

**Formulate + design + code + validate operational software for all facets of navigation & tracking**

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[www.facebook.com/pages/Vigil-Inc/118017154946809](http://www.facebook.com/pages/Vigil-Inc/118017154946809)

<http://jameslfarrell.com>

Registered professional engineer

I perform functional formulations and algorithm generation plus validation for both simulation and operational purposes in system integration. Specific areas include navigation, communication, data integrity, and tracking for aerospace, applying modern estimation to data from various sources (COMM, gyros, accelerometers, GPS/GNSS, radar, optical, etc.).

<http://jameslfarrell.com>

**Core Qualifications** (*see website cited above*)

- ✓ Complete design/development capability, including formulation plus coding
- ✓ State space linear algebra, multivariate statistics, morphometric analysis, ...
- ✓ Wide range of applications – avionics, vetronics, shipboard electronics, satellites, projectiles, ...
- ✓ In-depth insight and operational experience with applications of inertial instruments in general
- ✓ Multiple innovations for GPS/GNSS approaches not found elsewhere
- ✓ Breadth as well as depth among myriad navigation and tracking applications
- ✓ Generation of test data to validate system design in simulation and software/firmware at bench.

**Systems and Languages**

I currently use Mac 10.6, retaining Unix-based features from Linux which I had used for for ten years. Vmware provides Windows capability for using programs and tools from all the way back to DOS. I program in C , MATLAB, and Fortran. For C programming I use Xcode.

**Professional Experience**

1957-59      Minneapolis Honeywell: 1)Autopilot circuit test lab  2)Quality Control

1959-60      Bendix-Pacific Div: 1)Circuit design/development  2)Field service

1960-61      Teaching assistant, UCLA

1961-1992    Westinghouse Defense and Space Center, Baltimore MD :

31 years of design, simulation, and validation/test for modern estimation algorithms in navigation and tracking applications. Operational applications include HELRATS phased array radar, B1 radar, SDI track algorithms, F16 AFTI, etc. A sample:

- Test data generation for validation of synthetic aperture radar software and firmware
- Inertial navigation updating and transfer alignment algorithm designs
- Orbit determination, attitude determination, RAE structural deformation programs for NASA
- Director fire control system design for USAF-WPAFB and for U.S. Army, Ft. Monmouth
- Optimization algorithm for missile guidance and launch envelope boundaries
- Design of synchronization, carrier track, and decoding for digital communications.

1993-PRESENT :

VIGIL, Inc. Severna Park MD. Consulting for private industry, DOD, and University research. A recent addition to overall scope: 3-D morphometrics.

## Education

- Bachelor (Electrical Engineering), Marquette Univ., June 1957
- MS (Engineering), UCLA, January 1961
- Ph.D. (Electrical Engineering), Univ. of Maryland , June 1967

## Seminar Teaching

- Navtech (1980s through 2000)
- Various courses on-site and on-campus
- IEEE-PLANS (1990 through 2008)
- Self-sponsored courses
- Most recently – chosen as one of two inertial navigation instructors for courses sponsored by Institute of Navigation at annual ION-GNSS —  
<http://www.ion.org/meetings/gnss2011/tutorials.cfm#InertialNavigation1>  
<http://www.ion.org/meetings/gnss2011/tutorials.cfm#InertialNavigation2>
- 90-minute online introduction to inertial and satellite nav, available at  
<http://www.ion.org/tutorials/> (no cost to ION members).

## Organizations

- Institute of Navigation Fellow; former Air Nav Representative, former Regional VP
- IEEE Life Senior Member; Distinguished Lecturer, AES
- RTCA , Washington D.C., Co-chair of Working group for GPS Integrity, Committee SC159

## Clearance

TOP SECRET until leaving Westinghouse

## Publications

- Book, *Integrated Aircraft Navigation* (Academic Press, 1976; now paperback after 5 printings)
- Book, *GNSS Aided Navigation and Tracking* (2007) –  
extensive excerpt freely viewable online from my website
- 90-minute online basic GPS/Inertial tutorial available from [www.ion.org](http://www.ion.org)
- Collision avoidance (YouTube) at <http://jameslfarrell.com/media/video>
- Chapter in *Advances in Aerospace Systems (pt.3 - Dynamics and Control*, Academic Press, 1990)  
edited by C.T. Leondes
- Chapter in *Avionics Handbook* (CRC Press, 2001 and 2007) edited by Cary R. Spitzer
- Over 80 printed conference and journal manuscripts (*see*  
<http://jameslfarrell.com/published-articles-from-james-l-farrell>)
- Columns in *GPS World*
- Columns in *Inside GNSS*
- Columnist at WASHINGTON TECHNOLOGY during 1980s.