

**PROFESSIONAL LICENSES**

Washington State Professional Engineer Ref: 35623 99  
Achieve Global Leadership Facilitator Certification 07

**PATENTS**

**Vehicle Condition Monitoring** 04  
A. Trego, E. Haugse, R. Ikegami US 06691007  
**Material Removal Rate Fiber Optic Corrosion Sensor** 00  
E. Udd, A. Trego and E. Haugse US 06144026  
**Structural Health Monitoring Architecture using Sensor Technology** Pending  
A. Trego, E. Haugse, A. Akdeniz, D. Anderson, C. Greenberg US 20060004499

**EDUCATION**

**Mechanical Engineering, Ph. D.**  
SCHOOL Brigham Young University, Provo, Utah 94-97  
DISSERTATION Modeling of Stress Coupled Passively Damped  
Composite Structures in Axial & Flexural Vibration<sup>®</sup>  
GPA 4.0 / 4.0  
**Mechanical Engineering, M. S.** 93-94  
SCHOOL Brigham Young University, Provo, Utah  
THESIS A Comprehensive System for Modeling  
Variation in Mechanical Assemblies  
GPA 4.0 / 4.0  
**Mechanical Engineering, B. S.** 90-92  
SCHOOL Brigham Young University, Provo, Utah  
GPA 3.88 / 4.0, Magna Cum Laude  
SCHOOL Idaho State University, Pocatello, Idaho 88-90  
GPA 3.94 / 4.0

**PROFESSIONAL EXPERIENCE**

**Director** 06 - present  
ATK Aerospace Systems  
Tasks include:

- Developed strategy and team to perform launch services system level engineering.
- Directed system requirements development on launch systems including design, structural analysis, weight management, ICD management, loads and environments and assembly level integration and analysis.
- Led NASA Lunar Lander reconfigurable composite strut project on budget and schedule.
- ATK's interface with JSC's Structures Division in the Engineering Directorate
- College recruiting including interviewing students for prospective jobs and internships and interfacing with both the Society of Women Engineers and American Institute of Aeronautics and Astronautics.

**Manager** 05 - 06  
Becton Dickinson Medical  
Tasks include:

- Supervised and managed professional development of individuals with industrial design, packaging, graphics, BD Identity, molding and physical testing expertise and all associated regulatory compliances across two facilities.
- Developed successful OneCath product line business strategy with integrated technical requirements.

- Managed worldwide CAE effort to achieve a cultural transformation by aligning all engineering personnel to uniform software packages resulting in common processes, increased collaboration, functionality and cost savings.
- Provided regulatory affairs coordination with FDA.

### **Lead Engineer**

03 - 05

Phantom Works - Structures, Boeing

Tasks include:

- Structural IVHM Program Manager for Advanced Support Concepts Thrust. In charge of technology development, budgets, and personnel in a matrixed organization.
- Led the integration of four sophisticated electrical and mechanical aerospace systems (hardware and software) from concept (requirements development) to delivery of certified hardware (prototype) including development of technology and business strategies.
- Aging Aircraft Team Leader for Phantom Works. One of six team leaders across the Boeing Company and the only non-manager of the team leaders. This is an enterprise wide team defining the state of the art in structural life assessment and enhancement, maintenance and utilization of aging aerospace platforms. Responsible for the effective and efficient transition and integration of multiple advanced technologies into robust and reliable methods and practices ensuring the safe operation of Boeing products throughout their economic life.
- Key leader for determining, evaluating and developing important composite designs and new products and feature sets for the 787 with cross-functional team of business development, engineering and airline support. Congruently, a flight qualified battery operated health monitoring system was developed which was retrofitted onto existing commercial airplanes.
- Created technology roadmaps and next generation technology.
- Program manager for joint research effort with Australian government research agencies, CSIRO and DSTO developing corrosion prognostic algorithms.
- Program Manager over several external and internal engineering firms including negotiating contracts, developing customer requirements, setting priorities, budgets and reports.
- Member of various proposal and non-advocate teams.
- Built a global customer base of commercial and military entities to financially support and implement programs.
- Created and managed strategic relationships with international, government, military, commercial and university entities.
- Successfully negotiated and determined strategic direction of new and future technology with senior executives and other external customers such as unions, maintenance crews, and military personnel.
- College recruiting including interviewing students for prospective jobs, scholarships and internships and interfacing with both the Society of Women Engineers and American Society of Mechanical Engineering chapters.

### **Senior Specialist Engineer**

97 - 03

Phantom Works - Structures, Boeing

Tasks include:

- Principal investigator, including liaison, program management and subcontract management, for the X-34 Acoustic Emissions Structural Health Monitoring System Experiment. Provided customer interface, experiment analysis and presentation of final report to NASA Marshall. Integrated a flight qualified experiment onto the X-34 developed by Orbital Science Corporation.

- Principal investigator / technical lead, for the Internal Research and Development program overseeing remote NDI sensor development and autonomous corrosion monitoring for maintenance and modification repairs.
- Program manager / technical lead, including responsibility for statement of work, program budget and scheduling over several fiber optic health monitoring SBIR contracts. Developed new health monitoring technology using fiber optics.
- Assisted in developing a corrosion damage assessment framework for the USAF, including performing crack growth analysis and risk analysis to model fatigue cracking due to corrosion. Interfaced with the customer, maintenance crews and university consultants.
- Through design optimization of composite structures generated over \$360K in saving.
- Corporate wide external point of contact and lead for emergent sensor technology.
- Facilitated several products through FAA and ITAR regulatory compliance issues.
- Extensive cross-group and external company collaboration experience.
- Performed dynamic modal analysis using PATRAN and NASTRAN for various programs including JSF, B-52, Sea Launch, TRAM II, and the Space Station.

**Consulting Engineer**

*01 - Present*

**Injury and Crash Analysis**

Teaching short course for under ride analysis to a variety of disciplines including lawyers, accident re-constructionists and policemen. Provide analysis, consultation, patent litigation and expert testimony regarding fatigue and fracture analysis of materials, finite element analysis, vibration analysis, design analysis, accident reconstruction and accident reconstruction computer modeling.

**Consulting Engineer**

*04 - 06*

**PSI Forensics**

Provide analysis, consultation, patent litigation and expert testimony regarding fatigue and fracture analysis of materials, statistical analysis involving quality control, process flow and regression analysis, finite element analysis, vibration analysis, design analysis, accident reconstruction and accident reconstruction computer modeling.

**Research Assistant, Composites**

*94-97*

**Mechanical Engineering Dept., Brigham Young University**

Developed new modeling tools for analyzing and predicting passive damping in composite structures utilizing a new damping technology. Developed manufacturing methods of novel passively damped composite structures. Tested and designed composite damping structures utilizing this new technology.

**Research Assistant, Tolerance Analysis**

*90-94*

**Mechanical Engineering Dept., Brigham Young University**

Programmed, developed, tested, debugged and marketed AutoCATS, a Computer-Aided Tolerance Modeling System. Wrote users manual and presented software to sponsoring/buying companies.

**ACADEMIC COURSES TAUGHT**

**Adjunct Faculty, Dynamics and Thermodynamics**

*02 - 03*

**Mechanical Engineering Dept., Seattle University**

Taught junior level thermodynamics and dynamics courses to mechanical and civil engineers. Responsibilities included preparing and giving lectures, homework and tests. Student evaluation rating was 4.23 / 5.00.

**Instructor, Integrated Product and Process Engineering** 96-97  
 Mechanical Engineering Dept., Brigham Young University  
 Faculty coach for two 5 person senior student design teams learning a structured design process while each team worked with a company liaison engineer to solve industrially sponsored and financed, two semester long “design and build” projects.

**Instructor, Material Science & Associated Laboratory** 96  
 Mechanical Engineering Dept., Brigham Young University  
 Developed and taught sophomore level materials science course and laboratory for mechanical engineers. Responsibilities included preparing and giving lectures, homework and tests.

**Teaching Assistant, Aerodynamics** 96  
 Aerospace and Mechanical Engineering Dept., Australian Defence Force Academy  
 Taught sophomore engineering drawing class to cadets. Developed and graded homework and design problems for second year aerodynamics design class.

**PROFESSIONAL DEVELOPMENT**

**Appointments**

ABET Aerospace/Mechanical Engineering Evaluator 08-present  
 Professional Development Committee, AIAA 07-present  
 External reviewer for ADFA Mechanical Engineering PHD Thesis 06  
 External Advisory Board, ME Department, Brigham Young University 04-present

**Organizing Committee**

Expanding Your Horizons (Chair) 09, 10  
 SPIE International Symposium on Nondestructive Evaluation 05, 06  
 SAMPE Material Exposition 03, 04  
 Northwest Fiber Optic Society Workshop 03  
 Australian International Aerospace Congress 01

**Session Chair**

Congress on Corrosion in the Military Cost Reduction Strategies 05  
 AEROMAT Conference 04  
 Workshop on Structural Health Monitoring 03  
 Fifth Joint DOD/FAA/NASA Conference on Aging Aircraft 02  
 SPIE International Symposium on Nondestructive Evaluation 00  
 Techniques for Aging Infrastructure & Manufacturing Conference 00

**Short Courses Taught**

ACTAR Approved: Trailer Underride Analysis 02, 08, 10  
 Foundations for Leadership 07- 09

**Short Courses Taken**

Crucial Conversations 08  
 Achieve Global Facilitator Training (management courses) 08  
 Mentoring Techniques 05  
 Object Oriented C++ Programming for Non-C Programmers 03  
 Reconstruction of Trailer Side Underride Analysis 01  
 Behavior Description Interview Training 99, 05  
 Structural Integrity of New and Aging Metallic Aircraft 99  
 Computer Based Modeling for Design Analysis with MSC/NASTRAN 99  
 Hands on Fiber Optics Sensor Course 98  
 Computer Based Modeling for Design Analysis with MSC/PATRAN 97  
 Fatigue, Fracture Mechanics & Damage Tolerance 97

## AWARDS & HONORS

Utah Business "30 Women to Watch"	10
Women Tech Council "Rising Star"	09
Boeing High Potential Team	04
Boeing Pre Management Assessment Program	04
Boeing Achievement Award, 7E7 CAS	03
Employee Appreciation Award, 7E7 Nacelle	03
Boeing Future Leaders Program	03
Employee Appreciation Award, Boeing Sonic Cruiser	02
Employee Appreciation Award, MRB & Liaison	01
Employee Appreciation Award, Phantom Works	01
Boeing Cash Award, Phantom Works	01
ASM Outstanding Technical Presentation	00
Employee Appreciation Award, Boeing Test Facilities	00
National Science Foundation Graduate Fellowship	95-97
Brigham Young University Mechanical Engineering Outstanding Scholar	92
Boeing Undergraduate Scholarship	90-91
Big Sky Academic / Athletic Top Ten Team	89
Sigma Nu Fraternity Scholarship	89
Idaho State University Full Academic Scholarship	88
Society of Women Engineers Freshman Scholarship	88

## PROFESSIONAL SOCIETIES

Women Tech Council (ops committee)	09-present
AIAA (Associate Fellow)	07-present
Tau Beta Pi (service committee member for 3 years)	91-present
Society of Women Engineers (publicity chairman for 3 years)	88-present
WATAI	04-09
American Society of Mechanical Engineers	92-06
ASM International	00-06
Phi Kappa Phi	92-present

## SERVICE / ACTIVITIES

Expanding Your Horizons	09-10
Jr. USAV Girl's Volleyball Coach	04-05
Interlake High School Varsity Volleyball Assistant Coach	01-02
USAV Executive Board Adult Representative	99-00
USAV Women's Volleyball Coach	98-00
Varsity Volleyball (Idaho State University)	88-90
LDSSA Student Organization (service committee member)	88-90

## PRESENTATIONS & PUBLICATIONS

### Peer Reviewed Journals

- A. Trego, et al, 2003, "A Scientific Approach to Side Underride Analysis,"  
**Advances in Vehicle Aggressivity and Compatibility, Side and Rear Impact and Rollover Protection**, SP-1775, Society of Automotive Engineers, Warrendale, PA, SAE Technical Paper No. 2003-01-0178, pp. 41-47, 2003.
- A. Trego et al, 2001, "Axial Passive Damping Testing of Mass Produced Stress Coupled, Co-cured Damped Composites," **AIAA Journal**, Vol. 41, No. 3.
- A. Trego and D. Cope, 2001, "Evaluation of DaDT Lap Joint Analysis Tools," **AIAA Journal**, Vol. 39, No. 12, pp. 2250-2254.

- A. Trego and P. Eastman, 1999, "Flexural Damping Predictions of Mechanical Elements Designed Using Stress Coupled, Co-cured Damped Fiber Reinforced Composites," **Journal of Advanced Materials**, Vol. 31, No. 1, pp. 7- 17.
- A. Trego and P. Eastman, 1997, "Optimization of Passively Damped Composite Structures," **International Journal of Modeling & Simulation**, Vol. 17, No. 4, pp. 284-288.
- A. Trego, D. Olcott, and P. Eastman, 1997, "Improved Axial Damping of Mechanical Elements Through the Use of Multiple Layered, Stress Coupled, Co-cured Damped Fiber Reinforced Composites," **Journal of Advanced Materials**, Vol. 28, No. 2, pp. 28-34.

#### **Journals / Papers**

- A. Trego et al, 2001, "Structural Technology and Analysis Program (STAP) Delivery Order 0004: Durability Patch," **AFRL-VA-WP-TR-2001-3037**.
- A. Trego et al, 2001, "Analysis of Side Underride Crashes Misconceptions and the Problems," **Accident Investigation Quarterly**, Issue 27, summer 2001, pp.17-19.

#### **Peer Reviewed Conferences**

- J. Peterson et al, 2008, "Development and Implementation of a Space Systems Mass Properties Process," **67th Annual Conference of the Society of Allied Weight Engineers, Inc.**, Seattle, WA. May 2008.
- A. Trego and G. Clark, 2005, "Structural Health Monitoring System: from Collection to Analysis," **International Workshop on Structural Health Monitoring**, San Francisco, CA. September 2005.
- A. Trego, et al, 2005, "Development of a Corrosion Diagnostics and Prognostics System," **First World Congress on Corrosion in the Military Cost Reduction Strategies**, Sorrento, Italy. June 2005.
- A. Trego, 2004, "Structural Health Monitoring Technology on Commercial Aircraft II," **European Workshop on Structural Health Monitoring**, Munich, Germany. July 2004.
- C. Greenberg et al, 2004, "Structural Health Monitoring Technology on Commercial Aircraft," **Seventh International Aerospace Corrosion Control Symposium**, Amsterdam, Holland. April 2004.
- A. Trego, 2003, "Installation of the Autonomous Structural Integrity Monitoring System," **International Workshop on Structural Health Monitoring**, San Francisco, CA. September 2003.
- A. Akdeniz et al, 2003, "Structural Health Management (SHM) Technology Implementation on Commercial Airplanes," **Sixth Joint DoD/FAA/NASA Conference on Aging Aircraft Proceedings**, New Orleans, LA. September 2003.
- A. Trego, 2003, "An Update on Monitoring Moisture Ingression with Fiber Optic Sensors," **Sixth Pacific Northwest Fiber Optic Workshop**, Troutdale, Oregon. May 2003.
- A. Trego, 2003, "Monitoring Moisture Ingression with Fiber Optic Sensors," **Sixth International Conference on Sandwich Structures**, Ft. Lauderdale, Florida. March 2003.

- J. Elster, et al, 2003, "Flight Demonstration of Fiber Optic Sensors," **SPIE's International Symposium on Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing Conference Proceedings**, Newport Beach, California. March 2003.
- A. Trego, and D. Smith, 2002, "Battery Operated Health Monitoring System," **Fifth Joint DoD/FAA/NASA Conference on Aging Aircraft Proceedings**, San Francisco, Ca. September 2002.
- D. Banaszak, et al, 2002, "Damage Dosimeter Third Octave and Time History RMS Values," **Joint Statistical Meeting 2002**, New York, NY. August 2002.
- D. Banaszak, et al, 2002, "A Quick Look at Flight Data from a Digital Damage Dosimeter," **ESTECH 2002 Environmental Sciences and Technology**, Mount Prospect, IL. May 2002.
- A. Trego, R. Keller, 2002, "Fiber Optics in Bonded Repairs," **SAMPE 2002 International Symposium & Exhibition**, Long Beach, CA. May 2002.
- E. Hauge, et al, 2001, "Structural Vibration Monitoring for Damped Repair Design," **Third International Workshop on Structural Health Monitoring**, Stanford, Ca, 2001.
- A. Trego, et al, 2001, "Optical Fiber-Based Health Monitoring Systems for Composite Structures," **AIAA Australian International Aerospace Congress**, Canberra, ACT, Australia 2001.
- J. Elster, et al, 2001, "Optical Fiber-Based Adhesive Bondline Monitoring Systems for Composite Patch Systems," **SPIE's International Symposium on Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing Conference Proceedings**, Newport Beach California. March 2001.
- J. Elster, M. Jones, P. Tuloa, A. Trego, and I. Perez, 2000, "Corrosion Monitoring in Aging Aircraft Using Optical Fiber-Based Chemical Sensors," **Fourth Joint DoD/FAA/NASA Conference on Aging Aircraft Proceedings**, St. Louis, Missouri, pp. 13-20.
- W. Schulz, E. Udd, J. Seim, I. Perez, and A. Trego, 2000, "Progress on Health Monitoring of An Adhesive Joint Using a Multi-Axis Fiber Grating Strain Sensor System," **SPIE's International Symposium on Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing Conference Proceedings**, Vol. 3991-9, Newport Beach California.
- E. Udd, et al, 2000, "Use of Transversely Loaded Fiber Grating Strain Sensors for Aerospace Applications," **SPIE's International Symposium on Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing Conference Proceedings**, Vol. 3994-17, Newport Beach California.
- E. Udd, et al, 2000, "Multidimensional Strain Field Measurements Using Fiber Optic Grating Sensors," **SPIE's International Symposium on Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing Conference Proceedings**, Vol. 3986-35, Newport Beach California.
- W. Schulz, E. Udd, M. Morrell, J. Seim, I. Perez, and A. Trego, 1999, "Health Monitoring of an Adhesive Joint Using a Multi-Axis Fiber Grating Strain Sensor System," **SPIE's International Symposium on Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing Conference Proceedings**, Vol. 3586, Newport Beach California, pp. 41-52.

- A. Berens, D. West and A. Trego, 1999, "Risk Assessment of Fatigue Cracks in Corroded Lap Joints," **RTO Applied Vehicle Technology Panel Meeting Proceedings 18: Fatigue in the Presence of Corrosion**, Cedex, France, pp. 21-1 – 21-10.
- D. Cope, A. Trego, and D. West, 1999, "Analytical Framework for Assessment of Corrosion and Fatigue in Fuselage Lap Joints," **Second Joint NASA/FAA/DoD Conference on Aging Aircraft Proceedings NASA/CP-1999-208982/Part1**, Williamsburg, Virginia, pp. 472 – 481.
- A. Trego, E. Haugse and E. Udd, 1998, "Material Removal Rate Fiber Optic Corrosion Sensor," **Fourth Pacific Northwest Fiber Optic Sensor Workshop Proceedings of SPIE**, Vol. 3489, Troutdale, Oregon, pp. 105-109.
- A. Trego, et al, 1998, "Analytical Methodology for Assessing Corrosion and Fatigue in Fuselage Lap Joints," **1998 Air Force Corrosion Program Conference Proceedings**, Macon, Georgia.
- A. Trego, P. Eastman, W. Pratt, and C. Jensen, 1995, "Reduced Boring Bar Vibrations Using Damped Composite Structures," **Proceedings of the 1995 Design Engineering Technical Conferences**, Vol. 3, Part A, pp. 305-311.
- A. Trego, P. Eastman, and C. Jensen, 1995, "Optimization of Passively Damped Composite Structures," **Proceedings of the IASTED International Conference on Applied Modelling, Simulation and Optimization**, pp. 137-141.

#### **Invited Presentations**

- A. Trego, 2010, "Side Underride Analysis," **2010 Combined Annual Conference for Traffic Collision Reconstruction**, Ocean City, MD.
- A. Trego, 2010, "Possibilities," **MESA/STEP/SWE Awards Banquet**, Salt Lake City, Utah.
- A. Trego, 2006, "Reach, Reflect & Redefine," **SWE Regional Conference**, Salt Lake City, Utah.
- A. Trego, 2004, "Autonomous Structural Integrity Monitoring System for Environmental Conditions," **CPAC Conference**, Seattle, Washington.

#### **Presentations**

- A. Trego, 2004, "Structural Health Management: An Overview of Current Research Efforts at Boeing," **ASM Aeromat Conference**, Seattle, Washington.
- K. Cooper, et al, 2004, "Fiber Optic Sensor System for Aircraft Health Monitoring," **ASM Aeromat Conference**, Seattle, Washington.
- A. Trego, 2004, "Autonomous Structural Integrity Monitoring System for Environmental Conditions," **CHTE Conference**, Seattle, Washington.
- A. Trego, 2003, "Autonomous Structural Integrity Monitoring System," **DASCON Conference**, Seattle, Washington.
- R. Ikegami, A. Trego, 2002, "Battery Operated Health Monitoring System," **DASCON Conference**, St. Louis, Missouri.
- R. Ikegami, E. Haugse, and A. Trego, 2001, "Structural Monitoring for Damped Composite Repairs," **ASM Aeromat Conference**, Long Beach, California.

- A. Trego and T. Leeks, 2000, "Damage Detection Techniques Through The Use Of Acoustic Emissions," **ASM Aeromat Conference**, Seattle, Washington. **Outstanding Technical Presentation Award.**
- R. Ikegami and A. Trego, 2000, "Structural Health Management: An Overview of Current Research Efforts at Boeing," **ASM Aeromat Conference**, Seattle, Washington.
- E. Udd, W. Schulz, J. Seim, I. Perez, A. Trego, E. Haugse, 2000, "Nondestructive Evaluation of Adhesive Joints Using Advanced Fiber Grating Strain Sensor Technology," **ASM Aeromat Conference**, Seattle, Washington.
- A. Trego, 2000, "The Use of Fiber Optic Sensors for Health Monitoring of Bonded Repair Structures," **Fifth Pacific Northwest Fiber Sensor Workshop**, Troutdale, Oregon.
- E. Udd, W. Schulz, M. Morrell, J. Seim, I. Perez, A. Trego, 1999, "Structural Health Monitoring of an Adhesive Joint Using a Multi-Axis Fiber Grating Strain Sensor System," **ASM Aeromat Conference**, Dayton, Ohio.
- A. Trego, and K. Chase, 1993, "AutoCATS User's Manual," **Association for the Development of Computer Aided Tolerancing Systems (ADCATS)**, Brigham Young University, Provo, Utah.
- A. Trego, 1995, "Improved Structural Damping of Mechanical Elements Through the Use of Multiple Layered, Stress Coupled, Co-cured Damped Fiber Reinforced Composites," **SAMPE '95 International SAMPE Symposium & Exhibition**, Anaheim, California. **First place: SAMPE National Student Competition for Ph. D. Division.**
- A. Trego, 1993, "Tolerance Analysis," **SAMPE '93 International SAMPE Symposium & Exhibition**, Anaheim, California. **First place: SAMPE National Student Competition for M. S. Division.**