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CURRICULUM VITAE

EDUCATION

Doctor of Philosophy: Electrical

Queen's University, Kingston, ON, Canada   *Sep 2009 – Jun 2014*

- **Speciality:** Navigational Multi-Sensor Fusion, GPS, Inertial Sensors, Kalman Filtering
- **Major Subjects:** Inertial Navigation System, Global Positioning System, Adaptive Filtering
- **Research:** Improved Land Vehicle Navigation and GPS Integer Ambiguity Resolution Using Enhanced Reduced-IMU/GPS Integration

Master of Applied Science: Electrical

Royal Military College (RMC), Kingston, ON, Canada   *May 2007 – Jan 2009*

- **Speciality:** Navigational Multi-Sensor Fusion, GPS, Inertial Sensors, Kalman Filtering
- **Major Subjects:** Multi-Sensor Fusion, Digital Signal Processing, Adaptive Filtering
- **Research:** Implementation of Tightly Coupled INS/GPS Integration for Land Vehicle Navigation using Kalman Filter

Master of Engineering: Computer

Queen's University, Kingston, ON, Canada   *Sep 2004 – Jan 2006*

- **Speciality:** Digital Integrated Circuits, Computer Networks, Signal & Image Processing
- **Major Subjects:** Digital VLSI Architecture, Computer Architecture, Machine Vision
- **Research:** Design and Implementation of Logarithmic Multiplier (VLSI), Randomized Circle Detection (Machine Vision), Content Based Image Retrieval and Voice Over IP

Bachelor of Engineering: Avionics

N.E.D University, College of Aeronautical Engineering Campus, Pakistan   *1985 – 1989*

- **Speciality:** Avionics Engineering
- **Major Subjects:** Radar systems, Digital Design, Control Systems, Aircraft Systems, Communications
- **Research:** Design & Fabrication of Digital Frequency Hopping Radar

ACADEMIC EXPERIENCE

Instructor II: Electronics Department

Carleton University, Ottawa, ON, Canada   *Sep 2021 – Present*

I was promoted to Instructor II effective September 1, 2021 and my job responsibilities changed slightly. As an Instructor II, I am teaching two sections of ECOR 1043 Circuits in Fall and two sections in Winter. I also teach one section of ECOR 1043 in Summer. The average enrolment of each section of ECOR 1043 course is about 300 students and I managed all the administrative work associated with these courses. I taught ELEC 4504 Avionics Systems in the Winter of 2022. I am assigned a new course ELEC 4906 "Satellite-based Integrated Navigation" which I developed from scratch and taught first time in the Winter of 2023 and subsequently in 2023. This is included development of lectures, labs, quizzes and exams. My responsibilities also included supervision of Teaching Assistants so that they can perform their duties in an efficient manner. Additionally, I supervised the Fourth Year Capstone Design Projects (ELEC 4907).

Instructor I: Electronics Department

Carleton University, Ottawa, ON, Canada   *Aug 2019 – Aug 2021*

As an Instructor I, I taught ECOR 1043 Circuits, ECOR 1044 Mechatronics and ELEC 4504 Avionics Systems. I also supervised ELEC 4907 which is the fourth year Capstone design project. I developed all the course material for ECOR 1043 from scratch which included lectures, assignments, labs, quizzes and exams. I managed all the administrative work associated with these courses, of which, ECOR 1043 and 1044 courses have an average enrolment of around 300 students. My responsibilities also included supervision of Teaching Assistants so that they can perform their duties in an efficient manner.

Contract Instructor: Systems and Computer Engineering & Electronics Dept

Carleton University, Ottawa, ON, Canada   *Sep 2018 – Apr 2019*

In this position, I was hired to teach SYSC 3006 Computer Organization and ELEC 2607 Switching Circuits courses. I prepared and delivered lectures, supervised lab sessions, created assignments to assess student's understanding of the material. I managed all the administrative work associate with the courses and supervised Teaching Assistants so that the can carry-out their work smoothly and help students in completing their labs in effective manner.

Adjunct Professor: Electrical & Computer Engineering Dept

Royal Military College (RMC), Kingston, ON, Canada   *June 2019 – Present*

To stay at the forefront of my research field, I actively collaborate with Royal Military College (RMC) where I hold the position of an adjunct professor in the department of Electronics. RMC hosts an outstanding research and development team with leading Canadian expertise in the field of navigation. This collaboration is instrumental in ensuring that my expertise remains up-to-date and aligned with the latest advancements in navigation technologies, including GPS, INS, and integrated navigation systems for land-based, aerial, and underwater vehicles. It provides a valuable platform for me to engage with fellow researchers and contribute to the ongoing progress and knowledge dissemination in the realm of navigation.

Assistant Professor (term): Electrical & Computer Engineering Dept

Royal Military College (RMC), Kingston, ON, Canada   *Aug 2017 – May 2018*

During this term appointment as Assistant Professor at RMC, I taught EEE243 Applied Programming and EEE350 Digital Design-II courses. I also helped with EEE241 Electrical Technology course as senior TA. I also had the responsibility of preparing the documentation for upcoming CEAB accreditation visit. This included collection of course materials, graduate attributes and other relevant data.

Adjunct Assistant Professor: Electrical & Computer Engineering Dept

Queen's University, Kingston, ON, Canada   *Jan 2017 – Apr 2018*

During this tenure at Queen's university I taught ELEC 274 Computer Architecture, ELEC 271 Digital Systems and APSC 142 Introduction to Computing Programming courses. For ELEC 274, I developed the lectures, assignments and tutorials from scratch. I also co-developed the labs for this course which used Altera Nios II Processor on Cyclone III FPGA. Furthermore, I developed on-line quizzes with a huge data-bank of questions to help maximize randomization. As a special aid, I also developed animations and youtube videos to help teach abstruse concepts of the course.

Sessional Instructor: Electrical & Computer Engineering Dept

Royal Military College (RMC), Kingston, ON, Canada   *Aug 2011 – Dec 2016*

I have been teaching at RMC where I was hired as sessional instructor. During this tenure, I taught EEE250 Digital Design-I (similar to Queen's ELEC 271), EEE474 Radar & Electronic Warfare (EW) and EEE381 Aircraft Systems & Avionics courses to undergrad students. Apart from delivering the lectures, I also developed and revised lectures, quizzes, labs and assignments. All these courses included a significant laboratory component in which students analyse, design, simulate and implement digital circuits as well as antenna, communication and radar circuits. I prepared, conducted and marked all these labs. I also taught EEE523 Integrated Navigation Systems course to graduate students. Apart from delivering lectures, I also provided guidance in the completion of the project which was a big part of the course. This course covered various navigation subsystems (including Inertial Navigation and GPS) and their integration using Kalman filters.

Graduate Teaching Assistant: Electrical & Computer Engineering Dept

Royal Military College (RMC), Kingston, ON, Canada   *Sep 2015 – Dec 2016*

For the fall of 2016, I performed as a TA for GEE241 Electrical Technology (similar to Queen's ELEC 210) course. My duties included marking of assignments, quizzes and labs. I also conducted all the labs for the course. For the fall of 2015 and 2016, I was selected as a TA for EEE250 Digital Design-I course at RMC. As a TA, I supervised and guided the students during the lab periods. I checked the quizzes of the students and also marked their labs and final project (last lab) for this course. Based on my experience the previous year, I was in close contact with the main instructor and conducted regular meetings so that the course goes smoothly. During the summer of 2015 and 2016, I was also selected as a TA for a short concentrated course on Electronic Warfare (EW) titled "Radar Electronic Warfare System Technology (REWST)" meant for RCAF operators. Apart from usual TA duties during these courses, I developed GUIs for antenna and radar system to help the students in understanding the abstruse concepts of the system.

Graduate Teaching Assistant: Department of Geomatics Engineering

University of Calgary, Calgary, AB, Canada *Spring 2013*

For ENGO623 Inertial Navigation and INS/GPS Integration course, my supervisor entrusted me with preparing, managing and guiding the graduate students in their projects related to GPS and INS. I prepared raw data obtained from a real road trajectory which was used for both GPS and INS portions of the projects. The project topics included INS Mechanization, INS error modeling and INS/GPS Integration using Kalman filter.

Graduate Teaching Assistant: Electrical & Computer Engineering Dept

Queen's University, Kingston, ON, Canada *Jan 2013 – Apr 2013*

I was selected as a Graduate TA for APSC 142 Introduction to Computing Programming for Engineers course. I was responsible for monitoring and helping students in programming C language using microcomputer and robots. I also marked their labs and final project for this course. Furthermore, I oversaw the performance of undergrad TAs during the lab and assigned various duties to them for smooth conduction of the lab.

Instructor: Aeronautics (Aerospace & Avionics)

Aviation Engineering School, Pakistan *Feb 1993 – Jan 1996*

This was my first instructional appointment where I taught undergraduate and graduate students. Apart from aerospace and avionics courses I also taught electrical and computer courses. I was also involved in course scheduling, coordinating visits and arranging practical demonstrations of various aircraft avionics, and aerospace systems.

Instructor - Enrichment Studies Unit (ESU)

Queen's University, Kingston, ON, Canada *Spring 2014*
Spring 2013

I helped Queen's university in promoting higher education among young students through ESU program which offers enrichment opportunities to above average and gifted students in Grades 6 to 12. This was a challenge as I had to simplify the subject to their level of understanding without scarifying the accuracy and quality. I accomplished this through interesting animations and hands on exercises. I also arranged a field trip to Navigation lab of RMC to give the students a practical demonstration on various aspects of GPS.

Teacher - Engineer for a Year Program

Queen's University, Kingston, ON, Canada *Sep 2013 – Jun 2014*

I volunteered for the Queen's University Engineer for a Year Program, dedicated to fostering an appreciation for engineering among young students. Assigned to Leahurst College in Kingston, ON, I engaged students through captivating lectures, lively presentations, and hands-on demonstrations, illuminating intriguing facets of the engineering discipline. My involvement aimed to inspire and educate the next generation about the exciting world of engineering, instilling a passion for the field.

Professional Experience

Senior Test Engineer - WiTEST Inc.

15 Fitzgerald Rd, Suite 200, Ottawa, ON, Canada   *August 2019 – September 2020*

This experience included functional and verification test solutions of semiconductor, identification and integration of test instrumentations such as signal generators, spectrum analyzers, scopes and digitizers. Furthermore, the practical experience included the design of interface and signal condition PCB's for production testing of electronics systems, design and integration of test fixtures for production and manufacturing test solutions and planning of optimized test strategies in a manufacturing environment. On the other hand, this assignment also included the development of documentation for operation and maintenance of test equipment and processes including written descriptions, instructions and user manuals, and technical drawings (schematics, block diagrams).

Deputy Director - NavINST Lab

Royal Military College (RMC), Kingston, ON, Canada   *April 2015 – May 2018*

- Apart from conducting research at the Navigation & Instrumentation Lab (NavINST) of RMC, I was also involved in the supervisory and administrative duties for efficient functioning of the lab. I was leading three groups of researchers who were involved in different aspects of land vehicle navigation, guiding several graduate students in the process. My responsibilities also included:
  - Supervision and guidance of graduate and doctoral students of the lab
  - Writing of grants proposals and progress reports
  - Delivering presentations to visiting groups and funding agencies
  - Assessing and procuring various technical equipment for the research teams in the lab
  - Supervision of land vehicle experiments for navigational data collection
  - Inventory and upkeep of navigational test equipment
- For the research part, the major goal of my work was based on the improvement of navigational algorithms for land and aerial vehicles. I worked on, and supervised, various projects during this tenure which were primary related to synergistic integration of sensors including GPS, INS, LiDAR, Radar, vision, magnetometers, pressure sensors and speed sensors.

Senior Research Associate - NavINST Lab

Royal Military College (RMC), Kingston, ON, Canada   *July 2014 – October 2016*

- My primary focus of research is the improvement of accuracy, availability and integrity of navigational algorithms. The navigational sensors involved in my research include GPS, INS, LiDAR, Radar, vision and speed sensors. My focus is on seamless integration of these sensors using Kalman filter for land and aerial vehicle navigation. During this tenure I have contributed to several research projects funded by Department of National Defence (DND) which include Directorate of Technical Airworthiness and Engineering Support (DTAES), Defence Research and Development Canada (DRDC) Ottawa and Aerospace Research Advisory Committee (AERAC). Some of my research projects include the following:
  - Effect of Multi-GNSS, Timing and Carrier Phase Measurements on Aircraft Positioning Accuracy and System Synchronization

- Technical Investigation of Multiple-Antenna GNSS Receivers Capabilities for Anti-Jamming in NAVWAR Systems
- Receiver autonomous Integrity Monitoring Availability Analysis
- Design and implementation of centimetre level accuracy for land vehicle navigation using carrier phase GPS measurements
- Advanced Multi-Sensor Fusion and Autonomy
- Enhanced tightly-coupled integration of GPS and INS using Extended Kalman filter
- Integration of code-based precise point positioning and reduced inertial sensor system
- Integration of vision based navigation with INS and GPS for land vehicle navigation in challenging environments
- GPS cycle slip detection and correction at measurement level

Research Assistant

Royal Military College (RMC), Kingston, ON, Canada   *May 2007 – July 2014*

- During this tenure, my research included development of tightly coupled GPS/INS integration. This entailed following activities:
  - Acquiring , denoising , interpolating and synchronizing GPS and INS data
  - Development of INS mechanization
  - Development of GPS and INS error models for Kalman Filtering
  - Simulation of GPS outages and testing of algorithm on real life data

Research Assistant

Royal Military College (RMC), Kingston, ON, Canada   *Nov 2006 – Apr 2007*

- My research involved development of modules for Software Defined Radio including, Quadrature Direct Digital Frequency Synthesizer (QDDFS), Complex Mixer and Quad Demodulator. Following tasks were accomplished:
  - Writing of VHDL (RTL) code for QDDFS followed by simulation, synthesis
  - Verification of the results in MATLAB
  - Implementation on Spartan3 FPGA using Xilinx tools
  - Verification of the results of FPGA implementation using ChipScope Pro

Design Kit Developer - (Co-Op)

CMC Microsystems, Kingston, ON, Canada   *Apr 2005 – Aug 2005*

As a Design Kit Developer, I accomplished following:

- Developed a design kit for layout of a MEMS fabrication process co-developed by Micralyne Inc, and CMC Microsystems, Canada. It included following :
  - Mapping of structural layers of the process to the layout file and incorporation of derived layers
  - Development of process definition file and 3D view of the final layout
  - Incorporation of design rules into the technology file and automation of DRC
- Wrote a detailed user guide for the whole layout process which is being used by the leading technical universities of Canada.
- Presented my work in the 4th Canadian Workshop for MEMS, Ottawa in Aug 05.

Senior Avionics Engineer

Aviation Base Workshop, Pakistan   *Jan 1996 – Aug 2003*

- Designed digital modules for Aircraft Stall Warning System, Digital Airspeed Indicator, and sequencer of flare/chaff dispensing system (on PCB & FPGAs)
- Carried out simulation, testing and verification of digital circuits used in aircraft systems including communication sets, Direction Finding Systems, Auto Pilots, GPS and Radar systems.
- Taught Electronic Counter Measures Systems and aircraft instrumentation systems.
- Managed the technical aspects of all the aircraft design and maintenance activities.
- Managed the inventory of spare parts and timely availability of all special tools and equipment.
- Supervised technicians and engineers.
- Carried out all the technical as well as managerial communication with clients and contractors.
- Prepared and delivered presentations to local and foreign delegations.

Aircraft Maintenance Engineer

Aviation Base Workshop, Pakistan   *Jun 1989 – Feb 1993*

- This was my first appointment after graduation where I was responsible for airworthiness of a fleet of aircraft. My responsibilities included the following:

  - Maintenance, troubleshooting and modification of avionics systems of variety of helicopters and aircraft
  - Maintaining the record of aircraft inspections and modifications
  - Supervising technicians and ensuring their training is up-to-date
  - Writing of reports on issues related to flight-safety, accident investigation as well as various certifications

Achievements and Awards

- My book *Fundamentals of Inertial Navigation, Satellite-based Positioning and their Integration* became one of the top 25% most downloaded ebooks in the relevant field as reported by Springer in June 2016.
- Recipient of NSERC's *Alexander Graham Bell Canada Graduate Scholarship* (CGS) award for "academic excellence, research potential, communications skills and interpersonal & leadership abilities".

  Value: $105,000
- Recipient of *Duncan and Urlla Carmichael Fellowship* award for first class standing in academics during master's and doctoral studies.   Value: $10,000
- Awarded *International Space University (ISU) scholarship* for Space Studies Program.

  Value: $11,600
- Recipient of *Tri-Council Recipient Recognition Award* (TCRRA).   Value: $5,000
- Runner-up for the *Governor General's Academic Gold Medal* for academic excellence.
- Recipient of Honourable Mention in *IEEE Graduate Research Excellence Award* in recognition of Doctoral research in the field of Navigational Multi-Sensor Fusion.
- Awarded "Carleton University Favorite Faculty" for the 2023/2024 academic year by the Department of Housing and Residence Life Services, Carleton university.

Volunteer Experience

Electronics Department's Representative to CUASA Council

Carleton University Academic Staff Association, Ottawa ON, Canada   *Nov 2021 – Present*

- Update my colleagues about Council decisions or ongoing projects.
- Encourage colleagues to participate in upcoming CUASA events.
- Solicit input about bargaining priorities and union services.
- Record my colleagues' concerns about working conditions in my department or at Carleton generally, and report back to Council.
- Participate in CUASA Council Meetings and deliberate about CUASA's action to enforce the existing Collective Agreement, respond to changing workplace conditions and membership concerns, and promote awareness and solidarity among the members

Hiring Committee Member

Systems and Computer Engineering, Carleton University Academic, Ottawa ON, Canada Dec 2021 – Present

- Collect and peruse through the CVs of candidates.
- Prepare summary of the qualifications of each candidate versus the requirements of the position.
- Make an ordered list of candidates for discussion and selection of the best candidate for further consideration.
- Participate in meetings to discuss the list of candidates and selection of deserving candidates for interview and lectures sessions.
- Contact selected candidates for scheduling of interview, lecture and meetings with department faculty.
- Assess the candidate's style of teaching during lecture
- Interview all the selected candidates and assess their abilities to teach, perform administrative duties and research potentials.
- Based on discussions with other committee and faculty members, suggest the most suitable candidate for the job.

Graduate Attribute Committee Member

Department of Electronics, Carleton University Academic, Ottawa ON, Canada   *Sep 2020 – Present*

- Help streamlining the procedure to obtain GA data from instructors
- Format the GA data to make it easier to analyze and prepare reports
- Analyze the GA reports to extract trends and suggest measures for improvement.
- Participate in meetings to suggest and recommend improvements in curriculum and teaching methodologies dictated by the trends in the GA reports, data and charts.

Secretary IEEE Kingston Section

Kingston ON, Canada   *Dec 2012 – Dec 2014*

- Organize the section meetings and ensure the minutes are documented properly and disseminated to all concerned.
- Announce various technical talks and ensure that all members are aware of these interesting events.
- Help in organization of Annual General Meetings and Annual Banquets.
- Being a secretary, I rendered help in all other events whenever needed.

Engineer for a Year Program

Queen's University, Kingston, ON, Canada   *Sep 2013 – June 2014*

- I have volunteered for Queen's University Engineer for a Year program. The details are already given in *Academic Experience* section.

Climate Reality Leader

The Climate Reality Leadership Corps   *Aug 2013 – Present*

The Climate Reality Leadership Corps is a global network of activists committed to taking on the climate crisis and solving what is by far the greatest challenge of our time. I volunteered for it and got training in climate science and communication from Nobel Laureate and former U.S. Vice President Al Gore. My effort is to tell the story of climate change and inspire communities everywhere to take action through presentations in schools, homes, places of worship, businesses, and government forums.

Miscellaneous Details

- **Language Skills:** Fluent in verbal and written English, Urdu, Hindi and Panjabi
- **Tourism:** Visited Faroe Islands, USA, Germany, United Kingdom, Ireland, Scotland, Switzerland, France, Greece, Italy, Portugal, Spain, Iceland, UAE, Egypt, Bahrain, KSA
- **Hobbies:** Photography (@feenafoto), Reading, Etymology & Vocabulary Building, Watch Enthusiast & Collector
- **Sports:** Badminton, Athletics, Basket Ball

Publications

Book

[1] A. Noureldin, T. B. Karamat, and J. Georgy, *Fundamentals of Inertial Navigation, Satellite-based Positioning and their Integration.* Heidelberg: Springer, January 2013.

Journal Articles

[1] A. Abosekeen, T. B. Karamat, A. Noureldin, and M. J. Korenberg, "Adaptive cruise control radar-based positioning in GNSS challenging environment," *IET Radar, Sonar Navigation*, vol. 13, no. 10, pp. 1666–1677, 2019.

[2] M. T. Rahman, T. B. Karamat, S. Givigi, and A. Noureldin, "Improving multisensor positioning of land vehicles with integrated visual odometry for next-generation self-driving cars," *Journal of Advanced Transportation*, vol. 2018, p. 12 pages, March 2018.

[3] T. B. Karamat, R. G. Lins, S. N. Givigi, and A. Noureldin, "Novel EKF-based vision/inertial system integration for improved navigation," *IEEE Transactions on Instrumentation and Measurement*, vol. 67, pp. 116–125, January 2018.

[4] T. B. Karamat, M. M. Atia, and A. Noureldin, "An enhanced error model for EKF-based tightly-coupled integration of GPS and land vehicle's motion sensors," *Sensors*, vol. 15, no. 9, p. 24269, 2015.

[5] M. M. Atia, S. Liu, H. Nematallah, T. B. Karamat, and A. Noureldin, "Integrated indoor navigation system for ground vehicles with automatic 3D alignment and position initialization," *Vehicular Technology, IEEE Transactions on*, vol. 64, pp. 1279–1292, April 2015.

[6] T. B. Karamat, M. M. Atia, and A. Noureldin, "Performance analysis of code-phase based relative GPS positioning and its integration with land vehicle's motion sensors," *Sensors Journal, IEEE*, vol. 14, pp. 3084–3100, September 2014.

[7] M. Karaim, T. B. Karamat, A. Noureldin, and A. El-Shafie, "GPS cycle slip detection and correction at measurement level," *British Journal of Applied Science & Technology*, vol. 4, pp. 4239–4251, August 2014.

[8] M. M. Atia, T. B. Karamat, , and A. Noureldin, "An enhanced 3D multi-sensor integrated navigation system for land-vehicles," *Journal of Navigation*, vol. 67, pp. 651–671, March 2014.

[9] S. Liu, M. M. Atia, T. B. Karamat, and A. Noureldin, "A LiDAR-aided indoor navigation system for UGVs," *Journal of Navigation*, vol. 68, pp. 253–273, September 2015.

[10] M. Cossaboom, J. Georgy, T. B. Karamat, and A. Noureldin, "Augmented Kalman filter and map matching for 3D RISS/GPS integration for land vehicles," *International Journal of Navigation and Observation*, vol. 2012, p. 16, October 2012.

[11] A. Noureldin, J. Armstrong, A. El-Shafie, T. B. Karamat, D. McGaughey, M. Korenberg, and A. Hussain, "Accuracy enhancement of inertial sensors utilizing high resolution spectral analysis," *Sensors*, vol. 12, pp. 11638–11660, August 2012.

[12] J. Georgy, T. B. Karamat, U. Iqbal, and A. Noureldin, "Enhanced MEMS-IMU/odometer/GPS integration using mixture particle filter," *GPS Solutions*, vol. 15, pp. 239–252, September 2010.

[13] U. Iqbal, T. B. Karamat, A. F. Okou, and A. Noureldin, "Experimental results on an integrated GPS and multisensor system for land vehicle positioning," *International Journal of Navigation and Observation*, vol. 2009, p. 18, February 2009.

[14] A. Noureldin, T. B. Karamat, M. D. Eberts, and A. El-Shafie, "Performance enhancement of MEMS-based INS/GPS integration for low-cost navigation applications," *Vehicular Technology, IEEE Transactions on*, vol. 58, pp. 1077–1096, March 2009.

Conference Papers

[1] M. Karaim, A. Noureldin, and T. B. Karamat, "Low-cost IMU data denoising using Savitzky-Golay filters," in *2019 International Conference on Communications, Signal Processing, and their Applications (ICCSPA)*, pp. 1–5, March 2019.

[2] A. Abosekeen, A. Noureldin, T. B. Karamat, and M. J. Korenberg, "Comparative analysis of magnetic-based RISS using different MEMS-based sensors," in *Proceedings of the 30th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS+ 2017*, (Portland OR), pp. 2944–2959, September 2017.

[3] M. T. Rahman, T. B. Karamat, S. Givigi, and A. Noureldin, "Road test results and analysis on integrating visual odometry with car motion sensors for positioning and navigation," in *Mobile Mapping Technologies*, (Cairo, Egypt), MMT, May 2017.

[4] M. Karaim, M. Youssef, T. B. Karamat, and A. Noureldin, "Adaptive multi-hypothesis vector tracking system – design and implementation," in *Proceedings of the 29th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2016*, (Portland, OR), September 2016.

[5] H. E. Ibrahim, T. B. Karamat, A. El-Rabbany, and A. Noureldin, "Integration of code-based precise point positioning and reduced inertial sensor system," in *Proceedings of the 29th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2016*, (Portland, OR), September 2016.

[6] Y. Sun, M. T. Rahman, T. B. Karamat, , and A. Noureldin, "Integrating vision based navigation with INS and GPS for land vehicle navigation in challenging environments," in *Proceedings of the 29th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2016*, (Portland, OR), September 2016.

[7] T. B. Karamat, M. M. Atia, M. Karaim, and A. Noureldin, "Aided integer ambiguity resolution using low-cost motion sensors," in *Proceedings of the 28th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2015*, (Tampa, FL), pp. 2548–2559, September 2015.

[8] S. Liu, M. M. Atia, T. B. Karamat, A. Noureldin, and S. Givigi, "LiDAR-aided integrated INS/GPS navigation system for unmanned ground vehicles in urban and indoor environments using hybrid adaptive scan matching algorithm," in *Proceedings of the 28th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2015*, (Tampa, FL), pp. 2311–2318, September 2015.

[9] T. B. Karamat, M. M. Atia, A. Noureldin, and S. Givigi, "Performance comparison analysis of FOGS and MEMS IMU under an enhanced GPS/reduced INS land vehicles navigation system," in *Proceedings of the 27th International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2014*, (Tampa, FL), pp. 141–153, September 2014.

[10] S. Liu, M. M. Atia, T. B. Karamat, S. Givigi, and A. Noureldin, "A dual-rate multi-filter algorithm for LiDAR-aided indoor navigation systems," in *Proceedings of IEEE/ION PLANS 2014*, (Monterey, CA), pp. 1014–1019, May 2014.

[11] M. Karaim, T. B. Karamat, A. Noureldin, M. Tamazin, and M. Atia, "Real-time cycle-slip detection and correction for land vehicle navigation using inertial aiding," in *Proceedings of the 26th International Technical Meeting of The Satellite Division of the Institute of Navigation-ION GNSS 2013*, (Nashville, TN), pp. 1290–1298, September 2013.

[12] T. B. Karamat, J. Georgy, U. Iqbal, and A. Noureldin, "A tightly-coupled reduced multi-sensor system for urban navigation," in *Proceedings of the 22nd International Technical Meeting of the Satellite Division of the Institute of Navigation-ION GNSS 2009*, (Savannah, GA), pp. 582–592, September 2009.

Magazine Article

[1] M. Karaim, T. B. Karamat, A. Noureldin, M. Tamazin, and M. M. Atia, "Cycle-slips: Detection and correction using inertial aiding," *GPS World Magazine*, pp. 64–69, January 2014.