

aperture

SCOTT SWINFORD, *BSME, ACTAR*

Managing Forensic Expert - Accident Reconstruction

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EDUCATION

BSME — Bachelor of Science in Mechanical Engineering
- Minor in Mathematics
- Minor in Renewable Energy
- Minor in Entrepreneurship

University of Nevada, Reno, 2012

PROFESSIONAL CERTIFICATIONS

Full Accreditation as a Traffic Accident Reconstructionist with the Accreditation Commission for Traffic Accident Reconstruction (ACTAR) - Registration No. 3718
Society of Automotive Engineers Accident Reconstruction Certificate
Certified by Crash Data Specialists as a Crash Data Retrieval (CDR) System Operator
Certified by Crash Data Specialists as a Crash Data Retrieval (CDR) Data Analyst
Certified by SAE International (Society of Automotive Engineers) in Accessing and Interpreting Heavy Vehicle Event Data Recorders (HVEDR)
Certified by BERLA as a Vehicle Forensic Technician
Certified by BERLA as a Vehicle System Forensic Examiner
Certified by Northwestern University Center for Public Safety in Advanced Crash Reconstruction Utilizing Human Factors
FAA Part 107 Certified UAS Remote Pilot – Certificate No. 4358264
Nevada State Board of Professional Engineers and Land Surveyors (EI #0T6748)

MEMBERSHIPS

Southwestern Association of Technical Accident Investigators (SATAI)
Society of Automotive Engineers (SAE)
- Technical Paper Peer Reviewer

National Association of Professional Accident Reconstruction Specialists (NAPARS)

WORK EXPERIENCE

Aperture, LLC, 2021/Present
6351 Hinson St., Ste. R
Las Vegas, NV 89118

American Bio Engineers, LLC, 2011/2021

6351 Hinson St., Ste. R Las Vegas, NV 89118	2305 Historic Decatur Rd., Ste. 100 San Diego, CA 92106	7272 E Indian School Rd., Ste. 540 Scottsdale, AZ 85251

Accident Reconstruction with areas of expertise including Vehicular Accidents, Vehicular Dynamics, Speed Analysis, Event Data Recorders, Traffic Signal Operation, Instrumented Testing.

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PUBLICATIONS

Jones B., Calabro M., Brink J., and Swinford S. (2017). Accuracy of the Momentum Energy Restitution Method for Offset Inline Rear-End Impacts. *SAE International*, 2017-01-1425.

Furbish, C., Welcher, J., Brink, J., Jones, B., Swinford, S., and Anderson, R. (2019). Occupant Kinematics and Loading in Low Speed Lateral Impacts. *SAE Technical Paper*, 2019-01-1027. *Voted as one of the best papers for WCX™ World Congress Experience; selected to appear in *SAE International Journal of Advances and Current Practices in Mobility*.

Brink, J., Swinford, S., Furbish, C., Jones, B., Welcher, J., & Anderson, R. (2020). Methods for Quantifying the Impact Severity of Low-Speed Side Impacts at Varying Angles. *SAE Technical Paper,* 2020-01-0641.

Swinford, S., Jones, B., Brink, J., Furbish, C., Welcher, J., & Anderson, R. (2021). Study of the Measurement of Generation 2 Toyota Event Data Recorders in Low-Speed Side Impacts, *SAE Technical Paper,* 2021-01-0904. *Voted as one of the best papers for WCX™ World Congress Experience; selected to appear in *SAE International Journal of Advances and Current Practices in Mobility*.

Jorgensen, M., Swinford, S., and Jones, B. (2021). Validation of Vehicle Speed Analysis Utilizing the iNPUT-ACE Camera Match Overlay Tool, *SAE Technical Paper*, 2021-01-0877. *Voted as one of the best papers for WCX™ World Congress Experience; selected to appear in *SAE International Journal of Advances and Current Practices in Mobility*.

Vigil, C., Salboro, C., Jorgensen, M., Jones, B., Brink, J., Swinford, S. (2022). Validation of Utilizing a Self-Propelled Crash Sled to Simulate Occupant Accelerations in Minor Rear-End Impacts, *SAE Technical Paper*, 2022-01-0857.

Jorgensen, M., Swinford, S., Imada, K., and Farhat, A. (2025). Evaluation of Several Tesla Dashcam Angles for Model 3 and Y via Reverse Project Photogrammetry. *SAE Technical Paper,* 2025-01-8700.

LECTURES PRESENTED

Presented an informational lecture entitled “The Utilization of Event Data Recorders in Accident Reconstruction” to CSAA, February 2019.

Presented an informational lecture on the necessary elements of accident reconstruction and biomechanics to the Tingey Injury Law Firm, March 2019.

Presented an informational lecture on the necessary elements of accident reconstruction and biomechanics to Van Law Firm, November 2019.

Presented an informational lecture entitled “Accident Reconstruction, Biomechanics, and Event Data Recorders” at CSAA Claims Law Conference, October 2021.

Presented a Nevada Bar approved CLE lecture on accident reconstruction, biomechanics, and event data recorders, September 2022.

Presented “Validation of Vehicle Speed Analysis Utilizing the iNPUT-ACE Camera Match Overlay Tool” at SATAI Conference, March 2023.

Presented an informational lecture on event data recorders and accident reconstruction to Southwest Gas Corporation, July 2023.

Presented an informational lecture on accident reconstruction, biomechanics, and premise liability to Morgan & Morgan, March 2025.

Presented an informational lecture on accident reconstruction, biomechanics, and digital forensics to J.B. Hunt, March 2025.

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SPECIALIZED TRAINING/SEMINARS ATTENDED

ARC-CSI Crash Conference presented by *ARC-CSI* (Las Vegas, NV, 2012)
- Case Studies and Reconstruction Essentials for Tread Separation Accidents Involving Axle Tramp
- An Overview of GM Hybrid and Electric Vehicle Technology and Its Relationship to EDR Data
- Seat Belt Analysis
- Using ECM Diagnostic Data in Crash Reconstruction
- The Application of MADYMO to the Modeling of Real World Accidents
- Low Speed Collisions; Reconstruction Applications
- Low Speed Collisions; Biomechanical Analysis
- Drug Recognition Training
- Establishing Safe and Realistic Speed Limits
- Measuring Yaw Marks from Digital Maps
- Highway Design – Appurtenances
- ARAS 360 – Advanced Animation Made Easy

ARC-CSI Crash Conference presented by *ARC-CSI* (Las Vegas, NV, 2013)
- Damage, Energy and Computer Simulations
- Accident Reconstruction Using CRASH3 and LS-Dyna
- Braking Systems for Passenger Cars and Light Trucks
- Reliability of Crash Triggered Video and Data Recorders for Accident Reconstruction
- The Investigation of Transit System Events
- ARAS360: Combining Momentum Technology and SMAC Technology
- Differentiating Potentially Casual Pre-Crash Component Damage from Crash Damage
- Further Developments Regarding the Dynamic Modeling of Motor Vehicle Collision Response using the SDOF Approach
- Advances in Forensic Photography for Crash Investigations
- Motorcycle Crash Case Study and Evolving Motorcycle Technologies
- Determination of Vehicle Orientation at Ground Contact for Rollover Accidents
- PDOF, DOPF: What is it? How important is it?
- EDC: Reconstruction Techniques for Complex Crashes

ARC-CSI Crash Conference presented by *ARC-CSI* (Las Vegas, NV, 2014)
- Reconstruction Techniques for Analyzing Low Delta-V Crashes
- HVEDR: New Engines, New Software, New Coverage
- Human Fatigue & 1 Big Risk to Driver Performance
- Modern Methodologies in Accident Reconstruction
- Motorcycle Sliding Friction
- Quick Clearance of Serious Fatal Collisions Using GPS/GIS Technology
- Vehicle History Data Applications to Crash Reconstruction
- Conspicuity & Visibility: Issues & Testing
- Wheel Slip & Its Effect on Reported Vehicle Speed
- Impact of Inadequate Repairs on Vehicle Structural Integrity

Crash Data Retrieval (CDR) System Operators Course instructed by *Crash Data Specialists, LLC* (North Las Vegas, NV, 2014)

Crash Data Retrieval (CDR) Analysis and Applications Course instructed by *Crash Data Specialists, LLC* (North Las Vegas, NV, 2014)

CDR Summit presented by *Collision Publishing* (Houston, TX, 2015)
- Instrumented Crash Testing
- New Vehicle Technologies – Their Impact on CDR Imaging
- Clearing an ACM- What is it, how is it done?
- GM Ignition Switch Failures and the Associated CDR Data
- Toyota Event Recording Prioritization
- Review of CDR Case Law in North America
- Non-supported Nissan and Infinti Vehicle Crash Data via the Nissan Consult System

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- Nuances of Crash Reconstruction Using Non-Deployment Data
- Data Mining the NHTSA NASS CDR Database

SATAI Conference presented by the *Southwestern Association of Technical Accident Investigators* (Las Vegas, NV, 2015)
- Practical Evidence Interpretation Revisited & COLM, Vectors & Kinematics
- CRASH3 – Researching Stiffness Value
- Motorcycle Collisions

SATAI Crash Conference presented by the *Southwestern Association of Technical Accident Investigators* (Glendale, AZ, 2015)
- Member of the "Crash Crew" for instrumented crash testing
- Human Factors and Acceleration
- Compliance Crash Testing
- 3D Laser Scanning

Advanced Crash Reconstruction Utilizing Human Factors instructed by *Jeffrey Muttart/Northwestern University Center for Public Safety* (Glendale, AZ, 2015)

CDR Summit presented by *Collision Publishing* (Houston, TX, 2016)
- Fiat Chrysler Automobiles Update
- Data Privacy and New Laws
- Guide to Unsupported Ford EDR's
- Digital Security
- Vehicle System Forensics + Crash Data
- Process for working on Damaged Modules
- Update on Successful Reprogramming of ACM's and the Addition of Unrelated Data for Imaging
- Application of Crash Data from Non-Supported Ford Vehicles
- CDR Tool Version History
- Back Powering Vehicles for Newly Added Systems
- How Vehicle Systems Really Work Together and if it's 'Equipped'
- Hyundai/Kia Update
- Testing and Analysis of Unsupported Kia Data
- Insurance and Fleet Management Update

ARC-CSI Crash Conference presented by *ARC-CSI* (Las Vegas, NV, 2016)
- Comparison of IIHS driver and passenger-side small overlap crash tests
- Photography for Crash Reconstruction
- Comparative Crash Analysis Using NHTSA NASS Crash Data and Other Sources
- Safely Working Around Hybrids, Electric Vehicles and Newer Safety Systems
- Motorcycle reconstruction techniques tied to testing
- Scene and Vehicle Data Analysis to Evaluate Pre-crash Brake Application
- Evaluation of Wheel Impact in a Rollover Collision Through Simulation and Comparison to a Crash Test
- Crash Reconstruction Case Studies
- Lateral Acceleration Through a Curve, Real World Measurements of Normal Drivers at the Expected higher End
- When do Airbags Deploy?

SATAI Crash Conference presented by the *Southwestern Association of Technical Accident Investigators* (Glendale, AZ, 2016)
- Motorcycle and Bicycle Reconstruction, Railroad Track Hazards and Helmet Examination
- Nighttime Accident Documentation and Reconstruction
- Toxicology and Impaired Driving

EDR Summit presented by *Collision Publishing* (Houston, TX, 2017)
- Autonomous Vehicles – How Close are We?

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- Case Studies: Discovering and Analyzing Digital Data Acquired from Motor Vehicle Systems and Connected Mobile Devices
- Getting Subaru & Mitsubishi EDR Data. Which Cars Have it, How to Get it, and What You Need to Know to Use it
- Forensic Data from Heavy Vehicle Networks
- An Overview and Update of the Caterpillar ECM EDRs
- Toyota GEN3 Pre-Crash Brake Data – Details and Application
- Pre-Crash Data Recorded by the ACM. Where Does it Come From?
- Asynchronous Data Concepts in EDR Data
- An Overview and Update of Cummins ECM and EDR Capabilities
- Atypical Airbag Deployment Cases
- Hyundai and Kia EDR Data – Software Updates and Real World Applications
- Forensic Methods for Dealing with Damaged ECM/ECU Components
- CDR Data Case Studies for Late Model GM, Toyota, BMW, and Ford Vehicles
- Case Study: Mercedes-Benz Crash Data
- A Case Study Heavy Vehicle Crash Reconstruction Incorporating EDR ECM Data

PhotoModeler Training instructed by *Dan Mills* (Las Vegas, NV, 2017)

SATAI Conference presented by the *Southwestern Association of Technical Accident Investigators* (Las Vegas, NV, 2017)
- Motorcycle Collision Reconstruction
- Structural Crashworthiness and Finite Element Crash Simulation
- Ran-off-Road Crashes: When the driver doesn't stay on the straight and narrow

SATAI Conference presented by the *Southwestern Association of Technical Accident Investigators* (Glendale, AZ, January 2018)
- Low Speed Crash Analysis Fundamentals
- Momentum, Energy & Restitution Method (MER) for Low Speed Crash Reconstruction
- Pedestrian Collision Reconstruction
- Traffic Signal Timing Essentials for the Traffic Accident Investigator

EDR Summit presented by *Collision Publishing* (Houston, TX, 2018)
- Bosch CDR Tool and CDR900
- Your Vehicle Has an Infotainment System – Now What?
- On-Star Data: A Real-World Example of Automatic Collision Notification Evidence
- EDR Throttle Input
- Power Loss and "Reported" Vehicle Speeds
- Subaru EDR Evidence – Software Traits and Real-World Examples
- Tesla EDR
- Tesla Autopilot, Self-Driving Vehicles & Driver Assistance Features; Who Caused the Accident?
- Case Studies in Bosch CDR Tool Retrieved Data
- Detroit Diesel Engine EDR ECM Overview and Updates
- Legal Challenges Regarding EDR Data
- EDR and Motorcycles
- An Overview of the Bendix Wingman System and Bendix Data Recorder

Digital Forensics of Heavy Vehicle Event Data Recorders instructed by *Synercon Technologies/The University of Tulsa* (Farmington Hills, MI, 2018)

SATAI Conference presented by the *Southwestern Association of Technical Accident Investigators* (Henderson, NV, 2018)
- Heavy Vehicle Event Data Recorders
- Kawasaki Event Data Recorders
- Post-Collision Mechanical Examinations

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Accident Reconstruction with Heavy Vehicle Event Data Recorders instructed by *Bill Messerschmidt, Wes Grimes, and Greg Wilcoxson* (Mesa, AZ, 2018)

SATAI Conference presented by the *Southwestern Association of Technical Accident Investigators* (Glendale, AZ, 2019)

- Nighttime Crashes on Unlit and Lighted Roads
- Driver's Acceleration Behaviors
- Pedestrian Walking Speeds What Numbers to Use?

EDR Summit presented by *Collision Publishing* (Houston, TX, 2019)

- Bosch CDR Tool 2019 and Beyond: The GM ASCM, CDR 900, and More
- EDR and U-Haul 26-ft Box Trucks
- Analyzing Steering, Yaw and Lateral Accel Stability Control System Data
- Update on Reconstruction of Autonomous Vehicle and ADAS Technology
- Determining Vehicle Speed from An Audio Recording
- Velocity Analysis from Video Cameras
- Bosch CDR 900 Technical Discussion and Demonstration
- Tesla EDR Case Studies & Reconstruction Techniques
- A Generational Review of Collision Mitigation Systems in Heavy Vehicles
- Validation and Analysis of Vehicle Speed Data Acquired with the Berla iVe System
- Infotainment and EDR Correlation
- Car Fire = No EDR, Infotainment, or other Electronic Data?
- EDR Reprogramming
- CDR Technician Troubleshooting & Advanced Data Collection Techniques
- Impact Dynamics of Passenger Vehicle in Guardrail and Guardrail End Terminal Crashes
- Motorcycle Accident Reconstruction – Incorporating Struck Vehicle EDR Data
- EDR Data – Applications Beyond Impact Speed

HVE Forum presented by *Engineering Dynamics Corporation* (Las Vegas, NV, 2019)

- Advanced HVE

Accessing and Interpreting Heavy Vehicle Event Data Recorders instructed by *SAE International (Society of Automotive Engineers)* (Appleton, WI, 2019)

Vehicle System Forensics instructed by *BERLA* (Las Vegas, NV, 2019)

Traffic Signal Operations presented by *University of Maryland Center for Advanced Transportation Technology (CATT)/Consortium for Innovative Transportation Education (CITE)* (2019)

EDR Summit presented by *Collision Publishing* (Houston, TX, 2020)

- Bosch CDR Tool
- What Does "End of Event" Mean?
- Repowering & CDR Technician Review/Update
- Ignition Cycles
- Locomotive Event Recorder Downloads
- Crossing Signal Event Recorders
- Legal Challenges Regarding EDR Data in Testimony
- Traffic Signal as an EDR; Did it Record Your Crash
- How an Auto Insurance Carrier Claims Department Incorporates Crash Data into Investigations of Loss
- Testing and Validation of Toyota Vehicle Control History Data
- ATV Rollover
- Subaru ADAS System
- Pedestrian Automatic Emergency Braking (P-AEB)
- Can Autonomous Emergency Braking Data be "Event Data?"
- Tesla Update

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- Berla Update
- Examples of Forensic Investigations Using the Berla Digital Tool
- Nissan Steering and Recording Threshold

Vehicle Crash Reconstruction: Principles and Technology instructed by *SAE International* (Las Vegas, NV, 2022)

Air Brake Training instructed by *Bendix* (Sparks, NV, 2022)

Advanced Technology Training instructed by *Bendix* (Sparks, NV, 2022)

SATAI Conference presented by the *Southwestern Association of Technical Accident Investigators* (Glendale, AZ, 2023)
- EDR Updates
- Vehicle System Forensics
- Forensic Photography
- Vehicle Speed Analysis Using iNPUT-ACE

Reconstruction and Analysis of Rollover Crashes of Light Vehicles instructed by *SAE International* (2023)

Driver Distraction from Electronic Devices: Insights and Implications instructed by *SAE International* (2023)

Principles of Data Acquisition instructed by *Diversified Technical Systems* (Long Beach, CA, 2023)

Accident Reconstruction, the Autonomous Vehicle and ADAS instructed by *SAE International* (Ann Arbor, MI, 2023)

EDR User's Summit presented by *Collision Magazine* (Houston, TX, 2024)
- CDR – Past, Present & Future
- GM Vehicle Systems and their EDRs
- FCM Data – Practical Application
- Toyota Safety Sense (TSS) Testing and Research of VCH, PCS-O and PCS-I
- Heavy Vehicle EDR – The New, the Annoying, and the Ugly
- Mobile Forensics: Correlating Digital Data Between Mobile Phones, Phone Records, and Vehicle Systems
- ATSPM/EDR – Automated Traffic Signal Performance Measures and EDR
- ASCM/FCM – CDR Data Application
- Toyota Vehicle Control History
- EDR Data Verification Case Studies
- Hyundai & Kia Update ad Systems Overview
- Vehicle System Forensics
- Nissan Data Polarity and "Clipping"
- Tesla CAN Bus Data
- Toyota Techstream User's Course

Fundamentals of Vehicle Dynamics instructed by *SAE International* (2024)

Human Factors for Traffic Reconstruction instructed by *Driver Research Institute* (Glendale, AZ, 2025)

Symposium on EDR Research and Training presented by *NAPARS* (Chattanooga, TN, 2026)
- Applied Use of Yaw and Speed
- Bendix Safety Direct
- CDR Past, Present, Future
- The Cummins EDR
- Toyota Safety Sense and Data
- Beyond the Last Speed Value
- CDR Updates
- Hyundai and Kia EDR Data Update
- Passenger Vehicle High Speed Tests, Speedometers, Vehicle Test Equipment
- Mathematically Integrating Lateral Acceleration to Determine Lateral Displacement

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Smart Sensor Simulator 2 – Advanced Direct to Module Training instructed by *Forensic Training Group* (Pleasant View, TN, 2025)

RESEARCH

Sep 2015 — Performed and participated in instrumented Focus and Ram 1500 to pedestrian dummy, Crown Victoria to Focus side-swipe, and Ram 1500 head-on to a Prelude impacts with an instrumented human and Hybrid III dummy, in Glendale, AZ.
Results presented at SATAI conference, September 10-12, 2015, Glendale, AZ.

Jan 2016 — Performed and participated in instrumented xB to Transit Connect rear-end impacts with DriveCams equipped, in Las Vegas, NV.

Oct 2016 — Performed and participated in instrumented remote driven Celica into an angled head-on with a Ranger, and Massive Moving Barrier to Oldsmobile 98 and Expedition with child safety seat restrained 3 year old dummies, in Glendale, AZ.
Results presented at SATAI conference, October 6-8, 2016, Glendale, AZ.

Oct 2016 — Performed and participated in instrumented steering wheel and brake force, vehicle pitch, and bumper height change tests during hard braking using a Celica, in Mesa, AZ.

Oct 2016 — Performed and participated in instrumented license plate-to-bumper car-to-car rear-end impacts with human subjects using Civics and a Celica, in Mesa, AZ.

Jan 2018 — Performed and participated in instrumented license plate-to-bumper car-to-car frontal impacts with human subjects using Mustang and Impala, in Mesa, AZ.

Jan 2018 — Performed and participated in instrumented rear-end impacts with human subjects using Mustang and Impala, side-swipe/angled side/offset rear-end impacts with human subjects using Mustang and Malibu, Malibu and Tahoe into child dummy, and rear-end impact with human subjects using Mustang and Tahoe, in Glendale, AZ. *Results presented at SATAI conference, January 25-27, Glendale, AZ.*

Mar 2018 — Performed and participated in instrumented oblique lateral minor impacts involving human female subjects and instrumented Hybrid III ATDs at angles of 45º, 60º, and 90º using 2005 to 2007 Toyota Camrys and Corollas in Las Vegas, NV.

Jun 2018 — Performed and participated in instrumented car-to-car rear-end impacts with human subject using 2005 to 2007 Toyota Camrys and Corollas in Las Vegas, NV.

Jan 2019 — Performed and participated in instrumented remote driven broad-side rollover collision between a Tahoe and Grand Marquis, a multiple vehicle rear-end impact with a Town car, motorcycle and Prius, and yaw testing with a Suburban in Glendale, AZ.

Jan 2019 — Performed and participated in instrumented rear-end impacts between an Impala and Grand Marquis with human volunteers in Glendale, AZ.

Sep 2020 — Performed and participated in instrumented rear-end impacts between a Corolla and Camry with human volunteers in Las Vegas, NV.

Oct 2020 — Performed and participated in instrumented lateral minor impacts between and Corolla and Camry with human volunteers in Las Vegas, NV.

Jan 2021 — Performed and participated in rear-end, angled, and frontal impacts between a 2015 Hyundai Elantra and a 2015 Chevrolet Sonic with instrumented Hybrid III ATDs in Glendale, AZ.

Mar 2023 — Performed and participated in a series of six instrumented low speed rear-end impacts between a bullet Honda Civic and a target Ford Focus, with instrumented human driver and 50th percentile male Hybrid III and BioRID ATDs in the target vehicle and three human occupants in the bullet vehicle. Performed and participated in official SATAI conference crash tests utilizing instrumented

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vehicles, human volunteers, and ATDs, which included: high-speed remote-driven Ford Escape to ATD pedestrian impact; high speed remote-driven 50% frontal offset between a Ford Escape and Chevrolet Impala; a lane change side-swipe between a Subaru Outback and a Mazda 5; a T-swipe between a Subaru Outback front bumper and Mazda 5 side; a narrow offset angled collision between the right front of a Mazda 5 and the left front of a Subaru Outback; an impact between the right front of a Subaru Outback and the partially open Mazda 5 driver's door. Vehicle dynamics, vehicle damage, EDR data, and human/dummy occupants motions/loading were documented and analyzed. Pre and post full-body MRI scans were conducted on the instrumented human driver in the low speed rear-end tests. All tests were performed in Glendale, AZ. *Results presented at SATAI Conference, March 1-4, 2023, Glendale, AZ*

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