

SKIDEMARKS

THE OFFICIAL PUBLICATION OF THE CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

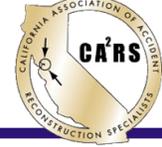


INDUSTRY CHANGES: MATERIALS & MINDSET



Volume 17, Number 4 // December 2015

CA2RS.COM



Board Beat

As 2015 winds down and we approach the Holiday Season, I would like to take time to say thank you for the following:

- Those of you that have been loyal CA2RS members during the past 17 years. You are the people who make CA2RS such a great organization. Currently, our membership is 420+ strong. We are the largest non-nation-wide Reconstruction Organization. We continue to have a high number of members who renew their membership every year. In addition, this year we had the most new members join in the history of the Organization.
- The talented people who have donated their time and expertise to instruct us at Quarterly Training Sessions and the Annual Conference. These people are essential for us to meet the Organization’s most important mission – to provide quality training in the field of Accident Investigation and Reconstruction.
- To Adam Hyde, who has selflessly donated his time the past two years – not only as a presenter at the Annual Conference, but who also has donated his time and expertise (free-of-charge) twice to teach 70+ CA2RS members the CDR Tech Level I and Level II classes.
- The Board of Directors – During my tenure as the Chairman of the Board of Directors, I have been blessed to work with a great group of fellow Board members. Though I am the Chairman, we run the BOD as a team. I cannot say enough good things about the current members of the BOD and the time and support they have all given to me and the Organization throughout the year.

In closing, I would like to wish everyone a Happy New Year.

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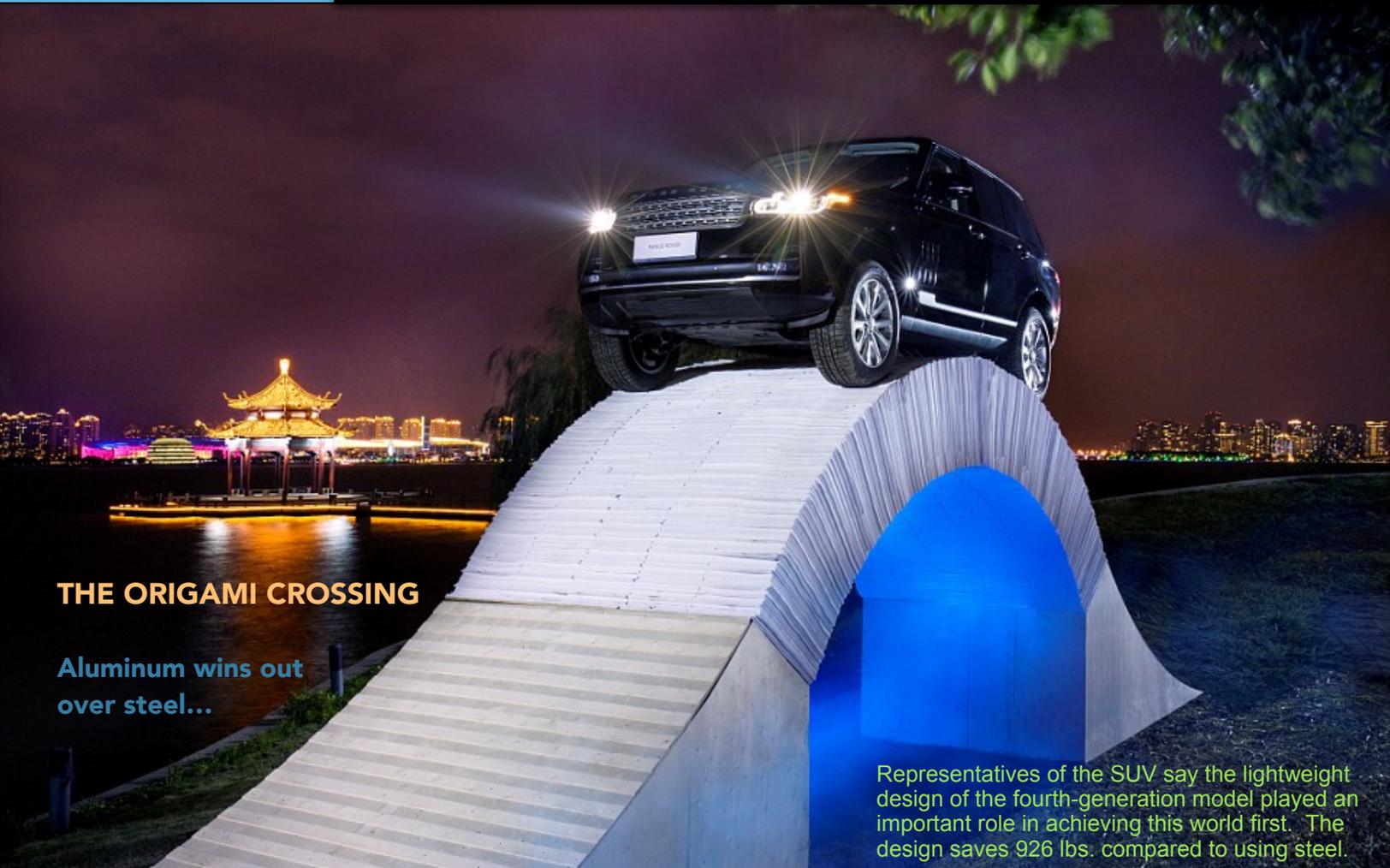
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THE ORIGAMI CROSSING

Aluminum wins out over steel...

Representatives of the SUV say the lightweight design of the fourth-generation model played an important role in achieving this world first. The design saves 926 lbs. compared to using steel.

Cheyenne MacDonald / dailymail.com / November 18, 2015

It almost seems impossible—a Range Rover, driving over a bridge built from nothing but paper. The event in Suzhou, China, marked the 45th anniversary of Land Rover's Range Rover, and achieved a historical first. As the 6 millionth model of Range Rover heads to China, its parent company selected this location, nicknamed “Venice of the East,” to drive the 5,234 lb. SUV over a 16.4-foot-long paper bridge.

Paper alone held up the vehicle when it made its short journey across - 54,390 pieces, provided by British manufacturer James Cropper PLC.

The bridge, designed by environmental artist Steve Messam, took three days to build and was done without the use of glue or bolts. Instead engineers packed the paper tightly. “Paper structures capable of supporting people have been built before but nothing on this scale has ever been attempted,” says Messam. “It's pushing engineering boundaries, just like the Range Rover, and the ease and composure with which the vehicle negotiated the arch was genuinely breath-taking.”

The bridge was constructed using specially designed wooden abutments, which are structures made to support the pressure of an arch. Builders then tightly stacked the paper atop the supports, held in place by a temporary framework. When the bridge was finished and the supports removed, Land Rover Experience chief instructor Chris Zhou carefully drove the all-aluminium SUV across.

The SUV ascended the ramp at a 34.7 degree angle and climbed to the top, where its weight was then supported by the arch technique.

The Origami Crossing — All-Aluminum SUV Drives Over Paper Bridge

In this technique, the weight is transferred into abutments to the side of the arch. Representatives of the SUV say the lightweight design of the fourth-generation model played an important role in achieving this world first. The design saves 926 pounds, compared to using steel.

“China is an important market for Range Rover, so we have picked the perfect place to celebrate 45 years of our luxury SUV family,” says Nick Rogers, Director Group Engineering, Jaguar Land Rover. The Range Rover features special all-terrain capabilities, which help the driver navigate difficult terrain, like slippery wet grass.

The bridge-crossing is not the first global achievement for the SUV, which has a history of world firsts dating back to 1972. Leftover paper from the project will be repurposed by Land Rover, and recycled locally in China for reuse.

“Range Rover’s advanced lightweight body and peerless all-terrain capability were crucial factors in making this unique drive possible,” Nick Rogers, Director Group Engineering, Jaguar Land Rover





Crash Data Retrieval Course Review

by Nick Salinas

W Once again, the CDR Technician Level 1 and Level 2 courses were offered this year prior to commencement of the CAARS 2015 annual conference. This year's course instructor was Adam Hyde, who also spoke at the annual conference. The two-day course consisted of lectures as well as hands-on training.

E For those unfamiliar with CDR technology, the acronym stands for Crash Data Retrieval, and it serves as a tool to access data that may be recorded in vehicles. The CDR technology is laden with unique vocabulary, nomenclature, and acronyms which were covered thoroughly during the first day's Level 1 course. As CDR technicians, our goal is to image the data that may be stored in a vehicle airbag control module (ACM). A technician has two options to retrieve the data: either use the DLC port (diagnostic link connector) if there is adequate power to the vehicle, or use vehicle specific cables to connect direct to module. While retrieving data via the DLC may be the simplest method, it is not always an option. A technician must know how to find and properly connect to an ACM using the direct-to-module method. In such cases, refer to the help file of the Bosch software to find the correct information on the ACM location and required cables or adapters. Hyde also stressed the importance of proper data preservation and explained that CDR data for a reconstructionist is analogous to the DNA sample found at a crime scene. In order for the data retrieved to be valid it must be saved in the original CDRx file – a PDF copy of the data will not suffice.

G During the second day of training, the Level 2 course covered more in-depth ways to retrieve data from vehicles and was followed by hands-on training. Hyde demonstrated how to re-power a vehicle in the event there are no keys or a power loss. He also showed students how a multi-meter works, and how to perform the voltage and resistance meter checks at the battery and power distribution center of a vehicle. All students were then required to retrieve data from airbag control modules by connecting through the DLC, direct-to-module, and re-powering through the fuse. Since vehicles with airbag control modules are now required to record crash data, this training is a must have for any reconstructionist. Hyde was an interesting and engaging instructor who ensured all students left the class with the proper skills and knowledge to retrieve CDR data from vehicles under any possible scenario.

Report from Anaheim—CAARS Annual Conference

by Roman Beck

N The 2015 Annual CAARS Conference was held from October 15-17 in Orange, California. Seventy members attended the conference and five vendors hosted tables. Orange was familiar turf for the CAARS Conference and it appeared as if the hotel and the surrounding night-life and restaurants were enjoyed by all.

A Ms. Jahna Rinaldi took care of the registration, hotel arrangements, and all other amenities. As always, she did a wonderful job making sure everyone was comfortable and happy. The conference topic was Event Data Recorders (EDR) and Pedestrian Collision Investigation and Reconstruction and was presented by Cooper Barrette. The speakers were familiar to the group from last year's conference and were kind enough to once again travel from Chicago to share their knowledge with us.

T The conference opened up on Thursday morning with an EDR overview by Adam Hyde. He discussed what was and was not an EDR. He first covered passenger vehicles, their airbag control modules, seat belt pretensioners, and available manufacturers. He covered the Bosch toolkit, as well as the independent Kia/Hyundai, Mitsubishi, and other OEM systems.





Report from Anaheim...

Adam then covered the Heavy Truck EDRs, their data capabilities, manufacturers, and toolkits. He discussed CFR Part 563 and best practices, which had an emphasis on avoiding evidence spoliation. He provided several case studies focusing on the accuracy of CDR reports, data limitations, and validation of “traditional” collision reconstructions. A case study involving the EDRs from a train and a Range Rover was presented. Additional case studies involving Fiat and Kia data gave the attendees exposure to a wide variety of EDR reports.

After a wonderful Mexican buffet lunch arranged by Jahna, Adam continued his presentation, focusing on EDR search warrants, court admissibility, and case law. Given the incredible amount of material on the subject, Adam graciously provided the attendees with a wealth of additional documents.

Friday morning opened up with Mr. Ken Enberg, who spoke about investigating pedestrian crashes. His presentation focused on interviewing witnesses and parties as well as identification and documentation of physical evidence (especially photography). His case study was an excellent example of a car versus pedestrian hit-and-run collision successfully investigated and prosecuted due to diligent and thorough evidence collection. Portions of the front bumper cover found at the scene fit the gaps on a damaged vehicle parked a couple miles away. In Ken’s words, “no math was necessary” to successfully prosecute the driver.

After a second fine lunch at the hotel, Mr. Roger Barrette provided a pedestrian kinematics presentation. He talked about the post-impact motion of a pedestrian in different types of collisions, with an emphasis on the variables of CG height, hood height, and vehicle braking. He provided a wealth of information about crash testing with dummies, pedestrian formulae, and walking speeds. He concluded his presentation with a bus versus pedestrian case study.

Saturday morning, the Annual CAARS General Membership meeting was conducted. Included in the meeting were elections to the CAARS Board of Directors: Jahna Beard was re-elected to Vice-Chair, Roman Beck, Dave Cameron and John Crews were re-elected to their positions of Directors-at-Large. The conference concluded with a huffing case study by Adam Hyde. He spoke about the investigation of a car versus pedestrian crash for which EDR and video surveillance data were available. The driver had been “huffing” dusting spray before the crash, which involved the vehicle traveling off the road and onto a sidewalk, where it struck a mother and her three children. The analysis involved an evaluation of the EDR data and calculations of speed based on video frame rate. Adam concluded his presentation with a case study of a car versus pedestrian collision where the EDR data did not match the physical and witness evidence.

The conference ended at approximately noon with a raffle of prizes. I look forward to what the 2016 CAARS Conference will bring!! See you in South Lake Tahoe, California.



Upcoming Training Opportunities

CAARS FIRST QUARTER TRAINING DAMAGE ENERGY METHODS



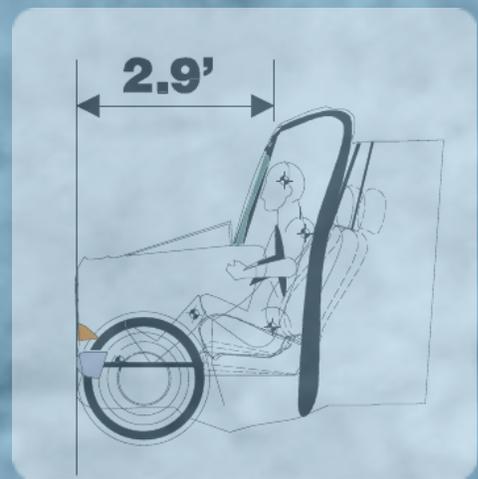
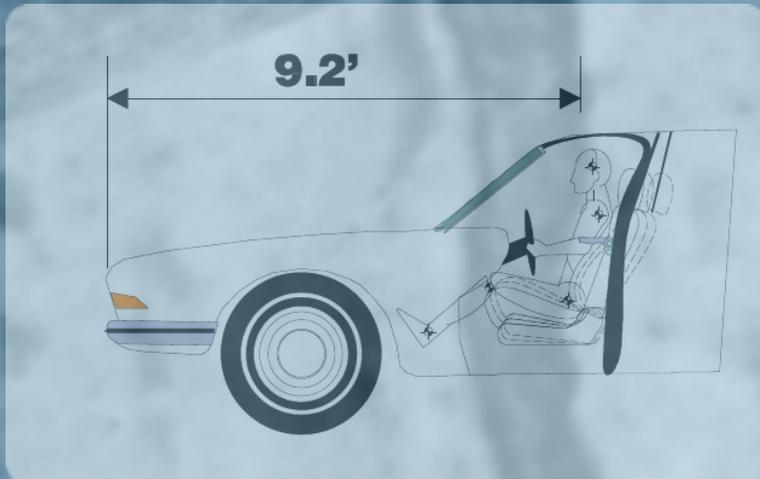
Presented by Toby Gloeckler

February 29, 2016: Glendora Police Department, 150 S. Glendora Ave, Glendora

Please park on the streets around the Civic Center, and NOT in the combo Police/Library parking lot. The location has been confirmed and we hope to see you there. If you plan to attend this training please register as an accurate count of attendees helps us to determine the quantity of handouts and refreshments to provide. For more information and online registration, click here: [2016 1st Quarter Training - Southern California](#)

March 2, 2016: Ulatis Community Center, 1000 Ulatis Drive, Vacaville

If you plan to attend this training please register. An accurate count of attendees helps us to determine the quantity of handouts and refreshments to provide. For more information and online registration, click here: [2016 1st Quarter Training - Northern California](#)



CORNER

the TRAINING



How a Ford F-150 Aluminum Repair Cost \$17,000 (and took a month)

<http://truckyeah.jalopnik.com> / Andrew P. Collins 7/23/2015

Ford says their certified repair centers can fix the 2015 Ford F-150 and its all-new aluminum body “no problem.” But this crazy story of a month-long job and an unbelievable service bay bill — \$17,000! — proves there are still some serious challenges to getting this truck back on the road after an accident. What the heck happened?

Here’s the scene: a couple months ago the unlucky owner of a brand-new super-expensive 2015 Ford F-150 King Ranch drove through an automatic car wash. Apparently, the car wash malfunctioned and a piece of heavy machinery fell on the roof of the truck. The driver decided they’d better get outta’ there, stepped on the gas...and tore the roof up like a can of beans in the process.

Now, of course, this kind of impact would have done major damage whether this truck was made of aluminum, steel, or any other automotive material. But in this case, it gave us the first real-world opportunity to see what’s involved in a repairing the aluminum Ford after a seriously heavy hit.

So the truck goes to the Waikem Body Shop in Massilon, Ohio. That’s the official body shop of George Waikem Ford, and it’s specifically certified by Ford in F-150 aluminum repair. (You can confirm that with the advanced search function on Ford.com’s dealership locator.)

And now, we can examine the question that’s dogged Ford since they announced the F-150 would go aluminum: what about repair costs? Is this shop legit or what? The dealership is fully invested in Ford’s changeover to aluminum. To the tune of about \$100,000 in tools and training, as a matter of fact.

“Since this is the future of our industry in saving fuel and other issues, we are better prepared for the future,” George “Chip” Waikem said in a [comment](#) about the new truck. “It has been the Waikem intent from day 1 to work thru any problems this new product will present. [sic]”

The Waikem Body Shop is headed up by Jim Shreve, a 40-year veteran of automotive body repair with a PhD in business administration who’s been published and cited in industry papers about fixing cars. Point is; this might well be *the* most qualified outfit to tackle a complex repair on a largely untested platform like the new F-150. Which is a good thing, because apparently the cab of that King Ranch was effectively eviscerated. “A \$17,000 repair” sounds impossible. Wouldn’t that truck be declared totaled? With just 4,000 miles on a vehicle the shop valued at “around \$70,000,” the owner’s insurance company saw fit to go through with a repair rather than totaling the truck. Shreve and his team stepped up to the challenge.

So how *did* this F-150 spend its four-week vacation in the service bay? “There was a big learning curve,” Dr. Shreve told me over the phone. “This [how to rebuild the truck] was like the best-kept secret Ford ever had... even they weren’t exactly sure how to walk through it.” Shreve’s shop has solid support from Ford, including direct access to the team on the F-150’s assembly lines. “We called a supervisor at the plant, they were just as mystified as us. We effectively had to reverse-engineer the truck.”

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*So they say, anyway

Early on, the repair team ran into one roadblock after another. Apparently the F-150's panels were color-coded, which the repair crew didn't realize at first. Then they figured out that the rivets used to hold the body together weren't all the same size. The shop had "nine hours just of [rivet] gun changes" by the end, Shreve told me. "Gun change time wasn't even mentioned" in the tutorials and literature he'd been studying from Ford.

What about that "F-150 parts shortage?" Remember how Ford keeps telling us they can't build enough F-150s? That's a problem for repair as much as it is for sales. "The rivet company can barely produce enough rivets to keep the assembly line running, they can't provide rivets for you," Shreve explained... 'you' being repair shops like his. "So you've got to source them yourself. We thought if it's a place where a rivet's gonna be ugly, we could TIG weld it." But in the state of Ohio where Waikem is located, it's an on-the-books law that a vehicle repaired as an insurance claim must be returned to "pre-accident" condition. That means, in a case like this, the shop has to follow OEM assembly practice exactly, and with OEM parts.

Okay... what's wrong with that? Those rivets are high-quality components that come in magazines just like a nail coil you'd load your nail gun with for a home improvement project. Apparently you can't buy a handful of them, you buy big packs of, say, 1,000. The shop spent \$2,300 of the insurance company's money in rivets alone, and "didn't use half of 'em, but we got charged for them so we had to bill for them." Annoyingly, Shreve said he's had lots of calls from other repair facilities asking if they can buy spare rivets off him, but he can't sell because they belong to the insurance company. Surely, this specific issue will be worked out soon enough... but it's pretty clear evidence that Ford can't escape growing pains when it comes to repairing their new truck. But it's going to get easier to fix this thing. Right? Yes.

After taking the time to learn processes and iron out a few kinks, things went pretty smooth: "Once we got down what worked and what didn't work, we got it done in about eight hours," Shreve said. Shreve smartly rotated his guys through all the tasks involved in putting a new upper structure and roof on the 2015 F-150 so they'd glean



Industry Change: **Materials** — Steel vs. Aluminum: A \$17,000 Repair?

as much experience with the truck as possible. “I’m not afraid of them now,” Shreve said about the truck, but said he was glad for the large support network from Ford he had at his disposal. “I had to go through about \$100,000 of tooling and training.” By his own admission, there was still some stumbling along the learning process. “And an indie (shop) is gonna try and do that without training?”

Not all Ford dealerships are equipped to perform body repairs at all, but those that don’t can “sponsor” local independent outfits to farm out bodywork. Shreve speculates that smaller operations without the budget of a large dealership network like Waikem’s will struggle getting up to pace on aluminum repair.

What’s Ford doing to make these repairs easier? Besides [helping dealers pay to retool their body shops](#), it sounds like Ford is doing a good job connecting the factory with repair guys in the field to streamline repairs and hammer out consistent practices. The 2015 F-150 has a lot of modularity built in so while this \$17,000 job is an extreme example, they’re hoping most common dents and dings will be able to swap in and out fairly simply.

So does aluminum actually cost more to fix or what?!

Ford would point to Shreve’s line that above; “Once we got down what worked and what didn’t work, we got it done in about eight hours” and say LOOK, SEE? They’d also correctly point out that Waikem billed their hourly rate the same as any other repair.

However, they also had to added in a sizable “setup time” bill, buy all those rivets, and of course deal with the four-week downtime. Seems like the aluminum-bodied F-150 will get easier to repair, but there’s still undeniable complexity over traditional steel as repair shops are getting up to speed on it.

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THE ALL-NEW **F-150** **BUILT Ford TOUGH**

Gearheads Get Four Reasons to Appreciate Postage Stamps In 2016

<http://truckyeah.jalopnik.com> / Andrew P Collins / 1/2/2016

The U.S. Postal Service (remember those guys?) has a big new crop of pretty stamps for 2016, including this set of four classic pickup trucks. Beautifully rendered as clean and colorful drawings, forget mailing the gas bill—these are nice enough to hang on the wall!

The '38 International, '53 Chevy, '48 Ford and '65 Ford are each on their own stamp. "Illustrator Chris Lyons created the artwork under the direction of Antonio Alcalá," the Postal Service said in a [press release](#).

Lyons has [his own website](#) where you can see some of the other things he's drawn. Looks like a lot of PhotoShop's "posterize" function to me, but his images have a nice modernized-retro vibe I think a lot of people dig right now.



As for the rest of the stamps, you can see the whole list of what's new for 2016 on [the Postal Service website](#). There are some nice landscapes and *Star Trek* entries in there, so maybe you can make your grandmother proud and send her a letter once in a while this year.

Editor's Two Cents: Unfortunately, the evolution from the homemade drag sled fashioned from an old tire filled with concrete to the g-Analyst to the various iterations of the Vericom to Datron to VBox and other accelerometers didn't make the list for stamps (no respect!!). Maybe next time...



CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

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Full Page	<input type="checkbox"/> \$100	<input type="checkbox"/> \$360	<input type="checkbox"/> December	November 1
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Make checks payable to "CAARS" and mail with this completed form to "CAARS Treasurer," 4632 Second Street, Suite 100, Davis, CA 95618, Re: Newsletter Ad. Additionally, e-mail ad copy to the newsletter editor at editor@ca2rs.com.

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related reading: **"Human Factors in Traffic Safety - Third Edition"**

"There are more than 175 million licensed drivers in the United States. Combined with the many pedestrians, bicyclists, motorcyclists, and other road users, this creates an interesting mix of elements with very different characteristics. Moving these elements efficiently and safely to their destinations presents a major challenge, particularly in densely populated areas. *Human Factors in Traffic Safety, Third Edition* will provide guidance in how to identify these elements in your collision investigations. The authors introduce you to the ways in which designers of vehicles and roadways historically often did not take into account the full range of road user characteristics. The book discusses the substantial improvements in design principles and standards achieved over the years due to the concerted effort by concerned individuals interested in roadway and vehicle design and its impact on traffic safety.

Most importantly, this book introduces you to the behavior of the road user. Driver limitations and driver or pedestrian error are the major factors in traffic accidents, contributing to about 90% of roadway crashes. Driver behavior, however, is often the most complex and yet least understood element in the roadway system. A wide variety of perspectives on human factors and driver behavior are covered ranging from the design of roads, vehicles and traffic control devices to emotional and motivational determinants of driver behavior. Many traffic safety experts have contributed to this book in order to give you a comprehensive introduction to human factors as it pertains to driver and pedestrian behavior and traffic safety.

This new edition has been extensively revised. All chapters have been edited and updated, along with new chapters on aggressive driving, intersection and roundabout crashes, positive guidance, and the traffic safety culture paradigm. If you are involved with accident investigation or the promotion of traffic safety in any capacity, this book is an essential part of your library.

- **Contributors:** Gerson Alexander, Cher Carney, Robert Dewar, Bonnie M. Dobbs, Paul Green, Fred Hanscom, Sarah Keller, Jeff Linkenbach, Michele Lustman, Daniel V. McGehee, Herbert Moskowitz, Paul Olson, Jay Otto, Michelle L. Reyes, James E. W. Roseborough, Alison Smiley, Thomas Smahel, Steve Swinford, Louis Tijerina, Nicholas Ward, David L. Wiesenthal.
- Copyright Date October 10, 2015
- 550 Pages, Hardcover Binding, 8.5" X 11"

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Human Factors in Traffic Safety

Third Edition

Edited by
Alison Smiley



Lawyers & Judges
Publishing Company, Inc.

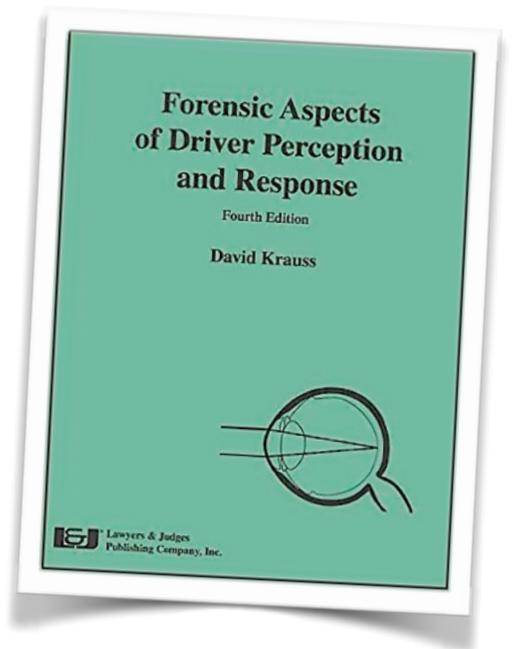


related reading: **Forensic Aspects of Driver Perception and Response — Fourth Edition**

This text contains the most current information available in the area of driver perception and perception-response time. All existing chapters have been expanded, providing in-depth coverage of areas such as light reflecting surfaces, visibility enhancing materials, driver age, gender and experience, fatigue, reaction time, speed perception and vehicle size, vehicle lighting and marking, glare, roadway design and the driver, work zones, railroad grade crossings, roadway signage, weather and driving and driver distraction.

Additionally, a new chapter has been added covering the proliferation of in-vehicle technology and its relationship to the driver. If you work with driver perception and response cases in any capacity, this book is an invaluable addition to your reference library.

- Author: David Krauss
- ISBN 10: 1-936360-33-0
- ISBN 13: 978-1-936360-33-8
- Copyright Date June 26, 2015
- 336 Pages
- Casebound Binding
- Size: 8.5 X 11 Inches (US)

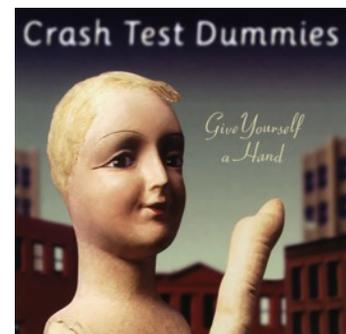
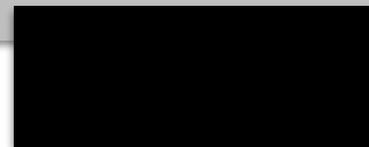


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SOUNDTRACK FOR SAKE OF DISCUSSION (and some good laughs)

In keeping with the sidebar musical addition introduced last issue, the soundtrack for your thoughts this issue is the Crash Test Dummies' 1999 release *Give Yourself a Hand*. In the mid-1980s, a less-than-serious bar band named **Bad Brad Roberts and the St. James Rhythm Pigs** evolved into the **Crash Test Dummies**, a name suggested by a friend of the band who was in medical school (the diagnostic mannequin, known colloquially as a crash test dummy, was known to the public already by this time). Seemingly odd and off-beat, the band went on to receive 14 nominations between 1992 and 2000 for Best Album, Best Album Design, Group of the Year, Best Video, and Entertainer of the Year, and other awards.

So what?! *I know*...point is, the industry seems to be taking a less-than-expected approach to things with lighter materials that cost more to repair (and that are possibly less safe than what we are used to). Add to that this idea that the car may end up having a mind of its own. Who becomes the dummy and who needs a hand then?





ACTAR Examination Dates

ACTAR TEST SCHEDULE – 2016 AT A GLANCE

SPRING 2016

Monday, April 11: Taylor, Michigan. Sponsored by Michigan State Police and held at the MSP 2nd District Headquarters before the SAE World Congress. New applications must be received by February 11, 2016.

Exam registration cutoff date: March 11, 2016.

Friday, April 15 (US): Golden, Colorado. Sponsored by the Colorado State Police and held at the CSP Academy, located at 15055 South Golden Road. New applications must be received by February 15, 2016.

Exam registration cutoff date: March 15, 2016.

Friday, April 15 (Canada): Edmonton, Alberta. Sponsored by CATAIR and held at Renneberg-Walker Engineering located at 920-49 Street. New applications must be received by February 15, 2016.

Exam registration cutoff date: March 15, 2016.

Sunday, May 1: Orlando, Florida, before the WREX 2016 Conference. New applications must be received by March 1, 2016.

Exam registration cutoff date: April 1, 2016.

FALL 2016

Friday, October 14: Golden, Colorado. Sponsored by the Colorado State Police and held at the CSP Academy located at 15055 South Golden Road. New applications must be received by August 14, 2016.

Exam registration cutoff date: September 14, 2016.

All tests prohibit the use of laptop computers, but allow pre-approved calculators. Refer to www.ACTAR.org.

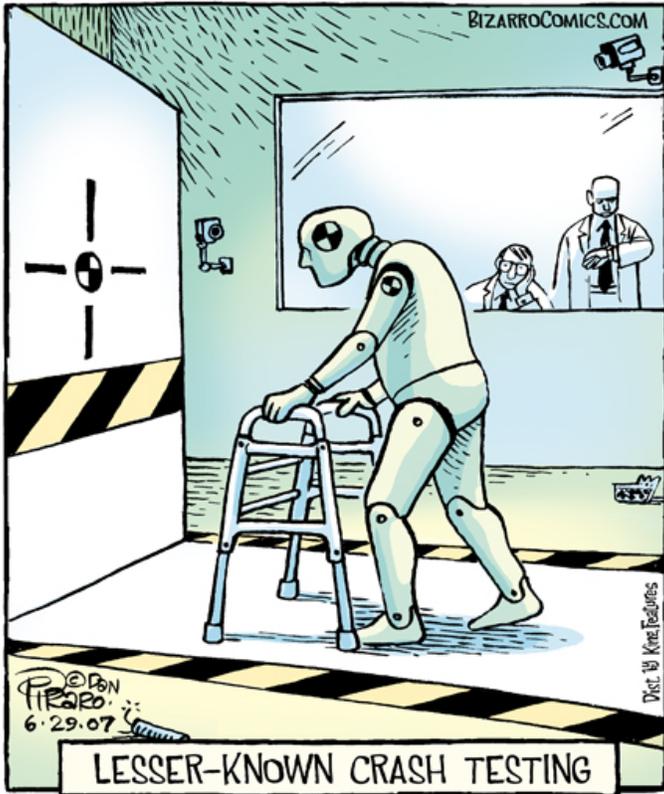


2015 ELECTION RESULTS

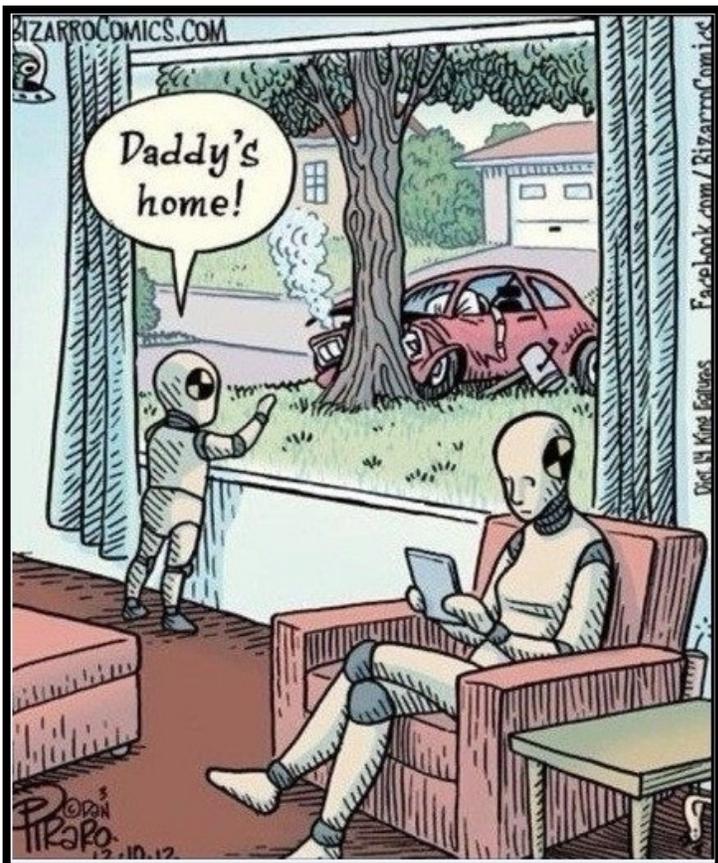
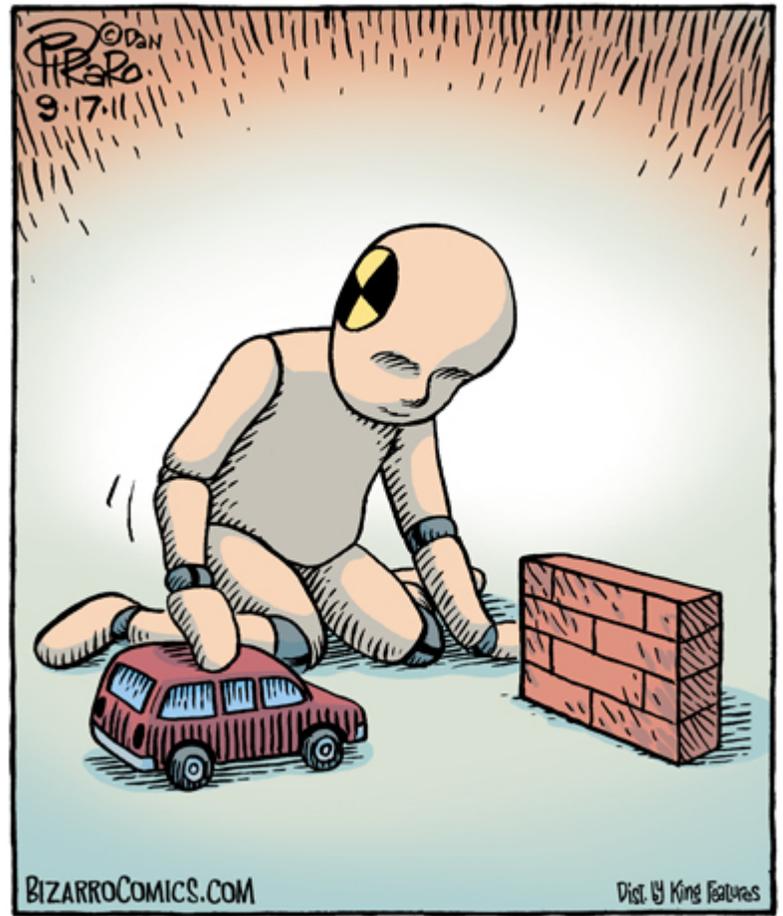
Thank you for your votes. The following individuals were re-elected into their respective positions, as follows:

- Jahna Rinaldi (Southern California)Vice Chair
- Roman Beck (Southern California)Director-at-Large
- Dave Cameron (Northern California)Director-at-Large
- John Crews (Southern California)Director-at-Large

Low-speed ped testing (Eubanks in booth)



How it all gets started



Hands-on distracted driver testing



Ford Car Patent Tips Detachable Unicycle

www.pcmag.com/ BY STEPHANIE MLOT 12/30/2015

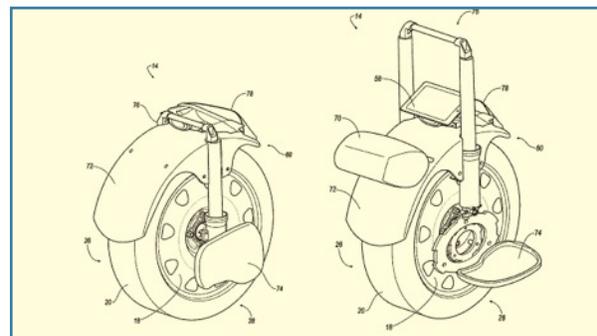
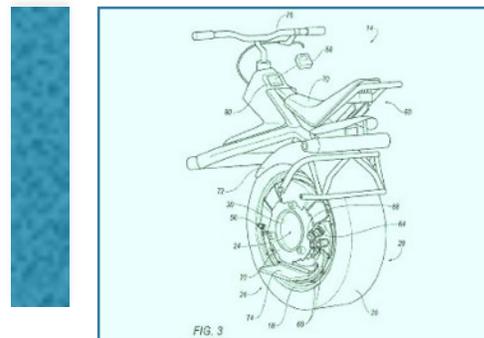
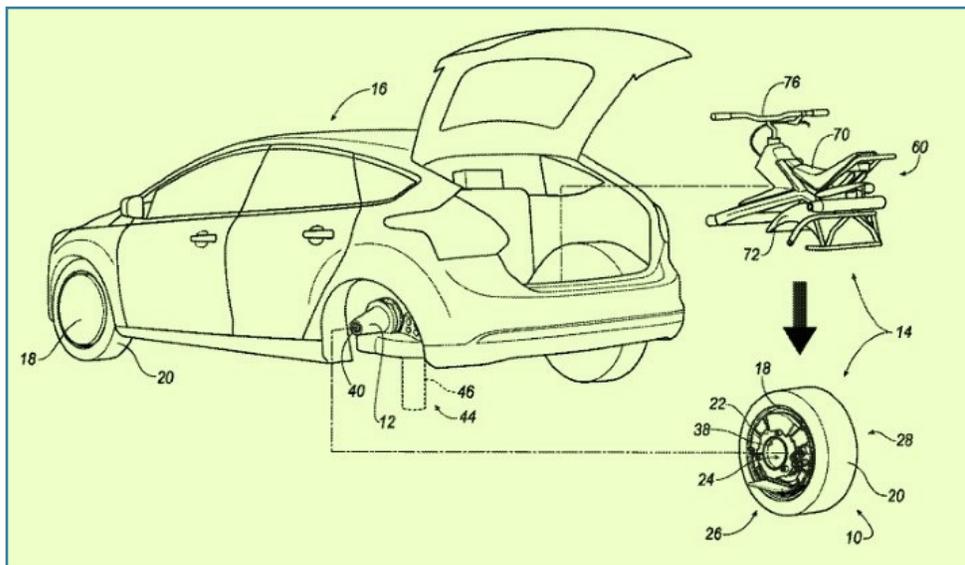
Ford seems to have found inspiration in an unlikely source. The auto maker this month earned a patent for a "self-propelled unicycle engagable with vehicle" — think the thick-wheeled Batpod detaching from the Batmobile in *The Dark Knight Rises*. In Ford's case, though, you may need better balance: The self-propelled unicycle is assembled using only one of the vehicle's tires.

First spotted by Patent Yogi, the multi-modal invention would be integrated with the vehicle — press a button to release one of the car's wheels, fix it to an upper attachment, hop on, and feel the wind in your hair. All the while knowing your car is safely stored in a remote parking lot, where it sits inoperable while the unicycle is disengaged from the suspension system.

Equipped with a battery, electric motor, seat, and foot rests, Ford's device could be used to supplement the automobile, or as a self-propelled alternative to the vehicle's gasoline-powered motor. In the vein of foldable bikes, electric skateboards, and scooters, this invention aims to solve the last-mile problem many folks suffer on long, congested commutes, Road & Track pointed out.

But don't get your hopes up for riding Batman-style unicycle to work every day: It's unlikely this idea will make it to the production line any time soon. "As a technology leader, we submit patents on innovative ideas as a normal course of business," a Ford spokesman told PCMag. "Patent applications are intended to protect new ideas, but aren't necessarily indication of new business or product plans."

In the meantime, the Michigan-based manufacturer has pledged to spend \$4.5 billion on 13 new electric vehicles by 2020. Ford is also testing autonomous vehicles in California, and is rumored to be teaming up with Google to build self-driving cars.



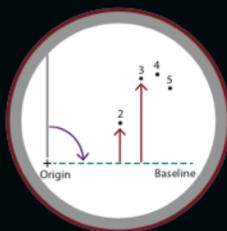


Crash Scene Investigation Using LTI Laser

Change of Approach: *One Laser Can Do It All*

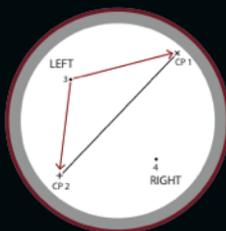
lasertech.com

Crash scene investigators are responsible for not only taking photographs of the scene, they also have to take detailed measurements of vehicle positions, surrounding landmarks and anything else that may be relevant to the cause of the crash. There are really only three tools an investigator can use to map a crash or crime scene: a conventional tape measure/wheel; a total station; or an LTI laser. All three have their advantages and disadvantages, but only one tool is truly measurably superior when you consider the following factors about crash scenes.



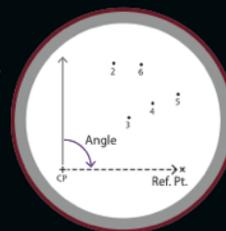
BASELINE

Occupy the roadside and measure features at a 90-degree angle.



RANGE/RANGE

Occupy the point of interest and measure the same two remote targets.



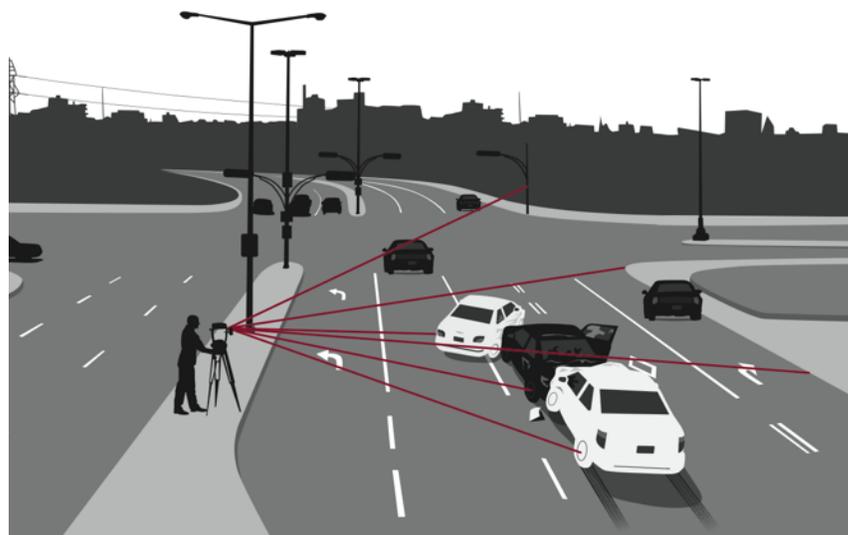
RADIAL ANGLE

Occupy any safe location and measure features at any angle.

Time is of the essence — the faster you can clear a scene the safer everyone becomes. Traffic accidents are known to cause secondary accidents, which make investigators on the scene and surrounding civilians susceptible to getting hurt. Investigators can't rush the process either because if a serious injury or a fatality occurred, it's extremely important to collect all the necessary position data for courtroom purposes.

This is precisely why LTI's laser mapping system is so ideal for crash scene investigators. By utilizing the power of reflectorless technology, you can make measurements to vehicles or any surrounding landmark without the need of a second person holding a prism pole. Using an LTI laser not only saves time, it also reduces the safety liability for you and your team.

Some crash scenes can be very large and complex or within extreme terrain that could prevent the use of conventional measurement tools or mapping methods. This is why we designed our field software with three choices in mapping techniques. Depending upon the area you have to work with will depend upon which technique will be the most effective for you.



Your department's overall budget, training time and changing personnel are all contributing factors when deciding what to buy for your investigation team. LTI offers a laser that can be used to measure speeds and then once it's toggled into survey mode, it can measure distances and heights.

A TruSpeed Sx laser makes sense because it serves a dual purpose and can easily integrate with our field mapping software. Minimal training is required, so if there is a change in personnel it won't take a lot of time and money to get a new investigator up to speed.

INDUSTRY CHANGES:

MATERIALS & MINDSET



Helping Law Agencies Crack Down on Aggressive Driving.

DBC (Distance Between Cars) - a unique measurement calculation unlike any other on the market.



Lasers with Tailgating Technology Built-In.

Introducing LTI's exclusive Distance Between Cars (DBC) firmware.



1 out of 3 Accidents are Caused by Tailgating

Validate your visual determination of "Following Too Closely" violations.



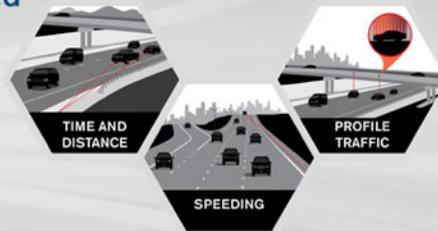
Crack Down on Aggressive Driving

Record it all on video and capture an image of their license plate.



The Measurements You Need In A Matter Of Seconds.

We have the tools and the technology to help you get the measurements you need quickly, easily and safely.



lasertech.com

TruPulse® 200X

The practical choice if you are solely doing crash scene mapping.

- Most affordable package
- Designed for one-person operation using range/range
- Easy to upgrade later with MapStar TruAngle
- Compact system that sets up quickly



TruSpeed® Sxb + MapStar® TruAngle®

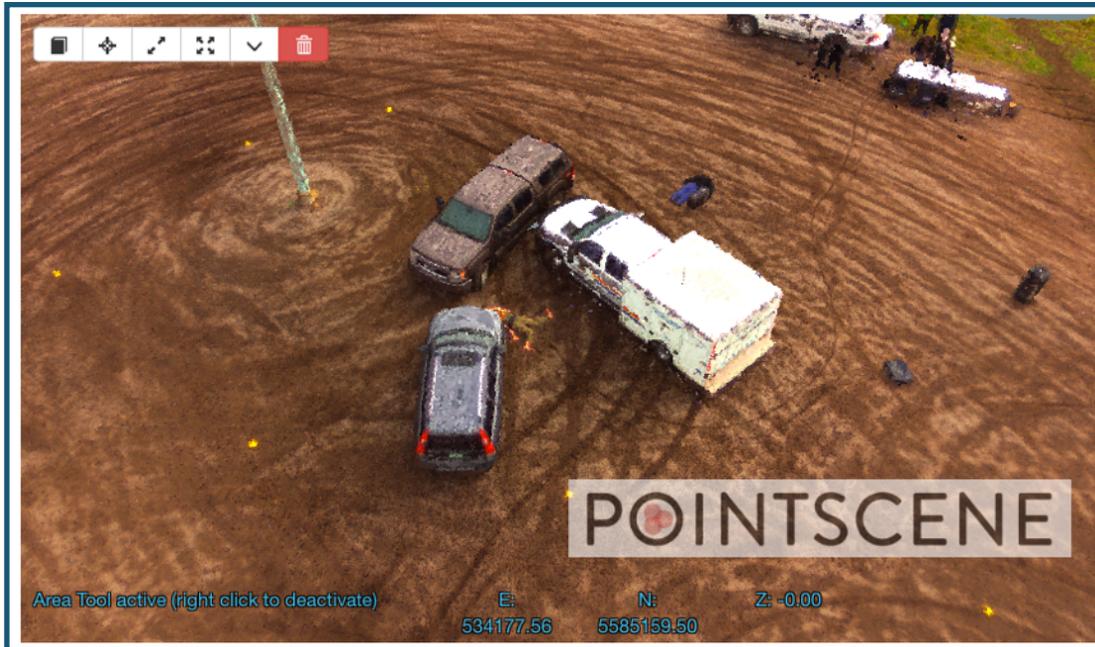
Collect 3D coordinates with a high degree of angle and distance accuracy.

- TruSpeed Sxb maps scenes and measures speeds for increased value to department
- Improves efficiency by mapping multiple points from a single control point
- Shoot directly to evidence or to a prism pole





This experimental project was organized by the Royal Canadian Mounted Police (RCMP) and Pix4D to investigate a proposed UAV-based protocol for accident and crime scene investigations. Comparing results with traditional methods (measuring tape, laser scanner) would show the accuracy and reliability of the achieved reconstruction results so that they can eventually be used as admitted evidence in court.



Two data sets of a made-up crime scene were acquired with quadcopters from Aeryon Labs (225 images) and Draganfly (212

images). The ground sampling distance was less than 1 cm in order not to miss any details. The full flight took less than thirty minutes including the pre-flight preparation. Eight yellow evidence markers were placed around the collision scene, indicating the location where all evidence was found. (The densified 3D point cloud is shown embedded above from the Pointscene.com platform.)

In order to improve the global accuracy of the final results, several points were measured with kinetic GPS and total station. These points were picked from corners of the vehicles, the feature objects, and the evidence markers. They were imported into the software and used either as ground control points, manual tie points or check points. In addition, a terrestrial laser scanner was set up in several locations to scan over the entire scene to be used for quality assessment of the UAV results. Pix4Dmapper's total processing time was approximately 2 hours on a laptop with a core i7 and 8GB RAM. A densified point cloud, digital surface model (DSM) and orthomosaic were generated.

The reconstructed results either exactly match or are within one centimeter accuracy when compared with traditional methods. Detailed comparisons of results can be found in the White Paper (http://pix4d.com/wp-content/uploads/2013/04/Pix4D-White-Paper_UAV-based-CSI.pdf) The project results show that UAV-based solutions not only save the field measuring work but also provide LiDAR-like accuracies with more visible details which can be admitted as evidence in court.

<http://blog.pix4d.com/post/103641424926/uav-based-accident-and-crime-scene-investigation>





AERIAL PERSPECTIVE



Corporal Doug Green, RCMP

The X4-ES aircraft is part of his kit and flown on a daily basis. May of 2013 Cpl. Green was the first public safety officer in the world to save a life using this aircraft & FLIR thermal camera.



HHC W/ NEWS

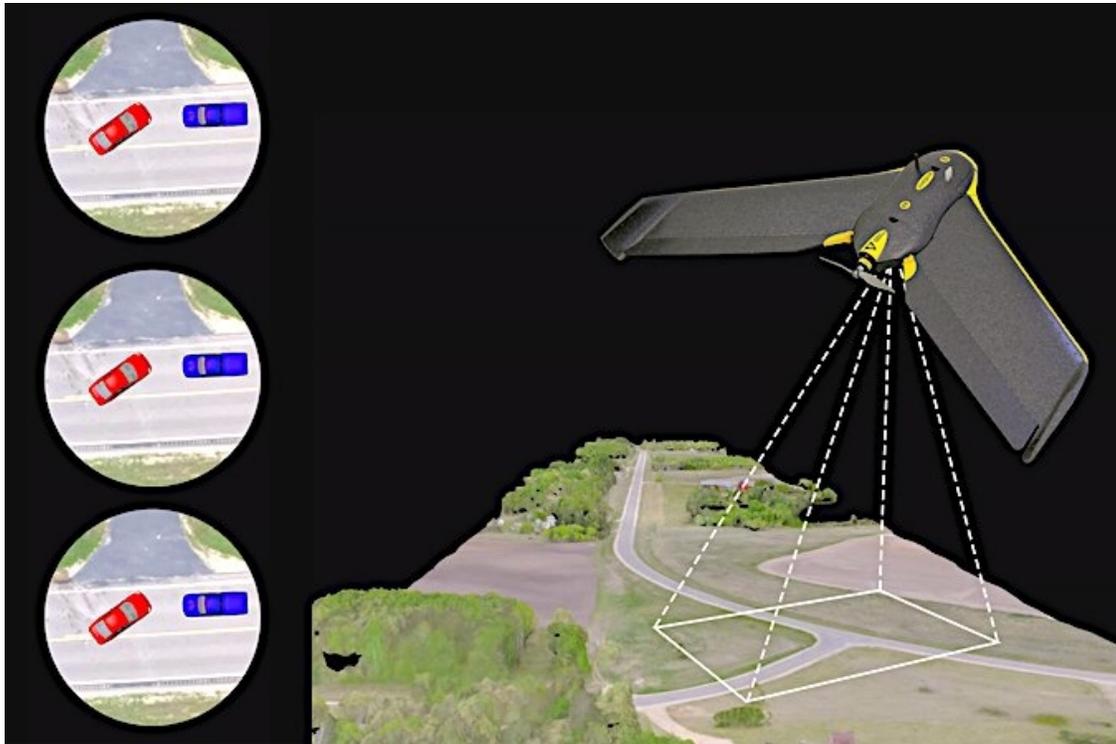


HAND HELD DEVICES THROUGH PAB NETWORK

DRAGWELY VIDEO NETWORK



Setting the Scene – Using Drones for Traffic Accident Reconstruction and Analysis



Greg Gravesen is an experienced traffic accident reconstruction specialist. Here he explains how employing a fixed-wing mapping drone has revolutionized his work.

Hi Greg, why don't you start by telling us a little about your background and experience?

Hi. I've been a law enforcement officer for 25 years.

During the past 22 years, I have developed a specialty in the area of crash reconstruction. In addition, through my position as a Sergeant with the St. Paul Police Department's Forensic Services Unit, I have had extensive experience in the area of crime scene documentation and illustrations.

How has the technology you use in this work changed over that time?

Early on in my career, I used tape measures to document my crash scenes. As technology developed and the costs got lower, I eventually upgraded to a laser scanning system. The past 15 years, I have incorporated terrestrial surveying instruments such as a Trimble robotic total station and a FARO scanner to document both crash and crime scenes. I am also involved in teaching this technology. Earlier this past year, I purchased the senseFly eBee drone, which has become my primary methodology of scene documentation. This system allows me to collect information for very large scenes very quickly.

How do you use the geospatial data you collect?

The senseFly mapping system allows me to create the orthomosaic image, a 3D point cloud, and a 3D mesh of my crash and outdoor crime scenes. This output can be used in a number of ways, from a pure graphical perspective and also during the analysis.

The eBee produces a high-resolution image that normally does not contain moving vehicles. In other words, if a moving vehicle is contained in one image, that cell of the mosaic can be replaced by another image. This results in a stunning image that can be a trial exhibit. This image can be used in several ways. One of the most common applications is to use this image to create highly detailed and accurate scale diagrams. In addition, the orthomosaic may also serve as the background for two-dimensional simulations and animations. The resulting graphic is very visually appealing.

INDUSTRY CHANGES:

MATERIALS & MINDSET



From a graphical perspective, I create a number of animations using the 3D point cloud data that I collect, for example with the laser scanner or more recently with the eBee. The most common type of animations involves a virtual “fly-through” of the scene. This allows the viewer to get a unique perspective of a scene that simply can’t be accomplished through traditional technologies such as photography. Using the eBee system these “fly-throughs” are easy and quick to create. In addition, I create more photorealistic animations where I insert scaled models of objects, pedestrians, etc. into the 3D point cloud. The 3D point clouds can also be used as a “blueprint” to create virtual models and environments using software such as Autodesk’s 3D Studio Max.

The video [link: <https://youtu.be/vwQFPRc7YYQ>, screenshot below] is a point cloud fly-through animation that depicts a scene over a mile long, which involved two vehicles drag racing. This animation allows the viewer to get a unique perspective of the entire crash scene. It would have taken days to use a terrestrial scanner to complete this project. This type of exhibit is really effective evidence. It gives juries and clients a unique perspective that traditional methods, such as photography, just cannot compete with. Another application of the drone’s output involves the use of computer simulation software, a powerful tool used in traffic accident reconstruction. This software predicts things such as vehicle positions, trajectories, acceleration, collision forces etc., which are based on Newton’s Laws of Motion. Specifically, I use Engineering Dynamic Corporation’s HVE and PC-Crash software packages. Both packages require an environment be created and later displayed in the simulated results. The orthomosaic image and the 3D point cloud created by the eBee are easily imported into this software and help produce a high quality, accurate output.



Why did you choose the eBee drone specifically? What made this system stand out?

I researched the eBee and was really impressed with it. However, I never really saw its full potential until I went out and bought one. It is an extremely versatile system that produces accurate results, quickly. Whether I am using the high-resolution orthomosaic image to create diagrams, the 3D point cloud to create a simulation environment, or creating fly-through animations, this work is done much quicker and safer than using other methodologies.

Using Drones for Accident Reconstruction and Analysis



For example, for large scenes when I would previously have used terrestrial scanners these would have taken one to two days to document (not including computer processing time). These take literally less than 30 minutes to fly and about three hours to process on the computer. Initially, the drone simply sounded too good to be true. However, I was amazed when I experienced it first-hand.

One of the other things I really like about the eBee system is its reliability and built-in safeguards.

What do you feel the acceptance of drone technology has been like in the crash and crime scene analysis world up to now?

Interestingly, rotary systems are becoming common, but some people think that fixed wing UAS have no place in forensics. I disagree completely. Often times, especially from the standpoint as a private consultant, my involvement is long after the date of the crash and I don't have the luxury of shutting down a road. A product like the eBee excels here because I am able to capture highly accurate information about the scene both quickly and safely. I am able to obtain 3D data in a fraction of the time it takes with other terrestrial surveying instruments. And best of all, I do not have to enter the roadway or shoulders to obtain it.

The resolution of the eBee's imagery means I can actually identify the paint marks that law enforcement made on the ground, tire evidence, ruts in ditches, and other important evidence. Another strength of the eBee system is the ability to document very large scenes. For example, I recently documented a crash scene that resulted from two vehicles racing. The incident occurred over a one mile section of roadway. I was able to document this scene with one 24-minute flight. I am not aware of a rotary system that could cover that extensive a scene in one flight. The multi-rotor systems I am familiar with do not have the battery life that permits them to have the kind of range seen with the eBee system.

You're working on a comprehensive study about your use of drone technology in crash reconstruction. Could you tell us a little more about what that will contain?

That's right. I have already done some validation testing prior to using the eBee system for case work. I am now planning on conducting a more extensive study that will scientifically evaluate drone technology in the content of scene analysis work. This testing will involve evaluating and comparing technologies such as the eBee, total stations and terrestrial laser scanners, and using a tape measure, in terms of their accuracy and efficiency. This type of research is useful to validate tools like the eBee and defend them with Daubert challenges in court. We hope to publish these results in a peer-reviewed journal. Based on my experience so far, the drone will prove to be the fastest, most comprehensive data gathering tool. Its speed and accuracy, from what I've seen so far, are just incredible.

Greg Gravesen has been an ACTAR-accredited traffic accident reconstruction specialist since 1994. He is the president of the private consulting company Northwest Crash Analysis, LLC and currently works as a Sergeant in the St. Paul Police Department, Minnesota, assigned to the Forensic Services Unit. He is also an adjunct instructor with IPTM.

waypoint.sensefly.com/setting-the-scene-using-drones-for-crash-reconstruction-and-analysis / 9/22/2015

WREX 2016 World Reconstruction EXposition

Already two years in the making, the WREX2016 presenters committee is currently reviewing topics, research, and presenters to bring the best in current training to the largest crash conference ever held in the US. One day of live crash testing, another day of robust testing, and three days of full group and breakout training sessions on dozens of different crash related topics.....you pick what interests you!

Estimated 40+ ACTAR CEUs.

This event will be sponsored by numerous crash association societies from the US and Canada and possibly International Associations. We are currently in the preliminary planning stages and **expect this to be the largest crash reconstruction conference ever held.**

Current plans includes numerous crash related guest speakers and two days of outdoor testing, including several high speed crash tests provided by multiple crash teams. The Rosen Shingle Creek facility (pictured below) offers us the chance to host everything but the high speed crash tests at one site and the chance to meet with others attending the event in the evenings.

There will be complimentary shuttle service to and from the Orlando airport. Twelve crash associations are already committed to take part and we are in talks with several other groups. Any other crash association that would like to be a part of this event is welcome to contact us for details at pcarspresident@gmail.com.

Rosen Shingle Creek Hotel, Orlando, Florida

(866) 996-9939

May 2-6, 2016

www.wrex2016.com

Hotel Amenities

- Complimentary access to fitness center
- Golf discounted to \$69 for greens fees and cart
- No resort fees
- 25% discount on food in hotels restaurants
- Luggage service allows you to check bags at the hotel and retrieve them at your home airport

The Rosen hotel in Florida is almost sold out of the room block for WREX2016. Less than 30 rooms are left at the reduced rate.

If you are planning on going to WREX you should make your reservation today.



CRASH TEST DAY will include four motorcycle crashes, several car-to-car crashes, and a heavy truck-to-heavy truck crash test!

This will be the largest conference of collision reconstructionists and investigators in the past 16 years, and possibly ever. WREX 2016 will be the first World Reconstruction Exposition that has been held since the year 2000. The event is being sponsored by 21 crash associations from the US, Canada, and around the world. WREX will likely be the largest training event for crash investigators that has ever been held.



t h e p a r t i n g
s h o t

Old, scratched up, and
beaten, these "toys" continue
to do their part in the collision
reconstructionist's toolbox.

What other tool allows you to
easily demonstrate and explain
collision dynamics with ease
and portability? (You have
permission to admit you still play
with toys you've had since you
were six. It's for work...)



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