



ALAN CANTOR, B.S.A.E. PROFESSIONAL BIOGRAPHICAL OUTLINE

BACKGROUND

Occupant crash protection expert, specializing in system design, human tolerance, occupant kinematics, crash safety, crash survival and life-support engineering. Areas of expertise include research, analysis and improvement of ground and air vehicle occupant seating systems, seatbelts, impact protection devices, inflatables, ejection seats, and escape capsules, crashworthiness, and occupant motion. Extensive experience in human tolerance and simulation, management of engineering staff, particularly in the area of automotive and aircraft crash injury.

ACADEMIC BACKGROUND

B.S. Aerospace Engineering, Pennsylvania State University, 1972

PROFESSIONAL EXPERIENCE

1999 – Present | ARCCA, Incorporated | Chief Executive Officer

- Conducts technical evaluation related to crash survival
- Performs corporate functions related to quality and effectiveness of the organization, at the direction of the Board

September 1987 – 1999 | ARCCA, Incorporated | President

- Led the company in its efforts to improve occupant safety and crash protection for both adults and children
- Served as technical expert in matters involving occupant crash injury and component design, particularly seats, seatbelts, impact protection devices, and other restraint systems
- Directed engineering staff in crash investigations, accident reconstruction, safety product design and injury mechanism analysis projects
- Led protocol development for human subject crash testing
- Participated in research projects related to improving occupant crash survival and safe restraint system design concepts

June 1972 – August 1987 | Naval Air Development Center | Engineer

- Manager of Seating and Escape Branch
- Responsible for technical direction
- Led efforts in research and product development, test and evaluation, design, simulation and engineering functions related to crash survivability
- Directed research and development staff of engineers and scientists in projects concerning occupant protection during crashes and ejections
- Efforts included mishap investigation, resulting in defect corrections, and major escape and restraint system developments
- Conducted crash tests, human subject tests, dynamic ejection tests, and automotive restraint tests

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, May 14, 2013.
- Co-inventor of Dual Stage Variable Load Energy Absorber for Vehicle Seating, U.S. Patent No. 8,162,374B2, April 24, 2012
- Co-inventor of Vehicle Safety Seat System in Passenger Vehicles, PCT/US98/27318, U. S. Patent No. 6,520,541 B1, February 18, 2003
- Co-inventor of Seat-Mounted Occupant Crash Protection System, U.S. Patent No. 6,155,601, December 5, 2000
- Co-inventor of Vehicle Safety Seat System in Passenger Vehicles, UNNS, 08/339,859, Patent No. 5,553,924, September 10, 1996
- Co-inventor of Deployment Sequence Mode Selection System for Aircraft Ejection Seats, U. S. Patent No. 4,527,758, July 9, 1985

PEER REVIEW LEARNED TREATISES

Occupant Crash Protection Handbook for Tactical Ground Vehicles (Light, Medium & Heavy)
November 15, 2000, Department of the Army

Allied Nations Air Standardization Coordinating Committee (ASCC) (Working Party 61), Ejection through the Canopy, 1985

Mil-S-18471G (AS) Military Specification for Aircrew Automated Escape System, Ejection Seat Type,
June 8, 1983, Department of the Navy

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*

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

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

Yannaccone, J. R., **Cantor, A.E.**, Eisentraut, D.K., Denham, W. Sicher, L.A., *Occupant Protection from Cargo in Armored Vehicles*, SAE 2005 World Congress, Detroit, Michigan, SAE 2005-01-0879, April, 2005. Selected for inclusion in SAE Transactions 2005.

Yannaccone, J. R., Sicher, L. A., and **Cantor, A.**, *Development of a Buckle Release Test Procedure*, SAE 2004-01-0472, March, 2004.

Sicher, L. A., Whitman, G. R., Yannaccone, J. R., D'Aulerio, L. **A., Cantor, A.**, Shanahan, D., and Reed, J., *Lateral Restraint: Comparison of Lap/Shoulder Belt vs. Lap/Shoulder Plus Supplemental Shoulder Belt Restraint Systems*, SAFE Association's 40th Annual Symposium, September 2002.

Whitman, G. R., D'Aulerio, L. A., Sicher, L. A., Yannaccone, J. R., and **Cantor, A.**, *Children in Rollover Crashes*, Biomedical Engineering: Recent Developments. J Vossoughi (Editor), ISBM: 1-930636-01-6 © 2002 Medical and Engineering Publishers, Inc.

Sicher, L. A., Whitman, G. R., Yannaccone, J. R., D'Aulerio, L. A., **Cantor, A.**, Shanahan, D., and Reed, J., *Lateral Restraint: Comparison of Lap/Shoulder Belt vs. Lap/Shoulder Plus Supplemental Shoulder Belt Restraint Systems*, SAFE Association's 39th Annual Symposium, September, 2001.

Whitman, G.R., Yannaccone, J.R., Bandak, F.A., Sicher, L., D'Aulerio, L., Shanahan, D., **Cantor, A.**, Roberts, D., Moss, S., *A Method for the Assessment of Tethered and Untethered Child Restraint Systems using the Hybrid III Three Year Old Dummy*, Injury Biomechanics Research, Twenty-Seventh International Workshop, San Diego, California, October 24, 1999, published June, 2001.

Sicher, L.A., Yannaccone, J.R., D'Aulerio, L.A., **Cantor, A.**, ARCCA Incorporated; Gedeon, M., Reed, J., *U.S. Army Tank-Automotive and Armaments Command, Occupant Protection During Rollover Events*, SAFE Association 38th Annual Symposium, Reno, Nevada October, 2000.

Sicher, L.A., Whitman, G.R., Yannaccone, J.R., D'Aulerio, L.A., and **Cantor, A.**, ARCCA Incorporated, *Common Occupant Crash Protection for Army Wheeled Trucks*, SAE 2000 World Congress, Detroit, Michigan, SAE 2000-01-1395, March, 2000.

Joganich, T.G., Markushewski, M. L., **Cantor, A.**, D'Aulerio, L.A. Whitman, G.R., Yannaccone, J.R., and Eisentraut, D.K., ARCCA Incorporated, *Effect of Cognitive Workload on Automatic Restraint System Usage*, SAE 2000 World Congress, Detroit, Michigan, SAE 2000-01-0174, March, 2000.

Whitman, G.R., Yannaccone, J.R., Bandak, F.A., Sicher, L., D'Aulerio, L., Shanahan, D., **Cantor, A.**, Roberts, D., Moss, S., *A Method for the Assessment of Tethered and Untethered Child Restraint Systems using the Hybrid III Three Year Old Dummy*, Injury Biomechanics Research, Twenty-Seventh International Workshop, San Diego, California, October 24, 1999 presented by John Yannaccone.

Whitman, G.R., Brown, K.A., **Cantor, A.**, D'Aulerio, L.A., Eisentraut, D.K., and Markushewski, M.L., ARCCA Incorporated, *Booster-with-Shield Child Restraint Case Studies*. Second Child Occupant Protection Symposium (A special joint session sponsored by Stapp, AAAM, and IRCOB), Lake Buena Vista, FL, November 1997.

Markushewski, M.L., **Cantor, A.**, Muzzy III, W.H., D'Aulerio, L.A., Whitman, G.R., Brown, K.A., and Eisentraut, D.K., ARCCA Incorporated, *Assessment of Asymmetrical Anchor Points and Load-Limiting Loops with the Lap Portion of Automotive Occupant Restraints*. 35th Survival and Flight Equipment SAFE Association, Phoenix, AZ, September 1997.

Eisentraut, D.K., Muzzy III, W.H., **Cantor, A.**, D'Aulerio, L.A., Whitman, G.R., Brown, K.A., and Markushewski, M.L., ARCCA Incorporated, *Assessment of Timely Retractor Lockup in Automotive Seatbelt Systems*. Society of Automotive Engineers, SAE Paper No. 97515, 1997.

Airbags and Automobile Crash Safety, Testimony before the United States Senate Committee on Commerce, Science and Transportation, Washington, DC; January, 1997.

Airbags, Testimony before the United States House of Representatives Commerce Committee, Subcommittee on Telecommunications, Trade and Consumer Protection, Washington, DC; April, 1997.

Cantor, A., Muzzy III, W.H., Eisentraut, D.K., D'Aulerio, L.A., and Whitman, G.R., ARCCA Incorporated, *Assessment and Control of Dynamic Overshoot with Automotive Seating During Vertical Impacts*. Proceedings of the IX International Conference on Vehicle Structural Mechanics and CAE, Society of Automotive Engineers, Troy, MI, April 1995.

Cantor, A., Muzzy III, W.H., Eisentraut, D.K., D'Aulerio, L.A., and Whitman, G.R., ARCCA Incorporated, *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, 1994.

Muzzy III, W.H., **Cantor, A.**, Eisentraut, D.K., and D'Aulerio, L.A., ARCCA Incorporated, *Seat Back Yielding and Collapse: A Danger to Occupants during Real World Collisions*. Proceedings of the 1993 ASME Summer Bioengineering Conference, ASME Publication BED - Vol. 24, Page 12, Breckenridge, Colorado, June 1993.

Cantor, A., *What Your Seatbelt Expert Ought to Know*. Experts-at-Law, May-June 1990.

Cantor, A., and Eisentraut, D.K., *The Seatbelt Defense*. New York State Bar Association, Trial Lawyers Section Digest, No. 16, June 1990.

Petition for Rulemaking to Amend FMVSS 207 to Prohibit Ramping up the Seat Back of an Occupant during a Collision, December 28, 1989.

F-18 Recovery System Evaluation, December 1981.

Canopy Penetration Tests on the A-7 Aircraft using an SIIS-3ER Ejection Seat, December 1981, Department of the Navy.

Position Paper, *ESCAPAC Replacement Recommendation for Approval for Service Use (ASU)*, October 1981.

Technical Note - *ESCAPAC Replacement Ejection Seat Program*, February 1981.

Technical Note - *ESCAPAC Replacement Ejection Seat Program*, October 1980.

ESCAPAC Open Deficiency Chits as of 24 July 1980, July 1980.

TF-18 Automated Aircrew Escape System (SRT), July 1980.

ESCAPAC Replacement Ejection Seat System, July 1980.

Dynamic Testing Evaluation of SIIS-3ER Escape System Airspeed Sensor, July 1980.

Deficiency Report SIIS-3ER Ejection Seat Program Design Review, May 1980.

ESCAPAC Replacement Program, Program Management Plan, April 1980.

ESCAPAC Replacement Ejection Seat Program, April 1980.

Aircraft Accident Investigation, August 1979, Willow Grove, PA.

Systematic Approach to Project Planning and Tracking of Engineering Projects Implemented in the Life Support Engineering Division, March 1979.

Powered Inertia Reel Retraction during Ejection, April 1978.

Aircraft Accident Investigation Report A-7E, April 1976.

Aircraft Accident Investigation Report TA-4J, February 1976.

Blue Ribbon Panel Report on COMOPTEVFOR Evaluation of Stencel SEU-3/A Ejection Seat, 1975.

Computer Analysis of Ejection under Deceleration, June 1975.

Aircraft Accident Investigation Report A-4C, NADC, July 1974.

Live Qualification of Lumbar Pad and Pulsating Cushion for S-3A Escape System, February 1974.

QT-33A Escape Performance Capabilities and Evaluation of Aircrew Change 260, December 1973.