AREAS OF EXPERTISE

- Systems Engineering
- Program Management
- Customer Engagement
- Agile Methodologies
- Statistical Orbit Determination
- GPS Receiver design
- GNSS Simulation
- Space Borne GPS
- Signals of Opportunity
- GN&C/Orbital Mechanics
- Software Defined Radio
- Space Hardware
- Kalman Filter Design
- Patents & IP
- Digital Signal Processing
- Modelling and Simulation
- SBIR Proposal development
- Technical Communications
- Project Budget and Staffing

GN&C/ GNSS SOFTWARE

- Statistical Orbit Determination
- SOCRATES/Plato
- Gipsy/Oasis II
- GEONS
- Satellite Tool Kit

CODING/SCRIPTING

- MATLAB/Simulink
- C/C++
- Fortran
- PERL
- Python

OTHER SOFTWARE

- DOORS
- Perforce
- JIRA
- Confluence
- Microsoft Office
- G-Suite

PROFESSIONAL AFFILIATIONS

- International Council on Systems Engineering
- Institute of Navigation
- Institute of Electrical and Electronics Engineers
- American Astronomical Society
- American Institute of Aeronautics and Astronautics

CONTACT INFORMATION

Kenn L. Gold
6936 Sungold Dr
Colorado Springs, CO 80923
Cell: (720) 841-6331
E-mail: kenngold67@gmail.com

Kenn L. Gold, PhD

https://www.linkedin.com/in/kennlgold

EDUCATION

Ph.D. Aerospace Engineering, University of Colorado, Boulder, Dec 1994
M.S. Aerospace Engineering, University of Colorado, Boulder, May 1991
B.S. Physics, University Southern Colorado, Pueblo, June 1989

SUMMARY

Dr. Gold is a dynamic technology strategist and innovator with deep expertise in GNSS, 5G cellular, and advanced positioning systems. After recently leaving Comtech Telecommunications, Inc., he served as a technical consultant to a confidential Canadian GNSS firm, completing a funding proposal with the European Space Agency and shepherding the company through investor due diligence, and implementation of Agile methodologies. At Comtech, he was a Technical Fellow in the Advance Systems Program, where he defined and implemented a future-focused (1 to 3 year) product and technology roadmap for cellular 5G location solutions. He worked closely with customers (including Verizon, AT&T, Reliance Jio), orchestrating Quarterly Design Reviews and engaging senior technical stakeholders to harmonize emerging 5G and GNSS capabilities. He managed the integration of 5G, GNSS, and related signals into E-911 software for emergency call centers, overseeing requirements, simulations, testing, and integration. He developed RF Signal Pattern positioning, a passive system comparing observed cellular signals to theoretical profiles.

He is an expert in spacecraft GNSS tracking, GPS utilization, and orbital analysis. With over three decades in DoD/NASA research, systems engineering, and team leadership, he has extensive experience in software-defined radio navigation for GNSS. As Principal Investigator on multiple Phase I SBIR contracts—several advancing to Phase II—he guided GPS receiver and simulator development from initial concept to full implementation. He also has extensive publications and teaching experience at graduate and undergraduate levels and expertise in international patent applications and is inventor on 4 patents.

RECENT WORK EXPERIENCE

Comtech Telecommunications Inc., Program Manager Advance Systems
January 2017 to October 2024

- Led CTI's Enterprise Technologies Advance Systems Development Team in creating the Future Product roadmap for cellular 5G location systems
- Led 5G integration planning to support multiple Quarterly Design Reviews with Verizon and AT&T
- Proficient in Agile methodologies (Scrum & Kanban) as Scrum Master, Product Owner, and Development Team Member, utilizing Jira for project management and DOORS for requirements tracking.
- Led the development of the company's RF Signal Pattern (RFSP) cellular power matching based passive location from algorithm prototype to product rollout involving cross-department requirement gathering and design reviews and interface with customer's senior technical and management staff
- Developed requirements and messaging prototype for interfacing with an orbital Real Time Kinematic corrections satellite broadcast system for advanced GNSS applications
- Developed filtering software and test/acceptance plans for transitioning a low-power snapshot GPS receiver from prototype to product for IOT applications.
- Manages a cross-disciplinary team of engineers across Denver, CO; Seattle, WA; Calgary, Canada; Wollongong, Australia, and Mumbai, India.

EARLIER TECHNICAL EMPLOYMENT HISTORY

- **VP, Director of R&D, Lead GNSS Technologist,** *Emergent Space Technologies Inc*., June 2009 to Nov 2016
  - Conducted flight software integration testing, validation, and verification for NASA's Orion Program.
  - Proficient in Agile methodologies (Scrum & Kanban) as Scrum Master, Product Owner, and Development Team Member, utilizing Jira for project management and DOORS for requirements tracking.
  - Performed software-in-the-loop and hardware-in-the-loop testing of flight software GN&C algorithms for EM-1 and EFT-1 missions.
  - Served as Principal Investigator for multiple GNSS-related SBIR contracts.
  - Developed waveform and hardware specifications for a Software Defined Radio-based spaceborne GPS receiver for NASA and DoD missions.
  - Integrated celestial navigation from a commercial star tracker into NASA's GEONS navigation software for Lunar Surface Navigation.
  - Led simulation studies to support GPS receiver selection for the GOES-R satellite program.

- **VP of R&D and Principal Engineer**, *Loctronix Technologies*, January 2005 to June 2009
  - *Led mathematical modeling and testing for a proprietary software-defined radio navigation waveform utilizing GNSS and beacons in a configured environment.*
  - *Managed diverse technical teams at sites in Colorado, Washington, & Tokyo.*
  - *Co-inventor for two patents involving Seamless Positioning (All GNSS, beacons, Cellular CDMA) location systems*

- **VP of Engineering/Chief Technology Officer,** *NAVSYS Corporation,* February 2003 to January 2005
  - *Led engineering efforts and product management from math concept to implementation for a GPS waveform simulator with IMU simulation capabilities using SDR technology.*
  - *Led the development of a SDR Digital Beam Steering Receiver for Higher than GPS Orbits*
  - *Completed extensive technical activities involving next generation GPS navigation systems (coupled GPS/INS, Ultra Tightly Coupled tracking, Beam-forming, RFI and multipath mitigation, network assistance)*

- **VP of Engineering /Chief Technology Officer**, *CyberLocator, Inc.*, January 2002 - January 2003
  Developed Seamless positioning concept and software defined radio technology to utilize GPS and Quasi-Zenith signals along with local S-band beacons for positioning in a warehouse environment. Project was in partnership with a Japanese Aerospace firm and involved program and technical management for team members located in Tokyo, Seattle and Colorado Springs.

- **VP, Director of Intellectual Property and New Business Development**, *CyberLocator Inc.*, Jan1995 – Jan 2002
  Served as a technical interface for a Patent law firm in developing, applying, and awarding 5 patents involving advanced Codeless GPS system designs and methodologies. Aided legal team in defending an earlier patent involving GPS authentication for online gaming against charges of patent infringement.

- **Adjunct Graduate Faculty,** Aerospace Engineering Sciences**,** *University of Colorado*, Boulder, Jan1996-Feb 2003
  PhD committee member, technical oversight, and management for 13 graduate students.

- **Professional Research Associate**, *Colorado Center for Astrodynamics Research*, January 1996 – February 2003
  Developed operational OD analysis system for Digital Globe Early Bird and QucikBird satellites utilizing Microcosm Kalman Filter. Processed GPS data for ionosphere TEC maps and radio occultation studies.

- **Research Associate,** *Colorado Center for Astrodynamics Research*, December 1994 - January 1996
  Worked on pre-launch GPS assessment for Geosat Follow-On. Processed Orbital Topex/Poseidon GPS data in a global network of GPS receivers.

- **Member of Technical Staff**, *Jet Propulsion Laboratory*, June - August 1992
  NASA-JPL Graduate Research Fellow, August 1992 - November 1994
  Led the GPS orbit determination efforts for Extreme Ultraviolet Explorer, which launched with the engineering prototype of the Topex GPSDR. Processed kinematic GPS ocean buoy data in support of altimeter calibration.

- **Lead Software Engineer,** *PFM Consultants*, September 1989- December 1994
  Led the development of a Kalman filter in Fortran 77 and associated hardware for a disposable GPS receiver/translator design for radiosonde weather balloons.

- **Research Assistant** *Center for Astrodynamics and Space Research*, January 1989- August 1989
  Performed precise GPS positioning in support of tectonic motion studies in a Santa Barbara Channel Islands regional network.

- **Research Assistant,** *University of Southern Colorado, Dept. of Physics***,** *September 1985 to January 1989*
  Supported research in laser holography to analyze resonance vibration modes for ultrasonic transducers.

FUNDED RESEARCH

1. "Hybrid Integrity for Precision Guidance and Landing," Navsys Corp., Navy Phase 2 SBIR, $800,000, Principal Investigator, January 2004 – January 2006.
2. "Realtime Body Dynamic Antenna Modeled GPS/JAMMER Simulator for HWIL," Navsys Corp, MDA Phase 1 SBIR, $100,000, Principal Investigator, May 2004 – November 2004.
3. "Completely Integrated Jamming Test System (CIJTS)," Navsys Corp, Air Force Phase 1 SBIR, $100,000, Principal Investigator, May 2004 – November 2004.
4. "Radio Navigation Waveform Experiment." Emergent Space Technologies, Inc., NASA Phase 1 SBIR, $125,000, Principal Investigator, January 2012-December 2012.
5. "Multi-Purpose Radio Signal Generation System." Emergent Space Technologies, Inc., NASA Phase 1 SBIR, Principal Investigator, $100,000, January 2010-December 2010.
6. "Multi-Purpose Radio Signal Generation System," Emergent Space Technologies, Inc., NASA Phase 2 SBIR, Principal Investigator, $600,000, January 2011-December 2012.
7. "TASS-Enhanced Near Earth Navigation System," Emergent Space Technologies, Inc., NASA Phase 1 SBIR, $124,000, Principal Investigator, January 2012-December 2012.
8. "TASS-Enhanced Near Earth Navigation System," Emergent Space Technologies, Inc., NASA Phase 2 SBIR, $699,916 Principal Investigator, selected for Award Negotiation April 2013, but the firm declined.

Dr. Gold has been the Principal Investigator, System Engineer, Technical Lead, or Principal Proposal Author on 23 awarded SBIR projects, including those above, in which he was the lead in all roles.

PATENTS

Mathews, Michael B, Kenn L. Gold, Peter F. MacDoran, "*System and Method for Positioning in Configured Environments"*, *US Patent 7,916,074*, 2011.

Mathews, Michael B, Kenn L. Gold, Peter F. MacDoran, "*System and Method for Positioning in Configured Environments"*, *US Patent 7,511,662*. 2009.

MacDoran, P.F, M.B. Mathews, F.A. Ziel, K.L. Gold, S.M. Anderson, M.A. Coffey, and D.E. Denning. "Method and Apparatus for Authenticating the Location of Remote Users of Networked Computer Systems." *U.S. Patent 5,757,916,* 1996.

MacDoran, P.F., D.B. Call, K.L. Gold, W.S. Schreiner, and F.A. Ziel. "Method and Apparatus for Tracking the Position and Velocity of Airborne Instrumentation." *U.S. Patent 5,347,285,* 1994.

PUBLICATIONS

Doctoral Thesis

GPS Based Orbit Determination for the Extreme Ultraviolet Explorer, December 1994, University of Colorado Boulder, Colorado Center for Astrodynamics Research. *Thesis Advisor*: Dr. George H. Born.

Professional Journals:

1. Mathews, Michael B., MacDoran, Peter F., Gold, Kenn L., "SCP Enabled Navigation Using Signals of Opportunity in GPS Obstructed Environments", *NAVIGATION, Journal of The Institute of Navigation*, Vol. 58, No. 2, Summer 2011, pp. 91-110.

2. Mathews, Michael, Kenn L. Gold, and Peter F. MacDoran, "Testing the limits of Power, A Methodology for Measuring the Power Consumption of Indoor-Outdoor Tracking GPS Receivers, *Inside GNSS*, March 2006.

3. Meek, Matthew, Kenn Gold, Yoola Hwang, Penina Axelrad, George Born, Doug Engelhardt, "Orbit Determination for the QuickBird Spacecraft", *Journal of Spacecraft and Rockets*, January 2003.

4. Thompson, B.F, Cam Meeks, Kenn Gold, George Born, and Penina Axelrad. "Autonomous Orbit Determination for QuickScat." *Journal of Spacecraft and Rockets*, March 2003.

5. Irish, Kelly, Kenn Gold, and three others. "Precision Orbit Determination for the Geosat Follow-On Satellites." *Journal of Spacecraft and Rockets,* Volume 35, May 1998**.**

6. Gold, Kenn, Willy Bertiger, Sien Wu, Tom Yunck, and George Born. "GPS Orbit Determination for The Extreme Ultraviolet Explorer." *Navigation*, Spring 1994.

7. Born, G., M. Parke., P. Axelrad, K. Gold, et.al. "Calibration of TOPEX/Poseidon Altimeter with GPS Equipped Buoys." *JGR*, Special TOPEX issue, December 1994.

Technical Meeting Proceedings:

1. MacDoran,P.F., M.B. Mathews, *Loctronix® Corporation;* K.L. Gold, *Emergent Space Technologies;* J.L. Alvarez, *Southwest Research Institute®* **"**Multi-Sensor, Signals of Opportunity Augmented GPS/GNSS Challenged Navigation**"** ION GNSS-13, Nashville, TN, Sept 16-20, 2013.

2. Handzo, Ryan, Jeffrey Parker, George Born, Kenn Gold, Using Signals of Opportunity in Deep Space Satellite Navigation: Breadth of Coverage and Solution Accuracy, 2013 AAS/AIAA Astrodynamics Specialist Conference, Aug 11-15, 2013, Hilton Head, SC.

3. Handzo, Ryan, Kenn Gold, George Born, Michael Davies, "Using Signals of Opportunity for Deep Space Navigation", Proceedings of the 36th Annual AAS Guidance and Control Conference, Breckenridge, CO, Feb 1-6, 2013.

4. Barbee, Brent W., Alfano, S., Pinon, E., Gold, K, Gaylor, D., Design of Spacecraft Missions to Remove Multiple Orbital Debris Objects, Proceedings of the 35th Annual AAS Guidance and Control Conference, Breckenridge, CO, Feb 3-8, 2012.

5. Gold, Kenn, MacDoran, P.F., Mathews, M.B., "Spectral Compression Processing for Orbital Navigation and Science Applications with Signals of Opportunity, Proceedings of the 34th Annual AAS Guidance and Control Conference, Breckenridge, CO, Feb 4-9, 2011.

6. Brent Barbee, Salvatore Alfano, Kenn Gold, David Gaylor and Elfego Pinon, "Mission design for multi-object Orbital Debris Removal Tours". AAS George H. Born Symposium, University of Colorado, May 14-15, 2010.

7. Gold, Kenn, Alison Brown, and Charles Johnson, "Bi-static Sensing and Multipath Mitigation with a 109 Element GPS Antenna Array and Digital Beam Steering Receiver", ION National Technical Meeting, San Diego, CA, January 2005.

8. Gold, Kenn, Alison Brown, and Charles Johnson, "Performance Testing of an Array of Digital Antenna Elements for Mitigation of Multipath for JPALS Aircraft Carrier Landings", ION National Technical Meeting, San Diego, CA, January 2005.

9. Gold, Kenn and Alison Brown, "Simulation of GPS/INS for Orbit Determination in High Earth Orbits", 2004 Core Technologies for Space Systems Conference, Colorado Springs, CO, November 2004.

10. Gold, Kenn and Alison Brown, "GPS/IMU Navigation and Simulation for Higher than GPS Orbits", Institute of Navigation, 2004 GNSS, Long Beach, CA, September 2004.

11. Gold, Kenn, and Alison Brown , "Characterization of the Multipath and RFI on a Carrier Flight Deck in Support of JPALS", classified session, ION 60th Annual Meeting, Dayton, OH, June 2004.

12. Gold, Kenn, and Alison Brown , "Simulation of GPS and INS Data for Military Receiver Applications", Proceedings of the Joint Navigation Conference, Las Vegas, NV, May 2004.

13. Gold, Kenn, and Alison Brown , "Network Assistance in a Software GPS Receiver Architecture", Proceedings of the Joint Navigation Conference, Las Vegas, NV, May 2004.

14. Gold, Kenn, and Alison Brown , "A Hybrid Integrity Solution for JPALS Precision Landing and Guidance", Proceedings of IEEE Plans, Monterey, CA, Apr. 2004

15. Gold, Kenn, and Alison Brown , “Architecture and Performance Testing of a Software GPS Receiver for Space-based Applications”, Proceedings of IEEEAC, Big Sky, MT, Mar. 2004

16. Gold, Kenn, Alison Brown, “A Software GPS Receiver Application for Embedding in Software Definable Radios”, Proceedings of ION GPS/GNSS 2003, Portland, OR, Sept. 2003.

17. Gold, Kenn, Randy Silva, Rhip Worrell, Alison Brown, “Space Navigation with Digital Beam Steering GPS Receiver Technology”, Proceedings of ION 59th Annual Meeting, Albuquerque, NM, June 2003

18. Gold, Kenn, Alison Brown, Mark Nylund, “A GPS Software Application for Embedding in Software Definable Radios”, MPRG Symposium, Virginia Tech, June 2003.

19. Gold, Kenn, A. Brown “GPS/Inertial Integrity Monitoring for JPALS SRGPS”, JPALS working group, Stanford University, March 2003.

20. Yoon, Yoke T., Michael Watkins, R. Steven Nerem, George Born, Kenn Gold, Gerard L. Kruizenga. “Resolving GPS Integer Phase Ambiguities for Jason-1”, Jason Workshop, CNES, Paris, December 2002.

21. Meek, Matthew, Kenn Gold, Yoola Hwang, Penina Axelrad, George Born, Doug Engelhardt, “Orbit Determination for the QuickBird Spacecraft”, Core Technology Conference, Colorado Springs, CO, Nov. 21, 2002.

22. McLaughlin, Craig, Kenn Gold, and George H. Born. “Altitude Effects on Autonomous Orbit Determination.” *Advances in the Astronautical Sciences, Astrodynamics (*1999): 99-369.

23. Komjathy, A, K. Gold, and G. Born. "A Comparison of Updating PRISM and IRI-95 Using JPL-Derived GIMs for Single Frequency Satellite Altimetry." Presented at the Ionospheric Determination and Specification for Ocean Altimetry and GPS Surface Reflection Workshop, Jet Propulsion Laboratory, Pasadena, California, December 2-4, 1997.

24. Davis, G.W., K.L. Gold, P. Axelrad, G.H. Born, and T.V. Martin. "A Low Cost, High Accuracy Automated GPS-Based Orbit Determination System for Low Earth Satellites." *ION GPS 97*, Kansas City (September 1997): 723-733.

25. Gold, Kenn, George Born, and Rob Markin. “Correction of Ionospheric Effects for a Single Frequency Altimeter.” *Spring 1996 AGU*, Baltimore Maryland, May 1996.

26. Irish, Kelly, Kenn Gold, and seven others. “Precision Orbit Determination for GEOSAT Follow-On and GFO-*2.” AAS Spaceflight Mechanics Conference*, Austin, TX, February 1996.

27. Bertiger, Willy, Thomas P. Yunck, Kenn Gold, Joseph Guinn, Angie Reichert, and Michael Watkins. "High Precision and Real Time Tracking of Low Earth Orbiters with GPS: Case Studies with TOPEX/POSEIDON and EUVE." Invited Talk, *Proceedings of the 3rd Workshop on High Precision Navigation*, Stuttgart, Germany, April 3-5, 1995: 97-107.

28. Gold, K.L., G.H. Born, K. J. Irish, A.K. Reichert, P. Axelrad, and S. Mitchell. “GPS Orbit Determination Accuracy Studies in the Geosat Orbit with GIPSY-OASIS II.” *ION National Technical Meeting*, Anaheim CA, January 18-20, 1995.

29. Gold, K.L., Angie Reichert, Willy Bertiger, Sien Wu, Tom Yunck, and George Born. "GPS Orbit Determination in the Presence of Selective Availability for The Extreme Ultraviolet Explorer.*" Proceedings of Institute of Navigation GPS '94, Colorado Springs*, CO, September 1994.

30. MacDoran, P.F., D.B. Call, K.L. Gold, W.S. Schriener, F.A. Ziel, M.B. Mathews, and S.M. Anderson. “Operational Expendable GPS Sensors for Earth Observation.” *Proceedings of Institute of Navigation GPS '94, Colorado Springs*, CO, September 1994.

31. Parke, M., G.Born, P. Axelrad, K.Gold, and eight others. “The Use of GPS Buoys to Calibrate Altimetric Satellites.” *Proceedings of Institute of Navigation GPS '94, Colorado Springs*, CO, September 1994.

32. Gold, K.L., Willy Bertiger, Sien Wu, Tom Yunck, and George Born. "GPS Orbit Determination for The Extreme Ultraviolet Explorer.*" Proceedings of Institute of Navigation GPS '93*, Colorado Springs, CO, September 1993.

33. Gold, K.L., Willy Bertiger, Sien Wu, Tom Yunck, George Born, Kristine Larson, and Ron Muellerschoen. "A Study of Real-Time GPS Orbit Determination for The Extreme Ultraviolet Explorer.*" Proceedings of Institute of Navigation National Technical Meeting*, San Diego, CA, January 1993.

34. Gold, K.L., W. Bertiger, S. Wu, T. Yunck. "Preliminary Orbit Determination Results for the Extreme Ultraviolet Explorer Mission." *Proceedings AAS Spaceflight Mechanics Conference*, Pasadena, CA, February 1992.

35. MacDoran, P.F., K.L. Gold, and W.S. Schreiner. "A Conceptual Design for A Codeless GPS Receiver for Space Applications.*" Proceedings of AIAA Astrodynamics Conference*, Durango, CO, August 1991.

36. Gold, K.L. "Ghost Busting: The Return From The Dead of PRN 8 Causes Pseudo Range Transients." *Proceedings of Institute of Navigation GPS '90*, Colorado Springs, CO, September 1990.

37. MacDoran, P.F., R.B. Miller, D.C. Jenkins, J. Lemmon, K.L. Gold, W. Schreiner, and G. Snyder. "Codeless GPS Applications to Multi-Path: CGAMP.*" Proceedings of the NASA Propagation Experimenters (NAPEX),* University of Texas, Austin, May 1990.