CURRICULUM VITAE

CONTACT INFORMATION

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EDUCATIONAL DEGREES/REGISTRATION

P.E. in State of Ohio, Registration Number PE 66926, since June 2002

Ph.D. Electrical Engineering, Ohio University, Athens, Ohio, Fall 1994 to Spring 1998, awarded in June 1998. Dissertation Title: "*Ranging Airport Pseudolite for Local Area Augmentation Using the Global Positioning System*".

M.S. Electrical Engineering, The Naval Postgraduate School, Monterey, CA, Fall 1986 to Summer 1987, awarded in August 1987; specialized in Communications Engineering. Thesis Title: "*Measured Noise Performance of a Direct-Sequence Spread-Spectrum System and a Comparison of Single-vice Dual-Channel Delay-Lock Loops*".

B.S. Electrical Engineering, The Pennsylvania State University, University Park, PA, Fall 1979 to Spring 1983, awarded in June 1983; emphasis in electromagnetics, communications, and antennas.

ACADEMIC EXPERIENCE

Ohio University, *School of Electrical Engineering and Computer Science, Athens, OH*
> Professor (6/2009-Present)
> Associate Professor (5/2004-6/2009)
> Assistant Professor, (3/1999-5/2004)
> Visiting Assistant Professor, (9/1998-3/1999)
> Graduate Instructor, (3/1998-6/1998)

Research:
- Integrated Avionics Technology Development, Federal Aviation Administration (FAA), Joint University Program between MIT, Princeton, and Ohio University. Grant 692M152140005, Grant 10-G-018, and Grant 16-G-012. Recent work has concentrated on using UAS/drone and hybrid autonomous vehicles to map airport surface using various sensors including: optical, LIDAR, thermal/IR, GNSS/GPS/INS, and other sensors. Principal Investigator for this ongoing task.
- Precise Reference Sensing for Collaborative Electronic Warfare (PRESENCE) using Secure Integrity GPS/GNSS Monitoring and Augmentation (SIGMA), 2/20/19-6/15/2021, support of USAF, Air Force Research Laboratory. Principal Investigator for this task. (Subcontract via Northrop Grumman)

- Satellite Navigation Augmentation to Improve Navigation Technology (SAINT). GNSS Receiver Configuration and Data Collection. Fabrication of specialized GNSS receiver systems to be remotely controlled, operated, and configured via the Internet to support the advancement of navigation technologies. 9/12/17-8/31/19, support of USAF, Air Force Research Laboratory. Principal Investigator for this task. (Task 2.1 SAINT on subcontract.)
- High-efficiency Water-loaded Microwave Antenna in Ultra-high Frequency Band, University of California at Berkley, 7/2016-1/2018. Development and testing in Ohio University Antenna Anechoic Chamber.
- Differential Global Positioning System (GPS) Performance Analysis task for Northrop-Grumman Corporation, El Segundo, CA for engineering services and white paper. 2/27/2009 to 6/12/2009. Principal Investigator for this task. Investigator for this task.
- GPS Long Range Navigation (LORAN)-C Analysis and Support, sponsored by the FAA, Contract: DTFA01-01-C-00071, Technical Task Description 2.1, 10/1/07 to 12/30/07; new work from 1/1/08 to 09/26/08, then with contract extension to 04/30/09. I am the Principal Investigator for Loran-C support to FAA on all aspects. Coordinate all development including King Air flight tests, Loran Propagation Model (LPM) development and validation, ASF measurement and validation studies, legacy performance assessments for GPS non-precision approach, H-field antenna specification.
- Ohio University Shielded Antenna Anechoic Chamber, used in research for the following projects:
  - Bluetooth Microstrip Patch Antenna characterization for a Wearable Body Area Network.
  - Spectral Systems Incorporated/Sierra Nevada Corporation microwave antenna development (2.4 GHz band)
  - High-efficiency Water-loaded Microwave Antenna in Ultra-high Frequency Band, University of California at Berkley.
  - FAA Instrumented Landing System (ILS) antenna (300MHz band)
  - Stanford University, Joint Precision Approach and Landing System GPS Controlled Reception Pattern Array measurement (L band)
  - USCG NDGPS Antenna Performance Analysis (L band)
  - FAA GPS interference work (L band)

  I am the Principal Investigator for development, testing, and coordination of all projects. All results were provided back to program sponsors.
- Development of a Prototype NDGPS High Performance Architecture Enhancement. Lead agency was the U.S. Department of Transportation (DOT) Federal Railroad Administration (FRA) funded through DOT/Volpe Center. Contract DTRS57-04-C-10026 Base Period from 10/20/05 to 04/20/06 and Options 1 until 10/20/06 to 10/20/07. This was essentially a follow-on contract to the Prototype NDGPS contract shown below. I was the Principal Investigator for all development and research efforts.
- Combat Sent System Passive Ranging for high accuracy bearing determination to locations off the aircraft body. Utilized DGPS carrier phase ambiguity solutions for mm-level positioning. Issued under contract FA8620-05-G-3015-0002, Subcontract 301502-OU-01, from U.S. Air Force, via Spectral Systems Incorporated/Sierra Nevada Corporation, from 8/1/05-4/15/06. (Co-PI with Frank van Graas); asked co-PI for advice occasionally. Contribution Level: High (~30%). I was the Principal Investigator for all development and research efforts including DC-3 flight tests.
- Analysis and Evaluation on Impact of the Wide Area Augmentation System (WAAS) to GPS on Maritime Radio Navigation Users, from Volpe. Contract DTRT57-05-P-80171 from 6/17/05-3/17/06. I was the Principal Investigator for all development and research efforts.
- Development of a Prototype Nationwide Differential Global Positioning System (NDGPS) and High

Performance Architecture Demonstration. Lead agency was the U.S. Department of Transportation (DOT) Federal Railroad Administration (FRA) funded through DOT/Volpe Center. Contract DTRS57-04-C-10026 Base Period from 03/30/04 to 09/30/04 and Options 2 until 09/30/06. I was the Principal Investigator for all development and research efforts. (This was the original DOT/FRA/Volpe contracts, which led to the follow-on contract shown earlier.)

- Missile Range Safety Technology (BMRST), Eastern Range, Command Destruct System (CDS) Testing Flight Test Support of integrated GPS/Inertial Navigation System (INS), supported by Florida Air National Guard (FLANG), Contract W911YN-06-P-002, from 10/06/05-07/06/05. I was the Principal Investigator for all development and research efforts.
- Antenna Baseline and Attitude Measurement Systems (ABAMS) Feasibility Study for UASs using DGPS. Lead agency is the U.S. Naval Research Laboratory, via ITT Industries, from 9/29/2004 to 8/5/2005. (co-PI with Tom Arthur)
- Antenna Performance Analysis for the U.S. Coast Guard NDGPS sites. New effort awarded from U.S. DOT Volpe Center, Contract DTRS57-04-P-80285, from 8/16/04-04/29/05. I was the Principal Investigator for all development and research efforts.
- Antenna Baseline Measurement System (ABMS) for high accuracy DGPS bearing determination to locations off the aircraft body. Contract F33657-02-G-4036-0004, Subcontract 4.3604-OU-01. Issued from U.S. Air Force, via Spectral Systems Incorporated/Sierra Nevada Corporation, from 9/1/03-10/31/04. (Co-PI with Frank van Graas) I was the Principal Investigator for the development and research efforts including DC-3 flight tests.
- Anti-Jam Navigation Terminal System (ANTS) using DGPS and pseudolites for the Air Force Research Laboratory, Space Vehicle, Ballistic Missile Technology Program Office. Contract F29601-00-C-0212, Anti-Jam Navigation Terminal System Using the Global Positioning System. Multi-year contract:
    - o Base Year, from 09/07/00 to 2/29/02
    - o Option Year One Awarded on 8/14/01 for 12 months:
        - Task 3.1 GPS Transceiver Development
        - Task 3.2 AZMLA Development; extended to 7/31/03.
  I was the Principal Investigator for all development and research efforts.
- GPS-based Range Safety System to meet the Air Force Research Laboratory, Space Vehicle, Ballistic Missile Technology Program Office requirements. Research for the establishment, licensing, and certification of a GPS-based range safety system to eliminate ground-based radars. Contract F29601-99-C-0176, GPS Range Safety Technology System, from 10/1/99 to 9/30/00; then, from 1/17/01-1/31/03. I was the Principal Investigator for all development and research efforts.

Teaching:
I taught the following electrical engineering courses at Ohio University, Athens, OH:
1. EE605/6054 Satellite-Based Navigation Systems, F00-01, F01-02, F03-04, W04-05, F06-07, F07-08, F08-09, F09-10, F10-11, F11-12, F12-13. S14-15, S16-17, S17-18, S18-19, S19-20, S20-21, S21-22, S22-23, S23-24.
2. EE441/541/4403/5403Antennas and Microwaves Theory, W98-99, S12-13, S13-14, S14-15, S16-17, S17-18, S18-19, S19-20, S20-21, S21-22, S22-23, S23-24.
3. EE602/690 & EE4900/5900 Radar Systems/Radar & Lidar Systems, S99-00, W10-11, F15-16, F16-17, F19-20.
4. EE613/690 High-Accuracy Satellite Navigation Systems, S00-01, S01-02, W03-04, S06-07, W07-08, W08-09, W09-10, S10-11, S11-12, F18-19.

5. EE6900 Satellite Communications, F13-14, F14-15, F20-21.
6. EE321/3214 Electromagnetics and Materials I, W98-99, W99-00, W01-02, W02-03, W04-05, F12-13, F13-14, F14-15, F15-16.
7. EE395C/EE3223 Intermediate Electrical and Computer Engineering Design Experience/Electromagnetics & Materials II, S02-03, F03-04, F06-07, S07-08, S09-10, F10-11, S10-11, F11-12, S11-12, S12-13, S13-14.
8. EE690 GNSS Antennas, W11-12, F13-14.
9. EE395B Intermediate Laboratory Experimentation II, W08-09, S08-09, W09-10, S09-10, F10-11, W10-11, S10-11, W11-12. (Electromagnetics/Motors part). (Electromagnetics/Antennas/Communications).
10. EE601/690, Electromagnetic Wave Propagation in Electronic Navigation Systems, F99-00, F04-05.
11. EE690 Satellite Navigation Systems for Automobiles Seminar (Independent Study), S06-07.
12. EE495A/B/C Electrical and Computer Engineering Capstone Design I, II, & III, Design Project Leader for a GPS Antenna, 2002-2003 and 2003-2004. Used EECS Antenna Anechoic Chamber in design evaluation.
13. EE490 Electromagnetics Experimentation Design, F02-03, superseded by EE395C.
14. EE690 Antenna Pattern Measurement Seminar (Independent Study), W00-01, F06-07.
15. EE371 Applied Probability and Statistics for Electrical Engineers, S97-98, S98-99.
16. EE312 Linear Systems and Networks II, W98-99.
17. EE310 Linear Systems and Networks I, F98-99.

Graduate Student Summary: The following lists are for the Theses/Dissertations Directed:
Graduated Students:
1. Jackson J. Brengman, MSEE, "Design and Integration of a Multispectral Sensor Suite with Focus on Georeferenced LIDAR Mapping", May 2024.
2. Kal Lele, Ph.D. EE, "Wideband and Multi-band Circular Periodic High-Impedance Surface Integrated with Wideband Spiral Antenna", December 2023.
3. Eric Hahn, MSEE, "Spatial and Polarization Domain-Based GNSS Processing for Multipath Mitigation using a Dual-Polarized Antenna Array", December 2022.
4. Tim Needham, Ph.D. EE, "Gravity Modeling in High-Integrity GNSS-Aided Inertial Navigation Systems", Ph.D., August 2022.
5. Andy Appleget, MSEE "A Consolidated GNSS Multipath Analysis Considering Modern GNSS Signals, Antenna, Installation, and Boundary Conditions", August 2020.
6. Michael Porter, MSEE "A Performance Analysis of two Civilian GNSS receivers in a GNSS Contested Laboratory Environment", August 2019.
7. Anthony Milluzzi "Avian Target Processing Algorithm for Bird Strike Risk Mitigation in Aviation", May 2019.
8. Levi Moore, MSEE, "An Enhanced Body Area Network to Wirelessly Monitor Biometric Information", Ohio University, December 2017.
9. Joel, Schopis, MSEE, "Single-element GNSS Patch Antenna with Pattern Control", August 2015.
10. Christian Sagardia, MSEE, "Design, Simulation, Fabrication, and Test of a GPS L1 Antenna Using the Finite-Difference Time Domain Method and Photolithography Techniques", May 2014.
11. Augustine Yellu, MSEE, "A Uniform Geometrical Theory of Diffraction Model of VHF Omni Range (VOR) Systems for Improved Accuracy, August 2013.
12. Zach Bauer, MSEE, "A Calibration Method for a Controlled Reception Pattern Antenna and Software Defined Radio Configuration", May 2013.

13. Mahesh Katragadda, MSEE, "Design and Simulation of a Planar Crossed-Dipole Global Navigation Satellite System (GNSS) Antenna in the L1 Frequency Band", Fall 2012.
14. Ravi Varma Komarabathuni, MSEE, "Performance Assessment of a 77 GHz Automotive Radar for Various Obstacle Avoidance Applications", Ohio University, Spring 2010-2011.
15. Raghunath Viswanatha, MSEE, "A Multi-channel RF Front End for Global Navigation Satellite System Receiver", Ohio University, November 2008.
16. Tim Needham, MSEE, "A Low Rate Data Link for a High Performance Differential Global Positioning System", Ohio University, June 2008.
17. Jeff Dickman, Ph.D.EE, "Single Platform Relative Positioning for Sensor Stabilization", Ohio University, June 2008.
18. Luyi Chen, MSEE, "Dual Frequency Patch Antenna Design for Global Navigation Satellite System", Ohio University, June 2007.
19. Ian Barton, MSEE, "Antenna Performance Analysis for the Nationwide Differential Global Positioning System", November 2005.
20. Yujie Zhang, Ph.D.EE, "High Performance Differential Global Positioning System (HP-DGPS) For Long Range Baseline Application", Ohio University, August 2005.
21. Sumit Bhattacharya, MSEE, "A Real-time Bi-directional Differential Global Positioning System Data Link over Internet Protocol", Ohio University, March 2005.
22. Sidharth Nair, MSEE, "A Multiple Antenna Global Positioning System Configuration For Enhanced Performance", Ohio University, June 2004.
23. Sai Kiran, Ph.D.EE, "A Wideband Airport Pseudolite for LAAS", Ohio University, November 2003.
24. Ranjeet Shetty, MSEE, "A Real-Time Bi-Directional Differential Global Positioning System", Ohio University, November 2002.
25. Jeff Dickman, MSEE, "Multipath Limiting Antenna Design Considerations for Ground Based Pseudolite Ranging Sources", Ohio University, November 2001.

Current Graduate Students:
1. Maarten Kastelein, Ph.D. EE, "Prototype Collision-Avoidance System for Small Multirotor Unmanned Aircraft at Low Altitude", graduation planned Fall 2024.

School Committee Service Summary:

Department Committees:
1. Chair, Promotion and Tenure, Associate, Professor, Instructional, 2024-present.
2. Chair, EE Faculty Hiring Committee, Spring 2023.
3. Member, Promotion and Tenure Committee, various 2005-2023.
4. School of EECS Faculty Fellowship Selection, Chair, Committee, Spring 2018.
5. Accreditation Board for Engineering and Technology (ABET) Committee for Electrical Engineering Program, School of EECS, 2013-Present.
6. Senior Design Committee, coordination of senior design project to ensure ABET compliance, 2013-Present, Committee Member.
7. Curriculum Committee, Review and oversee all changes to curriculums and courses, 2010-Present, Committee Member.
8. Graduate, School of EECS, 2004-2006, 2012-2016. Committee Member.
9. Assessment and Accreditation, School of EECS, 2002-2022, Committee Member.
10. EE Senior Focus for the School of EECS, 2003-2006, Committee Member.
11. EE Intermediate Courses for the School of EECS, 2003-2006, Committee Member.
12. EE Design Courses for the School of EECS, 2003-2006, Committee Member.

13. Matlab® Ad Hoc, February 2004, for discussion on adding additional MATLAB into the EECS curriculum. Outcome was to add Matlab® in EE103, Committee Member.
14. Intermediate Curriculum Committee, Overseeing Development of new EE333/EE334 Intermediate I/II, EE321 Electromagnetic, and EE371 Probability and Statistics Courses in new EECS Curriculum. 1999-2003, Head of Committee.
15. Stocker Research Award, School of EECS, 1999-2000, Committee Member.

College Committees:
1. Member, Dean Hiring Committee, Spring 2023.
2. College Professional Ethics Committee, Russ College of Engineering and Technology, 2004-2014, 2016-Present, Committee Member.
3. Engineering and Technology Fundamentals Committee, Russ College of Engineering and Technology, 2015-Present.
4. Dean's Evaluation Committee, for 2009 (member), 2014 (chair), 2016 (chair), 2017 (member).
5. Auto ID 5-year Review Committee. 2005, Committee Member.

University Committees:
1. Professional Relations Committee (PRC), Ohio University, sub-committee of Faculty Senate, 2006-2007, 2019-2020, Committee Member.
2. Faculty Senate, Ohio University for 2006-2009, 2009-2010, and 2013-2016. Faculty Senator, elected by and represent Russ College of Engineering and Technology.
3. Educational Programs and Student Activates (EPSA), Ohio University, sub-committee of Faculty Senate, 2013-Present, Committee Member.
4. Copyright Committee, Ohio University, Oct 2013-2014.
5. Facilities and Finances Committee (FFC), Ohio University, sub-committee of Faculty Senate, 2007-2011, Committee Member.
6. Budget Planning Council, Ohio University; Sept 2004-Sept 2005, committee advises Ohio University President and Provost on university wide budget issues. Appointed by Provost, Committee Member.

Consulting and Seminars Experience
The follow lists consulting and seminars performed.
- President for GNSS Solutions® Ltd, founded April 2006, outgrowth of CNS Seminars & Consultants, Ltd., www.GNSSsolutions.com
  - Offered one, three-day course at USAF, Holloman AFB, NM on July 20-22, 2015, and October 20-22, 2015.
  - Offered two, three-day courses at USAF, Holloman AFB, NM on July 22-24, 2014, and August 26-28, 2014.
  - Offered 24 tutorials on the two days preceding the ION GNSS 2010 Conference, Portland, OR, on September 20-21, 2010.
  - Offered 24 tutorials on the two days preceding the ION GNSS 2009 Conference, Savannah, GA, on September 21-22, 2009.
  - Offered 24 tutorials on the two days preceding the ION GNSS 2008 Conference, Savannah, GA, on September 15-16, 2008.
  - Offered 25 tutorials on the two days preceding the ION GNSS 2007 Conference, Fort Worth, TX, on September 24-25, 2007.
  - Offered 10 tutorials on the two days preceding the ION GNSS 2006 Conference, Fort Worth, TX, on September 25-26, 2006.

- <u>Seminar Instructor</u> for GNSS Solutions® Ltd
    - Taught seminar class prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2022 Conference, Denver, CO, September 12, 2023:
        - Multi-constellation GNSS Signals and Systems
    - Taught seminar class prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2022 Conference, Denver, CO, September 20, 2022:
        - Multi-constellation GNSS Signals and Systems
    - Taught seminar class prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2021 Conference, St. Louis, MO, September 21, 2021:
        - Multi-constellation GNSS Signals and Systems
    - Taught seminar class prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2020 Conference, St. Louis, MO (on-line), September 22, 2020:
        - Multi-constellation GNSS Signals and Systems
    - Taught seminar class prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2019 Conference, Miami, FL, September 17, 2019:
        - Multi-constellation GNSS Signals and Systems
    - Taught seminar class prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2017 Conference, Portland, OR September 26, 2017:
        - GNSS Error Characterization, Analysis, and Mitigation.
    - Taught two seminar classes prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2016 Conference, Portland, OR September 12, 2016:
        - Fundamentals of GNSS I with emphasis on GPS
        - Fundamentals of GNSS II with emphasis on GPS
    - Taught two seminar classes prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2015 Conference, Tampa, FL September 14, 2015:
        - Fundamentals of GNSS I with emphasis on GPS
        - Fundamentals of GNSS II with emphasis on GPS
    - Taught two seminar classes prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2014 Conference, Tampa, FL, September 8, 2014:
        - Fundamentals of GNSS I with emphasis on GPS
        - Fundamentals of GNSS II with emphasis on GPS
    - Taught a three-day seminar at Holloman Air Force Base, NM.
        - Fundaments of GNSS with emphasis on GPS, July 22-24, 2014
    - Taught three seminar classes prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS)+ 2013 Conference, Nashville, TN, September 16-17, 2013:
        - Fundamentals of GNSS I, September 16, 2013
        - Fundamentals of GNSS II, September 16, 2013
        - Fundamentals of GNSS III, September 17, 2013
    - Taught three seminar classes prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS) 2012 Conference, Nashville, TN, September 17-18, 2012:
        - Fundamentals of GNSS I, September 17, 2012
        - Fundamentals of GNSS II, September 17, 2012
        - Fundamentals of GNSS III, September 18, 2012
    - Taught one tutorial prior to Institute of Electrical and Electronics Engineers (IEEE)/ION Position Location and Navigation Symposium (PLANS), on GPS Error Characterization, Mitigation, and Analysis, April 23, 2012, Myrtle Beach, SC.

- Taught two seminar classes prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS) 2011 Conference, Portland, OR, September 19, 2011:
  - Fundamentals of GNSS I, September 19, 2011
  - Fundamentals of GNSS II, September 19, 2011
- Taught two seminar classes in Singapore in cooperation with EEM Advancement Seminars Ltd. In 2010 and 2007:
  - Fundamentals of Antennas for Communication, Navigation and Surveillance (CNS) Systems
    - 6 - 8 December 2010, Copthorne Orchid Singapore
    - 3 – 5 December 2007, York Hotel Singapore
  - Fundamentals of Global Navigation Satellite Systems (GNSS)
    - 9 – 10 December 2010, Copthorne Orchid Singapore
    - 1 – 2 December 2007, York Hotel Singapore
- Taught two days prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS) 2010 Conference, Portland, OR, September 20-21, 2010:
  - Fundamentals of GNSS I & II, September 20, 2010
  - GNSS Antenna I-Fundamentals, September 21, 2010
  - GNSS Antenna II-Special Topics, (taught first of three hours), September 21, 2010
- Taught one tutorial prior to Institute of Electrical and Electronics Engineers (IEEE)/ION Position Location and Navigation Symposium (PLANS), on GPS Error Characterization, Mitigation, and Analysis, May 3, 2010, Palm Springs/Indian Wells, CA.
- At IEEE Military Communications (MILCOM) Conference, taught Fundamentals of GNSS Tutorial, Boston, MA, October 20, 2009,
- Taught two days prior to the Institute of Navigation (ION) Global Navigation Satellite System (GNSS) 2009 Conference, Savannah, GA, September 21-22, 2009:
  - Fundamentals of GNSS I & II, September 21, 2009
  - Fundamentals of Antenna for GNSS, September 22, 2009
- Taught two days prior to the ION GNSS 2008 Conference, Savannah, GA, September 15-16, 2008:
  - Fundamentals of GNSS I & II, September 15, 2008
  - Fundamentals of Antenna for GNSS, September 16, 2008
- Taught one tutorial prior to Institute of Electrical and Electronics Engineers (IEEE)/ION Position Location and Navigation Symposium (PLANS), May 15, 2008, Monterey, CA, on Fundamentals of Satellite Navigation Systems Using GPS Tutorial.
- Taught two days prior to the ION GNSS 2007 Conference, Fort Worth, TX, September 24-25, 2007:
  - Fundamentals of GNSS I & II, September 24, 2007
  - Fundamentals of Antenna for GNSS, September 25, 2007.
- Taught two days prior to the ION GNSS 2006 Conference, Fort Worth, TX, September 24-25, 2006:
  - Fundamentals of GNSS I & II, September 25, 2006
  - GNSS Signal Propagation: Theory & Practice, September 25, 2006
  - Fundamentals of DGNSS, September 26, 2006
  - Fundamentals of Antenna for GNSS, September 26, 2006.
- Taught one tutorial prior to IEEE/ION PLANS, San Diego, CA, April 24, 2006, on Fundamentals of Satellite Navigation Systems Using GPS Tutorial.

- <u>Technical Expert Legal Consultant</u> with GNSS Solutions® Ltd, June 2005-Present.
  Technical expert in the areas of communication, navigation, and surveillance systems. Supported various intellectual property disputes, including patent infringement cases, Inter Partes Review (IPR), and patent re-examinations in the areas of:
  - GPS/GNSS antenna and receiver technologies
  - Vehicular and telematics navigation using GPS
  - Location of mobile devices
  - Integrated navigation systems
  - Wireless communication
  - Cellular phone E911 and location based services (LBS) in cellular networks
  - Satellite communications involving satellite antenna and internet technologies
  - Radar detection and speed control in automotive applications
  - Radar detection and location marking using GPS

  These patent cases were in the following venues:
  - US International Trade Commission (ITC) Federal Court.
  - US District Court in California, Texas, Virginia, Ohio, and Idaho.
  - USPTO Inter Partes Review (IPR), Patent Trial and Appeal Board.
  - USPTO Re-examinations.

- <u>Technical Expert Engineering Consultant</u> with GNSS Solutions® Ltd
  - Supported Global Cooling Incorporate of Athens, Ohio in electromagnetic compatibility, interference emissions product development for European CE testing. (July-Aug 2010).
  - Supported Spectracom Corporation for the development of advanced GPS and timing products. (June-Aug 2010)
- <u>Technical Expert Design Consultant</u> for ANTCOM on a Combined Ku/X-band Antenna Array for Land Navigations, Conceptual Design, May, 2005.
- <u>Seminar Instructor</u> for CNS Seminars & Consultants, Ltd. Taught the following:
  - Fundamentals of Antennas, Spectral Systems Incorporated (SSI), Dayton, OH, October 19-20, 2005.
  - Fundamentals of Antennas for CNS Systems, National Aeronautics and Space Administration (NASA), NASA John Glenn Research Center, Cleveland, OH, September 26-28, 2005.
  - Fundamentals of Navigation I, July 28-30, 2003, Florida Air National Guard, Cape Canaveral, FL.
- <u>Seminar Instructor</u> for Navtech GPS Seminars. Taught the following:
  - Pseudolites in Navigation and their Augmentation to GPS/GNSS, ION GNSS 2004 Tutorial, September 20, 2004, Portland, OR.
  - GPS Antenna Fundamentals and Details, ION GNSS 2004 Tutorial, September 20, 2004, Portland, OR.
  - GPS Antenna Fundamentals and Details, U.S. Coast Guard C2CEN, Portsmouth, VA, August 17, 2004.
  - Pseudolites in Navigation and Their Augmentation to GPS/GNSS, ION GPS 2003 Tutorial, September 8, 2003, Portland, OR.
  - Pseudolites in Navigation and Their Augmentation to GPS/GNSS, ION GPS 2002 Tutorial, September 23, 2002, Portland, OR.
- <u>Technical Expert Engineering Consultant</u> for OnStar, Incorporated on new antenna test techniques and small anechoic chamber design, March-August 2001.

Florida Institute of Technology, *Department of Electrical Engineering, Patuxent River, MD*
Graduate Instructor, (7/89-9/93)
- Taught the following graduate level courses at the Patuxent River, Maryland branch campus:
  1. EE 5234 Communication Systems I, and
  2. EE 5235 Communication Systems II. Text: Ziemer R.E., and Tranter W.H., "Principles of Communications, Systems, Modulation, and Noise", John Wiley, 1985.
  3. EE 5233 Satellite Communications; Text: Pratt T., and Bostian C., "Satellite Communications", John Wiley, 1986.
- Developed Comprehensive Exams for the Communications Concentration and graded comprehensive exams for the Linear Systems and Digital Control Systems Concentrations.

The Pennsylvania State University, *Department of Electrical Engineering, University Park, PA*
Teachers Assistant, (12/82-5/83)
- Graded homework and projects in an EE 438 Antenna Engineering course. Text: Stutzman W.L., and Thiele G.A., "Antenna Theory and Design", John Wiley, 1981.
- Laboratory Assistant in an EE 166 Electrical Instrumentation Laboratory. Answered students questions during laboratory, corrected their laboratory notebooks, and evaluated student's design projects.

FULL-TIME PROFESSIONAL EXPERIENCE

The following is a summary of my full-time professional experience prior to my full-time position at Ohio University.

Electronics Engineer, Naval Air Warfare Center, Patuxent River, MD (6/83-9/98)

Research Engineer (1994 – 1998), while at Ohio University
- Performed Research Investigating the Integration of Airport Pseudolites into the Local Area Augmentation System for increased availability. Research was sponsored by the FAA Satellite Program Office and performed at Ohio University.
- Developed unique Multipath Limiting Antennas for Pseudolite Applications,
- Developed and Tested off-frequency and on-frequency Pseudolite Architectures in Laboratory, Ground, and Flight Environments,
- Developed unique Pulsing and Automatic Gain Control Blanking Techniques to minimize Electromagnetic Interference with GPS,
- Integrated Pseudolite in a Differential Fashion for sub-meter Accuracy Necessary for Precision Approach.

Head, Communications, Navigation, and Identification Laboratory (1989 - 1994)
- Program Manager for the development of the Air Combat Environment Test and Evaluation Facility (ACETEF) Communications, Navigation, and Identification (CNI) Laboratory. The CNI Laboratory was a new facility that was started in 1989. This position involves the design and development of several high fidelity friendly, foreign, and threat CNI simulators for the Research, Developmental, Test and Evaluation (RDT&E) of friendly CNI systems and Electronic Warfare (EW) systems. The position involved:
- Recruiting and Supervision of 6 Civil Servant and 10-15 Contractor employees.
- Management of $12M in simulator development during tenure. Contracting Officer Technical Representative (COTR) on all CNI Laboratory contracts.
- GPS & Auxiliary Navigation Simulator Selection, Procurement, and Integration ($5M).

- Communications Environment Simulator (CES). The CES was developed for high-density threat CNI simulation; it was used primarily for the RDT&E of the ES-3A Multi-static Signal Processor and the EA-6B ALQ-99 EW System. The CES was developed under the Small Business Innovative Research (SBIR) Program. A full-scale CES was developed under a Phase III SBIR effort.
- Data Link Simulation: Developed/Procured simulation assets for various tactical, surveillance, and satellite voice and data links (Link 11, 4A, 16, OTCIXS/DAMA, TRAP/TADIX B, TIBS, TRIX, ANDVT, HAVEQUICK, and SINCGARS).
- Development of Communications/Identification Test Tool for RDT&E of CNI systems. This test tool was a VXI based test system with simulation, RF network, and data extraction components.
- Lead Navy CNI Engineer for the "Prelude Charlie" Project conducted between the U.S. Department of Defense and the United Kingdom Ministry of Defense, 1992.

Communications Engineer (1986 to 1989)

- Primary Design Engineer for the Navy Chainsaw Communication Link, a direct-sequence spread-spectrum system used to demonstrate a low rate digital data anti-jam capability in the VHF/UHF band. This project was an outgrowth of my thesis and funded from the Navy Science Advisory Program.
- Lead Engineer for the development of the Joint Tactical Information Distribution System (JTIDS) Laboratory Test System (JLTS), a VME based test system that measures the anti-jam (AJ) Margin of the JTIDS terminal as installed in a full-scale aircraft. This system was used primarily for E-2C and F-14D Aircraft AJ performance tests during the Developmental Testing (Phase II).
- Lead Program Engineer for the Naval Air Test Center on the High-Frequency Anti-Jam/ Link 11 Improvement Program.

Identification Friend or Foe Engineer (1983 to 1986)

- Project Engineer for measuring the electromagnetic compatibility (EMC) in the laboratory between the JTIDS and various Identification Friend or Foe (IFF), (i.e., secondary radar) Transponder (APX-72 & 100) and Interrogator (APX-76) Systems.
- Project Engineer for measuring the EMC in the laboratory between the Mark XV Combat Identification System (CIS) and several civilian Air Traffic Control Radar Beaconing System (ATCRABS) transponders and a civilian Distance Measuring Equipment (DME) device.
- Responsible for the development of the Navy IFF Test and Evaluation (NIFFTE) capabilities at the Naval Air Test Center, which included the establishment of the NIFFTE Laboratory.

BOOK PUBLICATIONS

Grewal, M., Andrews, A., Bartone, C., "Global Navigation Satellite Systems, Inertial Navigation, and Integration, 4th Edition, ISBN: ISBN: 978-1-119-54783-9, 2020, John Wiley & Sons, January 2020. https://www.wiley.com/en-us/Global+Navigation+Satellite+Systems%2C+Inertial+Navigation%2C+and+Integration%2C+4th+Edition-p-9781119547839

Grewal, M., Andrews, A., Bartone, C., "Global Navigation Satellite Systems, Inertial Navigation, and Integration, 3rd Edition, ISBN: 978-1-118-44700-0, 2013, John Wiley & Sons, March 2013. http://www.wiley.com/WileyCDA/WileyTitle/productCd-111844700X.html

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For the following list of refereed journals*, italic font* for author indicate advised student.

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2. *Zilun Gong, Z.*, Bartone, C., Yang, F., and Yao, J., "High-efficiency Water-loaded Microwave Antenna in Ultra-high Frequency Band", Applied Physics Letters, 112, 113501 (2018); https://doi.org/10.1063/1.5023237, Volume 112, Issue 11, Published Online: March 2018
3. *Vogelhuber, T., Fleming, G., Moore, L., Haggerty, M., Hanlon, P.,* Bartone, C., "Prize-Winning Ohio University Students Present Their Work on an Antenna for Body Area Network", *IEEE Antenna and Propagation Magazine*, Vol. 59, Issue: 1, pp.116-126, DOI: 10.1109/MAP.2016.2629188, February 2017.
4. *Dickman, J.*, Zhen, Z., Bartone, C., "Carrier Phase Multipath Error Characterization and Reduction in Single Aircraft Relative Navigation", *GPS Solutions Journal*, Springer-Verlag,. Volume 14, Number 2 / March, 2010.
5. *Dickman, J.*, Bartone, C., "Smoothing GPS carrier phase double differences using inertial measurements for high performance applications", *GPS Solutions Journal*, Springer-Verlag, Published online: 22 August 2007, print form, Vol. 12, No. 2, March 2008, pp.119-133, DOI 10.1007/s10291-007-0072-x.
6. *Zhang, Y.*, Bartone, C., "A Real-time MET-based Hopfield Troposphere Correction with Integrity Bound for Long Baseline DGPS", *GPS Solutions Journal*, Springer-Verlag, available on line and in printed version, Vol. 9, No. 4, Nov 2005, pp. 256-272. DOI 10.1007/s10291-005-0132-z.
7. *Zhang, Y.*, Bartone, C., "A General Concept and Algorithm of Projected DGPS for High Accuracy DGPS Based Systems", *NAVIGATION Journal of The Institute of Navigation,* Winter 2004-2005 Issue, Vol. 51, No. 4, pp.293-309.
8. "Verification and Mitigation of the Power-Induced Measurement Errors for Airport Pseudolites in LAAS", co-author: *Kiran, S.*, *GPS Solutions Journal*, Springer-Verlag, Vol. 7, No. 4, March 2004, pp. 241-252, DOI 10.1007/s10291-003-0076-0.
9. *Kiran, S.*, Bartone, C., "Flight-Test Results of an Integrated Wideband-Only Airport Pseudolite For The Category II/III Local Area Augmentation System", *Institute of Electrical and Electronics Engineers, Transactions on Aerospace and Electronics Systems*, Vol. 40, No. 1, January 2004, pp. 734-741, ISSN 0018-9251.
10. Thornberg, B., Thornberg, D., DiBenedetto, M., Braasch, M., Van Graas, F., Bartone, C., "The LAAS Integrated Multipath Limiting Antenna (IMLA)", *NAVIGATION Journal, of The Institute of Navigation, Vol. 50, No. 2, Summer 2003,* pp. 117-130.
11. Slivinsky, S., Nesbit, C., Bartone, C., Phillips, R., Roxrode, R., Development and Demonstration of a Ballistic Missile Range Safety Technology System", *NAVIGATION Journal of The Institute of Navigation, Vol. 49, No.2, Summer 2002*, pp. 91-102.
12. *Kiran, S.*, Bartone, C., "Flight-Test Results of an Integrated Wideband-Only Airport Pseudolite for the Category II/III Local Area Augmentation System", *NAVIGATION Journal of The, Institute of Navigation, Vol. 48, No.1, Spring 2001,* pp. 35-48.
13. Bartone, C., Van Graas, F., "Airport Pseudolite for Local Area Augmentation", *Institute of Electrical and Electronics Engineers, Transactions on Aerospace and Electronics Systems*, Vol. 36, No. 1, January 2000, pp. 278-286, ISSN 0018-9251.

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- Bartone, C.G., *Milluzzi, A.,* System and Method for Detection and Reporting of Targets with Data Links, US Patent No. 11,531,099 B2, Issue Date of Patent: Dec. 20, 2022.
- Bartone, C.G., *Schopis, J.L.,* Single-element Patch Antenna with Pattern Control, US Patent No. 10,770,794, Issue Date of Patent: Sep. 8, 2020.
- Bartone, C. G., *Drummond, C., Milluzzi, A*., System and Method for Detection and Reporting of Targets with Data Links, PCT application serial number: PCT/US2018/014877, PCT publication number: WO/2018/136947, July 26, 2018
- Bartone, C. A Terrestrial Positioning and Timing System (TPTS)-US Patent No. 9,851,429, Issue date: December 26, 2017
- Bartone, C., A Terrestrial Positioning and Timing System (TPTS)-US. Patent No. US 9,429,639 B2, Issued date August 30, 2016.
- Bartone, C.G., *Schopis, J.L.,* Single Element Antenna with Beam Control, Pub. No.: WO/2016/190907, Publication Date: Dec. 1, 2016, International Application No.: PCT/US2016/014128, International Filing Date: Jan. 20, 2016.
- Bartone, C.G., *Schopis, J.L.,* Single Element Antenna with Beam Control, Patent Application, , Publication No.: US2018/0269579, Pub. Date: Sep. 20, 2018.
- Bartone, C.G., *Schopis, J.L.,* Single Element Antenna with Beam Control, Patent Application, Application No.: 15/544,060
- Bartone, C.G., *Schopis, J.L.,* Single Element Antenna with Beam Control, Provisional Patent Application, 62/105,351 filed on Jan. 20, 2015, and provisional application No. 62/181,551 filed on Jun. 18, 2015.
- Bartone, C. A Terrestrial Positioning and Timing System (TPTS)-PCT. Utility Patent App. 2481-007. Pub. No.: WO/2013/165851. Publication Date: 07.11.2013, International Application No.: PCT/US2013/038486, International Filing Date: 26.04.2013.
- Bartone, C. A Terrestrial Positioning and Timing System (TPTS)-US. US 2013/0293421 Al, Nov. 7, 2013.
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- Bartone, C. A Terrestrial Positioning and Timing System (TPTS). Prov. App. OU-12020P.
- Bartone, C., Stansell, T. (listed as Stanwell, T.) A Multi-Circular Ring Controlled Reception Pattern Antenna for Robust GNSS, WO2013043741 A1.
- Bartone, C., *Zhang, Y.,* Real-time code multipath mitigation in the frequency domain using FDsmooth^{TM} for Global Navigation Satellite Systems, US 20050216210 A1
- Bartone, C., *Zhang, Y.,* Real-time WaveSmooth^{TM} error mitigation Global Navigation Satellite Systems, US 20050212696 A1

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2. Bartone, C., "Antenna", The World Book Encyclopedia, World Book, Inc., invited article. 2006, pp. 543-544.

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4. Slivinsky, S., McWhorter, M., Samson, J., Bartone, C., Schofield, Lt. Col. R, "Demonstration of the Ballistic Missile Range Safety Technology (BMRST) Mobile GPS-Based System for the QRLV-2 Launch", *Institute of Electrical and Electronics Engineers Aerospace Conference,* March 9-14, 2003, pp. 1-15, IEEE Catalog Number: 03TH8652C ISBN: 0-7803-7652-8.

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3. Bartone, C., Horowitz, A., "REACHING OUT! ION Outreach Helps Young Engineers Reach for the Sky", ION Newsletter, Volume 16, Number 4, Winter 2006-2007, pp. 4-5, 22.

4. Bartone, C., "Expert Advice: What's New: ION GNSS 2006", no co-author, GPS World Magazine, August 2006, pp. 12, also on-line at: http://www.gpsworld.com/gpsworld/article/articleDetail.jsp?id=360950.

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6. Bartone, C., "Making the Virtual (Museum) Real", ION Newsletter, Volume 16, Number 2, Summer 2006, pp 3.

7. Stephens, C., Bartone, C., "REACHING OUT! ION, Smithsonian Join Forces in Time & Navigation Exhibit", ION Newsletter, Volume 16, Number 1, Spring 2006, pp. 5, 19.

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3. *Lele, K*., Bartone, Chris, "Circularly Periodic Progressive Multi-Band High Impedance Surface Integrated with a Wideband Spiral Antenna for GNSS Applications," Proceedings of the 2024 International Technical Meeting of The Institute of Navigation, Long Beach, California, January 2024, pp. 987-997. https://doi.org/10.33012/2024.19552 (refereed)

4. *Song, S., Qin, X., Brengman, J.,* Bartone, C., Liu, J., "Holistic FOD detection via surface map and yolo networks", 2023 IEEE 33rd International Workshop on Machine Learning for Signal Processing (MLSP), September 17-20, 2023, Rome, Italy, IEEE Catalog Number: CFP23NNS-ART, ISBN: 978-8-3503-2411-2/23. (refereed)

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8. *Hahn, E.,* Gunawardena, S., Bartone, C., "Live-Sky GNSS Signal Processing Using a Dual-Polarized Antenna Array for Multipath Mitigation," Proceedings of the 2023 International Technical Meeting of The Institute of Navigation, Long Beach, California, January 2023, pp. 286-302. https://doi.org/10.33012/2023.18624

9. *Hahn, E.,* Gunawardena, S., Bartone, C., "GNSS Antenna Array Calibration for Spatial and Polarization Domain Based Multipath Mitigation", in *Proceedings of the 2022 International Technical Meeting of The Institute of Navigation*, Long Beach, CA, January 25-27, 2022, pp. 96-111. https://doi.org/10.33012/2022.18229

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13. Uijt de Haag, M., Bartone, C., Braasch, M., Flight-Test Evaluation of Small Form-Factor LiDAR and Radar Sensors for sUAS Detect-and-Avoid Applications, IEEE Digital Avionics Systems Conference (DASC), Sacramento, CA, September 25-29, 2016. Best Paper Award in Session.

14. Bartone, C., *Kohli,, M, Moore, L.,* "An e-Textile Antenna for Flexible Body Area Network", IEEE Antenna and Propagation / International Union of Radio Science (AP-S/URSI) Symposium, Fajardo, Puerto Rico, June 26-July 1, 2016.

15. *Kohli,, M.,* Bartone, C., "An e-Textile Edge-fed Spiral Antenna for Flexible Wearable Applications", IEEE Antenna and Propagation / International Union of Radio Science (AP-S/URSI) Symposium, Fajardo, Puerto Rico, June 26-July 1, 2016.

16. Bartone, C., "Single-aperture Patch Antenna with Pattern Control," IEEE *Proceedings of the IEEE/ION Position, Location, And Navigation Symposium (PLANS)*, Savanna, GA April 12-14, 2016, Peer reviewed session.

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18. Bartone, C., *Schopis, J.*, "Single-element Patch Antenna with Pattern Control," *Proceedings of the 28th International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS+ 2015)*, Tampa, Florida, September 2015, pp. 3272-3283. Peer reviewed session.

19. Bartone, C., "A Terrestrial Positioning and Timing System (TPTS)", *Institute of Navigation (ION)/Institute of Electrical and Electronics Engineers (IEEE), Position Location And Navigation Symposium (PLANS),* April 24-26, 2012, Myrtle Beach, SC.

20. Bartone, C., Stansell, T., "A Multi-Circular Ring CRPA for Robust GNSS Performance in an Interference and Multipath Environment", *Institute of Navigation – Global Navigation Satellite System,* September 20-23, 2011, Portland, Oregon.

21. Bartone, C., Stansell, T., "Antenna Configurations for a C-Band GNSS", *Institute of Navigation – Global Navigation Satellite System,* September 21-24, 2010, Portland, Oregon. (Best Presentation Award - Military GPS & Host Applications Integrations for Robust PNT Solutions)

22. Diggle, D.W., Bartone, C.G., Narins, M.J., "Loran Performance in a GPS Non-Precision Approach Environment", International Loran Association 37, London, England, October 28-30, 2008, pp. 1-22.

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24. Bartone, C., Narins, M., Pelgrum, W., *Chen, L.*, "H-field Antenna Considerations for *eLoran* Aviation Applications", IEEE PLANS, April 6-8, 2008, Monterey, CA, pp. 810-823.

25. *Zhang, Y.*, Bartone, C., "Single-site Carrier Phase Based Troposphere Integrity Monitoring",, *Institute of Navigation – National Technical Meeting,* January 18-20, 2006, pp. 530-542.

26. *Zhang, Y.*, Bartone, C., "A Prototype Long Baseline DGPS Concept Demonstration for NDGPS High Performance Land Applications", *Institute of Navigation – Global Navigation Satellite System Conference,* September 13-16, 2005, pp. 362-375.

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30. *Zhang, Y.*, Bartone, C., "Comparison of Real-time Troposphere Correction Techniques for High Performance DGPS Application", *Institute of Navigation – National Technical Meeting,* January 24-26, 2005, pp. 666-684.

31. Bartone, C., *Zhang, Y.*, "A Real-Time Hybrid-Domain WaveSmooth Code Processing Using Wavelets", *Institute of Navigation – Global Navigation Satellite System Conference 2004*, September 21-24, 2004, pp. 436-446.

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38. *Kiran, S.*, Bartone, C., "A Viable Airport Pseudolite Architecture for LAAS", *Institute of Navigation - Global Positioning System Conference 2003*, September 9-12, 2003, pp. 2326-2336.

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49. Bartone, C., *Kiran, S.*, "Development of a Wideband Airport Pseudolite for GPS Augmentation", *Institute of Navigation National Technical Meeting 2000*, January 25-28, 2000, pp. 50-57.

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52. Bartone, C., Van Graas, F., "Airport Pseudolite for Precision Approach Applications", *Institute of Navigation - Global Positioning System 1997*, September 16-19, 1997, pp. 1841-1850.
53. Bartone, C., "Advanced Pseudolite for Dual-Use Precision Approach Applications", no co-author, *Institute of Navigation - Global Positioning System 1996*, September 17-20, 1996, pp. 791-797. - Best Paper Awarded in Precision Approach Session.
54. Bartone, C., Ventrone, F., Green, G., Jr., "Near Real-Time GPS Simulator Integrated with the Manned Flight Simulator", *Institute of Navigation - Global Positioning System 1994*, September 20-23, 1994.

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1. *Test Procedures for a Doppler Very High Frequency Omnidirectional Range (DVOR) Antenna*, Technical Memorandum OU/AEC TM15-06/00020/18-03, in accordance with the deliverable schedule provided in Modification 3 to Technical Task Directive 18, Contract DTFAWA-10-D-00020. (co-author)
2. *Advanced Navigation Terminal System Using The Global Positioning System*, Final Report, OU/AEC 03-13TM-F29601-00-C-0212, Ohio University, August 2003. Published by AFRL as AFRL-VS-TR-2003-1133, dtd 07-25-03.
3. *Challenges In Acceptance/Licensing Of A Mobile Ballistic Missile Range Safety Technology (BMRST) System,* Final Report, 30 November 2002, (co-authors: Lt. Col. R. Schofield, R. Ostroff). Published by AFRL as AFRL-VS-TR-2001-1127.
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6. *Measured Noise Performance of a Direct-Sequence Spread-Spectrum System and a Comparison of Single-vice Dual-Channel Delay-Lock Loops*, The Naval Postgraduate School, MSEE Thesis, September 1987.
7. *Joint Tactical Information Distribution System/Identification Friend or Foe Interference Laboratory Testing on the AN/APX-100, MM/UPX-709, AN/APX-72 Transponders and RT-988 (AN/APX-76) IFF Interrogator*, Naval Air Test Center, Secret Technical Report SY-S37R-86, September 10, 1987.
8. *Evaluation of the AN/APX-72 IFF Transponder System as Installed in the P-3 Aircraft*, Naval Air Test Center, Confidential Technical report FW-C6R-87.
9. *Implementation of the Mark XII AN/APX-76A/B IFF Interrogator System into Various Navy Airborne Platforms*, Naval Air Test Center, Confidential Technical Memorandum TM 86-C38-SY, February 19, 1997.
10. *Mark XV Interference Laboratory Testing*, Naval Air Test Center, Secret First Interim Report SYS49R-86, Message dated 221547Z August 1986.

11. *F/A-18A Joint Tactical Information Distribution System/Identification Friend or Foe Antenna Isolation Measurements*, Naval Air Test Center, Unclassified Technical Report, SY-86R-85, March 13, 1986.
12. *Joint Tactical Information Distribution System/Identification Friend or Foe Interference Laboratory Testing*, Naval Air Test Center, Secret Technical Report, SYS64-85, February 26, 1986.
13. *SH-60B AN/APX-76 IFF Interrogator Antenna Patterns*, Naval Air Test Center, Unclassified Letter Report, Ser ltr SY81/453, December 13, 1984.
14. *Mark XV Combat Identification System X-Band/L-Band Prototype Transponder Antenna Evaluation*, Naval Air Test Center, Unclassified Report of Test Results, SY-9R-84, October 9, 1984.

PROFESSIONAL MEMBERSHIPS

- The Institute of Navigation (ION), Fellow, membership number: 010082
- The Institute of Electrical and Electronics Engineers (IEEE), Senior Member, membership number: 40293822.
- Association of Old Crows, membership number: 8335904.
- American Institute of Aeronautics and Astronautics (AIAA), membership number: 1241753.

OTHER PROFESSIONAL ACTIVITIES

Select Presentation:

1. Bird Strike Risk Mitigation Using Avian Radar and ADS-B, IEEE Integrated Navigation and Surveillance Conference, Washington, DC April 10-12, 2018.
2. GNSS Error Characterization, Analysis, and Mitigation, September 25, 2017, Portland, OR GNSS Solutions® Ltd seminar, international.
3. Bartone, C., "GNSS Antennas for Future GNSS Signals and Services", IEEE International Microwave Symposium, WFG-1 GNSS Frontends, Antennas, and Services Workshop, Honolulu, HI, June 9, 2017.
4. Bartone, C., "Single-aperture Patch Antenna with Pattern Control for GPS", IEEE International Microwave Symposium, WFG-1 GNSS Frontends, Antennas, and Services Workshop, Honolulu, HI, June 9, 2017.
5. Bartone, C., Braasch, M., Satellite Navigation Augmentation to Improve Navigation Technology (SAINT) Development, SAINT meeting, Ft. Walton Beach, FL, April 20, 2017.
6. Single-aperture Patch Antenna with Pattern Control for GPS, ION Dayton Section, November 10, 2016.
7. Bartone, C., "Flight-Test Evaluation of Small Form-Factor LiDAR and Radar Sensors for sUAS Detect-and-Avoid Applications", NASA Glenn Research Center, Communications and Intelligent Systems Division, Distinguished Technical Lecture Series, October 13, 2016, Cleveland, OH.
8. Fundamentals of GNSS I & II, September 12, 2016, Portland, OR GNSS Solutions® Ltd seminar, international.
9. Bartone, C., *Kohli,, M, Moore, L.,* "An e-Textile Antenna for Flexible Body Area Network", IEEE Antenna and Propagation / International Union of Radio Science (AP-S/URSI) Symposium, Fajardo, Puerto Rico, June 26-July 1, 2016.
10. Bartone, C., "Single-aperture Patch Antenna with Pattern Control," IEEE *Proceedings of the IEEE/ION Position, Location, And Navigation Symposium (PLANS)*, Savanna, GA April 13, 2016, Peer reviewed session.

11. Bartone, C., *Schopis, J.,* "Single-element Patch Antenna with Pattern Control", *Institute of Navigation – Global Navigation Satellite System+ 2015,* September 20-23, 2015, Tampa, FL, September 14-18, 2015.
12. Bartone, C., *Schopis, J.,* "Patch Antenna Asymmetry Performance Considerations & Mitigation", *Institute of Navigation – Global Navigation Satellite System+ 2015,* September 20-23, 2015, Tampa, FL, September 14-18, 2015.
13. Fundamentals of GNSS I & II, September 14, 2015, Tampa, FL GNSS Solutions® Ltd seminar, international.
14. Antenna Research at Ohio University, FAA Joint University Program, MIT, Cambridge, MA, October 28, 2014.
15. Fundamentals of GNSS I & II, September 8, 2014, Tampa, FL GNSS Solutions® Ltd seminar, international.
16. Fundamentals of GNSS I, II & III, September 16-17, 2013, Nashville, TN, GNSS Solutions® Ltd seminar, international.
17. Fundamentals of GNSS I, II & III, July 22-24, 2014, Holloman AFB, NM, GNSS Solutions® Ltd seminar.
18. Fundamentals of GNSS I, II & III, September 16-17, 2013, Nashville, TN, GNSS Solutions® Ltd seminar, international.
19. Fundamentals of GNSS I, II & III, September 17-18, 2012, Nashville, TN, GNSS Solutions® Ltd seminar, international.
20. A Terrestrial Positioning and Timing System (TPTS), *Institute of Navigation (ION)/Institute of Electrical and Electronics Engineers (IEEE), Position Location And Navigation Symposium (PLANS),* April 24-26, 2012, Myrtle Beach, SC.
21. GPS Error Characterization, Mitigation, and Analysis, IEEE/ION PLANS 2012, April 23, 2012, Myrtle Beach, SC., GNSS Solutions® seminar, international.
22. A Multi-Circular Ring CRPA for Robust GNSS Performance in an Interference and Multipath Environment", *Institute of Navigation – Global Navigation Satellite System,* September 20-23, 2011, Portland, Oregon.
23. Fundamentals of GNSS I & II, September 19, 2011, Portland, OR, GNSS Solutions® seminar, international.
24. Fundamentals of Antennas for Communications, Navigation and Surveillance (CNS) Systems, December 6-8, 2010, Singapore, EEM Advancement Centre Pte Ltd and GNSS Solutions®, seminar, international.
25. Fundamentals of GNSS, December 9-10, 2010, Singapore, EEM Advancement Centre Pte Ltd and GNSS Solutions®, seminar, international.
26. Antenna Configurations for a C-Band GNSS, ION GNSS 2010, September 21-24, 2010, Portland, Oregon. (Best Presentation Award)
27. Fundamentals of GNSS I & II, September 20, 2010, Portland, OR, GNSS Solutions® seminar, international.
28. GNSS Antennas I & II (first of three hours), September 21, 2010, Portland, OR, GNSS Solutions® seminar, international.
29. GPS Error Characterization, Mitigation, and Analysis, IEEE/ION PLANS, May 3, 2010, Palm Springs/Indian Wells, CA, GNSS Solutions® seminar, international.
30. Fundamentals of GNSS Tutorial, IEEE MILCOM Conference, Boston, MA, October 20, 2009, GNSS Solutions® seminar, international.

Graduate Students Thesis/Dissertation Committees Served (other than Head of Committee):

I have served on a wide variety of MSEE and Ph.D. committees in the general areas of electronic navigation, communications, electromagnetics, and controls.

1. Pike, Elizabeth, Assisted GNSS Using the Doppler Frequency Track Method, Ph.D., Ohio University, 2023.
2. Belzer, Jessica, Detection of GPS C/A Code Self Interference: An Evaluation of Monitors, Ohio University, Ph.D., 2021
3. Capucine Amielh, GNSS Multipath for Aircraft Surface Navigation, University of Toulouse, France, May 20, 2021.
4. Akanksha Rohit, "Flexible Sensors and Smart Patches for Multimodal Sensing", Ph.D., Ohio University, 2021.
5. Daniel Carbaugh, "Novel Organic Resists for Micro-patterning and Device Engineering", Ph.D., Ohio University, 2019.
6. Pengfei, Duan, "Predictive Alerting for Improved Aircraft State Awareness", Ph.D., Ohio University, 2018.
7. Russell Gilabert, "Location Corrections through Differential Networks, (LOCDIN), MSEE, Ohio University, 2018.
8. Patrick Hanlon, "Optimization and Characterization of an Inkjet Process for Printed Electronics", MSEE, Ohio University, 2018.
9. Mohammed Aimahamdy, "New Methods to Reduce Turbo Decoding Latency and the Complexity of Bit Insertion Techniques", Ph.D., Ohio University, 2017.
10. Akanksha Rohit, "Optimization and Characterization of a Capillary Contact Micro-Plotter for Printed Electronic Devices", MSEE, Ohio University, 2017.
11. Antoine BLAIS, "A Dual-frequency Direct Sample Software Defined Radio for Galileo used in Civil Aviation, École nationale de l'aviation civile (ENAC), Toulouse, France, (member of Ph.D. committee). September 2014, June 2015.
12. Kai-Jen Cheng, "Compression of Hyperspectral Images", Ph.D., Ohio University, 2013.
13. Nikhil Tej Gandhi, "Automatic Dependent Surveillance-Broadcast Enabled, Wake Vortex Mitigation using Cockpit Display", MSEE, Ohio University, 2012.
14. Qian Zhang, "Comparing Duplexing, Multiplexing, and Multiple Access Techniques in Ad Hoc Networks", Ph.D., Ohio University, Oct 2012.
15. Gabriele Giorgi, "GNSS Carrier Phase-based Attitude Determination Estimation and Applications", Ph.D., Delft University of Technology, in Delft, The Netherlands, graduated December 2011. (member of Ph.D committee)
16. Prasada Reddy Kurri, "Root Mean Square-Delay Spread Characteristics for Outdoor to Indoor Wireless Channels in the 5 GHz Band", MSEE, Ohio University, June 2011.
17. Mousmi Samudra, "Comparison of Indoor Ray Tracing and Measurement Results for 5 GHz Band Wireless Channels", MSEE, Ohio University, November 2010.
18. Simon, Jerry N. A "Systems Approach to the Formulation of Unmanned Air Vehicle Detect, Sense, and Avoid Performance Requirements", MSEE, Ohio University, November 2009,
19. Kai-Jen Cheng, "Comparison and Analysis of Stopping Rules for Iterative Decoding of Turbo Codes", School of EECS, Ohio University, June 2008.
20. Guruprasad Pai, "5 GHz Wireless Channel Characteristics on The Ohio University Campus", MSEE Thesis, School of EECS, Ohio University, September 2007.
21. BeiBei Whang, "Improved Interference Suppression Techniques In Single And Multi-Rate Direct Sequence Spread Spectrum Systems", Ph.D. Dissertation, School of EECS, Ohio University, March

2007.

22. Jidong Huang, "High-Integrity Carrier Phase Batch Processor for Differential Satellite Positioning", Ph.D. dissertation, School of EECS, Ohio University, November 2007.
23. Ravikanth Ekanthalingam, "Amplitude Estimation of Minimum Shift Keying Co-Channel Interference", MSEE Thesis, School of EECS, Ohio University, November 2004.
24. Narender R. Mannem, "Adaptive Data Rate Multicarrier Direct Sequence Spread Spectrum in Rayleigh Fading Channel", MSEE Thesis, School of EECS, Ohio University, November 2004.
25. Kamalakar Ganti, "Interleaver Design for the Modified Circular Simplex Turbo Block Coded Modulator", MSEE Thesis, School of EECS, Ohio University, November 2004.
26. Vignesh Krishnan, "Analysis of Error Propagation in Differential Satellite Based Positioning Systems", MSEE Thesis, School of EECS, Ohio University, July 2004.
27. Minish Lad, "Characterization of Atmospheric Noise and Precipitation Static in the Long Range Navigation (Loran-C) Band for Aircraft", MSEE Thesis, School of EECS, Ohio University, July 2004.
28. Lukas Marti, "Global Positioning System Interference and Satellite Anomalous Event Monitor", Ph.D. Dissertation, School of EECS, Ohio University, July 2004.
29. Hongxiang Li, "Performance of Multi-tone Direct Sequence Spread Spectrum in the Presence of Imperfect Carrier Synchronization", MSEE Thesis, School of EECS, Ohio University, May 2004.
30. Raghavendra Achanta, "Detection and Correction of Global Positioning System Carrier Phase Measurement Anomalies", MSEE Thesis, School of EECS, Ohio University, May 2004.
31. Joshua Neville, "Direct-Sequence Spread Spectrum Designs for Future Aviation Data Links Using Special Overlay", MSEE Thesis, School of EECS, Ohio University, March 2004.
32. Rigoberto Chinchilla, ""Interleaver design for the Circular Simplex Turbo Block Coded Modulator"", Ph.D. Dissertation, School of EECS, Ohio University, October 2003.
33. Arjun Mendu, "A New Simulation of Multi-State Fading Channels", MSEE Thesis, School of EECS, Ohio University, May 2003.
34. Francis Fofie, "Model Prediction of the Effect of Ameliorating Cosmetics on the performance of Airport Surveillance Radar and Air Traffic Control Radar Beacon Systems", MSEE, School of EECS, Ohio University, May 2003.
35. Jing Pang, "Direct Global Positioning System Programming Code Acquisition Field Programmable Gate Arrays Prototyping", Ph.D. Dissertation, School of EECS, Ohio University, May 2003.
36. Kevin Dutton, "Theory and Performance of an X-Band Radio Frequency Phase Differencing Position Tracking System", Ph.D. Dissertation, School of EECS, Ohio University, January 2003.
37. Andrey Soloviev, "Integrated Global Positioning/Inertial Navigation Systems by Frequency Domain Implementation of Inertial Computational Procedures", Ph. D. Dissertation, Ohio University, March 2002.
38. John Rodenbaugh, "Optimum Detection of Differentially-Encoded M-ary Phase Shift Keying in a Dispersive Aeronautical Channel", MSEE Thesis, Ohio University, May 2002.
39. Virat Deepak, "Performance of Multi-tone Direct Sequence Spread Spectrum in the Presence of Narrowband and Partial Band Interference", MSEE Thesis, Ohio University, May 2002.
40. Mohammed Alshareleh, "A Hardware Implementation of the Imbedded Reference Signal Algorithm System Using a Digital Signal Processing Board", Ohio University, April 2002.
41. Jacob Campbell, "Characteristic of a Real-Tim Digital Terrain Database Integrity Monitor for a Synthetic Vision System", MSEE Thesis, School of EECS, Ohio University, October 2001.
42. Aleksey Volodin, "Theoretical Limits of Block Codes", MSEE Thesis, School of EECS, Ohio University, October 2001.

43. Sanjeev Gunawardena, "Development of a Transform-Domain Instrumentation Global Positioning System Receiver For Signal Quality And Anomalous-Event Monitoring", Ph.D. Committee, School of EECS, Ohio University, 2001-2007.
44. Rouslan Ignatov, "Gain Scheduling via Control Signal Interpolation: Ball and Beam Example", MSEE Thesis, School of EECS, Ohio University, September 2001.
45. Joe Kelly, "Fading Multipath Bias Errors in Global Positioning System Receiver Tracking Loops", MSEE Thesis, School of EECS, Ohio University, May 2001.
46. Lucas Marti, "Integration of the Local Area Augmentation System and Inertial Navigation System for Aircraft Surface Movement Guidance", MSEE Thesis, School of EECS, Ohio University, August 2000.
47. Yun Yan, "Turbo Codes", MSEE Thesis, School of EECS, Ohio University, August 1999.
48. Andrew, Steven Paul, "Tools for the Simulation and Analysis of Aerodynamic Models", MSEE Thesis, School of EECS, Ohio University, July 1, 1999.
49. Lee, Shane-Woei, "A Carrier Phase Only Processing Technique for Differential Satellite-based Positioning Systems" Ph.D. Dissertation, School of Electrical Engineering and Computer Science, Ohio University, June 22, 1999.

Research Projects Directed (student and/or non-PI):

1. Broadband e-textile flexible antennas for wearable applications, Ohio University, Sept 2014-Present.
2. Low-cost radars for Unmanned Aircraft Systems (UAS) Detect and Avoid Applications, Ohio University, Nov 2015-2018.
3. Development of A New Class of Geogrids for Wireless Monitoring of Transportation Infrastructure, using real-time sensors RFID, Ohio University, 2015-2017.
4. Body Area Network using Bluetooth. IEEE Antenna Propagation Society Student Design Competition 2015. Selected as one of 3 finalists (out of 27 international teams), invited to IEEE AP-S Conference, finished 2nd July 2015. See: https://www.youtube.com/watch?v=MWnvpbdCOLQ and https://www.ohio.edu/engineering/news/news-story.cfm?newsItem=2265A285-5056-A81E-8D300A2B38B98610 and http://www.ieeeaps.org/awards/2015-ap-s-student-design-contest-winners
5. Dual-frequency GNSS Antenna Design Using Computational Electromagnetic Models:
    a. Luyi Chen, MSEE, "Dual Frequency Patch Antenna Design for Global Navigation Satellite System", Ohio University, graduated June 2007.
6. Navigation Sensor and Integration:
    a. Ravi Varma Komarabathuni, MSEE, "Performance Assessment of a 77 GHz Automotive Radar for Various Obstacle Avoidance Applications", Ohio University, graduated Spring 2010-2011.
    b. Kiran Kumar, "Intelligent Ground Vehicle Control using the Global Positioning Systems" graduation planned Fall 2013.
    c. Sumit Bhattacharya, Ph.D.EE, "A GPS-based Augmentation Navigation System Augmented with Multi-Vision Sensors", current Ph.D. student.
    d. Sidharth Nair, MSEE, "A Multiple Antenna Global Positioning System Configuration For Enhanced Performance", Ohio University, graduated June 2004.
7. Differential GNSS:
    a. Sumit Bhattacharya, MSEE, "A Real-time Bi-directional Differential Global Positioning System Data Link over Internet Protocol", Ohio University, graduated March 2005.
8. Local Area Augmentation System using GPS supporting pseudolite integration into LAAS for FAA: Performed research in the area of airport pseudolites in support of the FAA LAAS whereby

approximately 1/3 of FAA LAAS budget from 1998 to 2003 was for pseudolite development. Supported Principle Investigator Frank van Graas. I had directed one Ph.D. student (Sai Kiran), who graduated in November 2003, and one MSEE student (Jeff Dickman) who graduated November 2001, related to this work. Also, I have led the antenna work with the Ohio State University under this contract for antenna patterns in their compact antenna range and on the development of electromagnetic fence technology for multipath mitigation, which produced one conference paper by Yujie Zhang and myself. Major student involvement includes:

    a. Sai Kiran, Ph.D.EE, "A Wideband Airport Pseudolite for LAAS", Ohio University, graduated November 2003.

    b. Jeff Dickman, MSEE, "Multipath Limiting Antenna Design Considerations for Ground Based Pseudolite Ranging Sources", Ohio University, graduated November 2001.

Professional Society Activities:

1. Session Chair for the ION Pacific PNT, Natural Hazards Detection and other Remote Sensing Applications, Honolulu, HI, April 25-28, 2024.
2. Chair for ION, Parkinson Award Committee, Summer 2019.
3. Session Chair for the ION ITM/PTTI 2019, Non-GNSS Navigation Methods for Autonomous Systems Session, Reston, VA January 29-31, 2019.
4. Session Chair for the ION GNSS+ 2018, Peer Reviewed, Alternative PNT and Interference Detection Session, Miami, FL, September 24-28, 2018.
5. Chair for ION, Parkinson Award Committee, Summer 2018.
6. Session Chair for the ION ITM 2015, Peer Reviewed, Receiver and Antenna Technology Session, Monterey, CA, January 26-28, 2016.
7. Session Chair for the ION ITM 2015, Peer Reviewed, Receiver and Antenna Technology Session, Dana Point, CA, January 26-28, 2015.
8. Session Chair for the ION GNSS 2010, Urban & Indoor Navigation Technology 2 Session, Portland, OR, September 21-24, 2010.
9. Technical Chairman, for the International Loran Association 38th Annual Convention and Technical Symposium, October 13-15, 2009, Portland, ME.
10. Board Member, International Loran Association, 2009-2013, Director Appointed by President Sally Basker, International Loran Association for a one year term.
11. Board Member, International Loran Association, 2008-2009, Director Appointed for the International Loran Association, by President Langhorn Bond, International Loran Association 149th Board of Directors Meeting, October 30, 2008, London, UK for a one-year term.
12. Editor, ION Virtual Navigation Museum, www.ION.org/museum/, 2006-Present.
13. Chair, Institute of Navigation, Outreach Committee, June 2004 to January 2009.
14. General Chair, Institute of Navigation Global Navigation Satellite Systems (GNSS) 2006 Conference, September 26-28, 2006, Fort Worth, TX.
15. Session Chair for the IEEE/ION PLANS, Atmospheric Effects and Modeling Session, San Diego, CA, April 25-27, 2006.
16. Program Chair, Institute of Navigation Global Navigation Satellite Systems (GNSS) 2005 Conference, September 13-16, 2005, Long Beach, CA.
17. Session Chair for the Institute of Electrical and Electronic Engineers, Aerospace Conference, Advanced Navigation Systems for Surface, Air, and Space, Big Sky, MT, March 7-11, 2005.
18. Session Chair for the Institute of Navigation, National Technical Meeting, Aviation Session, San Diego, CA, January 24-26, 2005.

19. <u>Session Chair</u> for the Institute of Navigation, Annual Meeting Aviation Sessions I & II, Dayton, OH, June 7-9, 2004.
20. <u>Session Chair</u> for the Institute of Electrical and Electronic Engineers, Position Location and Navigation Symposium, Homeland Security Applications Session, Monterey, CA, April 26-29, 2004.
21. <u>Session Chair</u> for the Institute of Electrical and Electronic Engineers, Aerospace Conference, Advanced Satellite CNS Systems Session, Big Sky, MT, March 8-12, 2004.
22. <u>Eastern Region Vice-President</u> for the Institute of Navigation, 2003-2004.
23. <u>Establisher</u> of ION Section Sponsor Graduate Student Award for Ohio University. Established and got approved by the ION Dayton Section and ION National Office, this award for $2,000 and plaque to an Ohio University graduate student who demonstrates excellence in navigation. (I was also active in the establishment of this award internationally, as I proposed this award at the ION Council Meeting on June 22, 2003, on the behalf of Dr. John Racquet, and lobbied for its approval at the ION Council meeting.)
24. <u>Session Chair</u> for the Institute of Navigation, National Technical Meeting, Innovative Applications Session, Anaheim, CA, January 22-23, 2003.
25. <u>General Chair</u> for the Institute of Navigation – Annual Meeting Conference, June 24-26, 2002.
26. <u>Session Chair</u> for the IEEE PLANS 2002, Coupling/Integration of GPS/INS Session, April 14-16, 2002, Palm Springs, CA.
27. <u>Program Chair</u> for the Institute of Navigation – Annual Meeting Conference, Albuquerque, NM, June 13-16, 2001.
28. <u>Technical Chair</u> for the Institute of Navigation - Global Positioning System 2000 Conference, Salt Lake City, UT, September 19-22, 2000.
29. <u>Session Chair</u> for the American Institute of Aeronautics and Astronautics, Modeling and Simulation Conference, Avionics and Navigation Simulation Session, August 14-17, 2000.
30. <u>Session Co-Chair</u> for the Institute of Navigation Global Positioning System - 1999, Local Area Augmentation System/Precision Approach Session, September 14-17, 1999.
31. <u>Air Representative</u> for the Institute of Navigation, 1999-2001.
32. <u>Session Chair</u> for the Institute of Navigation 55th Annual Meeting, Local Area Augmentation System/Precision Approach Session, June 28-30, 1999.

Other Various Professional Items:
1. Editorial Advisory Board member for GPS Solutions Journal, Springer-Verlag, New York, Inc., 2002-2013.
2. Paper Reviewer for IEEE Aerospace Conference, Refereed Papers: for Robert J Minnichelli, Aerospace Corporation, IEEE Aerospace Conference 2009.
3. Journal Reviewer for IEEE AES Magazine: for IEEE AES Magazine, for Professor Peter K. Willett, Associate Editor, August 2003.
4. Journal Reviewer for IEEE Transactions on AES: AES-02-06, January 10, 2003, for Joseph L. Leva, Associate Editor for Navigation Systems, IEEE Transactions on AES.
5. TEAMS Question Author for the Tests of Engineering Aptitude, Mathematics, and Science (TEAMS) Competition 2003, Questions #2 Satellite Orbit.
6. Journal Reviewer for International Federation of Automatic Control (IFAC): for Dr. Jerrell Mitchell, Chair IFAC International Conference. November 2001
7. Journal Reviewer for IEEE Transactions on AES: AES-02-06, for Professor Peter K. Willett, Associate Editor, November 1999.

8. Panel Member Honeywell Workshop 1999, Future GPS Applications, April 6, 1999.
9. Sub-Committee Member on the Airport Pseudolite Sub-Committee for the RTCA, Incorporated SC-159 Working Group 4A for the Local Area Augmentation System, 1995-Present.
10. Panel Member Federal Aviation Administration Local Area Augmentation Architecture Committee (LARC), 1995-1996.
11. Technical Advisor for the establishment of a Wide Area Augmentation System simulation/stimulation test capability at the Naval Air Warfare Center – Aircraft Division, 1995.
12. Program Advisor for Tri-Service CNI Simulation under the Central Test and Evaluation Investment Program for the Department of Defense, 1993.
13. Lead Navy CNI Engineer for the "Prelude Charlie" Project conducted between the U.S. Department of Defense and the United Kingdom Ministry of Defense, 1992.
14. Proposal Reviewer for the Air Combat Environment Test and Evaluation Facility Indefinite Deliverable Indefinite Quantity Contract for the Offensive Sensors Laboratory, Naval Air Warfare Center – Aircraft Division, 1992.
15. Lead Technical Reviewer for the Air Combat Environment Test and Evaluation Facility Indefinite Deliverable Indefinite Quantity Contract for the Communications, Navigation, and Identification Laboratory, Naval Air Warfare Center – Aircraft Division, 1991.
16. Expert Lecture on Communications, Navigation, and Identification Systems for the Naval Test Pilot School, Naval Air Test Center, 1989-1990.

AWARDS AND RECOGNITIONS

- Research Award, Marvin E. and Ann D. White, The Russ College of Engineering and Technology, April 26, 2024.
- Research Award, Marvin E. and Ann D. White, The Russ College of Engineering and Technology, April 26, 2019.
- Awarded to be a Fellow of The Institute of Navigation (ION), awarded on 1/31/2019.
- Recipient of the Captain P.V.H. Weems Award, sponsored by The Institute of Navigation in recognition of continuing contributions to the art and science of navigation. 1/31/2019
- Best Paper in Session, Uijt de Haag, M., Bartone, C., Braasch, M., Flight-Test Evaluation of Small Form-Factor LiDAR and Radar Sensors for sUAS Detect-and-Avoid Applications, IEEE Digital Avionics Systems Conference (DASC), Sacramento, CA, September 25-29, 2016. Best Paper Award in Session.
- Teaching Award, Marvin E. and Ann D. White, The Russ College of Engineering and Technology, April 22, 2016.
- Body Area Network using Bluetooth. IEEE Antenna Propagation Society Student Design Competition 2015. Selected as one of 3 finalists (out of 27 international teams), invited to IEEE AP-S Conference, finished 2nd July 2015. See: https://www.youtube.com/watch?v=MWnvpbdCOLQ and https://www.ohio.edu/engineering/news/news-story.cfm?newsItem=2265A285-5056-A81E-8D300A2B38B98610, Advisor/mentor for 5 undergraduate students; only all undergraduate team to make it to the top 3. IEEE website; http://www.ieeeaps.org/awards/2015-ap-s-student-design-contest-winners
- Best Presentation Award for "Antenna Configurations for a C-Band GNSS", *Institute of Navigation – Global Navigation Satellite System,* September 21-24, 2010, Portland, Oregon. (co-author Tom Stansell)
- Best Paper Award for "Multipath Mitigation in the Frequency Domain", *Institute of Electrical and Electronics Engineers, Positioning, Location, And Navigation Symposium (PLANS),* April 27-29, 2004. (co-author Yujie. Zhang)

- Best Presentation/Paper Award for "A General Concept and Algorithm of Projected DGPS for High Accuracy DGPS Based Systems", Institute of Navigation - *Global Positioning System* 2003, Portland, OR, September 9-12, 2003 (co-author: Yujie Zhang)
- Recipient of William E. Jackson Award by the RTCA, September 30, 1998. "*Ranging Airport Pseudolite for Local Area Augmentation Using the Global Positioning System*"
- Best Paper Award for "Advanced Pseudolite for Dual-Use Precision Approach Applications", *Institute of Navigation - Global Positioning System 1996*, September 17-20, 1996 (Precision Approach Session).
- Awarded Long-Term Training Scholarship for Ph.D. EE Work.
- Awarded Long-Term Training Scholarship for MSEE Work.
- Recipient of Superior Performance Awards from the Navy for every year of employment.

LABORATORIES DEVELOPED

- Ohio University Satellite Augmentation to Improve Navigation Technology (SAINT) Laboratory. ($500K Global Navigation Satellite System RTK and AJ Laboratory.)
- Ohio University Antenna Anechoic Chamber, School of Electrical Engineering and Computer Science, Athens, OH. ($250K Development). See YouTube video: https://www.youtube.com/watch?v=zWO5_DjH-3A
- Air Combat Environment Test and Evaluation Facility (ACETEF), Communications, Navigation, and Identification Laboratory (CNIL), Naval Air Warfare Center – Aircraft Division, Patuxent River, Maryland. ($15 M Development)
- Naval Identification Friend or Foe Test and Evaluation Laboratory (NIFFTE), Naval Air Warfare Center – Aircraft Division, Patuxent River, Maryland. ($1.2 M Development)