LOUIS A. D'AULERIO, BAP
PROFESSIONAL BIOGRAPHICAL OUTLINE

AREAS OF SPECIALTY

Mr. D'Aulerio consults as an Occupant Crash Protection expert for ARCCA, Incorporated. Additional areas of expertise include:

- Computerized Crash/Motion Simulation
- Human Subject Crash Testing
- Air and Vehicle Safety Analysis
- Crash Investigation and Analysis
- Occupant Kinematics
- Injury Mechanism Analysis
- Crash Survivability Research
- Occupant Restraint Systems Research
- Safety Product Design and Development

BACKGROUND

Mr. D'Aulerio earned a BA in Physics from LaSalle College, and attended Pennsylvania State University for graduate courses in Engineering Science. He is highly qualified as a crashworthiness and crash safety expert with a focus on occupant crash protection. He has gained in-depth knowledge and extensive experience in computer simulation of human response to impact and inertial crash forces. He has spent his 35+year career in the design, development, test, computer simulation and analysis of occupant crash protection systems. He is co-inventor of three patents for seat and safety devices for passenger vehicles, and has authored several technical papers addressing his areas of expertise.

SUMMARY OF EXPERIENCE

- Played a primary role in the validation of one of the first crash victim simulation programs (BIOMAN)
- Developed two- and three-dimensional computer models of ejection seats and corresponding occupant crash motion, which are used extensively to analyze and evaluate escape system performance and in crash injury predictions. This validation was based on extensive testing with both crash dummies and human volunteers.
- Applied this unique experience to the development and improvement of seating and restraint systems used in both crash and ejection environments
- Participated in Navy programs to analyze and evaluate a practical design for a common ejection seat for several aircraft, as well as the F/TF-18 Escape System Improvement Program
- Designated as Systems Integrator for the Navy in the development of a systems-engineered cockpit, centered on the requirements of the human operator with strong emphasis on crash survivability

EDUCATION

- B.A. Physics, LaSalle College, 1975
- Various Government computer courses, 1976 – 1979
- Mathematics of Operations Research, NADC, Warminster, PA, May 1978
- Geometric Modeling and Computer Graphics, University of Michigan, May 1979
- Graduate Courses in Engineering Science, Pennsylvania State University, 1981 – 1985

- DYCAST Workshop – A Finite Element Program for Crash Analysis of Structures, NASA Langley, April 1982
- SOMLA Workshop – Computer Simulation of Aircraft in a Crash Environment, FAA Pomona, September 1982
- Dynamic Sensor Technology, Institute of Environmental Sciences, May 1983
- Decelerator Systems Engineering, University of Minnesota at SANDIA, July 1985
- Advanced Management of Engineering Projects, Drexel University, May 1987
- Systems Engineering Management Course, Defense Systems Management College, March 1989

PROFESSIONAL EXPERIENCE

Consultant, Present
Senior Crashworthiness and Crash Safety Expert, August 1991 – December 2017
ARCCA, Incorporated, Penns Park, PA

- Investigates cause of vehicle crashes, occupant injury, and human response to applied crash forces
- Provides engineering support for Government and private industry projects
- Analyzes failed vehicle components and assesses defective conditions
- Utilizes computer modeling to evaluate occupant seat and restraint systems for both ground and air vehicles that experience single- or multi-axis crash loading

Seating and Restraint Engineer, February 1976 – July 1991
Naval Air Development Center, Warminster, PA |

- Led validation efforts of the first crash victim simulation program
- Pioneered the use of mathematical simulations to analyze and evaluate human kinematics and response characteristics under crash and ejection conditions
- Developed both two- and three-dimensional computer models of ejection seats and the corresponding occupant crash motion, which are used extensively in the analysis and evaluation of escape systems performance and in crash injury prediction
- Developed a model to predict the dynamic shift of the human body's center of gravity when exposed to crash forces, based on extensive testing with crash dummies and human volunteers
- Directed the Navy Aircrew Common Ejection Seat program
- Analyzed and evaluated seat design and integration to provide a common ejection seat for various military aircraft
- Was instrumental in the development of a systems-engineered cockpit centered on the requirements of the human operator with strong emphasis on crash survivability
- Participated in two Navy programs, resulting in the development of inflatable restraints for fighter/attack aircrew. Responsible for the Escape System Improvement Program for military aircraft.

PROFESSIONAL AFFILIATIONS

- American Society of Mechanical Engineers (ASME)
- Society of Automotive Engineers (SAE)
- The SAFE Association
- Department of Defense Tri-Service Aircraft Seat Standardization Committee, (1982-1989)

PATENTS AND PETITIONS

- Co-author and signer of ARCCA, Incorporated's Petition to NHTSA on FMVSS 207: ***Petition to Amend 49 CFR 571.207, FMVSS 207-Seating Systems*** (September 28, 2015).
- Co-inventor of Dual Stage Variable Load Energy Absorber for Vehicle Seating, U.S. Patent No. 8,439,420B2, issued May 14, 2013.
- Co-inventor of Dual Stage Variable Load Energy Absorber for Vehicle Seating, U.S. Patent No. 8,162,374B2, issued April 24, 2012.
- Co-inventor of Seat-Mounted Occupant Crash Protection System, Patent No. 6,155,601, issued December 5, 2000.
- Co-inventor of Vehicle Safety Seat System, Patent No. 5,553,924, issued September 10, 1996.

PUBLICATIONS

D'Aulerio, Louis, Whitman, Gary, Sicher, Larry, Cantor, Alan, Markushewski, Mike. (2018): Forensic Performance Analysis of Load-Limiting Devices in Automotive Seat Belt Retractors, Journal of Forensic Sciences, DOI:10.1111/1556-4029.13955.
**Chosen by the JFS Associate Editors and Editor-in-Chief as a 2019 Noteworthy Article*

Gary R. Whitman, Dave Scott, **Louis D'Aulerio**, Larry Sicher, Brian Benda, Dennis Shanahan & Alfred Finch (2015): Rollover testing with volunteer live human subject, International Journal of Crashworthiness, DOI:10.1080/13588265.2015.1027563

Whitman, G., A.V Hart, L. Sicher, B.J. Benda, and **L. D'Aulerio,**(2013) *Minimizing the Risk of Lap/Shoulder Belted Children Submarining the Lap Belt*. Proceedings of the 23rd ESV Conference. May 27-30, 2013.

Whitman, G., A.V Hart, L. Sicher, B.J. Benda, and **L. D'Aulerio** (2013) *Rear-Facing Child Safety Seat Performance in Frontal NCAP Level Crashes*. Proceedings of the 23rd ESV Conference. May 27-30, 2013.

Whitman, G., **L. D'Aulerio**, B.J. Benda, and L. Sicher. (2012) *Considerations for Optimizing Occupant Protection to Children in Side Impact Crashes*. Proceedings of the ICRASH 2012 Conference. July 18-20, 2012.

Burton, J., S. Kumar, P. Lewis, **L. D'Aulerio**, et al. (2010). *Biomechanical Analysis and Injury Prevention in Off-Highway Vehicular Crashes*. Rocky Mountain Bioengineering Symposium & International ISA Biomedical Sciences Instrumentation Symposium, Laramie, WY, April 9, 2010.

Yannaccone, J., G. Whitman, L. Sicher, **L. D'Aulerio**. (2006). *Analysis of Nij in Simulated Real-World Crashes with a 3-year-old Hybrid-III*. International Journal of Crashworthiness, 2006 Vol. 11 No. 5.

Benda, B.J., **L. D'Aulerio**, et al. (2006). *Performance of Automotive Seat Belts During Inverted (-Gz) Rollover Drop Tests*. ICRASH 2006-International Crashworthiness Conference, Athens, Greece.

Cantor, A., M.L. Markushewski, **L. D'Aulerio**, et al. (2005). *When Driver Safety Fails-Then What? Vehicular Accident Analysis: The Big Picture-The Risk Benefit Analysis of Seating System Design*. ASSE National Conference, New Orleans, Louisiana, June 2005

Sicher, L.A., G.R. Whitman, **L. D'Aulerio**, et al. (2002). *Lateral Restraint for Children*. SAFE Association's 40th Annual Symposium.

Whitman, G., **L. D'Aulerio**, et al. (2002). *Children In Rollover Crashes*. Biomedical Engineering: Recent Developments, Medical and Engineering Publishers, Inc.

Sicher, L.A., G.R. Whitman, J.R. Yannaccone, **L. D'Aulerio**, et al. (2001). *Lateral Restraint: Comparison of Lap/Shoulder Belt vs. Lap/Shoulder Plus Supplemental Shoulder Belt Restraint Systems*. SAFE Association's 39th Annual Symposium.

Sicher, L., J. Yannaccone, **L. D'Aulerio**, et al. (2000). *Occupant Protection During Rollover Events*. SAFE Association 38th Annual Symposium.

Joganich, T. G., M. L. Markushewski, A. Cantor, **L. D'Aulerio**, et al. (2000). *Effect of Cognitive Workload on Automatic Restraint System Usage* (SAE 2000-01-0174). Selected for inclusion in SAE Transactions. SAE 2000 World Congress. Detroit, MI, Society of Automotive Engineers.

Sicher, L.A., G.R. Whitman, J.R. Yannaccone, **L. D'Aulerio**, and A. Cantor. (2000). *Common Occupant Crash Protection for Army Wheeled Trucks* (SAE 2000-01-1395) Selected for inclusion in SAE Transactions. SAE 2000 World Congress, Society of Automotive Engineers.

Whitman, G.R., J.R. Yannaccone, F.A. Bandak, L. Sicher, **L. D'Aulerio**, et al. (1999). *A Method for the Assessment of Tethered and Untethered Child Restraint Systems using Hybrid III Three Year Old Dummy*. Injury Biomechanics Research, Proceedings of the Twenty Seventh International Workshop, San Diego, CA, October 24, 1999.

Whitman, G. R., K.A. Brown, A. Cantor, **L. D'Aulerio**, et al. (1997). *Booster-with-Shield Child Restraint Case Studies* (SAE 973307). Society of Automotive Engineers, Second Child Occupant Protection Symposium (special joint session sponsored by Stapp, AAAM, and IRCOBI). Lake Buena Vista, FL.

Markushewski, M. L., A. Cantor, W.H. Muzzy III, **L. D'Aulerio**, et al. (1997). *Assessment of Asymmetrical Anchor Points and Load-Limiting Loops with the Lap Portion of Automotive Occupant Restraints*. SAFE Association's 35th Annual Symposium.

Eisentraut, D. K., W. H. Muzzy III, A. Cantor, **L. D'Aulerio**, et al. (1997). *Assessment of Timely Retractor Lockup in Automotive Seat Belt System* (SAE 971515). Warrendale, PA, Society of Automotive Engineers.

Cantor, A., W. H. Muzzy III, D.K. Eisentraut, **L. D'Aulerio**, et al. (1995). *Assessment and Control of Dynamic Overshoot with Automotive Seating During Vertical Impacts* (SAE 951084). Proceedings of the IX International Conference on Vehicle Structural Mechanics and CAE. Troy, MI, Society of Automotive Engineers.

Cantor, A., W. H. Muzzy III, D.K. Eisentraut, **L. D'Aulerio**, et al. (1994). *Occupant Dynamic Response to Vertical Acceleration (+Gz) With Automotive Seating*. Proceedings of the November 1994 Materials Technology for the 21st Century International Congress and Expo. Chicago, IL.

Muzzy, W. H., A. Cantor, D.K. Eisentraut, **L. D'Aulerio**, et al. (1993). *Seat Back Yielding and Collapse: A Danger to Occupants During Real World Collisions*. 1993 Bioengineering Conference, American Society of Mechanical Engineers.

D'Aulerio, L. and P. Yost. (1990). *Navy Aircrew Common Ejection Seat (NACES) Program Summary*. SAFE Association's 28th Annual Symposium.

D'Aulerio, L. and P. Yost. (1987). Inflight Testing of the Navy Aircrew Common Ejection Seat (NACES). SAFE Association's 25th Annual Symposium.

D'Aulerio, L. and P. Yost. (1984). *Development of a Generalized Escape System Simulation Computer Program*. SAFE Association's 22nd Annual Symposium.

D'Aulerio, L. (1982). *Development of a Continuous Mode Sequencing Concept for Ejection Seats*. SAFE Association's 20th Annual Symposium.

Frisch, G.D. and **L. D'Aulerio**. (1982). *Instrumentation Requirements for Assessing Occupant Response to Three Dimensional High Acceleration Environments*. AGARD Conference Proceedings No. 322.

Frisch, G.D. and **L. D'Aulerio**. (1981). *A Standardized Instrumentation Methodology for Assessing Ejection Seat Performance*. SAFE Association's 19th Annual Symposium.

D'Aulerio, L. and G.D. Frisch. (1981) *Investigation of the Motion of the Center of Mass of an Occupant under Ejection Accelerations*. SAFE Association's 19th Annual Symposium.

Frisch, G.D. and **L. D'Aulerio**. (1980). BIOMAN*: An Improved Occupant-Crew Station Compliance Modeling System*. Aviation Space Environmental Medicine, 51(2):160-167.

Frisch, G.D. and **L. D'Aulerio**. (1979). *Crew Station Assessment Using the BIOMAN Modeling System. SAFE Association's 17th Annual Symposium*.

Tyburski, J.J., G.D. Frisch, **L. D'Aulerio**. (1979*). Low Level, Adverse Attitude Escape Using a Vertical Seeking Seat*. AGARD Conference Proceedings No. 267.

Frisch, G.D., J. O'Rourke, **L. D'Aulerio**. (1977). *Mechanism of Head and Neck Response to Gx Impact Acceleration: A Math Modeling Approach*. Aviation Space Environmental Medicine, 48(3):223-230.

Frisch, G.D., J. O'Rourke, and **L. D'Aulerio**. (1976). *The Effectiveness of Mathematical Models as Human Analogs* (SAE 760774). Society of Automotive Engineers, Warrendale, PA.

AWARDS AND RECOGNITIONS

- PMRS Performance Awards for 1986, 1987, 1988, 1989
- Letter of Commendation from VF-126, Miramar, for Computer Trajectory
- Letter of Commendation from NASA, Houston, for Computer Analysis of Crew Escape System for the Space Shuttle, December 1988
- Quality Step Increase (QSI), June 1984
- Outstanding Performance Award, March 1979
- Analysis in Support of Aircraft Accident Investigation, March 1976