Wireless 911 (E911) and Next Generation 911; Real-Time Location Systems (RTLS) including Radio Frequency Identification (RFID) systems, Wi-Fi-based positioning systems (WPS), BLE/Beacon-based location systems, Bluetooth, Near Field Communications (NFC), and alternative RTLS (Ultrasound, Infrared); Wearable Tags/Sensor tracking systems; Zigbee/Mesh networks; and

various hybrids and combinations, as well as a broad array of IoT sensors and other systems, network, 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, 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, Draft Kings, FedEx, GE, GM, Geotab, Green Mountain Grill, Google, Heil, the Houston Police Department, the L.A. County District Attorney's Office, Lyft, Macropoint, Nextel, NAVTEQ, Overhead Door, Peschke, Qualcomm, Samsung, Sprint, Target, Toyota, Twilio, Verizon Wireless, VIVINT, Volkswagen, and Zillow.

Mr. Williams has successfully represented both prosecutors and defendants in patent, ITC, and criminal litigation (including assisting State Public Defender entities), as well as both sides of civil trade secrets, product liability, fraud, and other litigation. He has been deposed 24 times and has testified 8 times, including [successfully](#) in The Eastern District Court of Texas (winning both infringement and invalidity matters), and in [winning](#) in ITC Court. In total he has provided expertise in matters involving over 150 patents and over 40 criminal and civil matters. His credentials in wireless/mobile/IT technologies are established to the 1980s.

Mr. Williams is expert in smart location technology issues in the Internet of Things (IoT) 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 design, sensor design and deployment strategies; process (re)engineering; IT integration; data aggregation, segmentation, analysis, and management; scalability; and security and privacy issues, requirements, collaboration structures, and ongoing management. He is expert on Big Data issues associated with location and IoT data.

With over thirty-five years in location, networking/communications, control, and information technology solutions design, selection, implementation and ongoing management, Mr. Williams has extensive experience in the activities and issues needed to get applications to market, including planning and design at the application, system, interface/integration,

network, IT, operational and customer facing levels. He has been published and quoted by leading magazines and newspapers about mobile services, including The New York Times, CBS News.com, The Columbus (Ohio) Dispatch, The Boston Globe, Computerworld, Directions Mag, Mission Critical Communications, Popular Mechanics, and RFID Journal. Mr. Williams has authored five books on wireless location, including *The Definitive Guide to IoT Sensors (Target: December 2021)*, *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (two versions, third in progress)*, *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.

## Employment History

From: 2002      **E911-LBS Consulting**

To: Present

Position: *President and Founder*

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

- Provided expert witness, technical consulting, and research analysis services with respect to location-based services-related intellectual property/patent protection, licensing, and litigation (details in separate litigation support section).
- Provide forensics expertise in examination of mobile location-related events and associated data for civil and criminal matters (both prosecutor/plaintiff and defense entities).
- Developed, implemented, managed, and marketed a portfolio of LBS applications and broader offers for leading North American wireless carrier. Responsible for all dimensions of product lifecycle and associated budgets. Work included the development and launch of several LBS applications including mobile social networking, family tracking, local search, 411 w/ location, and mobile worker, fleet, and asset management. Location technologies utilized include GPS, Wi-Fi positioning, RFID, Bluetooth, Cell ID (CID), ECID, and TDOA. Worked extensively with network engineering to troubleshoot/refine

new location-determination infrastructure to address/improve location accuracy, privacy and security issues.

- Conducted geofencing accuracy compliance analysis for ride-sharing company auditing their driver airport compliance record. Involved extensive use of JSON/GeoJSON records.
- Conducted comprehensive technical and intellectual property analysis of Real-Time Location Systems (e.g. RFID, Wi-Fi Positioning, Bluetooth, Infrared/Ultrasound, Others) market for European client looking to assert location-related patents.
- Provided technical guidance for mobile payments/wallet startup utilizing RFID, NFC and other technologies as key location enablers. Identified key issues and redeveloped successful patent application after initial USPTO rejection.
- Conducted technical and intellectual property analysis for Fleet Management/Telematics operator and service provider assessing potential infringement candidates.
- Conducted analysis of location aggregation market for client interested in acquisition in that industry space.
- Provided E911 consulting expertise in support of new spectrum regulatory approval and technical implementation issues for nationwide 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) 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 (Target: December 2021)*, *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2005/2009 versions)*, *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, digital media and content, 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 implement Intelligent Network services, 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 a variety of industries including hospitality/retail, energy, agriculture, and banking/financial services.

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.

### **Litigation Support Experience**

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; Decision Pending.

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: 2020-2021      **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. Won.

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 (7); In progress.

Date: 2020-2021      **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); In progress.

- Date: 2020 **Baker Botts**  
Matter: Lyft  
Project: Providing expert consulting, support, and report for IPRs involving Intelligent Transportation systems, geofences, and associated location technologies including GPS, Bluetooth, Wi-Fi positioning, RFID, and road sensors/readers. Deposition; In progress.
- Date: 2020 **Finnegan & Henderson**  
Matter: Google (2)  
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. In progress.
- Date: 2019-2021 **Lynch Thompson LLP**  
Matter: Heil  
Project: Providing technical/engineering expertise in trade secrets matter involving Internet of Things, RFID, Telematics, Vehicle Sensors, and Big Data for leading waste management vehicle manufacturer. Deposition; In progress.
- 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. Won; potential \$1 billion in damages involved (settlement reached).
- 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. Won.
- 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. Won.
- 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. 2 matters won; others ongoing.

Date: 2013, 2019/2020  
Projects: **XYVerify (3)**  
Patent Re-Submission and Approval; Patent Application Creation (Re)wrote patent applications for LBS/financial verification system using multiple location determination methods including RFID, Bluetooth, WPS, and GPS. Efforts enabled patents to be approved after initial rejection by USPTO.

Date: 2013-2020  
Matters: **Civil and Criminal Forensics**  
Project: Various  
Provided cellphone, vehicle, specialty device, and computer-based location forensics expertise in over 40 criminal and civil matters involving numerous location determination technologies and associated applications. Criminal matters include homicide, assault (multiple types), arson, armed robbery, breaking and entering, and property crime. Civil matters include trade secrets, product liability, accident liability, fraud, and employment matters.

Applications/Platforms for criminal and civil forensics analysis include cellular records, 911 records, Facebook/Instagram/Messenger/social media apps, Google/search, Google tracking apps (e.g. Timeline, others), vehicle tracking systems, specialty GPS (e.g. GPS ankle bracelets, special devices) surveillance and safety systems, smart home systems, aviation, and connected cars, Expert/knowledgeable in numerous forensic technologies, tools, and accident/incident reconstruction methods including CDR, NELOS, PCMD, RTT, EVDO, Cellebrite, Paraben, Google Earth/Timeline, and Hawk Analytics/CellHawk, as well as specialized knowledge on iOS and Android smartphone location determination techniques and data collection, analysis, and management of all types including KML/KMZ, (Geo)JSON, CSV, (E)WKT/WKB, Shapefile, ESRI, and other GIS vector/raster systems, technologies, formats, and models.

Date: 2019  
Matter: **Sterne Kessler Goldstein Fox**  
Project: Volkswagen  
Provided expert support for IPR involving Location-Based Messaging in automotive related use matter/environments.

Date: 2017-2018  
Matter: **Finnegan & Henderson**  
Project: Fed Ex  
Provided expert support, consulting, reports, deposition, and trial testifying for infringement and district court invalidity proceedings on behalf of leading transportation/shipping company. Matter won (in The Eastern District Court of Texas) on both infringement and invalidity counts on behalf of defendant Fed Ex.

- Date: 2017-2018 **Polsinelli**  
Matter: Uber  
Project: Provided expert support and reports for Trade Secrets matter involving major shared transportation provider.
- Date: 2017-2018 **Renner Otto**  
Matters: Macropoint; Timekeeping Systems Inc.  
Projects: Providing consulting, expert services, report and deposition in district court patent invalidity matters for transportation and employee tracking providers.
- Date: 2016-2018 **Paul Hastings**  
Matters: Samsung (2 matters)  
Project: Provided expert services for Inter Partes Review (IPR) of multiple location, safety, and security patents on behalf of major telecommunications equipment and services provider.
- Date: 2016-2017 **European Firm**  
Matter: Patent Infringement/Claim Chart Analysis  
Project: Provided consulting, market analysis, and claim chart development for patent holder involving RTLS-related repeater technologies, particularly using WPAN/Zigbee networks.
- Date: 2016-2017 **Baker Botts**  
Matter: Twilio  
Project: Provided location/E911-related expert services, report, and deposition for Inter Partes Review (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 office. Defendant pled guilty.
- 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. Settled.
- 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 (2)  
Project: Provided expert support for patent litigation efforts involving fleet management devices, software, and services. Won.
- 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. Matter won.
- 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 Thuente 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. Won.
- 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, and future technology direction.

## Education

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

## Patents

- "Method and apparatus for providing mobile social networking privacy." (U.S. Patent Number 8,613,109, issued on December 17, 2013).
- "Systems and methods of using wireless location, context, and/or one or more communication networks for monitoring for, preempting, and/or mitigating pre-identified behavior." (U.S. Patent Number 10,477,342, Issued November 12, 2019).

- “Systems and methods for monitoring for and preempting pre-identified restriction violation-related behavior(s) of persons under restriction” (U.S. Patent Number 10,497,242, Issued December 3, 2019).
- “Systems and methods for providing location-based security and/or privacy for restricting user access” (U.S. Patent Number 10,555,112, Issued February 4, 2020).

## **Publications**

### **Books:**

1. The Definitive Guide to IoT Sensors (Target: December 2021)
2. The Practical Guide to The Internet of Things (IoT): Use Matters and Enabling Technologies (Target: January 2022)
3. The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2 versions, plus version in development)
4. The Definitive Guide to Wireless E911
5. The Definitive Guide to Mobile Positioning and Location Management (Co-authored)

### **Articles/Quotations:**

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

## **Languages/Tools**

- C/C++, Java, Basic, Cobol, Fortran, Pascal, APL, Assembly
- 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**

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