THE UNIVERSITY OF TEXAS AT AUSTIN
College of Engineering
Resume

FULL NAME: **E. Glenn Lightsey** **TITLE:** **Assistant Professor**

DEPARTMENT: **Aerospace Engineering and Engineering Mechanics**

EDUCATION:

Princeton University	Mechanical & Aerospace Engineering	B.S.E., *cum laude*	1986
Johns Hopkins University	Electrical Engineering	M.S.	1991
Stanford University	Aeronautics & Astronautics	Ph.D.	1997

CURRENT AND PREVIOUS ACADEMIC POSITIONS:

Assistant Professor, The University of Texas at Austin, Department of Aerospace Engineering and Engineering Mechanics, June 1999 – present.

OTHER PROFESSIONAL EXPERIENCE:

Aerospace Engineer, NASA Goddard Space Flight Center, Cyrogenics, Propulsion and Fluid Systems Branch, September 1986 – June 1987.

Control System Designer, NASA Goddard Space Flight Center, Guidance and Control Branch, July 1987 – August 1988.

Lead Attitude Control System Engineer, Solar Anomalous and Magnetospheric Particle Explorer (SAMPEX) Spacecraft, NASA Goddard Space Flight Center, September 1988 – June 1991.

Aerospace Engineer, NASA Goddard Space Flight Center, and full-time Graduate Student, Stanford University , June 1991 – November 1996.

Global Positioning System (GPS) Technology Lead, NASA Goddard Space Flight Center, Guidance, Navigation and Control Branch, November 1996 – May 1999.

PROFESSIONAL INTERNET SITE:

http://gps.csr.utexas.edu

CONSULTING:

Stanford University, October 2000 – December 2000
AstroNav Corp., June 2000 – December 2000
Emergent Technologies Corp., March 2002 – June 2002

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:

Member, Institute of Navigation
Senior Member, American Institute of Aeronautics & Astronautics
Member, American Astronautical Society
Member, Aircraft Owners and Pilots Association
Member, Sigma Xi Research Society

PROFESSIONAL SOCIETY AND MAJOR GOVERNMENTAL COMMITTEES, EDITORIAL BOARDS, AND CONFERENCES ORGANIZED/CHAIRED:

Management Council, Space Representative, Institute of Navigation, June 1998 – 2000
Session Chairman, Attitude Systems, Institute of Navigation, GPS-98 Conference, September 1998
Session Chairman, Space Navigation, Institute of Navigation, National Technical Meeting, January 1998, 1999
Guidance and Control Technical Committee, American Institute of Aeronautics & Astronautics, December 1999 - present
Session Chairman, Algorithms and Methods, Institute of Navigation, GPS-2000 Conference, September 2000
Aerospace Technical Committee, International Forum on Automatic Control, August 2001 – present

Area Chairman, Special Topics on GPS, American Institute of Aeronautics & Astronautics, Guidance, Navigation and Control Conference, August 2002
Editorial Advisory Board, *GPS World*, September 2000 - present
Technical Chairman, American Institute of Aeronautics & Astronautics, Guidance, Navigation, and Control Conference, August 2003 (planned)

PROFESSIONAL COMMUNITY SERVICE

High School Site Visit, National Engineering Week, Fredericksburg High School, Fredericksburg, TX, March 2000
Middle School Site Visit, National Engineering Week, Hammond Middle School, Columbia, SC, March 2001
The University of Texas at Austin "Explore UT Day," Booth Exhibit, March 2001, March 2002, March 2003
"Everything You Always Wanted to Know About GPS But Were Afraid to Ask," UT Honors Colloquium, July 2001, July 2002
"GPS For Air Patrol," Civil Air Patrol, May 2002
Elementary School Site Visit, Science Day, Bridgepoint Elementary School, Austin, TX, January 2003

UNIVERSITY COMMITTEES/ADMINISTRATIVE ASSIGNMENTS:

College

Member, Co-op Program Advisors Committee, 2000 – 2002
Member, Dean's ASE/EM Department Chair Search Committee, December 2002 – April 2003

Department

ASE/EM Graduate Area Coordinator (Orbital Mechanics), 2000 – present
Faculty Advisor, American Institute of Aeronautics and Astronautics Student Chapter, 2000 – present
ASE/EM Curriculum Committee, 2002 – present

HONORS AND AWARDS:

First Place, AIAA Northeast Region Conference Presentation, "Design of a Flight Simulator for Spin Analysis," 1986.
First Place, NASA Equal Opportunity Prize, "Design of a General Positioning System for Visually Impaired Persons," 1987.
Goddard Space Flight Center Research and Study Fellowship, 1991-1993.
Best Paper co-author, Institute of Navigation (ION) Conference, ION GPS-94, "Pre-flight Testing of the Spartan GADACS Experiment," September 1994.
Young Engineer of the Year Award, American Institute of Aeronautics and Astronautics (AIAA) National Capital Section, May 1996. In recognition of contributions leading to spacecraft advances using GPS.
Group Achievement Award, Global Positioning System (GPS) Test Facility Design Team, NASA / GSFC, March 1997.
NASA GSFC Center of Excellence, individual award, "In recognition of unique and outstanding contributions to the utilization of Global Positioning System (GPS) technology in space," January 1999
NASA Manned Flight Awareness award, Space Shuttle Mission STS-96, May 1999
Halliburton Young Faculty Excellence Award, College of Engineering, 2000
NASA SOAR Experiment Flight Team Award, August 2001
Aerospace Engineering & Engineering Mechanics Department Teaching Award, May 2003
College of Engineering Award for Outstanding Engineering Teaching by an Assistant Professor, May 2003

PUBLICATIONS:

Refereed Journal Publications

1. Cohen, C. E., Lightsey, E. G., Parkinson, B. W., "Space Flight Tests of Attitude Determination Using GPS," *International Journal of Satellite Comunications*, Vol. 12, December 1994, pages 427-433.
2. Crassidis, J. L., Lightsey, E. G., Markley, F. L., "Efficient and Optimal Attitude Determination Using Global Positioning System Signals," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 22, No. 2, March-April 1999, pages 193-201.
3. Crassidis, J. L., Markley, F. L., Lightsey, E. G., "Global Positioning System Integer Ambiguity Resolution Without Attitude Knowledge," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 22, No. 2, March-April 1999, pages 212-218.
4. Lightsey, E. G., Blackburn, G., Simpson, J., "Going Up: A GPS Receiver is Modified for Space," *GPS World*, Vol. 11, No. 9, September 2000, pages 30-34.
5. Crassidis, J. L., Lightsey, E. G., "Attitude Determination Using Combined GPS and Three-Axis Magnetometer Data," *Space Technology: Journal of the International Forum on Automatic Control,* Vol. 20, No. 4, July 2001, pages 147-156.
6. Um, J., Lightsey, E. G., "GPS Attitude Determination for the SOAR Experiment," *Navigation: Journal of the Institute for Navigation,* Vol. 48, No. 3, Fall 2001, pages 181-194, issued Fall 2002.
7. Montenbruck, M., Ebinuma, T., Lightsey, E. G., Leung, S., "A Real-Time Kinematic GPS Sensor for Spacecraft Relative Navigation," *Journal of Aerospace Science and Technology,* Vol. 6, June 2002, pages 435-449.
8. Lightsey, E.G., Madsen, J.D., "Three Axis Attitude Determination Using GPS Signal to Noise Ratio Measurements," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 26, No. 2, March-April 2003, pp. 304-310.
9. Ebinuma, T., Bishop, R. H., Lightsey, E. G., "Hardware in the Loop GPS Test Facility for Spacecraft Autonomous Rendezvous," *AIAA Journal of Guidance, Control, and Dynamics,* Vol. 26, No. 3, May-June 2003, p. 425-433.
10. Madsen, J. D., Lightsey, E. G., "Robust Spacecraft Attitude Determination Using Global Positioning System Receivers," *AIAA Journal of Spacecraft and Rockets*, April 2003 (accepted).

Refereed Conference Proceedings

1. Lightsey, E. G., Bauer, F. H., "Design and Analysis of a Flexible Body Instrument Pointing System for the GOES Meteorological Satellites," American Institute of Aeronautics and Astronautics (AIAA) 27th Aerospace Sciences Conference, AIAA 89-0542, January 1989.
2. Lightsey, E. G., Cohen, C. E., Parkinson, B. W., "Application of GPS Attitude Determination to Gravity Gradient Stabilized Spacecraft," AIAA Guidance, Navigation, and Control Conference, AIAA-93-3788-CP, August 1993, pages 820-826.
3. Cohen, C. E., Lightsey, E. G., Parkinson, B. W., Feess, W. A., "Space Flight Tests of Attitude Determination Using GPS: Preliminary Results," Institute of Navigation (ION) GPS Conference, ION GPS-93, September 1993.
4. Lightsey, E. G., Cohen, C. E., Feess, W. A., Parkinson, B. W., "Analysis of Spacecraft Attitude Measurements Using Onboard GPS," 17th Annual American Astronautical Society (AAS) Guidance and Control Conference, AAS 94-063, February 1994, pages 521-532.
5. Lightsey, E. G., Cohen, C. E., Parkinson, B. W., "Attitude Determination and Control for Spacecraft Using Differential GPS," Second ESA International Conference on Guidance, Navigation, and Control Systems, April 1994, pages 453-461.
6. Bauer, F. H., Lightsey, E. G., McCullough, J. D., O'Donnell, Jr., Schnurr, R., "GADACS: A GPS Attitude Determination and Control Experiment on a Spartan Spacecraft," International Forum on Automatic Control Guidance and Control Conference, August 1994..
7. O'Donnell, J. R., McCullough, J. D., Lightsey, E. G., Schnurr, R., Jackson, L., "Testing of GPS-Based Attitude Control Systems," International Forum on Automatic Control Guidance and Control Conference, August 1994.
8. Bauer, F. H., Lightsey, E. G., McCullough, J. D., O'Donnell, J. R., Schnurr, R., Class, B., Jackson, L., Leiter, S., "Pre-flight Testing of the Spartan GADACS Experiment," ION GPS-94, September 1994.
9. Lightsey, E. G., Cohen, C. E., Parkinson, B. W., "Development of a GPS Receiver for Reliable Real-Time Attitude Determination in Space," ION GPS-94, September 1994.

10. Bauer, F.H., Lightsey, E. G., Leake, S., McCullough, J. D., O'Donnell, Jr., Hartman, K., Hart, R., "The GPS Attitude Determination Flyer (GADFLY): A Space-Qualified GPS Attitude Receiver on the SSTI-Lewis Spacecraft," ION GPS-95, September 1995.
11. Uematsu, H., Parkinson, B. W., Lightsey, E. G., "GPS Receiver Design and Requirement Analysis for the Stanford Gravity Probe B Relativity Mission," ION GPS-95, September 1995.
12. Lightsey, E. G., Ketchum, E., Flatley, T. W., Crassidis, J. L., Freesland, D., Reiss, K., Young, D., "Flight Results of GPS Based Attitude Control on the REX II Spacecraft," ION GPS-96, September 1996.
13. Lightsey, E. G., Parkinson, B. W., "GPS Based Attitude Determination On Nonaligned Antenna Arrays," ION GPS-96, September 1996.
14. Crassidis, J. L., Markley, F. L., Lightsey, E. G., "Application of Vectorized Attitude Determination Using Global Positioning System Signals," AIAA Astrodynamics Specialist Conference, AIAA-98-4390, August 1998.
15. Bauer, F. H., Hartman, K., Lightsey, E. G. , "Current Status and Future Visions of NASA's Programs in Spaceborne GPS," AIAA Defense & Civil Space Programs Conference, AIAA 98-5272, October 1998.
16. Lightsey, E. G., Campbell, C. E., Carpenter, R., Simpson, J., Davis, G., "Design and Performance of Space Algorithms for the GPS Receiver used on International Space Station and Crew Return Vehicle," International Workshop on Aerospace Applications of the Global Positioning System, February 2000, pages 583-593.
17. Crassidis, J. L., Lightsey, E. G., "Attitude Determination Using Combined GPS and Three-Axis Magnetometer Data," International Workshop on Aerospace Applications of the Global Positioning System, February 2000, pages 522-534.
18. Um, J., Lightsey, E. G., "Space Flight Test Results for the SOAR Experiment," ION GPS-2000, September 2000, pages 2243-2251.
19. Simpson, J., Campbell, C.E., Lightsey, E. G., "Testing Results of the X-38 Crew Return Vehicle GPS Receiver," ION GPS-2000, September 2000, pages 2038-2046.
20. Madsen, J.D., Lightsey, E.G., "Kalman Filtered Signal to Noise Ratio Pointing Vector Algorithm for the Space Station," ION National Technical Meeting, January 2001.
21. Ebinuma, T., Bishop, R.H., Lightsey, E.G., "Spacecraft Rendezvous Using GPS Relative Navigation," AAS/AIAA Space Flight Mechanics Meeting, AAS 01-152, February 2001.
22. Lightsey, E.G., Um, J., "Autonomous Relative Navigation Methods in the Proximity of the International Space Station," Proceedings of the International Symposium on Kinematic Systems in Geodesy, Geomatics, and Navigation, KIS-2001 Conference, June 2001, pages 169-179.
23. Ebinuma, T., Bishop, R.H., Lightsey, E.G., "Hardware-in-the-loop GPS Test Facility for Spacecraft Autonomous Rendezvous," ION GPS-2001, September 2001, pages 2286-2293.
24. Wawrzyniak, G.G., Lightsey, E.G., Key, K.W, "Ground Experimentation of a Pseudolite-only Method for the Relative Positioning of Two Spacecraft," ION GPS-2001, September 2001, pages 1468-1478.
25. Williams, J. Lightsey, E.G., Yoon, S., Schutz, R.E., "Testing of the ICESat BlackJack GPS Receiver Engineering Model," ION GPS-2002, September 2002, pages 703-714.
26. Ebinuma, T., Montenbruck, O., Lightsey, E.G., "Precise Spacecraft Relative Navigation Using Kinematic Inter-Spacecraft State Estimates," ION GPS-2002, September 2002, pages 2038-2046.
27. Montenbruck, O., Lightsey, E.G., Ebinuma, T., Leung, S., "A Differential GPS Systems for Spacecraft Proximity Operations," 5th International ESA Conference on Spacecraft Guidance, Navigation, and Control Systems, October 2002.
28. Ebinuma, T., Lightsey, E.G., "A Closed-Loop Hardware Simulation of Decentralized Satellite Formation Control," AAS Rocky Mountain Section Conference on Guidance and Control, AAS 03-004, February 2003.
29. Lightsey, E.G., Crassidis, J.L., "Real-Time Attitude-Independent GPS Integer Ambiguity Resolution," The John L. Junkins Astrodynamics Symposium, AAS 03-266, May 2003.
30. Monda, E., Lightsey, E.G., Key, K., "An Investigation of GPS Pseudolite Based Relative Navigation," American Astronautical Society Astrodynamics Specialist Conference, August 2003 (accepted).
31. Holt, G.N., Lightsey, E.G., Montenbruck, O., "Benchmark Testing for Spaceborne Global Positioning System Receivers," AIAA Guidance, Navigation, and Control Conference, August 2003 (accepted).
32. Gaylor, D., Lightsey, E.G., "GPS/INS Kalman Filter Design for Spacecraft Operating in the Proximity of the International Space Station," AIAA Guidance, Navigation, and Control Conference, August 2003 (accepted).
33. Bamford, W.A., Lightsey, E.G., "Navigation of Large Autonomously Controlled Formations," AIAA Guidance, Navigation, and Control Conference, August 2003 (accepted).
34. Madsen, J. D., Lightsey, E. G., "Attitude Determination Using GPS Signal to Noise Ration and Carrier Phase Measurements," AIAA Guidance, Navigation, and Control Conference, August 2003 (accepted).

35. Holt, G., Stewart, S., Mauldin, J., Campbell, T., Eckhoff, P. Elmasri, H., Evans, B., Garg, M., Greenbaum, J., Linford, M., Poole, M., Lightsey, E.G., Raja, L.L., Ebinuma, T., "Relative Navigation, Microdischarge Plasma Thruster, and Distributed Communications Experiments on the FASTRAC Mission," AIAA Utah State University SmallSat Conference, August 2003 (accepted).

Other Major Publications

1. Flatley, T. W., Forden, J. K., Henretty, D. A., Lightsey, E. G., Markley, F. L., "On-board Attitude Determination and Control Algorithms for SAMPEX," NASA Flight Mechanics Symposium, May 1990.
2. Lightsey, E. G., "Development and Flight Demonstration of a GPS Receiver for Space," Ph.D. Thesis, Stanford University, February 1997.
3. Crassidis, J. L., Markley, F. L., Lightsey, E. G., Ketchum, E., "Predictive Attitude Determination Using Global Positioning System Signals," NASA GSFC Flight Mechanics Symposium, July 1997.

Book Chapters (Authored/Co-Authored, Edited/Co-Edited)

1. Lightsey, E. G., "Spacecraft Attitude Control Using GPS Carrier Phase," Global Positioning System: Theory and Applications, American Institute of Aeronautics and Astronautics Technical Series, Vol. 2, 1996, pages 461-480.

PATENTS/COPYRIGHTED SOFTWARE:

1. US Patent Number 6,005,514, "Method for Attitude Determination Using GPS Carrier Phase on Nonaligned Antennas," December 21, 1999.

RESEARCH TOPICS

Spacecraft Dynamics and Control, Estimation, Sensor Avionics, The Global Positioning System, Attitude Determination, Relative Navigation, Satellite Constellations and Formation Flight, Satellite Autonomy, Spacecraft Design, Spacecraft Testing.