Stanford



Juan Blanch

Sr Research Engineer, Program-Walter, T.

Bio

BIO

Juan Blanch is a senior research engineer in the Department of Aeronautics and Astronautics (AA) at Stanford University. He received a Ph.D. and M.S. in Aeronautics and Astronautics, and a M.S. in Electrical Engineering, all three from Stanford University. He is a graduate from Ecole Polytechnique, France.

Dr. Blanch's research goal is to make location technology safe for critical applications, like air navigation and autonomous driving. His thesis work, for which he received the Institute of Navigation Parkinson Award, applied geospatial statistics to ionospheric estimation. This work is now fielded in the Wide Area Augmentation System – which is used by over 100,000 aircraft and by more than 1 million land users-, and has resulted in significant performance improvements. Within the FAA's Global Navigation Satellite System Evolutionary Architecture Study (GEAS), Dr. Blanch developed an Advanced Receiver Autonomous Integrity Monitoring (ARAIM) algorithm that is now referenced by the international aviation integrity community. This algorithm can support a wide range of assumptions, readily handles multiple fault cases, and has a simple but rigorous proof of safety. He served as one of the lead authors on the initial GEAS report that proposed ARAIM as one of the most promising future architectures to support world-wide vertical guidance of aircraft, and he is now working on the development of the aviation standards to enable ARAIM. More recently, he has worked on the extension of these techniques to high accuracy automotive navigation.

He has over 100 scientific publications including conference proceedings, trade magazine articles, and peer-reviewed journal articles. He has been recognized as a top peer-reviewer by Publons and the Institute of Navigation, and is currently an Associate Editor for IEEE Transactions on Aerospace Electronic Systems. He received the 2010 Early Achievement Award from the Institute of Navigation.

ACADEMIC APPOINTMENTS

- Sr Research Engineer, Program-Walter, T.

HONORS AND AWARDS

- Top peer reviewer, Publons (2019)
- Early Achievement Award, Institute of Navigation (June, 2010)
- Bradford W. Parkinson Award for Graduate Student Excellence in Global Navigation Satellite Systems, Institute of Navigation (September 2004)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Associate Editor, IEEE (2018 - present)
- Member, Institute of Navigation (2003 - present)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Aeronautics and Astronautics (2004)
- M.S., Stanford University , Electrical Engineering (2004)
- M.S., Stanford University , Aeronautics and Astronautics (2000)
- Eng. Deg., Ecole Polytechnique, France , Applied Physics (1999)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research focuses on the design of navigation integrity algorithms for safety critical applications (like air navigation and autonomous driving). I am interested in both the design of practical algorithms that provide the required safety margins, and in the theoretical limits on the performance of the integrity monitoring algorithms.

Publications

PUBLICATIONS

- **An Evaluation of the Advanced RAIM Threat Model**
  Blanch, J., Walter, T., IEEE
  IEEE.2023: 408-413
- **A FAULT DETECTION AND EXCLUSION ESTIMATOR DESIGNED FOR INTEGRITY**
  Blanch, J., Walter, T., INST NAVIGAT
  INST NAVIGATION.2021: 1672-1686
- **Evaluating the Application of PPP Techniques to ARAIM Using Flight Data**
  Phelts, R., Gunning, K., Blanch, J., Walter, T., Inst Navigat
  INST NAVIGATION.2020: 379–85
- **Stress Testing Advanced RAIM Airborne Algorithms**
  Blanch, J., Walter, T., Inst Navigat
  INST NAVIGATION.2020: 421–39
- **Gaussian Bounds of Sample Distributions for Integrity Analysis** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Blanch, J., Walter, T., Enge, P.
  2019; 55 (4): 1806–15
- **Fixed Subset Selection to Reduce Advanced RAIM Complexity**
  Blanch, J., Walter, T., Enge, P., Inst Navigat
  INST NAVIGATION.2018: 88–98
- **A Formula for Solution Separation without Subset Solutions for Advanced RAIM**
  Blanch, J., Walter, T., Enge, P., IEEE
  IEEE.2018: 316–26
- **Theoretical Results on the Optimal Detection Statistics for Autonomous Integrity Monitoring** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Blanch, J., Walter, T., Enge, P.
  2017; 64 (1): 123–37
- **A Simple Position Estimator That Improves Advanced RAIM Performance** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Blanch, J., Walter, T., Enge, P., Kropp, V.
  2015; 51 (3): 2485-U960

- **Baseline Advanced RAIM User Algorithm and Possible Improvements** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Blanch, J., Walker, T., Enge, P., Lee, Y., Pervan, B., Rippl, M., Spletter, A., Kropp, V.
  2015; 51 (1): 713-732
- **Optimal Positioning for Advanced Raim** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Blanch, J., Walter, T., Enge, P.
  2013; 60 (4): 279-289
- **RAIM with Optimal Integrity and Continuity Allocations Under Multiple Failures** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Blanch, J., Walter, T., Enge, P.
  2010; 46 (3): 1235-1247
- **Locating GNSS Interference Sources using ADS-B with Non-linear Least Squares** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Liu, Z., Lo, S., Blanch, J., Chen, Y., Walter, T.
  2025; 72 (3)
- **WAAS and the Ionosphere - A Historical Perspective: Monitoring Storms** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Sparks, L., Altshuler, E., Pandya, N., Blanch, J., Walter, T.
  2022; 69 (1)
- **Fast Protection Levels for Fault Detection With an Application to Advanced RAIM** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Blanch, J., Walter, T.
  2021; 57 (1): 55–65
- **GAUSSIAN BOUNDING IMPROVEMENTS AND AN ANALYSIS OF THE BIAS-SIGMA TRADEOFF FOR GNSS INTEGRITY**
  Blanch, J., Liu, X., Walter, T., Inst Navigat
  INST NAVIGATION.2021: 703-713
- **Continuity and Availability Evaluation in Horizontal ARAIM**
  Joerger, M., Racelis, D., Blanch, J., Pervan, B., INST NAVIGAT
  INST NAVIGATION.2021: 278-289
- **Analysis of GNSS Constellation Performance for Advanced RAIM**
  Blanch, J., Liu, X., Gunning, K., Walter, T., INST NAVIGAT
  INST NAVIGATION.2021: 1410-1434
- **Ground Monitoring to Support ARAIM for Military Users: Alternatives for Rapid and Rare Update Rates**
  Pullen, S., Lo, S., Katz, A., Blanch, J., Walter, T., Katronick, A., Crews, M., Johnson, R., INST NAVIGAT
  INST NAVIGATION.2021: 1481-1507
- **Providing Continuity and Integrity in the Presence of GNSS Spoofing**
  Rothmaier, F., Chen, Y., Lo, S., Blanch, J., Walter, T., INST NAVIGAT
  INST NAVIGATION.2021: 1828-1842
- **Investigation into September 2020 GPS SVN 74 Performance Anomaly**
  Walter, T., Liu, Z., Blanch, J., Pham, K., Mick, J., Wanner, W., Inst Navigat
  INST NAVIGATION.2021: 189-200
- **Assessment of Ionospheric Correction Behavior for Use with Precise Point Positioning (PPP)**
  Walter, T., Blanch, J., de Groot, L., Norman, L., Inst Navigat
  INST NAVIGATION.2021: 616-624
- **ARAIM for Military Users: ISM Parameters, Constellation-Check Procedure and Performance Estimates**
  Katz, A., Pullen, S., Lo, S., Blanch, J., Walter, T., Katronick, A., Crews, M., Jackson, R., Inst Navigat
  INST NAVIGATION.2021: 173-188

- **ARAIM Continuity and Availability Assertions, Assumptions, and Evaluation Methods**
  Joerger, M., Zhai, Y., Martini, I., Blanch, J., Pervan, B., Inst Navigat
  INST NAVIGATION.2020: 404–20
- **BOUNDING TEMPORALLY CORRELATED MEASUREMENT NOISE WITH AN APPLICATION TO GNSS INTEGRITY**
  Blanch, J., Phelts, E., Gunning, K., Walter, T., de Groot, L., Norman, L., Inst Navigat
  INST NAVIGATION.2020: 27-38
- **Determination of Fault Probabilities for ARAIM** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Walter, T., Blanch, J., Gunning, K., Joerger, M., Pervan, B.
  2019; 55 (6): 3505–16
- **Standards for ARAIM ISM Data Analysis**
  Walter, T., Blanch, J., Gunning, K., Inst Navigat
  INST NAVIGATION.2019: 777–84
- **Development of Advanced RAIM Minimum Operational Performance Standards**
  Blanch, J., Walter, T., Berz, G., Burns, J., Clark, B., Joerger, M., Mabilleau, M., Martini, I., Milner, C., Pervan, B., Lee, Y., Inst Navigat
  INST NAVIGATION.2019: 1381–91
- **Integrity for Tightly Coupled PPP and IMU**
  Gunning, K., Blanch, J., Walter, T., de Groot, L., Norman, L., Inst Navigat
  INST NAVIGATION.2019: 3066–78
- **SBAS Corrections for PPP Integrity with Solution Separation**
  Gunning, K., Blanch, J., Walter, T., Inst Navigat
  INST NAVIGATION.2019: 707–19
- **Development and Evaluation of Airborne Multipath Error Bounds for L1-L5**
  Blanch, J., Walter, T., Phelts, R., Inst Navigat
  INST NAVIGATION.2019: 53–61
- **Reducing Computational Load in Solution Separation for Kalman Filters and an Application to PPP Integrity**
  Blanch, J., Gunning, K., Walter, T., De Groot, L., Norman, L., Inst Navigat
  INST NAVIGATION.2019: 720–29
- **Safety Analysis of Ranging Biases on the WAAS GEOs**
  Walter, T., Blanch, J., Altshuler, E., Inst Navigat
  INST NAVIGATION.2019: 113–30
- **Lower Bounds in Optimal Integrity Monitoring**
  Blanch, J., Walter, T., Inst Navigat
  INST NAVIGATION.2019: 915–24
- **Validation of the Unfaulted Error Bounds for ARAIM** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Walter, T., Gunning, K., Phelts, R., Blanch, J.
  2018; 65 (1): 117–33
- **Improved User Position Monitor for WAAS** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Walter, T., Blanch, J.
  2017; 64 (1): 165–75
- **Projected Performance of a Baseline High Integrity GNSS Railway Architecture under Nominal and Faulted Conditions**
  Lo, S., Pullen, S., Blanch, J., Enge, P., Neri, A., Palma, V., Salvitti, M., Stallo, C., INST NAVIGAT
  INST NAVIGATION.2017: 2148–71
- **Integrity measures in direct-positioning**
  Closas, P., Gusi-Amigo, A., Blanch, J., INST NAVIGAT
  INST NAVIGATION.2017: 2428–35

- **Feasibility of fault exclusion related to advanced RAIM for GNSS spoofing detection**
  Kuusniemi, H., Blanch, J., Chen, Y., Lo, S., Innac, A., Ferrara, G., Honkala, S., Bhuiyan, M. H., Thombre, S., Soderholm, S., Walter, T., Phelts, R., Enge, et al
  INST NAVIGATION.2017: 2359–70
- **Initial Results of a Multi-Constellation ARAIM Airborne Prototype**
  Blanch, J., Phelts, R., Chen, Y., Enge, P., INST NAVIGAT
  INST NAVIGATION.2017: 184–209
- **A MATLAB Toolset to Determine Strict Gaussian Bounding Distributions of a Sample Distribution**
  Blanch, J., Walter, T., Enge, P., INST NAVIGAT
  INST NAVIGATION.2017: 4236–47
- **A Simple Satellite Exclusion Algorithm for Advanced RAIM**
  Blanch, J., Walter, T., Enge, P., Inst Navigat
  INST NAVIGATION.2016: 239–44
- **GNSS Integrity in The Arctic** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Reid, T., Walter, T., Blanch, J., Enge, P.
  2016; 63 (4): 469-492
- **Improved Ephemeris Monitoring for GNSS**
  Walter, T., Gunning, K., Blanch, J., Inst Navigat
  INST NAVIGATION.2016: 600–608
- **Determination of Fault Probabilities for ARAIM**
  Walter, T., Blanch, J., Joerger, M., Pervan, B., IEEE
  IEEE.2016: 451–61
- **Improved User Position Monitor for WAAS**
  Walter, T., Blanch, J., Inst Navigat
  INST NAVIGATION.2016: 343–52
- **Mitigation of short duration satellite outages for Advanced RAIM and other integrity systems based on GNSS**
  Blanch, J., Chen, Y., Phelts, R., Walter, T., Enge, P., Inst Navigat
  INST NAVIGATION.2016: 1688–95
- **Demonstrating ARAIM on UAS using Software Defined Radio and Civilian Signal GPS L1/L2C and GLONASS G1/G2**
  Chen, Y., Perkins, A., Lo, S., Akos, D. M., Blanch, J., Walter, T., Enge, P., Inst Navigat
  INST NAVIGATION.2016: 231–38
- **Satellite Selection for Multi-Constellation SBAS**
  Walter, T., Blanch, J., Kropp, V., Inst Navigat
  INST NAVIGATION.2016: 1350–59
- **ARAIM in Flight Using GPS and GLONASS: Initial Results from a Real-time Implementation**
  Phelts, R., Blanch, J., Chen, Y., Enge, P., Riley, S., Inst Navigat
  INST NAVIGATION.2016: 3264–69
- **Progress on Working Group-C Activities on Advanced RAIM**
  Blanch, J., Walter, T., Enge, P., Burns, J., Alexander, K., Boyero, J., Lee, Y., Pervan, B., Joerger, M., Khanafseh, S., Rippl, M., Martini, I., Perea, et al
  INST NAVIGATION.2015: 629–38
- **Airborne Mitigation Of Constellation Wide Faults**
  Walter, T., Blanch, J., Inst Navigat
  INST NAVIGATION.2015: 676–86
- **GNSS Integrity in The Arctic**
  Reid, T. G. R., Walter, T., Blanch, J., Enge, P. K., Inst Navigat
  INST NAVIGATION.2015: 1726–40

- **Fast Multiple Fault Exclusion with a Large Number of Measurements**
  Blanch, J., Walter, T., Enge, P., Inst Navigat
  INST NAVIGATION.2015: 696–701
- **Characterization of GPS Clock and Ephemeris Errors to Support ARAIM**
  Walter, T., Blanch, J., Inst Navigat
  INST NAVIGATION.2015: 920–31
- **The Effect of Nominal Signal Deformations on ARAIM Users** *International Technical Meeting of the Institute-of-Navigation*
  Phelts, R. E., Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2014: 56–67
- **Reduced Subset Analysis for Multi-Constellation ARAIM** *International Technical Meeting of the Institute-of-Navigation*
  Walter, T., Blanch, J., Enge, P.
  INST NAVIGATION.2014: 89–98
- **Evaluation of a covariance-based clock and ephemeris error bounding algorithm for SBAS**
  Blanch, J., Walter, T., Enge, P., Stern, A., Altshuler, E., Inst Navigat
  INST NAVIGATION.2014: 3270–76
- **Exclusion for Advanced RAIM: Requirements and a Baseline Algorithm** *International Technical Meeting of the Institute-of-Navigation*
  Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2014: 99–107
- **Architectures for Advanced RAIM: Offline and Online**
  Blanch, J., Walter, T., Enge, P., Pervan, B., Joerger, M., Khanafseh, S., Burns, J., Alexander, K., Boyero, J., Lee, Y., Kropp, V., Milner, C., Macabiau, et al
  INST NAVIGATION.2014: 787–804
- **Development of a Real-time GNSS Software Receiver for Evaluating RAIM in Multi-constellation** *International Technical Meeting of the Institute-of-Navigation*
  Chen, Y., Lo, S., Akos, D. M., Choi, M., Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2014: 525–533
- **Critical Elements for a Multi-Constellation Advanced RAIM** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Blanch, J., Walter, T., Enge, P., Wallner, S., Fernandez, F. A., Dellago, R., Ioannides, R., Hernandez, I. F.
  2013; 60 (1): 53-69
- **Incorporating GLONASS into Aviation RAIM Receivers** *International Technical Meeting of the Institute-of-Navigation*
  Walter, T., Blanch, J., Choi, M. J., Reid, T., Enge, P.
  INST NAVIGATION.2013: 239–249
- **Results on the Optimal Detection Statistic for Integrity Monitoring** *International Technical Meeting of the Institute-of-Navigation*
  Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2013: 262–273
- **Near Term Improvements to WAAS Availability** *International Technical Meeting of the Institute-of-Navigation*
  Blanch, J., Walter, T., Phelts, R. E., Enge, P.
  INST NAVIGATION.2013: 71–77
- **Implementation of the L5 SBAS MOPS**
  Walter, T., Blanch, J., Enge, P., Inst Navigat
  INST NAVIGATION.2013: 814–24
- **Advanced RAIM System Architecture with a Long Latency Integrity Support Message**
  Blanch, J., Walter, T., Enge, P., Inst Navigat
  INST NAVIGATION.2013: 2605–13
- **A Framework for Analyzing Architectures that Support ARAIM** *25th International Technical Meeting of the Satellite-Division of the Institute-of-Navigation*

Walter, T., Blanch, J., Enge, P.
INST NAVIGATION.2012: 2850–2857

- **Evolving WAAS to Serve L1/L5 Users** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Walter, T., Blanch, J., Phelts, R. E., Enge, P.
  2012; 59 (4): 317-327
- **Evaluation of Multi-Constellation Advanced RAIM for Vertical Guidance using GPS and GLONASS Signals with Multiple Faults** *25th International Technical Meeting of the Satellite-Division of the Institute-of-Navigation*
  Choi, M., Blanch, J., Walter, T., Akos, D., Enge, P.
  INST NAVIGATION.2012: 884–892
- **Advanced RAIM User Algorithm Description: Integrity Support Message Processing, Fault Detection, Exclusion, and Protection Level Calculation** *25th International Technical Meeting of the Satellite-Division of the Institute-of-Navigation*
  Blanch, J., Walter, T., Enge, P., Lee, Y., Pervan, B., Rippl, M., Spletter, A.
  INST NAVIGATION.2012: 2828–2849
- **OPTIMAL POSITIONING FOR ADVANCED RAIM** *International Technical Meeting (ITM) of the Institute-of-Navigation (ION)*
  Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2012: 1624–1631
- **L1/L5 SBAS MOPS to Support Multiple Constellations** *25th International Technical Meeting of the Satellite-Division of the Institute-of-Navigation*
  Walter, T., Blanch, J., Enge, P.
  INST NAVIGATION.2012: 1287–1297
- **Estimating ionospheric delay using kriging: 2. Impact on satellite-based augmentation system availability** *RADIO SCIENCE*
  Sparks, L., Blanch, J., Pandya, N.
  2011; 46
- **Estimating ionospheric delay using kriging: 1. Methodology** *RADIO SCIENCE*
  Sparks, L., Blanch, J., Pandya, N.
  2011; 46
- **A Clock and Ephemeris Algorithm for Dual Frequency SBAS** *24th International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS)*
  Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2011: 2513–2519
- **Evolving WAAS to Serve L1/L5 Users** *24th International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS)*
  Walter, T., Blanch, J., Phelts, R. E., Enge, P.
  INST NAVIGATION.2011: 2495–2504
- **Demonstrations of Multi-Constellation Advanced RAIM for Vertical Guidance using GPS and GLONASS Signals** *24th International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS)*
  Choi, M., Blanch, J., Akos, D., Heng, L., Gao, G., Walter, T., Enge, P.
  INST NAVIGATION.2011: 3227–3234
- **A Proposal for Multi-Constellation Advanced RAIM for Vertical Guidance** *24th International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS)*
  Blanch, J., Walter, T., Enge, P., Wallner, S., Fernandez, F. A., Dellago, R., Ioannides, R., Pervan, B., Hernandez, I. F.
  INST NAVIGATION.2011: 2665–2680
- **Advanced RAIM Demonstration using Four Months of Ground Data** *International Technical Meeting of the Institute of Navigation*
  Choi, M., Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2011: 279–284
- **Optimization of a Vertical Protection Level Equation for Dual Frequency SBAS** *International Technical Meeting of the Institute of Navigation*
  Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2011: 459–463
- **Coverage Improvement for Dual Frequency SBAS** *2010 International Technical Meeting of the Institute-of-Navigation*

Walter, T., Blanch, J., Enge, P.
INST NAVIGATION.2010: 344–353

- **Kriging as a Means of Improving WAAS Availability**
  Sparks, L., Blanch, J., Pandya, N., ION
  INST NAVIGATION.2010: 2013–20

- **Prototyping Advanced RAIM for Vertical Guidance** *23rd International Technical Meeting of the Satellite Division of the Institute-of-Navigation (ION GNSS-2010)*
  Blanch, J., Choi, M. J., Walter, T., Enge, P.
  INST NAVIGATION.2010: 285–291

- **GPS in Mid-life with an International Team of Doctors Analyzing IIF-1 Satellite Performance and Backward-Compatibility** *23rd International Technical Meeting of the Satellite Division of the Institute-of-Navigation (ION GNSS-2010)*
  Gao, G. X., Heng, L., Wong, G., Phelts, E., Blanch, J., Walter, T., Enge, P., Erker, S., Thoelert, S., Meurer, M.
  INST NAVIGATION.2010: 1597–1604

- **Vertical Protection Level Equations for Dual Frequency SBAS** *23rd International Technical Meeting of the Satellite Division of the Institute-of-Navigation (ION GNSS-2010)*
  Walter, T., Blanch, J., Enge, P.
  INST NAVIGATION.2010: 2031–2041

- **Evaluation of Signal in Space Error Bounds to Support Aviation Integrity** *22nd International Technical Meeting of the Satellite Division of the Institute-of-Navigation (ION GNSS-09)*
  Walter, T., Blanch, J., Enge, P.
  INST NAVIGATION.2009: 1317–1329

- **Improved Iono PHMI Calculation for SBAS Systems**
  Mayer, C., Blanch, J., ION
  INST NAVIGATION.2009: 875–80

- **Hysteresis in RAIM** *22nd International Technical Meeting of the Satellite Division of the Institute-of-Navigation (ION GNSS-09)*
  Blanch, J., Mayer, C., Lo, S., Walter, T., Enge, P.
  INST NAVIGATION.2009: 2818–2823

- **Methodology and Case Studies of Signal-in-Space Error Calculation Top-down Meets Bottom-up** *22nd International Technical Meeting of the Satellite Division of the Institute-of-Navigation (ION GNSS-09)*
  Gao, G. X., Tang, H., Blanch, J., Lee, J., Walter, T., Enge, P.
  INST NAVIGATION.2009: 2824–2831

- **Worldwide Vertical Guidance of Aircraft Based on Modernized GPS and New Integrity Augmentations** *PROCEEDINGS OF THE IEEE*
  Walter, T., Enge, P., Blanch, J., Pervan, B.
  2008; 96 (12): 1918-1935

- **Bounding higher-order ionosphere errors for the dual-frequency GPS user** *RADIO SCIENCE*
  Datta-Barua, S., Walter, T., Blanch, J., Enge, P.
  2008; 43 (5)

- **Position Error Bound Calculation for GNSS using Measurement Residuals** *IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS*
  Blanch, J., Walter, T., Enge, P.
  2008; 44 (3): 977-984

- **Future Architectures to Provide Aviation Integrity** *2008 National Technical Meeting of the Institute-of-Navigation*
  Walter, T., Blanch, J., Enge, P., Pervan, B., Gratton, L.
  INST NAVIGATION.2008: 394–401

- **Understanding PHMI for Safety of Life Applications in GNSS** *2007 National Technical Meeting of the Institute-of-Navigation*
  Blanch, J., Walter, T., Enge, P.
  INST NAVIGATION.2007: 305–310

- **Fault Detection and Elimination for Galileo-GPS Vertical Guidance** *2007 National Technical Meeting of the Institute-of-Navigation*
  Ene, A., Blanch, J., Powell, J. D.
  INST NAVIGATION.2007: 1244–1254
- **Galileo-GPS RAIM for Vertical Guidance** *2006 National Technical Meeting of the Institute-of-Navigation*
  Ene, A., Blanch, J., Walter, T.
  INST NAVIGATION.2006: 432–440
- **Bounding Higher Order Ionosphere Errors for the Dual Frequency GPS User** *19th International Technical Meeting of the Satellite Division of the Institute-of-Navigation*
  Datta-Barua, S., Walter, T., Blanch, J., Enge, P.
  INST NAVIGATION.2006: 1377–1392
- **Robust Detection of Ionospheric Irregularities** *NAVIGATION-JOURNAL OF THE INSTITUTE OF NAVIGATION*
  Walter, T., et al
  2001; 48 (2): 89–100