Timothy P. Jung

PhD, PE

Senior Managing Consultant, Director of Aviation

Dr. Jung is the Director of Aviation at Engineering Systems Inc. (ESi), where he uses his aeronautical engineering expertise and experience as a pilot to conduct aircraft accident reconstruction and analysis. He often leads multidisciplinary teams to provide comprehensive explanations about the causes of aviation accidents. He is a skilled analyst of radar, GPS, and ADS-B data. His expertise also includes the analysis of on-board data from flight data recorders, cockpit voice recorders, and avionics. Dr. Jung is frequently retained to reconstruct aircraft flight paths, evaluate aircraft performance, and the status of aircraft systems. In addition to data analysis, Dr. Jung also examines and interprets aircraft wreckage to augment his analysis of aviation accidents.

He joined ESi following a 25-year career in the U.S. Air Force. In the Air Force, Dr. Jung served as an aircraft commander and instructor pilot with over 2,400 flight hours in aircraft ranging from sailplanes to supersonic bombers including the T-1A, the Beech 400 business jet and the B-1B. During his final assignment he taught flight test techniques in the T-41D (Cessna 172). Currently, Dr. Jung holds a commercial and instrument pilot FAA rating for gliders, single-engine and multi-engine aircraft. He also has experience flying Cirrus aircraft.

Dr. Jung has a Ph.D. in aerospace engineering and is a licensed professional engineer in Colorado. He is an accomplished professor and lecturer. He has taught courses in flight test, aerodynamics, aircraft design, and experimental methods at the Air Force Academy and Air Force Test Pilot School. In addition to his aviation work, Dr. Jung has also investigated a wide variety of engineering problems such as the aerodynamics of rope, buildings, structures, and vehicles.

Education

Ph.D., Aerospace Engineering, University of Colorado, 2012

M.S., Aeronautical Engineering, Air Force Institute of Technology, 2005

M.S., Technology Management, South Dakota School of Mines & Technology, 2000

B.S., Aeronautical Engineering, Air Force Academy, 1992

Contact Information

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ESi Denver

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Areas of Specialization

- Aerodynamics, including Transonic Aerodynamics
- Aircraft Accident Reconstruction
- Aircraft Design
- Aircraft Performance
- Aviation Operations
- Fluid Dynamics
- Mid-air Collisions
- Piloting Expertise
- Radar, GPS, ADS-B Analysis
- Thermodynamics
- Wind Tunnel Testing

Licenses & Certifications

- State of Colorado P.E. License No.55109
- FAA Commercial Single Engine, Multiengine and Glider Pilot with Instrument Rating
- FAA Part 107 Remote Pilot Certificate (drones and sUAS)

Positions Held

Engineering Systems Inc., Colorado Springs, Colorado

- Director of Aviation and Senior Managing Consultant, 2022 – present
- Senior Consultant, 2021 - present
- Senior Staff Consultant, 2018 – 2020

USAF Academy, Colorado Springs, Colorado

- Senior Military Faculty, Associate Professor and Instructor Pilot, 2013 – 2018

Ministry of Defense, Kabul, Afghanistan

- Advisor, 2012 – 2013

University of Colorado, Boulder, CO

- Doctoral Candidate, Aerospace Engineering, 2009 – 2012

USAF Academy, Colorado Springs, Colorado

- Aeronautics Laboratory Director, Assistant Professor and Instructor Pilot, 2006 – 2009

Central Command Air Forces, Al Udeid, Qatar

- Deployed Safety and Standardization Liaison Officer, Sept. 2006 – Jan. 2007

Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio

- Graduate Student, Intermediate Developmental Education, 2004 – 2005

Squadron Officer School, Maxwell Air Force Base, Alabama

- Instructor, Assistant Operations Officer, 2003 – 2004

86th Flying Training Squadron, Laughlin Air Force Base, Texas

- T-1A Instructor Pilot, Asst. Ops. Officer, Alternate Wing Inspector General, 2000 – 2003

37th Bomb Squadron, Ellsworth Air Force Base, South Dakota

- Aircraft Commander B-1B Bomber and Mobility Officer, 1996 – 2000

308th Fighter Squadron, USAF Luke Air Force Base, Arizona

- Maintenance Officer, 1994 - 1996

54th Flying Training Squadron, Reese Air Force Base, Arizona

- T-37 and T-38 Student Pilot, 1992 – 1994

Continuing Education

- **Aircraft Propeller Accident Investigation Course - Hartzell Propeller**, 2024
- **Dan Raymer's Aircraft Conceptual Design Short Course**, 2015
- **Air War College**, 2013
- **Air Command and Staff College**, 2003
- **Squadron Office School**, 1998
- **Installation Inspector General Training Course**, 2002
- **AETC Flight Commander Course**, 2001
- **Supervisor Safety Training**, 2001
- **Air Advisor School**, 2012
- **Air Force Academic Instructor Course**, 2003
- **Aircraft Accident Investigation Course (University of Sothern California)**, 2018
- **Cirrus SR20 Transition Training Course**, 2019
- **Lycoming Engines Service School**, 2019
- **Crash Reconstruction for the Engineer (Northwestern University)**, 2022
- **Forensic Engineering: Learning from Failures (Delft University)**, 2022

Professional Affiliations/Honors

American Institute of Aeronautics and Astronautics (AIAA)

- Associate Fellow

Sigma Gamma Tau, Aerospace Engineering Honor Society

- Member

ASTM F44-20 General Aviation Aircraft, Flight Committee

- Member

Tau Beta Pi, Engineering Honor Society

- Member

American Owners and Pilot Association

- Member

Cirrus Owners and Pilots Association

- Member

International Society of Air Safety Investigators

- Associate Member

Afghanistan Training Command

- Bronze Star Medal, NATO

DARPA Innovation

- Challenge Winner

Department of Aeronautics, Air Force Academy

- Outstanding Academy Educator,

B-1B Initial Qualification Course

- Distinguished Graduate

Pilot Training

- Outstanding Second Lieutenant Award

Publications

“Accuracy of Flight Parameters Calculated from Radar and Automated Dependent Surveillance-Broadcast (ADS-B) Data,” **T.P. Jung**, K.M. Greene, K.R. Thobe , M.K. Bauer , and A. Moen, AIAA Journal of Aircraft (accepted, publication pending in 2026).

“Accuracy of Flight Parameters Calculated from Radar and Automated Dependent Surveillance-Broadcast (ADS-B) Data”, **T.P. Jung**, K.M. Greene, K.R. Thobe, M.K. Bauer, A.Z. Moen, AIAA, SciTech Forum, AIAA-2025-1623, 2025.

“Use of Specific Excess Power in Aviation Accident Analysis”, **T.P. Jung**, S.L. Morris, J.H. Slane, R.C. Winn, S.A. Brandt, K.M. Greene, American Institute of Aeronautics and Astronautics, SciTech Forum, AIAA-2021-1337, 2021.

“Quantification of Pressure Fluctuations in a Trisonic Wind Tunnel”, **T.P. Jung**, A.B. Atwood, A.M. Ciccarello, STAI-127-AFA-2A, Supersonic Testing Association International, Bucharest, Romania, 2017.

“Trisonic Wind Tunnel Investigation of Porous Wall Effects on Shock Wave Attenuation”, **T.P. Jung**, M.P. Wilkinson, J.T. McCubbins, J.N. Montgomery, STAI-127 AFA-2B, Supersonic Testing “Association International, Bucharest, Romania, 2017.

"Modified Linear Theory Sonic Booms Compared to Experimental and Numerical Results", **T.P. Jung**, R.P. Starkey, B. Argrow, Journal of Aircraft, Vol. 52, No. 6 September 2015, pp. 1821-1837, doi: 10.2514/1.C033088.

"The Value of Semi-Empirical Analysis Models in Aircraft Design", S.A. Brandt, M. Post, D.W. Hall, F. Gilliam, **T.P. Jung**, and T.R. Yechout, 16th, AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, AIAA Aviation, June 2015. AIAA Paper, 2015-2486, http://dx.doi.org/10.2514/6.2015-2486.

"Lobe Balancing Design Method to Create Frozen Sonic Booms Using Aircraft Components", **T.P. Jung**, R.P. Starkey, and B. Argrow, Journal of Aircraft, Vol. 49, No. 6, December 2012, pp. 1878-1893, doi: 10.2514/1.C031709.

Methodology for Conducting Scaled Sonic-Boom Flight Tests Using Unmanned Aircraft Systems", **T.P. Jung**, R.P. Starkey, and B. Argrow, Journal of Aircraft, Vol. 49, No. 5, September 2012, pp. 1234-1244, doi: 10.2514/1.C031449.

"Modified Linear Theory Aircraft Design Tools and Sonic Boom Minimization Strategy Applied to Signature Freezing via F-Function Lobe Balancing", **T.P. Jung**, PhD. Dissertation, Department of Aerospace Science Engineering, University of Colorado, Boulder, Colorado, August 2012.

"Wind Tunnel Study of Drag of Various Rope Designs", **T.P. Jung**, 27th AIAA Applied Aerodynamics Conference, June 2009, AIAA Paper 2009-3608, http://dx.doi.org/10.2514/6.2009-3608.

"Wind Tunnel Study of Interference Effects Relating to Aft Supersonic Ejection of a Store", **T.P. Jung**, M. Reeder, R. Maple, and J. Crafton, 36th AIAA Fluid Dynamics Conference and Exhibit, June 2006, AIAA Paper 2006-3363, http://dx.doi.org/10.2514/6.2006-3363.

"Wind Tunnel Study of Interference Effects Relating to the Aft Supersonic Ejection of a Store", **T.P. Jung**, Master's Degree Thesis, Department of Aeronautics and Astronautics, Air Force Institute of Aeronautics, Wright Patterson, AFB, OH, December 2005.

Engineering Research Reports

"Investigation of Transonic Stability and Performance of Atlas V Rocket", M. Corey, A. Hood and **T.P. Jung**, Department of Aeronautics, U.S. Air Force Academy, May 2015

"Transonic Wind Tunnel Study of Damaged AIM-9L/M Fins and Comparison to Missile DATCOM", L.C. Barrett, H.W. Kollar and **T.P. Jung**, Department of Aeronautics, U.S. Air Force Academy, December 2015 (For Official Use Only)

"Wind Tunnel Testing to Evaluate Static Stability of SURG Micro Air Vehicle", R. Korkis-Kanaan, J. Laheta, M. Wade, and **T.P. Jung**, Department of Aeronautics, U.S. Air Force Academy, May 2014

"LDV Wake Measurements of a Cyclical Wave Power Energy Converter", F. Baker, S. Bell and **T.P. Jung**, Department of Aeronautics, U.S. Air Force Academy, May 2009

"Supersonic Fin Drag Sensitivity Analysis and Comparison to Missile DATCOM", L. Matthews, C. Wolff and **T.P. Jung**, Department of Aeronautics, U.S. Air Force Academy, December 2007

Presentations

"GNSS in Accident Reconstruction and GNSS Interference", **T.P. Jung**, K.M. Greene, International Underwriters Association NextGen Aviation Conference, London, October 2024

"The Use of Virtual Reality in Accident Reconstruction", **T.P. Jung**, S.L. Morris, and B. Winn, ATS-2018 American Institute of Aeronautics and Astronautics Rocky Mountain Section Annual Technical Symposium, October 2018

"Supersonic Testing Capabilities at the US Air Force Academy – Trisonic Wind Tunnel and Ludwieg Tube", T. Hayden, **T.P. Jung** and E. Stevens, Supersonic Tunnel Association, International, 2015

"Wind Tunnel Stability Test of SURG MAVs at Low Reynolds Numbers", **T.P. Jung**, R. Korkis-Kanaan, J. Laheta, and M. Wade, AIAA-Rocky Mountain Section Annual Technical Symposium, Colorado Springs, October 2014

"Wind Tunnel Study of Interference Effects Relating to Aft Supersonic Ejection of a Store", T.P. Jung, Dayton Engineering Sciences Symposium, October 2005

Project Experience

Investigations

Aviation

- Reconstructed the mid-air fatal collision between a Piper Cub and Cessna 208 Caravan using ADS-B and handheld GPS data. Oversaw the creation of a 3D simulation, which allowed viewers to understand visually what the pilots should have seen and how they could have avoided the collision.
- Conducted an in-depth system analysis of a military helicopter fatal accident. Analyzed systems and Flight Data Recorder (FDR) data and Cockpit Voice Recorder (CVR) to demonstrate that the accident was not caused by a system failure. Refuted complaint that the OEM's design was flawed.
- Analyzed the aerodynamic penalty from paint imperfections on Extra 300 high-performance aerobatic aircraft. Showed that the paint did not change the stall characteristics or create a hazard, nor did it cause the alleged Extra 300 hull damage.
- Led a multidisciplinary team that used photogrammetry to evaluate the takeoff performance of Mooney M20K accident that was captured on video. Also, analyzed dynamometer data to demonstrate how the fuel, magneto and propeller governor settings affected engine power. Used propeller sound from cellphone video to estimate engine RPMs. Evaluated the repairs and airworthiness of the aircraft. Presented results to jury and explained that the slow acceleration discovered in the photogrammetry was caused by improper engine settings.
- Investigated a P-47 Warbird accident. Analysis of engine damage showed that the malfunction was not caused by poor oil maintenance.

- Instrumented a Cessna 172 with external sensors and cameras and put the aircraft in “Experimental” status. Piloted the aircrafts during tests. Showed the airflow around the brakes cleans the brakes of asbestos particles.
- Investigated a small Unmanned Vehicle (sUAS) or “drone” accident. Examined drone flight data and system data. Demonstrated that the drone did not have a design defect, and the accident was caused by the carelessness of the operator.

Engineering

- Performed aerodynamic analysis on the effects of crosswinds on ground vehicles. Integrated Computational Fluid Dynamics (CFD), wind tunnel, and theoretical data into a database. The database was used by Dr. Jung to author a MATLAB computer program, which predicts the movement of ground vehicles caused by wind. Evaluated various designs and configurations to determine at what point a crosswind would tip a vehicle over Dr. Jung’s work allows safe operation in high winds without fear of a serious incident.
- Conducted thermodynamic analysis of carbon dioxide storage bottles. Conducted testing with instrumented bottles to demonstrate that a user can overpressure the bottles and cause them to burst.