



DANIEL L. OLTROGGE, MS / AE

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S U M M A R Y

Multi-disciplinary corporate developer and engineer with twenty two years experience in team leadership, corporate relations, people skills, engineering and operations. Extensive support to government, civil, and commercial customers directly resulting in numerous accolades and customer cost savings potentially exceeding \$1 billion. Particular strength in managing multi-disciplinary information and projects leading to risk reduction, cost savings and enhanced operations. Active DoD Top Secret clearance.

Corporate Developer & Administrator

- Proactive, innovative, and visionary
- Proven outstanding written, verbal & graphics skills
- Customer Interface for New Business and Contracts
- Team Building, Training/Mentoring and Leadership

Master Engineer and Simulator

- Systems Engineering; Risk & Anomaly Mgmt
- Modeling, Simulations, Visualization, Analysis
- STK, QualNet, Adobe Creative Suite, ESRI ArcGIS, VS 2005, C++, FTN, APL, MATLAB

P R O F E S S I O N A L E X P E R I E N C E

SKYSENTRY, LLC COLORADO SPRINGS, CO

2005-PRESENT

LEAD SYSTEMS ENGINEER

Engineering expertise to SkySentry LLC (High Altitude Airships & MDA company).

- ❑ Missile flyout modeling, constellation coverage, intercept dynamics, STK simulations.
- ❑ Communications modeling, relay contention, tools interfaces.

1EARTH RESEARCH, LLC COLORADO SPRINGS, CO

2003-PRESENT

CEO AND SENIOR ANALYST

Founder and Senior Analyst of a technical consulting firm leveraging advanced techniques and algorithms from the space industry toward the improvement of both space and terrestrial processes.

- ❑ Flight Operations & Tracking Team Lead for the world's smallest operational satellites.
- ❑ Systems engineering leader on University Nanosat, MEPSI and Aerocube Satellite Programs.
- ❑ Developed international standards in space operations, space debris and astrodynamics.
- ❑ ESRI ArcGIS Business Development for LIDAR software development company.
- ❑ CFO; Contracts Officer; designed/operated multiple computer networks; FSO.

THE AEROSPACE CORPORATION ATRIUM OFFICES, COLORADO SPRINGS, CO

2000-2003

SENIOR PROJECT ENGINEER

2000 - 2003

Lead Technical Analyst in Space Operations Support Office (SOPSO). Provided vision and direction to all phases of SOPSO activities. Effective supervision of resources and innovative ideas and process resulted in improved modeling capabilities, performance assessments and robustness.

- ❑ Won NRO Tier III Award for anomaly investigation and resolution for critical system.
- ❑ Detected and mitigated severe re-contact threat for new National satellite

THE AEROSPACE CORPORATION PETERSON AIR FORCE BASE, COLORADO SPRINGS, CO **1995-1999**

PROJECT ENGINEER

1995 – 1999

Principal Technical Analyst for Air Force Space Command Directorate of Requirements, Requirements Analysis Center. Developed system requirements and independently assessed system performance. Directed requirements tracking, requirements analysis, analysis of alternatives and trade study efforts.

- ❑ Five years Air Force Space HQ executive staff; policy, advocacy, consensus building.
- ❑ Authored proposals. Staffing and delivery. Suspense management. Strategic planning.
- ❑ Requirements tracking between EELV Requirements & Spec. documents (DOORS). Identified unmet and extraneous requirements, saving millions.
- ❑ Led Missile Warning/Space Surveillance Network performance assessment.
- ❑ Engineering team technical lead for advanced analysis tool technologies:
 - Worldwide Radio Frequency (RF) Impingement & Interference software ‘EMTR_RF.’
 - Optimal burn reconstruction and performance assessment tool ‘AVALON.’
 - Conceived & developed nation’s COLA & RFI tool suite “Collision Vision.”
 - Conceived & developed system-of-systems satellite constellation performance assessment tool ‘BLINE’, now a principal National rapid concept assessment tool.

THE AEROSPACE CORPORATION EL SEGUNDO, CA**1985-1995**

ENGINEERING SPECIALIST

1993 – 1995

Lead engineer for high-priority projects.

- ❑ Led numerous operations teams for launch, early orbit, and on-orbit activities.
- ❑ Engineering team leader and principal developer in applying advanced technologies to conceive, create, enhance and maintain analysis software tools to meet customer needs:
 - Developed interdisciplinary, integrated satellite operations tool; adopted by government as their operational spacecraft control software when satellite contractor was unable to develop a similar capability.
 - Created a novel, highly efficient ephemeris reconstruction and satellite tracking tool ‘CPLANE’ that is fifteen times faster and much more accurate than other methods.
 - Pioneered system-of-systems satellite constellation performance assessment tool ‘BSPACE;’ developed industry-unique optimal tasking algorithms, satellite coverage and sensor models. Still in use today by the government as one of their fundamental concept assessment tools.
- ❑ Created innovative covariance-based ground antenna search and acquisition software.
- ❑ Mentored many new engineers and Air Force analysts.

SENIOR MEMBER, TECHNICAL STAFF

1985 – 1993

Satellite orbit analyst and astrodynamics software tool developer. Independently verified software and contractor ascent trajectories for multi-billion dollar programs.

- ❑ Developed integrated numerical 6-Degrees-of-Freedom (position, attitude under full range of perturbations; magnetic and aero-torque spin control) simulations.
- ❑ Created a wide variety of heavily relied-upon in-house analysis tools to support government.
- ❑ Developed antenna signal strength & link analysis software for launch vehicles.
- ❑ Analyzed all facets of launch, early orbit, on-orbit and disposal/reentry operations.
- ❑ Performed telemetry bit stream processing.
- ❑ Recruited new employees for the corporation.

PREMIER INDUSTRIES, INCORPORATED MINNEAPOLIS, MN**1995-2006**

COMPUTER SYSTEMS ADMINISTRATION AND PARTS ASSEMBLY

Systems administrator for Premier's computer network and assembly of Premier machined parts.

- ❑ Configure, install, back up and maintain the company's computer network.
- ❑ Performed torch silver soldering and assembly.

E D U C A T I O N

Small Business Innovative Research Course • *University of Colorado at Colorado Springs* • 2003
 Nx Level Business Development Course • *University of Colorado at Colorado Springs* • 2003
 MS/Aerospace Engr • *Univ. of So. California* • Los Angeles, CA (3.75/4.00 GPA) • 1985 - 1987
 BS/Aerospace Engineering • *Iowa State University* • Ames, IA (3.32/4.00 GPA) • 1980 - 1985

T R A I N I N G

Analytic Graphics, Inc. (AGI) "*Certified Rocket Scientist*" – *STK expert qualified status 2006-2007*
 Satellite Tool Kit Beginner and Advanced Courses • *Analytic Graphics, Inc.* • 1998-2006
 bmdBenchmark Training Course • *Georgia Technical Research Institute* • 2005
 ArcGIS 8.2 Certification Course • *University of Colorado at Colorado Springs* • 2003
 Microsoft Access User's Course • *Peterson Air Force Base* • 1997
 C++, IDL, Computer Graphics, LISP and APL Courses • *Aerospace Technical Inst.* • 1988 – 1997

A W A R D S & P U B L I C A T I O N S

- Recipient of over 40 distinct commendations from government and commercial customers for exemplary performance, distinguished service, critical support and key contributions:
 - Picosatellite Operations Lead for Popular Science's 100 "Best of What's New in 2000"
 - Twice-nominated for President's Award for RF and Collision Avoidance tools development
 - NRO Tier III Award Feb 2002 and two NRO Director's Team Awards (2001 & 2002)
- Authored and presented numerous professional papers for 20 domestic and 5 international conferences, as well as a technical journal article and a commissioned chapter for technical text book, Space Systems Modeling and Simulation. Complete list available upon request.

P R O F E S S I O N A L A F F I L I A T I O N S

- Senior Member, American Institute of Aeronautics and Astronautics
- Member, American Astronautics Society
- International Standards Organization (SC14/TC20, Space Operations)
- Orbital Debris Coordination Working Group (IADC subcommittee)
- Member, Aerospace Engineering Honorary, Sigma Gamma Tau

V O L U N T E E R E X P E R I E N C E

Lectures to elementary students on space, satellites and rockets; Ascension Lutheran Church Social Outreach Director & Computer IT Director; Colorado Opera Festival; Colorado Vocal Arts Ensemble; Colorado Springs Chorale; Interfaith Hospitality Network for Homeless Families; Rainbow Trails Lutheran Summer Camp Maintenance; 1500-mile bicycle tour fund raiser and relief efforts for the Children of The Americas Foundation for under-privileged kids.

REFERENCES FOR DANIEL L. OLTROGGE

| | N A M E | T I T L E | R E L A T I O N - S H I P | P H O N E |
|---|---------------------|---|---|------------------|
| 1 | Thomas J. Lang | Department Head Astrodynamics Dept. The Aerospace Corp. | Previous Manager | 310-336-4307 |
| 2 | Dan Holt | Pastor, Ascension Lutheran Church | Pastor and friend | 719-593-1694 |
| 3 | Dr. David Finkleman | Senior Scientist, Analytic Graphics Inc. | Co-Author, International Standards Organization, Business Partner | 719-573-2600 |

PROFESSIONAL PUBLICATIONS

1. Davis, R. and Oltrogge, D.L., "**Computer Simulation of Orbital Mechanics**", International Astrodynamics Congress, Stockholm, Sweden, October 1985.
2. Oltrogge, D.L., "**Forward Prediction Capability of the NORAD and SCF Propagators for the ITV Mission**," Aerospace Technical Operating Report to ITV Conference, 16 September 1987.
3. Oltrogge, D.L., "**User's Guide to the 6-D SPIN Program**," Aerospace Technical Operating Report, 15 November 1991.
4. Chao, C.C., Strizzi, J.D. and Oltrogge, D.L., Johnson, C.J., and Williams, S.D., "**Improved Reentry Impact Point Prediction Using NORAD Elements and the LIFETIME program**," Paper AAS 94-159, AAS Space Flight Mechanics Conference, Cocoa Beach, Florida, February 1994.
5. Hast, S. L., Oltrogge, D.L. and Hart, M.J., "**A Compact Finite Burn Targeting and Reconstruction Algorithm**," Paper AIAA-94-3744-CP, AIAA Astrodynamics Conference, Scottsdale, AZ, summer 1994.
6. Oltrogge, D. L., "**RF Power Impingement Analysis**," REEF Conference, Chantilly, VA, 1995.
7. Hast, S. L., Oltrogge, D.L. and Hart, M.J., "**Compact Finite Burn Targeting and Reconstruction Algorithm**," Journal of Guidance, Control and Dynamics, Vol. 19, No. 4, July-August 1996.
8. Oltrogge, D. L. and R. G. Gist, "**The Collision Vision Prototype Assessment System**," 16th Space Control Conference at MIT Lincoln Laboratory, April 14-16, 1998.
9. Oltrogge, D. L., "**Launch and On-Orbit RF Power Impingement Characterization**," 16th Space Control Conference at MIT Lincoln Laboratory, April 14-16, 1998.
10. Oltrogge, D. L., "**RF Power Impingement Analysis and Worldwide Characterization**," REEF Conference, Chantilly, VA, 14 Mar 1997.
11. Oltrogge, D.L. and Jamison, James, "**Initial Post-Launch Station Acquisition of Nanosatellites**," Second International Conference on Integrated Micro/Nanotechnology for Space Applications, Pasadena, California, 11-15 April 1999.
12. Oltrogge, D.L., Warner, L. and Joshi, R., "**SSN Optical Augmentation (SOA) Cost Benefits Analysis**," 17th Space Control Conference at MIT Lincoln Laboratory, April 1999.
13. Oltrogge, D. L. and Bustillos, A.C., "**RF Power Impingement Analysis and Worldwide Characterization**," Frequency Managers Group Conference, Baltimore, Maryland, 1999.
14. Gist, R.G. and Oltrogge, D.L., "**Collision Vision: Covariance Modeling and Intersection Detection for Spacecraft Situational Awareness**," Paper AAS-351, AAS/AIAA Space Flight Mechanics Conference, Girdwood, Alaska, August 1999.
15. Oltrogge, D.L. and Gist, R.G., "**Collision Vision: Situational Awareness For Safe And Reliable Space Operations**," Paper IAA-99-IAA.6.6.07, 50th International Astronautical Congress, Amsterdam, The Netherlands, 4-8 Oct 1999.
16. Oltrogge, D.L., "**Covariance-Based Mission Operations**," Stanford University and Naval Post-Graduate Engineering Schools, April 2000.
17. Gist, R.L. and Oltrogge, D.L., "**Aspects of High Fidelity Collision Avoidance Analysis for Space Launch**," 2nd NRO/AIAA Workshop on Space Launch Integration, Chantilly, VA, 3 May 2000.
18. Oltrogge, D.L., "**Aerospace Collision Avoidance Activities**," Center for Orbital Reentry and Debris Studies (CORDS) Technical Forum, The Aerospace Corporation, 1-3 November 2000.
19. Peterson, G.E., Gist, R.G. and Oltrogge, D.L., "**Covariance Generation for Space Objects using Public Data**," Paper AAS 01-113, AAS/AIAA Space Flight Mechanics Meeting, Santa Barbara, California, 11-14 February 2001.
20. Oltrogge, D.L., Raman, K. and Chan, J., "**Experiences with Situational Awareness for Communications Satellite Operators**," Paper AIAA 2001-0075, 19th AIAA International Communications Satellite Systems Conference and Exhibit, Toulouse, France, 17-20 April 2001.
21. Oltrogge, D.L. and Dichmann, D., "**Improved Covariance-Based Search & Acquisition Strategies for Launch & Early Orbit**," 3rd NRO/AIAA Workshop on Space Launch Integration, Chantilly, VA, 23 July 2001.
22. Gist, R.G. and Oltrogge, D.L., "**Risk Management Of Unintentionally Collocated Geosynchronous Spacecraft**," Paper AAS-01-321, 2001 AIAA/AAS Astrodynamics Specialist Conference, Quebec City, Quebec, Canada, 30 July – 4 August 2001.
23. Oltrogge, D.L., "**Collision Avoidance & RF Interference Aspects of Space Situational Awareness**," 2001 Amos Technical Conference, Maui, HI, 10 September 2001.
24. Oltrogge, D.L., "**Spiral Scan Acquisition/Tracking Method for Picosats**," Aerospace Forum on Space Debris, Collision Avoidance, and Reentry Hazards, The Aerospace Corporation, 1-3 November 2000.
25. Oltrogge, D.L., Alfano, S. and Gist, R.G., "**Satellite Mission Operations Improvements Through Covariance-Based Methods**," Paper AIAA 2002-1814, SatMax 2002: Satellite Performance Workshop, Arlington, VA, 22 April 2002.
26. Oltrogge, D.L., "**Satellite Threat Monitoring For Communications Satellite Operators**," Paper AIAA 2002-2020, 20th AIAA International Communications Satellite Systems Conference and Exhibit, Montreal, Quebec, Canada, 12-15 May 2002.
27. Oltrogge, D.L. and Gist, R.G., "**Collision Avoidance and Radio Frequency Interference, Chapter 15 of book entitled, Space Systems Modeling and Simulation (SMSS)**, ISBN 1-884989-15-2, The Aerospace Press/AIAA, 2004.
28. Finkleman, D. and Oltrogge, D.L., "**Progress in International Space and Astrodynamics Standards**," Paper AAS 06-234, 20th AAS/AIAA Space Flight Mechanics Conference, Tampa, FL, 24-26 January 2006.
29. Oltrogge, D.L. and Chao, C.C., "**Standardized Approaches for Estimating Orbit Lifetime after End-of-Life**," Paper AAS 07-261, 2007 AAS/AIAA Astrodynamics Specialist Conference, Mackinac Island, MI, 19-23 August 2007.
30. Finkleman, D., Oltrogge, D.L., Faulds, A. and Gerber, J., "**Analysis Of The Response Of A Space Surveillance Network To Orbital Debris Events**," Paper AAS 08-127, 2008 AAS/AIAA Astrodynamics Specialist Conference, Galveston, TX 27-31 January 2008.

SOFTWARE DEVELOPMENT EXPERIENCE

I created many software tools to perform multi-discipline engineering analyses; for example:

1. **EMTR_RF**, software and utilities I wrote to process a 200,000-emitter worldwide database & compute RF environment experienced by launching and/or on-orbit vehicles;
2. **SPIN** – “Special Perturbations Integration” S/W to integrate orbit and attitude (6 DoF).
 - High fidelity orbit integration, including a blowdown propulsion model;
 - High fidelity attitude integration, (magnetic torquing, ring-dampers, aero torquing);
 - Groundstation contacts with refraction and obscurae;
 - Relative motion and collision assessment;
 - Oltrogge, D.L., “User’s Guide to the 6-D SPIN Program,” 15 November 1991.
3. **OPUS** – Orbit Propagation and Utility Software.
 - Optimal maneuver reconstruction and orbit/covariance propagation;
 - ‘Eigenmorphing,’ the ‘morphing’ of error covariances between known event times to best represent error growth/dynamics during periods of unknown perturbations;
 - Covariance-based antenna scanning and search/acquisition plans;
 - Export of ephemerides, facilities and satellite data for import into STK;
4. **Collision Vision** – I was the project leader in the creation of the official DoD/National launch collision avoidance toolset.
5. **BSPACE, BLINE** – Original programmer and algorithm team member for the system-of-systems constellation performance assessment tool suite, adopted in the NRO Director’s Demo Toolset and used for systems constellation performance assessments for many programs of national significance.
 - Very fast, accurate constellation performance metrics which facilitate optimization;
 - Digitized collector satellite and relay supply times versus on-ground requirements;
 - Probability of Cloud Cover (PCC) using NCAR 10-year climatological model;
 - Conceived & implemented “Valley Fill” optimal accommodation algorithm;
6. **LIMEAWAY** – Created operational satellite attitude selection program.
 - Created digitized attitude representation of higher resolution than the similar implementation in STK attitude model in use today;
 - Used innovative bit-masks to store time-varying constraint violation data;
 - Integrated power, thermal & orbit disciplines into single spacecraft systems model;
7. **RF Interference** – Created Radio Frequency Interference modules for Collision Vision.
 - Carrier over Noise + Interference; detailed 3-D antenna models
8. **Benchmark/STK/QualNet (BSQ) Program Interface** – Co-developing joint simulation environment program which will interface between Benchmark, STK & QualNet S/W.
 - Defined object classes to contain missile, network, event, radar and C2BMC objects;
 - Devised recursive object structure to hold missile parent/child relationships;
9. **“DEbris Breakup from Impact of Engagement (DEBBIE)** – Implemented impact equations based on empirical NASA breakup model.
 - Conservation of mass as well as linear and kinetic energy;
10. **“Computation of Aero-vehicle Ephemeris Subject to Aerodynamic Reactions (CAESAR)** – Airship flight 6DoF model incorporating rudimentary thruster control laws.
 - Incorporates winds aloft based upon random draws of historical data;
 - Waypoint modeling.