

# Ralph Ewig, PhD

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## SPACE LAUNCH SYSTEMS ENGINEERING

### Engineering Management, Launch Vehicle Development, Space Systems Engineering

Results focused engineering manager with excellent communications skills in multiple languages, leading diverse teams of all sizes combining both traditional and entrepreneurial space industry participants. Energetic proposal manager, generating successful proposals for very large procurements in defense and commercial space. Expert launch vehicle analyst, with hands-on insight into every discipline of launch vehicle design. Experienced trajectory analyst, optimizing launch vehicle performance using the full spread of industry tools. One of the world's foremost experts on self-pressurized (VaPak) rocket propulsion, with extensive history in analyzing/testing bi-propellant liquid systems. Principal Investigator for numerous research efforts, including space architecture design/optimization and nuclear rocket propulsion. Resourceful space systems engineer, integrating industry standard analysis tools and developing innovative custom applications. Web tools developer for collaboration and system engineering applications. Prolific author with publications in journals, conferences, industry standards, and online content.

- Engineering management
- Proposal management
- Launch vehicle design / development
- Performance / trajectory analysis
- Self-pressurized (VaPak) propulsion analysis
- Rocket engine development / testing
- Principal Investigator
- Space architecture design / optimization
- Nuclear propulsion design / testing
- Space systems engineering / analysis
- Engineering software development
- Authored 30+ aerospace publications

**Bachelor of Science** University of Washington (Seattle), Aeronautics & Astronautics, 1995

**Master of Science** University of Washington (Seattle), Aeronautics & Astronautics (Plasma Physics), 1997

**Doctor of Philosophy** University of Washington (Seattle), Aeronautics & Astronautics (Space Transportation), 2006

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## PROFESSIONAL EXPERIENCE

HOLDER AEROSPACE (Renton, WA - www.holderaerospace.com)

2005 – Present

### Partner / Chief Engineer (2006 – present)

One of three equal partners; leads all engineering / technical work in support of a wide variety of projects. Clients include large traditional aerospace companies as well as small entrepreneurial space companies, with work funded through NASA, DOE, DOD, and commercial investments. Lead for all in-house engineering development projects.

- Effectively managed multi-million dollar proposal supporting Northrop Grumman Corporation in their bid for the NASA Ares V program; coordinated the entire proposal development and review process on site.
- Supported the Boeing Company on a proposal of developing fly-wheel energy storage systems for mobile defense applications for the Defense Advanced Research Projects Agency.
- Lead several in-house research efforts, including the development of automotive oxidizer/fuel sensor technology from motorsports for rocket applications, and a water launched horizontal take-off / landing RLV.

### Principal / Senior Engineer (2005 – 2006)

Technical lead for all engineering efforts in support of mostly entrepreneurial aerospace clients. Project manager for complex full-scale aerospace systems testing, with very rapid schedules/time-lines and limited resources.

- Performed studies on exploration vehicle fleet reliability and safety aspects in support of Transformational Space Corporation (t/Space) under NASA Program Constellation funding.
- Conducted full scale Crew eXchange Vehicle (CXV) drop test for t/Space off the coast of California using rapid prototyping and low-cost telemetry / avionics providing exceptional value with very limited resources.
- Successfully executed launch vehicle performance analyzes for t/Space and Blue Origin in support of their commercial space launch programs. Trained Blue Origin personnel in the use of trajectory analysis tools.

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AIRLAUNCH LLC (Kirkland, WA - [www.airlaunchllc.com](http://www.airlaunchllc.com))

2006 – 2008

**Project Manager** (2007 – 2008)

Manager and technical lead of all new launch vehicle development programs, integrating teams of large traditional aerospace companies with small entrepreneurial “New Space” firms and in-house personnel.

- Successfully managed a highly diverse group of subcontractors (traditional and entrepreneurial) on large scale conceptual launch vehicle design program funded under proprietary defense organization.
- Effectively managed full-scale launch vehicle development proposal with 11 subcontractors for funding under proprietary defense organization.

**Senior Engineer** (2006 – 2007)

Analysis and full scale testing of LOX/Propane & LOX/Methane bi-propellant rocket engines (30,000 lbf thrust), based on self-pressurization (VaPak) technology. Lead launch vehicle performance analyst for QuickReach SLV.

- Developed a sophisticated analysis tool for bi-propellant self-pressurized (VaPak) rocket systems using MATLAB and OTIS; integrating propulsion system / launch vehicle performance analysis & optimization.
- Effectively communicated highly technical information on launch vehicle performance and propulsion system technology; briefing at all levels of the USAF including the Chief Scientist and four-star Generals.

ANDREWS SPACE (Seattle, WA & Los Angeles, CA - [www.andrewsspace.com](http://www.andrewsspace.com))

2000 – 2005

**Principal Investigator** (2003 – 2005)

Project manager and technical lead for a variety of research efforts funded under government contracts. Responsible for schedule & funds management, using Earned Value Management System and subcontractor oversight.

- Developed the Mini-MagOrion pulsed nuclear propulsion concept under NASA/DOE funding; conducted several magnetic implosion experiments at Sandia National Lab’s Z-machine and Saturn machine.
- Developed the Versatile Space Transportation Architecture (VISTA) under NASA Program Constellation Concept Exploration and Refinement (CENR) funding; extensive systems analysis and optimization.
- Principal participant in the Federal Aviation Administration (FAA) Reusable Launch System safety working group under AIAA oversight; contributed to developing the AIAA RLV Safety standards publication.

**Systems Engineer** (2000 – 2003)

Space system engineer responsible for various analysis tasks for both launch vehicles and spacecraft.

- Designed the solar based power system for the Andrews Space Crew Logistics Vehicle (CLV); including array sizing and selection, energy storage systems trades, and power conditioning system specifications.
- Performed conceptual launch vehicle analysis supporting Northrop Grumman funded under NASA’s 2<sup>nd</sup> Gen RLV / SLI program. Analyzed 30+ launch architectures for performance, operations, and reliability / safety.
- Performed systems / requirements engineering work in support of Orbital Science’s Corporation, funded under the NASA Orbital Space Plane program. Implemented CRADLE application throughout the enterprise.
- Led the development of a Graphical User Interface for the NASA Optimal Trajectories by Implicit Simulation (OTIS) tool; significantly reduced analysis turn-around for all launch-vehicle analysis projects.
- Developed, deployed, and managed a web-based Document Management System (DMS) using HTML, PHP, and MySQL deployed on a Linux server. The DMS allowed file configuration control and sharing for all employees across multiple geographic locations, dramatically improving collaboration.

UNIVERSITY OF WASHINGTON (Seattle, WA - [www.aa.washington.edu](http://www.aa.washington.edu))

1995 – 2000

**Project Engineer** (1998 – 2000)

Project manager / systems engineering lead for university nano-satellite project from onset to Critical Design Review.

- Effectively managed group of 40+ students and coordinated program efforts across three universities.
- Taught several courses on systems engineering and astrodynamics in a university environment.

**Research Assistant** (1995 – 1998)

Aided in construction & operation of various plasma physics experiments investigating magnetically confined fusion.

- Designed/implemented/operated magnetic diagnostic devices on the Helicity Injected Torus II experiment.
- Contributed analysis tools for the use of coaxial helicity injection current drive on the Princeton NSTX.