SKIDMARKS

THE OFFICIAL PUBLICATION OF THE CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

moving past human error?

is error-prone human involvement simply unavoidable?

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the BOARD BEAT

It's been an awesome 2017. The Board of Directors, especially our training coordinator Sean Shimada, has been hard at work putting together training for this year.

The first-quarter training, which occurred on February 21 in Southern California and February 23 in Northern California, was focused on Work Zone Crashes for Accident Investigators and Reconstructionists. This was presented by David Eisenbeisz and Dale Dunlap and we had good feedback from the information presented.

Training for the second-quarter took place in Southern California on May 31 and on June 9 in Northern California. The topic for the second quarter was Accident Reconstruction & Injury Biomechanics: From Black Box to Broken Bones. This was presented by John Gardiner and Steve Anderson and gave a thorough explanation how these two topics were interlinked.

The CAARS Board of Directors has been diligently planning away and continues and to work on the finalization of the 2017 Annual Conference. This year, the conference will be held once again in Southern California at the Embassy Suites, located at 400 North State College Boulevard in the City of Orange. The conference will be held from October 26–28. To continue with our custom, we will once again host the ACTAR examination on October 25, the day prior to the conference. Best of luck to any of our members who are venturing forth with the exam this year. We hope our training has assisted in your preparation.

The Board of Directors are always looking for suggestions from the membership for future training topics. We aim to have all quarterly training sessions arranged well in advance, but are always open to ideas and suggestions. If your suggestion for a training topics has not yet been scheduled for the current calendar year, it may be a topic we can fit into a future conference or training session.

As always, a venue is usually the most difficult thing to acquire. If you have access to facilities for training, please contact the CAARS Board of Directors at, training@ca2rs.com, or ca2rs@ca2rs.com with information on training sites.

Lastly, you likely received an e-mail reminder about membership dues. I know we all put things off - especially during the summer (and especially bills), but remember the benefits we all enjoy when membership fees (which were due July 1) are paid in full. Help up continue the great work we do.

David Cameron, CAARS Board of Directors — *Dave*

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LIVES DEPEND ON HOW FAST DRIVERS RESUME CONTROL OF SEMI-AUTONOMOUS VEHICLES

How fast can you react? When cars don't have steering wheels and humans have no means of vehicle control, "takeover time" won't be a thing. With driver-assist features and semi-autonomous driving modes increasing every model year, however, **the speed with which human drivers respond to alerts to resume manual control is a big-time concern.**

Researchers at the University of Southhampton ran simulation tests to measure human "takeover time" under two conditions. They measured how long it took drivers riding in the car but not otherwise engaged to take back control and the length of time when drivers were distracted by another activity – in the test simulation they were told to imagine they were reading an issue of National Geographic.

In the simulation test, subjects drove a Jaguar XJ 350 traveling at 70 mph for 18.6 miles in moderate traffic on a six-lane highway, with three lanes traveling in each direction with a separation barrier. The test group consisted of 26 participants (10 females and 16 males) ages 20 to 52 with a minimum of one-year and average of 10.6 years of driving experience. Switching between manual and automated mode required touching two buttons on a tablet located on the simulation vehicle center console. **When the test required human takeover from the automated mode, an icon replaced the speed indicator on the instrument panel and a computer-generated voice stated, "Please resume control."**

In the first test mode, with drivers not distracted, the median takeover time was 4.56 seconds. The range of responses, however, was from 1.97 seconds to 25.75 seconds. So that means that for the subject with the slowest tested takeover time, the car going 70 mph would have traveled just over a half mile before the human regained control. At the median time of 4.56 seconds, the car would have traveled 468 feet, or a little more than one and a half football fields.

In the distracted mode, testing the range in response time wasn't as great, from 3.17 to 20.99 seconds, with a median time of 6.06 seconds. So in the median takeover time, the car would have gone 622 feet, or more than two football fields, before human takeover. In the slowest response time, the car traveled about 2,155 feet. It's important to note that the test times didn't measure driver response to whatever was going on, but just how long it took them to regain control. Then they had to assess the situation and take appropriate action. If you don't find that a little scary, maybe think again.

The authors of the study note that while contemporary driver assistance features are commonly considered "automated," they are more accurately "conditionally automated" and drivers should be fully aware of the misconception and know the difference. Once vehicles are fully autonomous, all passengers will just be able to ride, but until that time, driver takeover time will be a crucial factor.

For the subject with the slowest tested takeover time, the car going 70 mph would have traveled just over a half mile before the human regained control.

Bruce Brown / Digital Trends / January 2017

Tudor Cobalas nearly crashed his car while driving and texting on his phone.

It was this near-death experience that inspired him to turn the smartphone from a weapon of mass distraction into a tool for safer driving. Mr Cobalas, 30, from Romania, developed SafeDrive, an app that rewards drivers for ignoring their phones while driving. Once a driver exceeds 6mph, the app launches a "Release" button on the screen, effectively locking the phone. Driving without checking the phone generates points that can be converted into shopping discounts in the SafeDrive Marketplace. Pressing the Release button while driving wipes out the points earned during that journey.

It's a simple idea that has attracted nearly 100,000 users globally and 30 commercial partners, from insurance companies to retailers. Mr Cobalas has also developed an app, Milez, aimed at teenage drivers. "It was a response to questions from parents in the US who wanted to educate their children, young drivers," he says. Again, the idea is simple–teenage drivers are financially rewarded by relatives and friends through the Milez app if they drive safely.

Carnage

Mr Cobalas's native Romania has a particularly poor record when it comes to road fatalities. In the European Union as a whole, the average number of road deaths per million inhabitants is 51.5. In Romania, it is nearly double that figure at 95. Worldwide, about 1.25 million people die each year as a result of road traffic accidents, according to the World Health Organization (WHO). "Smartphone distraction" is blamed for an increasing number of accidents. Drivers using a mobile phone are four times more likely to be involved in a crash, the WHO says.

That is why a growing number of technology entrepreneurs are trying to tackle the problem. "Although smartphones are rightly blamed for an increase in distracted driving, we wanted to show that smartphones could be used to make drivers better," says Hari Balakrishnan, chief technology officer of Cambridge Mobile Telematics, a US company that has developed an app called DriveWell.

Are hands-free apps that read out messages *just as distracting*? Cobalas, developer of *SafeDrive* and *Milez* believes so.

The app measures all aspects of driving such as hard braking, abrupt acceleration, sharp cornering and speeding. But it also monitors how often drivers are distracted by their phones and generates a "safety score" at the end of each trip. The company emerged from a project at the Massachusetts Institute of Technology run by Mr Balakrishnan and co-founder Sam Madden.

The free app features competition leader boards that enable drivers to compete with their friends, family and colleagues, as well as personalised safer driving tips. Good safety scores can earn drivers discounts on their car insurance with some insurers, Mr Balakrishnan says. Last year the company launched a competition to find Boston's safest driver. Nearly 5,000 people have signed up, and 98 have been awarded more than $3,400 in prizes. Data from 40,000 DriveWell app users around the world demonstrate its effectiveness, says Mr Madden. "By day 30, we see a 35% reduction in phone use and a 20% reduction in the number of hard braking events," he says.

"Voluntary"

Nick Lloyd, road safety manager at the UK's Royal Society for the Prevention of Accidents (Rospa), agrees that apps designed to reduce driver distraction show promise. But he points out that as use of these apps is voluntary, "we do not know what kinds of drivers are likely to choose to use these apps". In other words, dangerous drivers are precisely the ones who do not think they drive dangerously and thus don't think they need any help.

The problem with smartphones is that they constantly buzz and ping with notifications - they are designed to distract us. So Rob Joseph, 27, an app developer based in London, developed ReadItToMe, an Android-only app that turns written messages into the spoken word, and vice versa.

"The idea initially came up when I was receiving text messages while on the London Overground but was too squished in among people to be able to pull out my phone to check them," he says. The app can read any text notifications your phone receives, including emails and those from social messaging apps such as WhatsApp. At present it can read in any language but reply in only a few.

About 1.25 million people are killed on the world's roads every year

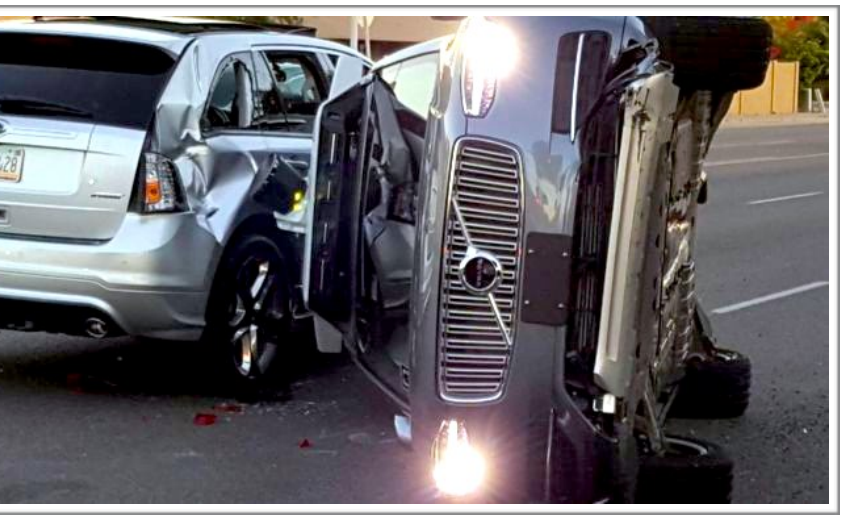
I feel that receiving messages you can't check because you're driving is just as much a distraction as texting while driving," says Mr Joseph. "You're constantly thinking: 'who could it be?' and you don't want to wait until you next pull over." "While some newer cars offer the option to read SMS messages, they don't offer the option to reply, so something like ReadItToMe bridges that gap," he says.

The app, which has 22,000 active users, is free to use for reading SMS messages, or £1.49 if you want to use voice reply or other apps. But does hands-free really make you accident-free? "There are some safety concerns about safe driving applications, such as those which read text messages out loud to the driver, as this could be distracting," says Rospa's Nick Lloyd.

And the National Safety Council suggests that the use of hands-free devices still requires you to multi-task mentally, affecting a driver's ability to respond quickly to hazards.

Perhaps the answer is switching off phone notifications altogether before every journey.

Are public roads becoming the R&D proving grounds for autonomous vehicles?



Uber has pulled its self-driving cars from the roads after an accident which left one of the vehicles on its side.

BBC News / March 27, 2017

Pictures posted online showed the car on its right side on an Arizona street, next to another badly damaged vehicle. The car - a Volvo SUV - was in self-driving mode at the time of the crash, on Friday, Uber said. No one was hurt. A spokeswoman for the police in Tempe, Arizona said the accident occurred when another vehicle "failed to yield" to the Uber car at a left turn.

"There was a person behind the wheel. It is uncertain at this time if they were controlling the vehicle at the time of the collision," spokeswoman Josie Montenegro said.

Uber's self-driving cars always have a human in the driving seat who can take over the controls. The company pulled its self-driving vehicles off the road in Arizona at first, followed by test sites in Pennsylvania and California - all three states where it operated the vehicles. The incident follows a tumultuous few weeks for the car-hailing app service, after several negative stories about workplace practices and ethics. A number of executives have quit in recent weeks, including president Jeff Jones.

Tesla Model X Using Autopilot Collides With Phoenix Police Motorcycle

CarBuzz.com / March 29, 2017

In the short time it's been acquainted with self-driving vehicles, the state of Arizona seems to be unable to give autonomous vehicles a break. As an Arizona native, your fair writer is inclined to point fingers at the questionable driving practices of all 6.7 million residents, but it appears that the technology could be equally culpable. Following a wreck between an SUV and one of Uber's armada of self-driving Volvo XC90s, The Arizona Republic now reports that another autonomous crash has taken place in the Grand Canyon state. The accident actually occurred on March 21st, prior to the Uber accident. This time around the involved party wasn't a self-driving XC90 but a Tesla Model X that may have been using autopilot at the time of the accident. Unfortunately for Elon Musk, the Model X seems to have chosen the worst target it could run into, a police officer on a motorcycle, commanding a public image nearly as bad as if it had run over a group of school children. However, the details surrounding the story paint a very different picture and less severe picture. The accident occurred after both the Model X and the police officer had exited the freeway and come to a stop. After stopping, the Model X began to move forward, prompting the officer to dismount once they noticed.

The Model X then struck the motorcycle, although no damage was reported on either the Tesla or the bike, particularly because the officer mentioned the Model X couldn't have been moving faster than 3 mph. The driver, who along with the officer remain unnamed, claimed that Autopilot was engaged, but Tesla's own website mentions that the system prompts the driver to take over after exiting the freeway. In terms of damages, Phoenix police spokesman Sergeant Alan Pfohl mentions that the collision was such a minor incident that it wouldn't have been investigated if it didn't involve an officer. Tesla told The Arizona Republic that it hasn't even been informed of the accident. To advocate for Tesla, if Autopilot really was engaged, then the system was working outside of its parameters and if it wasn't, then the accident is the fault of the driver. On the other hand, there is prior evidence suggesting that other Teslas have suffered from episodes of unintended acceleration, but these were never confirmed to be due to a fault of the Autopilot system. It may be wise to brace for more reports like these as beta versions of autonomous vehicles are thrown onto the road with drivers of all skill levels.

Stop me if you've heard this one. Why did the police officer cross the road? To jump off his motorcycle and flee to safety before the auto-piloted car could strike. The car *reportedly* was on autopilot – at least that's what the Tesla driver told investigating officers. Phoenix police can't really confirm that the driver wasn't in control and probably never will get to the bottom of it. It was such a minor incident, and no probe is planned. By collision standards, last week's incident involving a Tesla Model X and a Phoenix police officer barely qualified for a police report. There were no injuries, no damages. Sergeant Alan Pfohl, a Phoenix police spokesman, called the contact between the two vehicles a "tap." But the driver's allegation opens the door to questions in the emerging and still-murky legal realm of automated and driver-assisted vehicles. An accident involving an Uber self-driving car and a vehicle turning left in front of it in Tempe raised more issues (story above). The Arizona Republic asked a series of questions about the future of these cars and what their presence on the road could mean for driver and manufacturer liability. A series of experts provided answers.

Are cars really driving themselves right now?

Kind of. To get a general idea of where technology stands and what it's capable of, take a look at the National Highway Traffic Safety Administration and Society of Automotive Engineers' six levels of driving automation. Zero denotes full human control and five is a fully autonomous vehicle. One is generally considered cruise control, and two, "partial automation," is about the limit of technology on roadways today, according to the society. These cars have the capabilities to intelligently steer, accelerate and decelerate. The human driver, however, is expected to fully monitor the driving environment and "perform all remaining aspects of the dynamic driving task," according to SAE's definition. When an automated or driver-assisted vehicle causes an accident, who is at fault? Car or driver? Where technology stands today – at level two or below – it's the driver, said Bryant Walker Smith, an assistant law professor at the University of South Carolina. "Anything that's below level 3, it's clearly a human that's supposed to be doing part of the driving," Smith said.

Smith, who recently authored a 74-page report on automated driving and product liability, stressed that liability isn't a binary concept. There can be multiple parties at fault in any given collision, and multiple parties can be sued. But it should be noted, he said, that the vast majority of crashes are caused by human error. And many crashes involving driver-assisted cars are caused by the other vehicle. Automated cars are forecast to reduce the likelihood of human error, making driving much safer than it is today. But as cars become more and more autonomous, Smith said, it is believed that liability will shift from driver to car. "Which means that, in the future, if automated driving is in fact safer, then manufacturers will bear a greater share," he said . "Manufacturers will have hopefully a bigger slice of a smaller pie of the total crashes."

If an autonomous or driver-assisted car breaks the law, does the driver get a citation?

In the future, automated cars likely will be programmed not to speed, run lights or commit other common traffic offenses. Kevin Biesty, deputy director for policy for the Arizona Department of Transportation, said in cars with dual modes, it's going to be a matter for law enforcement to investigate whether car or human is in control of the vehicle.

If it's in autonomous mode, where would a citation go? What does it mean to be in control? Can you still be cited for a DUI?

These are questions that Biesty said are ripe for court consideration. "These are things that, in my opinion, are going to be decided by case law," he said.

Will autonomous car drivers get special licenses?

Not necessarily, Biesty said. To date, there are no special drivers' licenses for driver-assisted vehicles. Rather, there could be some instructions given by the dealership, just like they would offer for any advanced feature on a new car. Biesty said more of the driving regulations, however, could shift to from driver to car, and therefore from state to federal government. It's the National Highway Traffic Safety Administration that currently approves new technologies in vehicles, and Biesty said this protocol shift likely could continue as technology advances. Eventually, Biesty said, this could strip state motor vehicle departments of one of their core functions – licensing drivers. "There are numerous conversations going on, about, 'At what point does the MVD become a registration of vehicles and an identification agency?" Biesty said.

Will autonomous cars be specially marked, or get special license plates? "At this point we don't really see a need for it, specifically for our department," Biesty said. However, there's a possibility that other agencies may want to distinguish these vehicles from others. Biesty noted that this was the case when alternative fuel vehicles emerged. It was the first responders who asked for these designations since there would be differences in how to deal with an electric vehicle versus gasoline. "But for right now," Biesty said, "nobody has asked."

A Call for Better State Data Collection: *Undercounted is Underinvested*

How Incomplete Crash Reports Impact Efforts to Save Lives

Preliminary National Safety Council (NSC) estimates show that 2016 may have been the deadliest year on the nation's roads **since 2007. As many as 40,000 people may** have died as a result of motor vehicle crashes, while an estimated 4.6 million **additional roadway users were seriously in**jured. This marks a 6% increase over 2015 and a 14% increase over 2014. **There is so much loss, but little is known about key driver behavior factors in these crashes, because critical data is under-reported.**

Collecting data from a crash scene may be seen as merely "filling out accident reports" for violation and insurance purposes. **Data collection efforts immediately followi**ng a crash provide a unique opportunity to help guide prevention strategies. **Currently, some states are recording this ty**pe data and others are not. When data of this kind is requested to be reported on a crash report and is entered, prevention professionals will have the data to better understand driver and non-motorist behaviors. When this data is not recorded, prevention professionals are left guessing.

There are two areas of crash factor data in which under-counting can be a detriment to prevention efforts on a national level:

- Factors that are difficult to observe and measure, such as driver behavior.
- Factors involving fast emerging communications entertainment technologies, and advanced driver assistance systems.

The **Model Minimum Uniform Crash Criteria Guideline** (MMUCC) provides suggested data elements that should be collected on crash reports and is developed by the National Highway Traffic Safety Administration (NHTSA) and the Governors Highway Safety Association (GHSA). MMUCC also provides a suggested crash report that states and municipalities can use. The intent is to standardize data collection nationally, so that crash data can be compared and used for developing crash prevention strategies.

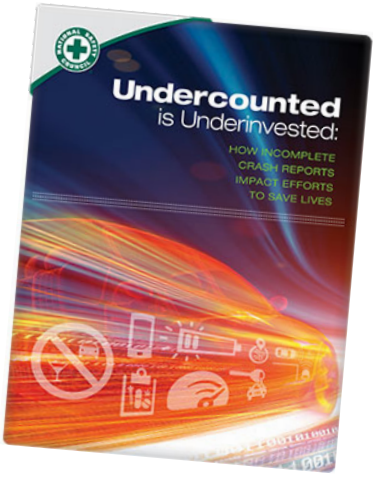
While MMUCC is voluntary, many states work to achieve "MMUCC compliance," to ensure crash reports collect data suggested in MMUCC guidelines. The fifth edition of MMUCC will be released later this year. Some states have significant revisions to crash reports underway; however, they are awaiting release of the new version of MMUCC and new suggested data elements before finalizing those report updates.

When crash factors are not represented, regulations, laws and policies are difficult to justify, and the reasons behind them aren't data-driven. Motor vehicle safety issues may not receive the attention and resources needed to reduce the risks if a clear picture of the issue cannot be painted. The result can be an under-investment in prevention resources or lack of realization about needed vehicle improvements. The presence of data helps explain the size and scope of a safety problem and may shine light on how to address the issues.

NHTSA led the National Motor Vehicle Crash Causation Survey (NMVCCS) between 2005 and 2007. The study conducted in-depth investigations of 5,470 crashes and assigned critical reasons for why the crashes happened:

- Recognition errors (driver inattention, internal and external distractions, and inadequate surveillance) – 41% of crashes.
- Decision errors(driving too fast for conditions, misjudgment of gap or others' speed) – 33% of crashes
- Performance errors(overcompensation,poor directional control) – 11% of crashes.

We need a clear understanding of why drivers make these errors in order to significantly reduce crashes, fatalities and injuries. A 2017 National Safety Council survey provides a glimpse into risky driver behaviors that may be the root causes of so many crashes. **A startling number of individuals indicated comfort with speeding (64%), texting manually or through voice controls (47%), driving while impaired by marijuana (13%), or driving after they feel they had too much alcohol (10%).**



Read the entire report here.

Cars Hidden During World War II Form a Rusty Graveyard in France

Ada Carr / November 29, 2016 / weather.com

Vincent Michel, a physical education teacher from Belgium, stumbled across the automobiles stashed inside of a pit, the Telegraph reports. "It felt like we were walking back in time, 70 years ago, and I just wondered how on earth it was possible," Michel said in a statement obtained by the Telegraph. "Almost all the cars were empty, with the shells the only things remaining." He added that the owner of the quarry pulled a few of the cars out to auction off, but most of them were left behind because they're too damaged to move. "It was an unbelievable experience, and I really hope to find a similar place in the future," said Michel. World War II was fought from 1939 until 1945 and was as the largest war in history.

Constitutional Problems with California's Specialty License Plate Program

Professor Leslie Gielow Jacobs/Professor J. Clark Kelso/Mr. Ryan W. Marcroft

I. Introduction

This brief report arises out of a program of research being undertaken by one of us (Professor Leslie Gielow Jacobs) dealing with the application of the free speech clause to situations where the government and private individuals speak together. A thorough review and explanation of the relevant constitutional principles as they apply to special interest license plate programs appears in Leslie Gielow Jacobs' *Free Speech and the Limits of Legislative Discretion: The Example of Specialty License Plates*, 53 Florida Law Review 419 (July 2001).

Our focus here is on California's specialty license plate program. We conclude that the program as currently structured raises serious constitutional concerns. These concerns can be substantially eliminated by restructuring the program to remove the Legislature's role in approving or rejecting particular license plates.

II. Description of California's Special Interest License Plate Program

Like most other states, California has a special interest license plate program. Under this program, private, non-profit organizations can seek to have special designs or messages printed on license plates that are then sold to the public at higher prices than ordinary license plates. There are currently some 44 special license plates available in California. [1]

The primary purpose of the special interest license plate program is to produce additional revenue for the state by making special license plates available for purchase at higher prices than regular license plates. In fiscal year 2000-01, for example, the special interest license plate program produced more than $30 million in revenues.[2] A consumer is willing to pay higher prices for a special license plate presumably because the consumer wishes to be associated with the message or design displayed on the plate. For those license plates which are privately sponsored, the organization providing sponsorship benefits by sharing in the State's profits from the sale and by the advertising and marketing exposure generated by the appearance on the plate of recognizable logos or messages.

Generally, a non-profit organization interested in creating a special license plate must get a California legislator to sponsor legislation authorizing the issuance of the special plate.[3] If enacted, the legislation authorizes the Department of Motor Vehicles ("DMV") to issue special license plates bearing the unique design of the special interest group.[4]

California Vehicle Code § 5060 sets forth the prerequisite criteria for applicant organizations, the physical parameters of special license plates, and other procedural requirements.[5] For example, letter and number spacing or configuration requirements can be found in that section of the Vehicle Code.[6] Moreover, the section requires the group wishing to sponsor a special license plate to obtain 7,500 fee paid applications for the plate prior to their issuance.[7] Consumers typically pay between $20 and $50 to obtain one of the special plates from the DMV.[8] Depending on the specific authorizing legislation, revenues from the sale of special license plates are divided up among the DMV, the State of California, and the special interest.[9]

III. Constitutional Analysis

There is a significant risk that the process by which special license plates are approved in California violates the free speech clause of the United States Constitution (and, possibly, the California Constitution as well). A federal district court in Louisiana has granted a preliminary injunction barring further sales of special license plates pursuant to a program that appears in many respects to be similar to California's program.[10]

The "freedom of speech" guarantee in the First Amendment[11] protects private speakers from government actions that suppress their points of view.[12] As a general matter, the government is restrained by the First Amendment from censoring private speech "based on hostility-or favoritism-towards the underlying message."[13] These protections extend to instances where the government permits private speech on government property, such as streets,[14] parks,[15] or license plates.[16] When the government permits private speech on government property, the government may not discriminate against private speakers based on the content or viewpoint of the message. Generally, the only time the government may limit such speech is when its reasons for doing so are neutral as to the viewpoints expressed in the message.[17]

As noted above, the decision in California of whether to accept or reject a proposed special license plate is vested in the Legislature. It is usually not possible for a court to determine the reasons why the

Legislature chose to adopt or to reject a certain license plate. The Legislature has not adopted any objective criteria to guide its decision-making, and it is doubtful that any such criteria would actually bind the Legislature in any event. Thus, the Legislature's discretion in deciding which plates to approve and which to reject appears to be unbounded. Without clear and objective guidelines, legislators are free to inject viewpoint considerations into the decision whether to approve or reject a special license plate.[18] Indeed, in light of the constitutional role of a legislative body to reflect the will of the people, it would be surprising if the viewpoints of a majority of the people were not reflected in these decisions. Moreover, the knowledge that legislators approve and reject license plate proposals based on viewpoint undoubtedly deters some groups from even applying, a form of induced self-censorship.[19]

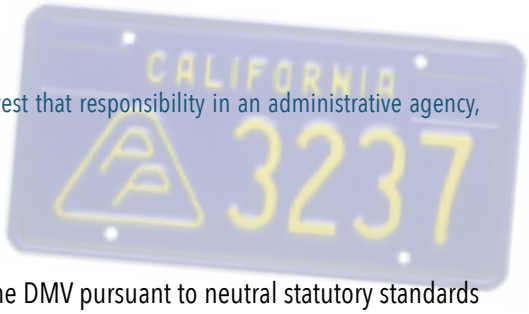
Because of the Legislature's broad discretion to approve or reject special license plates, a discretion that plainly encompasses viewpoint discrimination, there is a significant risk that California's special license plate program is unconstitutional and would be subject to a judicial challenge.

IV. Possible Solutions

The Legislature can respond to the constitutional risk described above in three ways: First, the Legislature can ignore the constitutional risk and continue considering proposed special license plates on an ad hoc basis. The existing program in California has not been challenged in court, and absent such a challenge and an injunction barring its future implementation, DMV's constitutional obligation is to enforce the statutes as written. Cal. Const., Art. III, § 3.5.

Second, the Legislature could decide that it should no longer approve any special license plates for private organizations and that its power to do so under the existing program should be eliminated. The Legislature could do this by repealing the statutes that authorize applications from private organizations for special license plates. These statutes could be repealed without affecting any of the previously authorized special license plates. While theoretically the Legislature could consider private applications in the future, the repeal of the authorizing statutes would undoubtedly deter any new applications for special license plates and would reduce or eliminate future legislative involvement.

Third, the Legislature could replace the existing system with a special license plate program that has a better constitutional foundation than our current system. There are three critical changes that would place the system on a better foundation:



- Remove from the Legislature the responsibility for approving or rejecting individual applications and vest that responsibility in an administrative agency, such as the DMV.
- Establish clear, non-viewpoint discriminatory standards for considering individual applications.
- Administer the program consistently.

Under this revised system, the special license plate program would be administered exclusively by the DMV pursuant to neutral statutory standards in which individual decisions by DMV would be explained in writing in light of those standards subject to appropriate judicial review. Over the course of the next several months, the Capital Center will develop specific legislation to implement this revised program.

As noted above, there are a substantial number of special license plates that have already been approved. We believe that these existing plates could continue to be sold even after implementation of a revised program without requiring reapplication so long as each of the plates actually satisfies the new statutory standards. Although we have not completed our analysis on this issue, it appears that all of the existing plates are likely to satisfy neutral standards. The legislation we are drafting will directly address this issue.

Governor Gray Davis and Assemblymembers Herb Wesson and Dave Cox have announced their intention to seek a special commemorative plate to provide funds for, among other things, the survivors of the terrorist attacks on September 11. We believe that this special license plate will also pass constitutional muster. First, it is likely that this license plate will satisfy the legislative standards we are drafting. Second, the constitutional analysis above applies only when government limits private speech (e.g., by approving some private applications for special license plates but rejecting other applications). Government has much greater freedom when it speaks for itself. We understand that the commemorative license plate is not being privately sponsored and that revenue from the sale of the license plate will be deposited in government-controlled accounts. Thus, the bill authorizing a commemorative plate is more properly characterized as government speech, and not speech by a private organization. Accordingly, we believe the bill authorizing the commemorative license plate is likely to be constitutional.

Read the original article and see all associated footnotes located on the University of the Pacific, McGeorge School of Law.
Follow this link for the article: http://www.mcgeorge.edu/Faculty_and_Scholarship/Centers_and_Institutes/Capital_Center_for_Law_and_Policy/Under_the_Dome_–_Law_and_Policy_Events_and_Activities/Reports_Studies_and_Policy_Projects/Constitutional_Problems_-x966-ml.htm.

These plates are issued, upon request, to newspaper, newsreel, and television photographers and camera operators. They are not available for trailers. These plates are issued, upon request, to newspaper, newsreel, and television photographers and camera operators. They are not available for trailers.

"The Press Photographers Association of Greater Los Angeles" is a professional organization comprised of still and video photojournalists, independent photographers and photojournalism students that work on newspapers, television stations, wire services, national news and sports publications throughout Southern California.

Our Association–founded in 1936–is recognized by the IRS with 501c6 status and are currently applying for charitable organization status (501c3), which is in the application phase, as an educational foundation. We have been in existence continually since 1936, and have produced our annual yearbook – Just One More – since 1954. We currently have around 400 members, mostly based in Los Angeles/Southern California, but many are located across the USA. Our members consist of video and still photographers and college students enrolled in journalism/photo-journalism courses.

Visitors to our website www.ppagla.org come from over 24 countries, including throughout the United States.

Each year, 1,000 copies of Just One More are printed and distributed to our members, as well as distribution to chief photographers of newspapers and television stations, photo repair & retail shops, government (local and state), police and fire officials, colleges and public libraries across the southland. It is a historic record of Los Angeles and Southern California and press photography at it's best.

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Now for a Commercial Break

From time to time, I am asked a question about commercial vehicles. The answer to the questions could benefit more than just the person who asked the question. I have decided to write a column for the CA2RS newsletter answering commercial vehicle related questions. If you have a question feel free to contact me at wfocha@comcast.net

QUESTION: *Bill, recently I read a deposition in a commercial vehicle case where weight was an issue. The trucking industry expert on the other side used the terms "tare weight" and "declared weight". What do these terms mean?*

Thanks, CK.

ANSWER: CK, weight is one of the things I get asked about all the time. I will answer your question and then give you a few more terms to add to your vocabulary.

Tare weight is the weight of your truck and trailer, empty. The tare weight is usually taken when you enter a facilities to be loaded. For accident reconstruction this is a pretty accurate weight as it takes into account the driver, fuel and any accessories and devices added to the truck after it was manufactured. If you find a scales ticket or a receipt for the product the truck has hauled it will have the tare weight on it.

Don't confuse tare weight with published unladen weight or curb weight. Both of these weights usually don't take into account accessories and equipment added to a truck after the manufacture was done building the truck.

Declared Weight: When you register a commercial truck or truck tractor in California, you have to declare how much weight you plan to haul. This weight includes trailers that you are pulling. If you look at the door of the truck you will see a white sticker with black printing and a small year sticker that is the same color as the registration sticker. This is the declared weight sticker (Figures 1 and 4). It will have a number in it between 10 and 80. This number indicated in thousands of pounds how much weight the owner of the truck has declared he is going to haul. This is not a good indication as to the weight of the truck at the time of the collision.

Gross Axle Weight Rating (GAWR). This is the maximum load a particular axle can support.

Gross Vehicle Weight Rating (GVWR). Most of the readers are familiar with this term. This is the total amount of weight the manufacturer of the truck, truck tractor or trailer has designed the vehicle to weigh when loaded. This would be the vehicle plus the load.

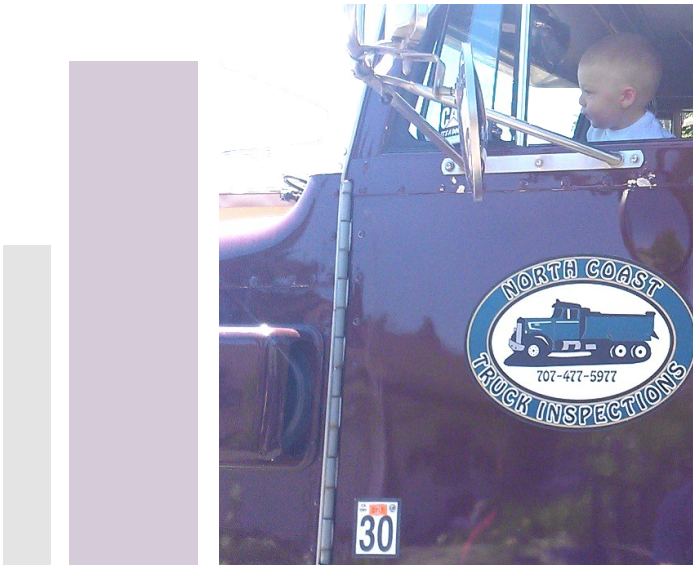
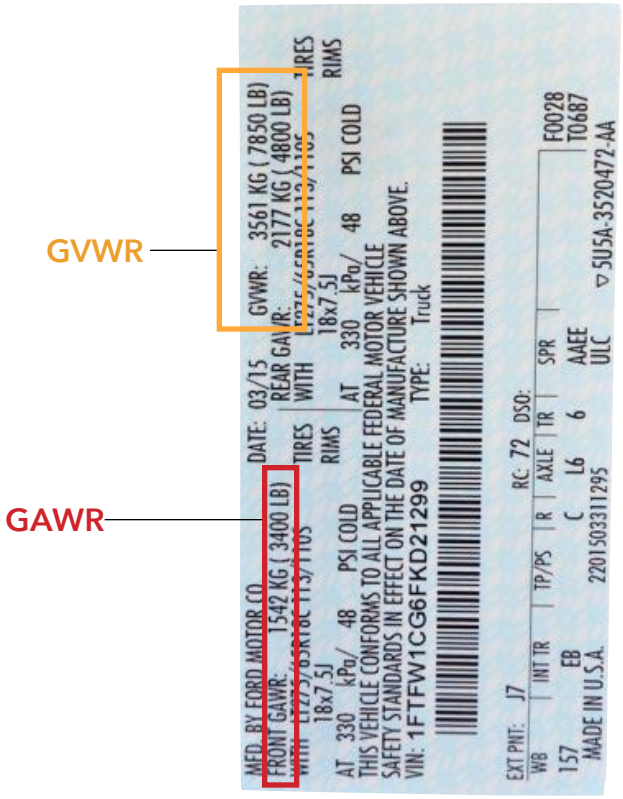


Figure 1: *Declared weight sticker (30 and orange sticker)*

Gross Combined Vehicle Weight Rating (GCVWR). You will usually see this on truck tractors. It is how much weight the truck tractor is designed to haul with a trailer.



Bridge Weight. I hesitate to bring this one up as it may add confusion to the issue; however, it may raise a question or two I can use in a future column. The bridge rule was created to have a method spread a load over a number of axles to lessen the concentration of weight exerted on any one portion of the bridge (Figures 2-3, below). The typical tractor semi-trailer combination has a gross weight of 80,000 lbs dispersed over five axles. As the axles get closer together, the amount of weight capable of being carried will decrease. An example of this is an end dump trailer, which is usually shorter and can therefore only gross 73,280 lbs.

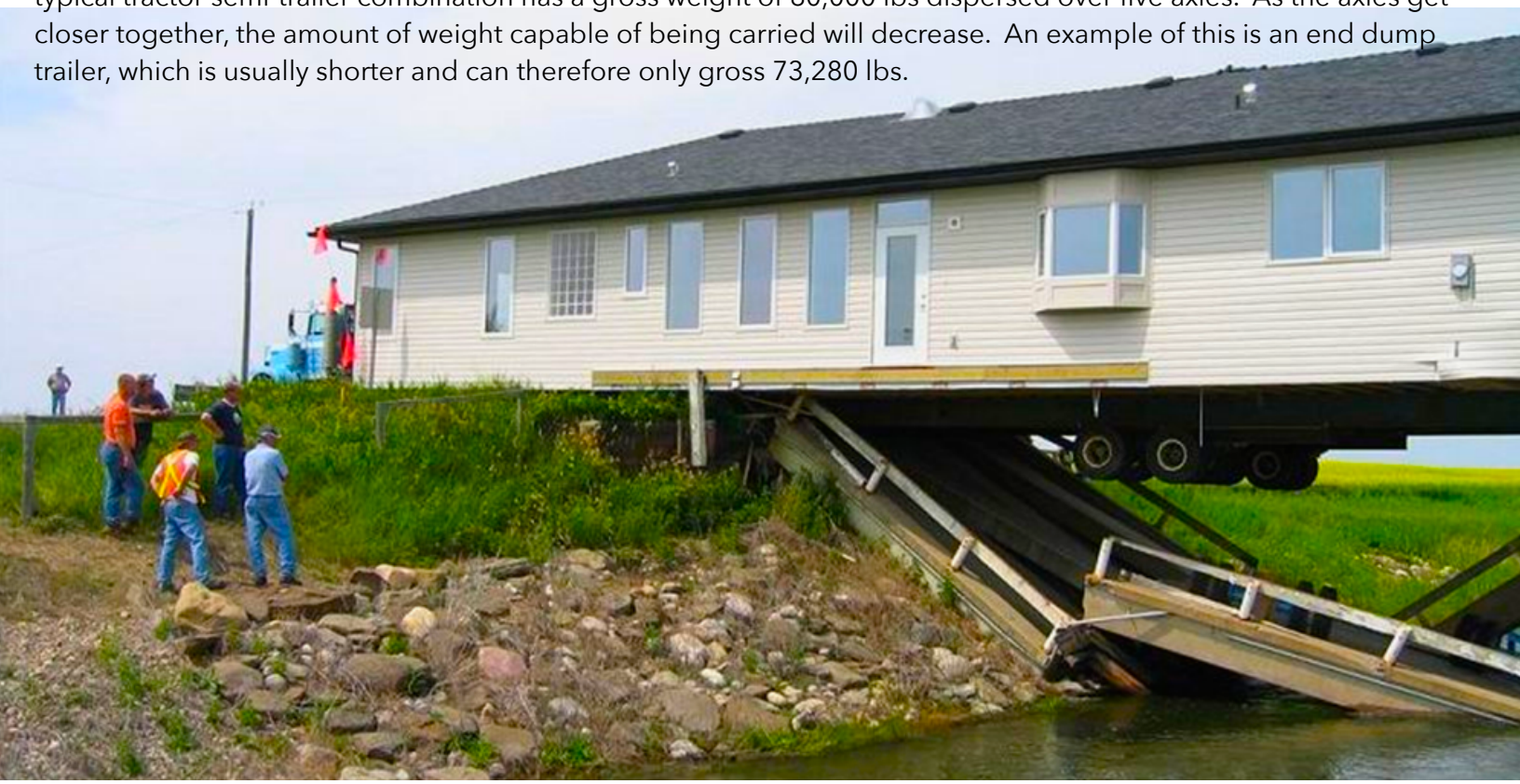


Figure 2: The trailer load was, presumably, distributed over the length of the trailer

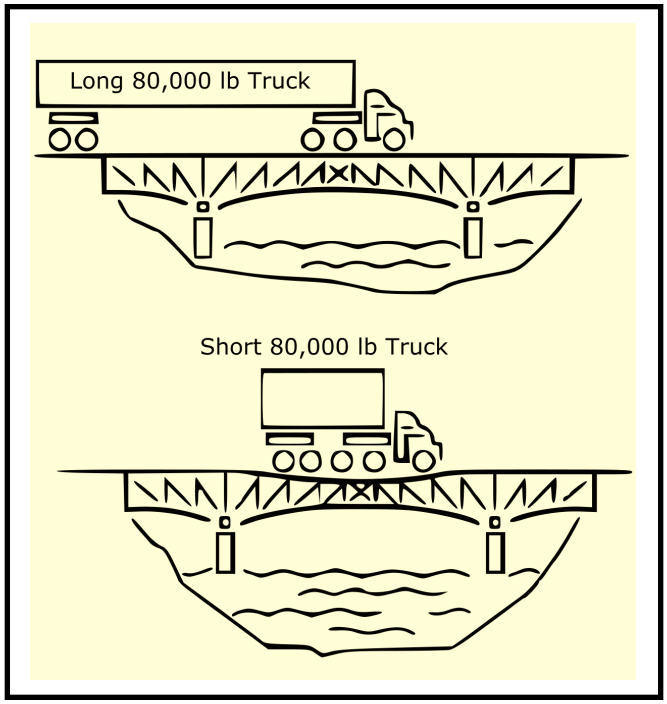


Figure3: Bridge weight examples showing differing lengths

CVRA Weight Chart

Gross Vehicle Weight Range	Weight Code	Decals	Gross Vehicle Weight Range	Weight Code	Decals
10,001-15,000	A	15	15,001-20,000	B	20
20,001-26,000	C	26	26,001-30,000	D	30
30,001-35,000	E	35	35,001-40,000	F	40
40,001-45,000	G	45	45,001-50,000	H	50
50,001-54,999	I	54	55,000-60,000	J	60
60,001-65,000	K	65	65,001-70,000	L	70
70,001-75,000	M	75	75,001-80,000	N	80

Figure 4: Declared weight samples

CAARS 2017 Annual Conference

ORANGE, CALIFORNIA

SAVE THE DATE FOR THE FALL CONFERENCE **OCTOBER 26-28, 2017**

The Embassy Suites in Anaheim-Orange is back by popular demand for this year's conference. Set the aside the dates in your calendars and check in with the CA2RS website regularly to get yourself registered.

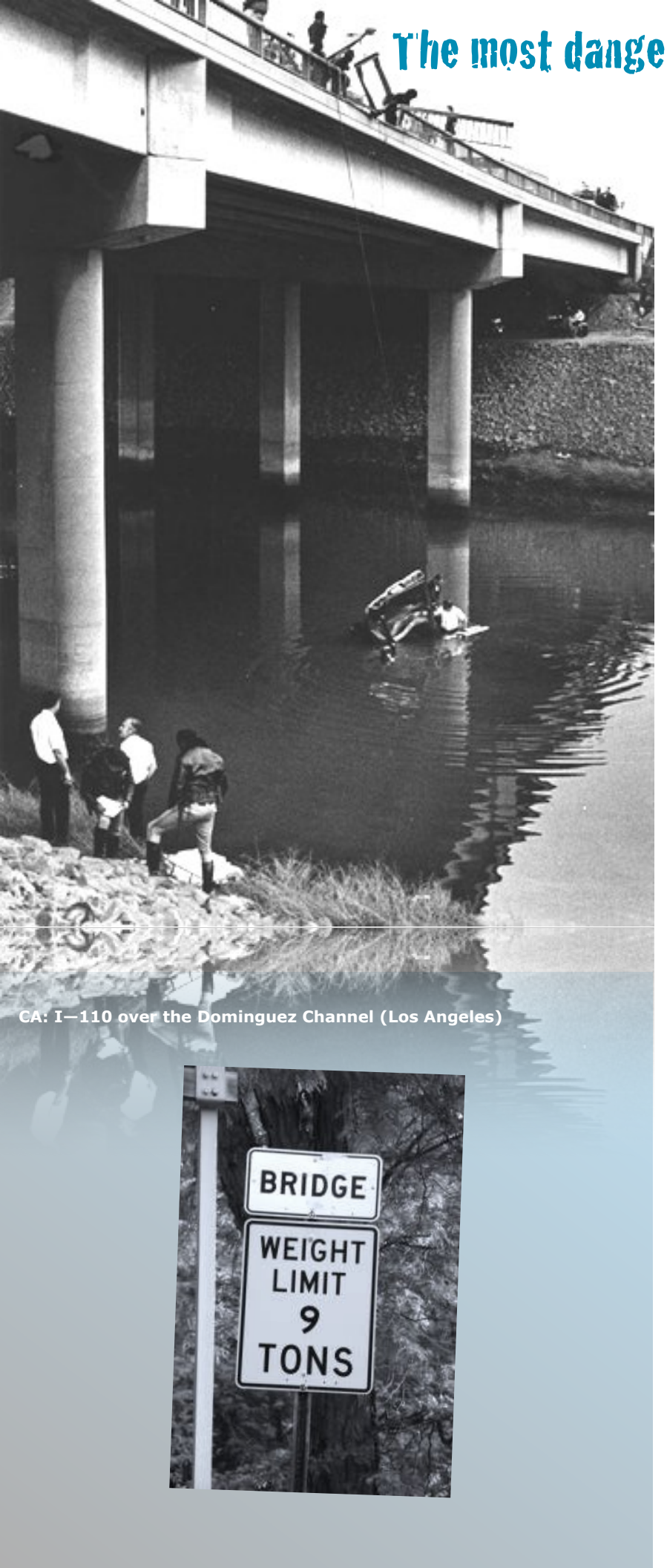
This year's conference will be held from October 26–28. As per our custom, we will be hosting the ACTAR Examination on October 25, just prior to the Conference. We hope to see you there for this one-of-a-kind opportunity to gather, learn, explore new topics, and discuss collision reconstruction and investigation topics as a specialized community.

This year's conference topics will include Motorcycles , Roll Overs, and Critical Speed Yaw (CSY) Analysis. Presenters will be Lou Peck (Dial Engineering) , Dave King (MEA Forensics) , Steve Anderson (MEA Forensics) and others soon to be announced. As always, we look forward to seeing you and enjoying an excellent time of training and good times.

Go to www.ca2rs.com for further information.

The most dangerous bridge in every US state

MSN.com / Business Insider / June 9, 2017 / Leanna Garfield



CA: I—110 over the Dominguez Channel (Los Angeles)

On June 7, President Trump rallied in Ohio for his $1 trillion infrastructure plan, a key campaign promise that's now part of his domestic agenda.

One of the plan's goals is to fix America's bridges, which received a C+ grade in the American Society of Civil Engineers' 2017 Infrastructure Report Card. (Overall, US infrastructure scored a D+, and the ASCE estimates the country needs to spend $4.5 trillion by 2025 to improve its roads, bridges, dams, airports, schools, and more.)

Every state has at least one structurally deficient bridge, which the US Department of Transportation (DOT) defines as when one or more key bridge components (e.g. the deck, superstructure, or substructure) is in "poor" condition. There are 185 million daily crossings on nearly 56,000 structurally deficient US bridges, according to the American Road and Transportation Builders Association.

Using 2017 data from theUS Federal Highway Administration, Auto Insurance Center found the most structurally deficient bridge—based on the highest number of components in poor or worse condition - in each state and Washington, DC. On June 7, President Trump rallied in Ohio for his $1 trillion infrastructure plan, a key campaign promise that's now part of his domestic agenda.

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Anaheim Police Department (East Station)

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Rates available until September 26, 2017.

Robert W. Taylor, a pioneer of the modern computer, dies at 85

April 14, 2017, LA Times / Esmeralda Bermudez and Michael Hiltzik

Robert W. Taylor, one of the most important figures in the creation of the modern computer and the Internet, has died. He was 85. According to his son Kurt Taylor, the scientist died Thursday at his home in Woodside. He suffered from Parkinson's disease and other ailments. Taylor's name was not known to the public, but it was a byword in computer science and networking, where he was a key innovator who transformed the world of technology.

Taylor was a Pentagon researcher in the 1960s when he launched Arpanet, which evolved into what we know today as the Internet. Later, he moved to Xerox's legendary Palo Alto Research Center, where he oversaw the engineering team responsible for such inventions as the personal computer, Ethernet and the visual computer display. Taylor pushed for his projects with outspoken, uncompromising vision. Along the way, he fought his share of bureaucratic battles. The adopted son of a Methodist minister and his wife landed at the Pentagon in the mid-1960s after a stint with NASA. He worked at the Advanced Projects Research Agency, or ARPA, and was responsible for a project devoted to interactive computing.

With millions of dollars at his disposal, Taylor funded nascent computer-science programs at institutions around the country – MIT, UCLA, Stanford, the universities of Utah and Illinois. He nurtured the youngest, most talented scientists he could find. But it irked him to have to deal with their myriad incompatible computer systems. He demanded a system that would allow them to communicate with each other and secured the funding to get the concept off the ground.

He then oversaw the construction of a network that seamlessly connected numerous research computers nationwide. Taylor foresaw that this network would one day not only be an administrative tool, but a necessary utility for the public. **In a 1968 paper he co-wrote, Taylor stated: "In a few years, men will be able to communicate more effectively through a machine than face to face."** He predicted that the network would provide services people would come to rely on, such as investment advice, and others that you would "call for when you need them," like dictionaries and encyclopedias.

In 1970, Taylor moved to the Xerox Corp. after ARPA moved away from basic research and become more devoted to Vietnam War needs. There, the native of Texas became intrigued by Xerox's research on the West Coast to develop technologies for the "paperless" or digital office. Taylor assembled an impressive team of computer designers, in part by raiding the academic programs he had funded at ARPA. Computers of that era were room-sized machines that worked on a time-sharing basis – every user competed for time on the machine to run his or her own programs. Taylor's concept, and those of the scientists he brought in, was that the computer should be a personal device with a high-quality display.

Under his guidance, scientists Alan Kay, Butler Lampson and Chuck Thacker designed and built the first personal computer, the Alto. It was equipped with a screen about the size and shape of a paper page, and in time it sported a graphical display that eventually would become familiar via its offspring, Microsoft Windows and Apple's Macintosh screens. The Alto was a genuinely personal device – every PARC computer scientist had his or her own. It began to have the electronic power to fulfill Kay's dream of a computer that could not only perform calculations, but advance human creativity.

Taylor's lab also developed Ethernet and a what-you-see-is-what-you-get word-processing program called Bravo – which, after its developer, Charles Simonyi, moved to Microsoft, evolved into Microsoft Word. Taylor's greatest achievement may have been creating an environment that allowed his diverse, brilliant engineers and scientists to work together. He nurtured their talents and teamwork while fending off more mundane corporate demands. In addition to Kurt, Taylor is survived by two other sons, Erik and Derek, and three grandchildren.

From the Archives Why Robert Taylor is one of the most important figures in the history of computer science

LA Times / September 21, 2009
Michael HiltzikContact Reporter

Since it's so fashionable these days to question whether government can do anything right – whether it's regulating banks, bolstering the economy or overseeing healthcare – it's worth noting that we're about to celebrate the 40th anniversary of one of the most important federal initiatives of our time.

The event was the launch of the Internet, which we date from Oct. 29, 1969, when a refrigerator-sized special-purpose computer in Leonard Kleinrock's engineering lab at UCLA transmitted its first message to a twin machine in Menlo Park, Calif. ***(The message was the first two letters of the command "Login.")***

That was the first exchange over what was then known as the ARPAnet, which evolved, after many intermediate steps, into what we know today as the Internet. The ARPAnet had been hatched many years earlier in the mind of a Pentagon research official named Robert W. Taylor. We should begin the story with him, because his role reminds us that sometimes private enterprise isn't always up to the task of advancing technological progress, and sometimes even gets in the way. Then it's crucial for the government to step in.

Taylor, now 77, isn't known to the public. But his name is a byword in computer science and networking, where he's regarded as one of the most important figures in the field's history.

That's not only because of his role in creating the Internet but because of what he did after leaving the Pentagon: He moved to Xerox's Palo Alto Research Center, the legendary PARC, where he oversaw the engineering team responsible for such inventions as the personal computer, Ethernet (a local networking system, for you non-geeks out there), and the visual computer display.

I first met Taylor 10 years ago, when he became the central figure in a book I was writing about PARC. He was outspoken, uncompromising and visionary then, and he still is, as he showed an audience honoring him last week at the University of Texas, his alma mater.

As the chief of the information technology office at the Defense Department's Advanced Research Projects Agency (ARPA) in 1966, Taylor demanded that the computer research projects he was funding around the country learn to talk to one another.

Taylor was deeply frustrated that while his researchers were in constant communication with one another coast to coast, their computers labored in mutual unintelligibility. Terminals cluttered his own office – one to interact with his government-funded computer project at Berkeley, another to speak to MIT, and so on. By the end of the year, he had secured a $1-million appropriation for the design and construction of a network that would seamlessly interconnect MIT, Berkeley and other university research computers nationwide.

Taylor foresaw that the network he ordered up would evolve beyond an administrative convenience. In a 1968 paper entitled "The Computer as a Communication Device," co-written with his ARPA mentor, a transplanted MIT scientist named J.C.R. Licklider, he foresaw its development into a public utility. Forty years on, that remarkable paper reads like a work of clairvoyance. "In a few years," it began, "men will be able to communicate more effectively through a machine than face to face." It forecast that the network would provide

some services for which you'd "subscribe on a regular basis," like investment advice, and others that you would "call for when you need them," like dictionaries and encyclopedias. Communicating online, it concluded, "will be as natural an extension of individual work as face-to-face communication is now." Sound familiar?

Taylor tried to interest private industry in his project, but the companies he approached dismissed the idea. IBM told him its computers already talked to one another, completely missing his point that their computers should talk to everyone else's. AT&T, then the monopoly proprietor of the phone system over which the network would operate, fought Taylor's project tooth and nail, contending that the network's "packet switching" technology (a method of transmitting data in discrete blocks) wouldn't work on its phone lines and might even damage them. Packet switching remains the Internet's governing technology to this day.

His experience underscores the importance of a government role in fields like basic research, which profit-seeking enterprises tend to shun. "Industry generally avoids long-term research because it entails risk," the veteran computer scientist Ed Lazowska told Congress a few years ago. Why? Because it's hard to predict the results of such research, and since it has to be published and publicly validated, corporations can't capitalize on their investments in isolation.

Yet once the research reaches a certain point, private industry piles in – Lazowska cited a National Research Council list of 19 multibillion-dollar industries that had been incubated with federal funding, generally via university grants – including the Internet, Web browsers and cellphones – before becoming commercially viable. Taylor's ARPAnet was eventually turned over to the National Science Foundation, which in 1991 opened what was then known as NSFnet to commercial exploitation. Four years later, the dot-com boom was underway. The real world brims with other examples. No private company would have made the investment to build a toll-free interstate highway system, yet who can deny that the cheap large-scale movement of goods coast-to-coast on capacious roadways is a crucial lubricant of our economy?

Healthcare? Private insurance companies have demonstrated over the last decade that they can't be expected to cover the entire community at an affordable price – the realities of the free market mandate that each one cherry-pick the healthiest (read most profitable) risks, and hope its rivals get stuck with the higher-priced clientele. Take the government out of the equation, whether as regulator or competitor, and they will continue to pursue their own interests, not yours and mine.

Taylor also believes that, despite the Web's successful commercialization, it may be time for the government to play a stronger role. The corporations making billions of dollars from the Web haven't done their part to build up its capacity, so a shortage looms as customers increasingly use the network for bandwidth-hogging tasks like downloading movies. Instead, service providers are plotting to profiteer from the bandwidth scarcity by hiking user fees. "The telecommunications industry has promised us for years that if we only let them raise prices and do mergers, they'd increase bandwidth," Taylor said this week. "They haven't kept their promise."

UCLA professor Leonard Kleinrock discusses the Interface Message Processor in Korn Convocation Hall in 1999. (PR·Perry C. Riddle / Los Angeles Times)

He thinks the proper model for the Internet, given its critical role in our lives today, is as a taxpayer-supported service available to everybody, rich or poor, at no charge. Both notions spring from his experience witnessing the interaction of government and private enterprise. What he learned then he still believes.

"The idea that private industry can always do something better than the government is false and sad and divisive," Taylor observed at the University of Texas event. "People should know better."

Question: A GoPro caught a collision on camera…but the driver was killed in the collision. So, now what? Can I view the video, or does someone still hold ownership over the device?

Electronic Communications Searches: The New California Law - Mark Hutchins

A new law in California ensures that law enforcement can't snoop around your digital data without first obtaining a warrant. Effective January first, California's comprehensive Electronic Communications Privacy Act (CalECPA) became law. As the result, a search warrant is now ordinarily required to obtain copies of any electronic communication content or related data that was sent to or received by a suspect or anyone else. This includes email, voicemail, text messages, subscriber information, and cell site tracking data. CalECPA also changed the required form and notice requirements of electronic communications search warrants. It accomplished all of this by adding, deleting, or modifying several sections of the Penal Code.

The consequences of these changes for law enforcement are enormous because they restrict when and how officers can obtain an entire class of information which has become crucial in many criminal investigations. They do, however, provide clarity to this important area of the law which, until now, was regulated by the federal government's disordered hodgepodge known as the Electronic Communications Privacy Act (ECPA).

One of the problems with the ECPA is that it went into effect in 1986, which was several years before electronic communications became the dominant means of personal and business contact in the United States and virtually everywhere else. As the result, it enabled officers to obtain this content and data without too much difficulty. And few people complained because most people had not yet come to view electronic communications as highly private. They do now.

As these changes were occurring, the providers of electronic communications services (especially their attorneys) were becoming more and more nervous about privacy lawsuits that might result if they continued to release this information without a search warrant. So, many of them took the position that officers must obtain a warrant for almost everything, even if the ECPA might have required only a low-level court order known as a D-Order. Moreover, many judges in California were refusing to sign D-Orders because California law did not expressly authorize them to do so. And then the Sixth and Ninth Circuits issued persuasive opinions in which they ruled that, even if the ECPA did not require a search warrant, the Fourth Amendment did.

Congress did, however, occasionally attempt to update the ECPA by enacting legislation such as the Stored Communications Act, the Communications Assistance for Law Enforcement Act, the Patriot Act in 2001, and the Foreign Intelligence Surveillance Amendments Act in 2008. But this legislation did not satisfactorily address the general public's concern about the privacy. So the California Legislature took the initiative and, as reported by the national news media, passed CalECPA. (It has been reported that Congress may be using CalECPA as the blue- print for a new federal privacy bill.)

In this article, we will explain the fundamentals of the new law. But first, it is important to note that it was passed by a two-thirds majority of the Legislature which means that any evidence obtained in violation of the law may be suppressed. Also note that because CalECPA is more strict than ECPA, officers who comply with the California law will be in compliance with federal law.

One other thing: the information we will discuss in this introductory article is based on our understanding of CalECPA at the time we went to press. It will take a while before the Legislature and our appellate courts resolve some of the uncertainties and dubious provisions in the law. We will, of course, report on these developments as they occur.

The New Regulations

CalECPA covers nearly every form of stored electronic communications and data about such communications that might be relevant in a criminal investigation. This includes communications and data that were stored in a physical device to which officers made a physical or electronic contact (e.g., the suspect's cell phone), and information stored in equipment owned or operated by a provider(e.g., voicemail, subscriber records).5 It also includes real time interception of cell site location information and pen register/phone trap information.

ELECTRONIC COMMUNICATION INFORMATION: As used in CalECPA, the term "electronic communication information" includes any information about a communication (a.k.a. "metadata.") Examples include the names of the sender and recipient of an email or text message; the time or date the communication was created, sent, or received; the IP address of a person's computer and the websites visited by that computer including the date and time of the visit. The term also includes the message and cell site location information, but these subjects will be discussed separately. It is easy to remember the requirements for obtaining electronic communication information. That's because there is only one: Officers must obtain a search warrant. (It is noteworthy, and disturbing, that the Legislature decided not to permit the warrantless release of this information when it could save a life or prevent great bodily injury.)

SUBSCRIBER INFORMATION: The term "subscriber information" means general information which the subscriber submitted to the provider in order to open or maintain an account. This includes the subscriber's name, address, phone number, email address, and "similar contact information" It also includes the length of service and the types of services utilized by the subscriber. Although CalECPA provides a definition of "subscriber information," it exempted this information from its definition of "electronic communication information." So we do not know for sure what officers must do to obtain it. One possibility is that providers may release it without a warrant if it is relevant to an investigation. But until this is clarified, they may require a warrant.

ELECTRONIC COMMUNICATIONS: The term "electronic communication information" also includes the spoken and written words in a communication that has been stored in an electronic communications device or in equipment owned or operated by a service provider. Because "content" was included in the definition of "electronic communication information," it can only be obtained by means of a search warrant. But if officers believe they have probable cause to search for communications or data stored in a device in their custody, they may seize it and promptly seek a warrant.

CELL SITE LOCATION INFORMATION: "Cell Site Location Information" (CSLI) is information that identifies the physical locations of cell towers or other sites that were utilized by a provider in transmitting information to or from a particular cell phone or other device which utilized cell sites. CSLI has become useful to law enforcement because, by knowing the locations of the cell sites which carry a suspect's messages and transmission data, officers can essentially "follow" the suspect's phone and, thereby, the suspect.

For no apparent reason, CSLI falls into three categories: "electronic communication," "electronic communication information," and "electronic device information. This seems to mean it can be obtained by means of a search warrant, exigent circumstances, or "specific consent." We will discuss the term "specific consent" below in the section "Consent, probation and parole searches."

There are two types of CSLI: historical and prospective. "Historical" CSLI consists of records pertaining to cell transmissions that occurred in the past. For example, if officers wanted to know if a murder suspect had been near the location where the victim's body had been found, they would seek historical data for the relevant time period.

The other type of CSLI –"prospective" information–consists of cell site data that will be obtained after a court issues a search warrant, or after officers determined that CSLI was needed because of exigent circumstances. Prospective information is usually obtained in real time, meaning it is sent directly from the provider's equipment to an investigator's computer, tablet, or cell phone. For example, if officers wanted to follow a suspect by means of cell tower transmissions (or GPS) they would seek prospective data.

One method of obtaining prospective CSLI is through equipment owned or operated by a cell phone provider. This can be accomplished by having the provider "ping" the target's phone, which means transmitting an electronic signal that instructs the phone to disclose its current location. This information is then disseminated to officers in real time or through periodic reports.

CSLI can also be obtained by means of a "cell site simulator." These are mobile devices that, when near the target's phone, essentially trick it into believing that the simulator is a cell site, and that it is the closest and most powerful cell site in its vicinity. This causes the cell phone to send the phone's current location It may also do a variety of more intrusive things. For example, when we went to press, cell site simulators were a hot topic in the news media because it was alleged in a privacy lawsuit that they can intercept communications as well as data.

PEN REGISTERS AND PHONE TRAPS: A "pen register" is a device or software application that records or decodes the phone numbers that are dialed on the target's phone over a particular period of time. A "phone trap" or "trap and trace device" functions like a pen register but, instead of obtaining phone numbers dialed on the target's phone, it identifies the phone numbers of devices from which calls to the phone were made.

Although pen registers and phone traps serve important functions in law enforcement, it is uncertain whether officers may obtain authorization to install and monitor them via a court order, or whether a search warrant is required. That is because the Legislature passed two bills in 2015 – Senate Bill 178 and Assembly Bill 929–which establish different requirements for utilizing these devices. Specifically, SB 178 requires a warrant, while AB 929 requires a court order that does not require probable cause. In fact, AB 929 requires only a officer's declaration that the data which is likely to be obtained via the pen register and/or phone trap is relevant to an ongoing criminal investigation.

Based on its analysis of these two bills, the California Department of Justice concluded that AB 929 was superseded by SB 178 which would mean that a search warrant would be required. It appears that one reason for this conclusion is that SB 178 was the bill that established the comprehensive change in the law which we discussed earlier in this article, while AB 929 pertained only to pen registers and phone traps. Although the Legislature is expected to correct this oversight, it usually takes some time which means that, until then, officers may need a search warrant.

Consent, probation and parole searches

CONSENT SEARCHES: Per CalECPA, the only type of search that can be conducted pursuant to the suspect's consent is a search for "electronic device information" which is defined as "any information stored on or generated through the operation of an electronic device, including the current and prior locations of the device" (i.e., CSLI). But such consent must constitute "specific consent," a new type of consent discussed next under "Probation searches."

PROBATION SEARCHES: It is not clear whether officers may search a probationer's cell phone or other electronic communications device pursuant to a probation search condition that authorizes warrantless searches of property under the control of the probationer. Although the legal basis for probation searches is "consent," CalECPA requires something it calls "specific consent," which it defines as "consent provided directly to the government entity seeking information." What does this mean?

It seems to mean that searches of electronic communications devices are not covered under the scope of a probation search. That is because such consent is not given "directly" to officers–it is given directly to the sentencing judge in exchange for the judge's agreement not to send the probationer directly to jail or prison. Assuming that's what "specific consent" means, it admittedly represents irrational legislative overreaching. After all, it would mean that officers may search the probationer's entire home and its contents–including documents and personal property–but not his cell phone. Why should a person's cell phone be entitled to more privacy than his home? This is a question the Legislature should be required to address.

PAROLE SEARCHES: Unlike probation searches, parole and post-release community supervision (PRCS) searches are mandated by statute, which means that officers will need a search warrant. (Again, it seems strange that, as with probationers, officers may search the parolee's entire home pursuant to the terms of parole but not his cell phone.)

Warrantless searches permitted

Although a warrant is ordinarily required to search electronics communications devices and records, CalECPA expressly authorizes the following warrantless searches:

ABANDONED DEVICES: Officers may search a cell phone if they have a good faith belief that it is lost, stolen, or abandoned. However, they must limit the search to files or other information that may help "identify, verify, or contact the owner or authorized possessor of the device."

INFORMATION VOLUNTARILY DISCLOSED: Neither a search warrant nor other authorization is required to search or seize information that is voluntarily disclosed to an officer by the intended recipient of the information.

CELL PHONES IN PRISONS: Although it sounds obvious, a warrant is not ordinarily required to search for records stored in a cell phone that was apparently abandoned in a state prison.

Article originally posted here (see for footnotes).

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Motorcycle Crash Testing Review

by Chris Kauderer

On June 14 and June 15, 2017 the CA2RS Organization conducted their third set of Motorcycle Crash Tests. The first set of motorcycle crash testing conducted by the CA2RS Organization was in 2004. The second set was in 2009,

The testing done earlier this month took place at Mare Island in Vallejo, CA. The Vallejo PD, led by Lieutenant Mike Nichelini, were our hosts for the two days of crash testing and the day of preparation. Many thanks to Lt Nichelini and his colleagues at the Vallejo PD and the City of Vallejo.

The year's Motorcycle Crash Testing was definitely a collaborative effort with over 30 CA2RS members participating and offering their expertise, experience, equipment and instrumentation. Nationally renowned Motorcycle Reconstruction Expert Lou Peck took the lead as far as designing the crash test configuration and data collection efforts. Bill Focha, the MacGyver of the CA2RS organization, designed and manufactured both the motorcycle delivery system for the crash tests and the slide tests. Bill is a veteran of all three of the CA2RS Motorcycle Crash Tests and is one of only two people who have been present for all of the CA2RS Crash Tests

The CA2RS membership in attendance at this year's motorcycle testing was impressive and included Steve Anderson (former editor of Cycle Magazine); IPTM Instructors; Engineers and scientists from many of the leading forensic and reconstruction firms in both Northern and Southern California; Officers from some of the largest departments in the state (LAPD, SFPD and the CHP); former and current members of the CHP MAIT program; a college professor; and experts in the field of forensic photography and videography, including the use of UAV (drones).

All of the data collected by the attendees will be compiled and immediately distributed to all in attendance. There is already discussion of technical papers and exhibits being produced from the data, photographs and video footage generated from the motorcycle crash testing. The data collected will be made available to all CA2RS members at a later time.

This motorcycle crash testing is another example of the benefit of being a CA2RS member. All CA2RS members were invited to attend and take an active role in the conducting of the tests and collection of the data, photographs, and video footage. Contrary to other organizations and institutions, CA2RS charged NO additional fee for attending and participating in the motorcycle crash testing. The CA2RS BOD believes this type of experience is invaluable to the investigator and reconstructionist. We hope to be able to offer live crash testing and training again in the near future

Thanks again to all who made this such a successful endeavor

Chris


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Autonomous Vehicle Implementation Predictions
Implications for Transport Planning
1 May 2017

By
Todd Litman
Victoria Transport Policy Institute

Outside Perspective –

Victoria Transport Policy Institute

Autonomous Vehicle Implementation Predictions

Todd Litman (Published May 2017)

This report explores the impacts that autonomous (also called self-driving, driverless or robotic) vehicles are likely to have on travel demands and transportation planning. It discusses autonomous vehicle benefits and costs, predicts their likely development and implementation based on experience with previous vehicle technologies, and explores how they will affect planning decisions such as optimal road, parking and public transit supply. The analysis indicates that some benefits, such as independent mobility for affluent non-drivers, may begin in the 2020s or 2030s, but most impacts, including reduced traffic and parking congestion (and therefore road and parking facility supply requirements), independent mobility for low-income people (and therefore reduced need to subsidize transit), increased safety, energy conservation and pollution reductions, will only be significant when autonomous vehicles become common and affordable, probably in the 2040s to 2060s, and some benefits may require prohibiting human-driven vehicles on certain roadways, which could take longer. http://www.vtpi.org/avip.pdf

Our Driverless Future – Sue Halpern

Driverless: Intelligent Cars and the Road Ahead

by Hod Lipson and Melba Kurman / MIT Press, 312 pp.

This September, Uber, the app-summoned taxi service, launched a fleet of driverless Volvos and Fords in the city of Pittsburgh. While Google has had its own autonomous vehicles on the roads of Mountain View, California, Austin, Texas, Kirkland, Washington, and Phoenix, Arizona, for a few years, gathering data and refining its Pittsburgh venture marks the first time such cars will be available to be hailed by the American public. (The world's first autonomous taxi began offering rides in Singapore at the end of August, edging out Uber by a few weeks.) Pittsburgh, with its hills, narrow side streets, snow, and many bridges, may not seem like the ideal venue to deploy cars that can have difficulty navigating hills, narrow streets, snow, and bridges. But the city is home to Carnegie Mellon's renowned National Robotics Engineering Center, and in the winter of 2015, Uber lured away forty of its researchers and engineers for its new Advanced Technologies Center, also in Pittsburgh, to jump-start the company's entry into the driverless car business. Uber's autonomous vehicles have already begun picking up passengers, but they still have someone behind the wheel in the event the car hits a snag. It seems overstated to call this person a driver since much of the time the car will be driving itself. Uber's ultimate goal, and the goal of Google and Lyft and Daimler and Ford and GM and Baidu

and Delphi and Mobileye and Volvo and every other company vying to bring autonomous vehicles to market, is to make that person redundant. As Hod Lipson and Melba Kurman make clear in *Driverless: Intelligent Cars and the Road Ahead*, the question is not if this can happen, but when and under what circumstances.

The timeline is a bit fuzzy. According to a remarkably bullish report issued by Morgan Stanley in 2013, sometime between 2018 and 2022 cars will have "complete autonomous capability"; by 2026, "100% autonomous penetration" of the market will be achieved. A study by the market research firm IHS Automotive predicts that by 2050, nearly all vehicles will be self-driving; a University of Michigan study says 2030. Chris Urmson, who until recently was project manager of Google's autonomous car division, is more circumspect.

"How quickly can we get this into people's hands? If you read the papers, you see maybe it's three years, maybe it's thirty years. And I am here to tell you that honestly, it's a bit of both," he told an audience at Austin's South By Southwest Festival in March. "This technology," Urmson went on, "is almost certainly going to come out incrementally. We imagine we are going to find places where the weather is good, where the roads are easy to drive–the technology might come there first. And then once we have confidence with that, we will move to more challenging locations."

As anyone looking to buy a new car these days knows, a number of technologies already cede certain tasks to the vehicle. These include windshield wipers that turn on when they sense rain, brakes that engage automatically when the car ahead is too close, blind-spot detectors, drift warnings that alert the driver when the car has strayed into another lane, cruise control that maintains a set distance from other vehicles, and the ability of the car to parallel park itself. Tesla cars go further. In "autopilot" mode they are able to steer, change lanes, and maintain proper speed, all without human intervention. YouTube is full of videos of Tesla "drivers" reading, playing games, writing, and jumping into the back seat as their cars carry on with the mundane tasks of driving. And though the company cautions drivers to keep their hands on the steering wheel when using autopilot, one of the giddiest hands-free Tesla videos was posted by Talulah Riley, the (then) wife of Elon Musk, the company's CEO.

These new technologies are sold to consumers as safety features, and it is easy to see why. Cars that slow down in relation to the vehicle in front of them don't rear-end those cars. Cars that warn drivers of lane-drift can be repositioned before they cause a collision. Cars that park themselves avoid bumping into the cars around them. Cars that sense the rain and clear it from the windshield provide better visibility. Paradoxically, though, cars equipped with these features can make driving less safe, not more, because of what Lipson and Kurman call "split responsibility." When drivers believe the car is in control, their attention often wanders or they choose to do things other than drive. When Tesla driver Joshua Brown broadsided a truck at seventy-four miles per hour last May, he was counting on the car's autopilot feature to "see" the white eighteen-wheeler turning in front of it in the bright Florida sun. It didn't, and Brown was killed. When the truck driver approached the wreckage, he told authorities, a Harry Potter video was still playing in a portable DVD player.

While Brown's collision could be considered a one-off–or, more accurately, a three-off, since there have been two other accidents involving Tesla's autopilot software–preliminary research suggests that these kinds of collisions soon may become more frequent as more cars become semiautonomous. In a study conducted by Virginia Tech in which twelve subjects were sent on a three-hour test drive around a track, 58 percent of participants in cars with lane-assist technology

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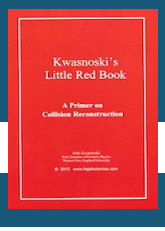

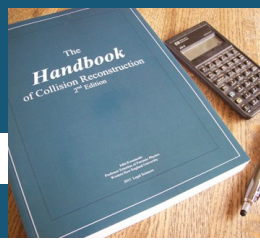

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Legal Sciences instructors have taught general traffic officers, DRE officers, accident reconstructionists, investigators, prosecutors, government criminalists, toxicologists, crime lab technicians, crime victims, personal injury attorneys and judges across the US.

It is the goal of Legal Sciences to produce educational resources that will be considered among the finest in the field. John Kwasnoski is Professor Emeritus of Forensic Physics at Western New England University, after 31 years on the faculty. He is one of the most sought-after collision reconstruction and police/prosecutor trainers in the country. He has served as an expert in several cases of national significance, including: ***South Carolina v. Susan Smith*** (a mother's drowning murder of her two sons) and ***US v. Makharadze*** (the "Russian Diplomat" case).

Professor Kwasnoski has co-authored best-selling books, including: *The Handbook of Collision Reconstruction, Courtroom Success: Being an Effective Witness,* and *Kwasnoski's Little Red Book*. He has written more than seventy articles and lectured extensively on the subjects of Collision Reconstruction and Effective Courtroom Testimony. His Online Digital Library (ODL) includes more than 40 webinar presentations from the nationally known *Lethal Weapon* program and a document section including approximately fifty technical papers and publications. Professor Kwasnoski has taught for the National College of District Attorneys, NHTSA, the National Traffic Law Center, and the American Prosecutors Research Institute, for whom he authored articles for their quarterly newsletter, "Between the Lines."

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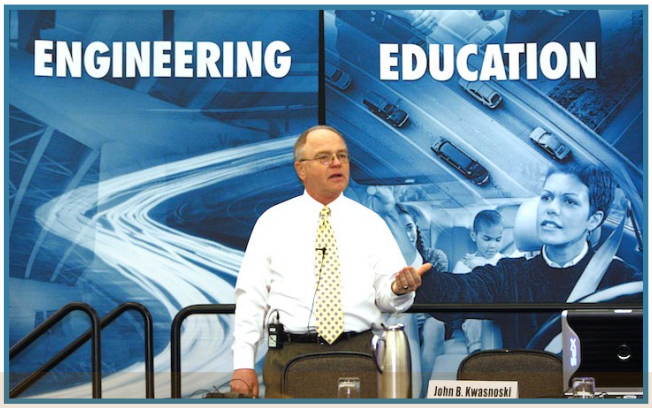

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watched a DVD while driving and 25 percent used the time to read. Not everyone was tempted by the videos, magazines, books, and food the researchers left in the cars, but enough were that overall safety for everyone on the road diminished. As Lipson and Kurman point out, "Clearly there's a tipping point at which autonomous driving technologies will actually create more danger for human drivers rather than less." This is why Google, most prominently, is aiming to bypass split responsibility and go directly to cars without steering wheels and brake pedals, so that humans will have no ability to drive at all.

For generations of Americans especially, and young Americans even more, driving and the open road promised a kind of freedom: the ability to light out for the territory, even if the territory was only the mall one town over. Autonomous vehicles also come with the promise of freedom, the freedom of getting places without having to pay attention to the open (or, more likely, clogged) road, and with it, the freedom to sleep, work, read e-mail, text, play, have sex, drink a beer, watch a movie, or do nothing at all. In the words of the Morgan Stanley analysts, whose enthusiasm is matched by advocates in Silicon Valley and cheerleaders in Detroit, driverless vehicles will deliver us to a "utopian society."

That utopia looks something like this: fleets of autonomous vehicles—call them taxi bots—owned by companies like Uber and Google, able to be deployed on demand, that will eliminate, for the most part, the need for private car ownership. (Currently, most privately owned cars sit idle for most of the day, simply taking up space and depreciating in value.) Fewer privately owned vehicles will result in fewer cars on the road overall. With fewer cars will come fewer traffic jams and fewer accidents. Fewer accidents will enable cars to be made from lighter materials, saving on fuel. They will be smaller, too, since cars will no longer need to be armored against one another.

With less private car ownership, individuals will be freed of car payments, fuel and maintenance costs, and insurance premiums. Riders will have more disposable income and less debt. The built environment will improve as well, as road signs are eliminated—smart cars always know where they are and where they are going—and parking spaces, having become obsolete, are converted into green spaces. And if this weren't utopian enough, the Morgan Stanley analysts estimate that switching to full vehicle autonomy will save the United States economy alone $1.3 trillion a year.

There are many assumptions embedded in this scenario, the most obvious being that people will be willing to give up private car ownership and ride in shared, driverless vehicles. (Depending on the situation, sharing either means using cars owned by fleet companies in place of privately owned vehicles, or shuttling in cars owned by fleet companies with other riders, most likely strangers going to proximate destinations.) There is no way to know yet if this will happen. In a survey by the Insurance Information Institute last May, 55 percent of respondents said they would not ride in an autonomous vehicle. But that could change as self-driving cars become more commonplace, and as today's young adults, who have been slower to get drivers' licenses and own cars than their parents' generation, and who have been early adopters of car-sharing businesses like Zipcar and Uber, become the dominant demographic.

Yet even if car-sharing membership continues its upward trajectory, these services may remain marginal. (Predictions are that 3.8 million Americans will be members of car-sharing programs by 2020—about 1 percent of the population.) And while it seemed as though the millennial generation was eschewing automobile ownership—the car industry called it the "go-nowhere" generation—its reluctance to buy cars may have had more to do with a weak economy (student debt, unemployment, and underemployment, especially) than with desire. More millennials are buying cars now than ever

before, and car sales overall are increasing. If Singapore, which has attempted to curb private car ownership by imposing heavy taxes, licensing fees, and congestion pricing, and by providing free public transit during the morning commute, is any guide, it suggests that moving the public away from private car ownership will be challenging: despite all these efforts, subway use in Singapore has gone down, not up. It is far from clear whether the country's new self-driving taxi service will be able to shift behavior and buying patterns.

There is little doubt that so far, in carefully chosen settings, where the weather is temperate, the roads are well marked, and the environment is mapped in exquisite detail, fully autonomous vehicles are safer than cars driven by humans. There were over 35,000 traffic fatalities in the United States last year, and over six million accidents, almost all due to human error. Since they were introduced in 2009, Google's self-driving cars have logged more than 1.5 million miles and have been involved in eighteen accidents, with only one considered to be the fault of the car. (At the same time, Google's human copilots have had to take over hundreds, and possibly thousands, of times.)

But Google's cars are being tested in relatively tame environments. The crucial exam begins when they are let loose, to go hither and yon, on roads without clear line markers, in snowstorms and ice storms, in heavily forested areas, and in places where GPS signals are weak or nonexistent. As Chris Urmson told that South By Southwest audience, this experiment is an unlikely prospect in the near term. But his remarks came before Baidu, Google's Chinese rival, announced it will have autonomous cars for sale in two years. It is a bold claim since so far, according to Lipson and Kurman, "to date, no robotic operating system can claim to have fully mastered three crucial capabilities: real-time reaction speed, 99.999% reliability, and better than human-level perception."

Still, the artificial intelligence guiding vehicles to full autonomy gets better and better the more miles and terrain those vehicles drive, and this is by design. As data is fed into an onboard computer from a car's many sensors and cameras, that data is parsed by an algorithm looking for statistical patterns. Those patterns enable the computer to instantaneously build a model of possible outcomes and instruct the car to proceed accordingly. The more data the algorithm has to work with–from GPS, radar, LIDAR (laser radar), sonar, inertial measurement unity (IMU), or visual clues matched to a high-definition map of topographical and geographical features–the more accurate its predictions become. The algorithm also benefits from "fleet learning": acquiring data, and thus "experience," from other vehicles equipped with the same operating system. (Autonomous cars can also communicate with each other on the road.)

This artificial intelligence enables the car to determine, for example, if the obstruction ahead is a small child or a cardboard box that has blown into the road. AI will teach it, by repetition, that the category "people" includes both those who wear trousers and those who wear skirts, those who are small and those who are tall, those who walk alone and those who walk hand-in-hand. The car will know to stop when the traffic light is red, and not to obey the green traffic light when a traffic cop is standing in the road, gesturing for it to stop.

At least that's the ideal. A car's "perception" can be stymied by mud on its cameras and by environments that do not have many distinguishing landmarks. Complex situations, like what to do when a squirrel runs into the road, followed by a dog, followed by a child, are beyond its competence. As Lipson and Kurman observe, "the technological last mile in driverless-car design is the development of software that can provide reliable artificial perception. If history is any guide, this last mile could prove to be a long haul."

There are other issues, too, that are likely to slow, though not stop, the widespread adoption of autonomous vehicles even if these technical obstacles can be overcome. Insurance is one. Now that the National Highway Traffic Safety Administration has determined that the driver of an autonomous car is its computer, will insurance need to be carried by the car manufacturer or by the software developer? (Volvo has already said it will cover the cost of accidents in its autonomous vehicles if the system has been used correctly.) Will members of car-sharing services have to waive their right to sue if a fleet car gets in an accident? And how will blame be assessed? Was the accident the fault of software that didn't accurately read the road, or the municipality that didn't maintain the road? Tort law is likely to be as challenged by the advent of self-driving cars as the automobile industry itself.

Then there are the ethical considerations. Machines can learn, but they can't process information without instructions, and as a consequence autonomous vehicles will have to be programmed in advance to respond to various life-and-death scenarios. Human drivers make such calculations all the time. They are idiosyncratic and unsystematic, two things computers are not, which is why robotic cars are safer than cars driven by humans.

But there are ethical precepts embedded in artificial intelligence. Cars will be programmed to execute a predetermined calculus that puts a value on the living creatures that come into their path. Will it be utilitarian, and steer the car in the direction that will kill or injure the least number of pedestrians, or will there be other rules–when possible, spare children, for instance? Someone will have to write the code to set these limits, and it is not clear yet who will tell the coders what to write. Will we have a referendum, or will these decisions be made by engineers or corporate executives? If we needed a reminder that autonomous vehicles are actually robots, this may be it.

At the moment, it is easy not to notice. Cars with semiautonomous features look like other cars on the road. Most likely, no one passing the Audi Q5 that drove itself (for the most part) from San Francisco to New York last March knew it was being piloted by GPS and an array of sensors, cameras, and algorithms. This will change when steering wheels and brake pedals are museum pieces, when cars are made of carbon fiber that has been punched out by 3D printers, and when they display the names of tech companies like video card maker NVIDIA and optical sensor pioneer Mobileye, rather than GM and Chrysler, on their grilles–if they have grilles.

The major car makers, rushing to make alliances with tech companies, understand their days of dominance are numbered. "We are rapidly becoming both an auto company and a mobility company," Bill Ford, the chairman of Ford Motor Company, told an audience in Kansas City in February. He knows that if the fleet model prevails, Ford and other car manufacturers will be selling many fewer cars. More crucially, the winners in this new system will be the ones with the best software, and the best software will come from the most robust data, and the companies with the most robust data are the tech companies that have been hoovering it up for years: Google most of all.

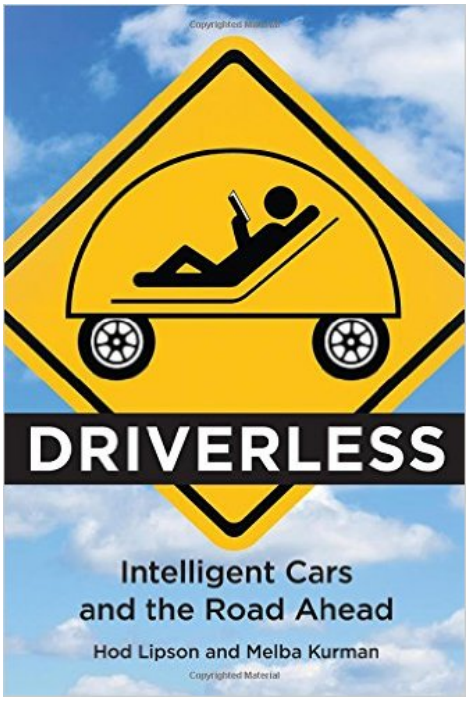
"The mobility revolution is going to affect all of us personally and many of us professionally," Ford said that day in Kansas City. He might have been thinking about car salespeople, whose jobs are likely to become obsolete, but before that it will be the taxi drivers and truckers who will be displaced by vehicles that drive themselves. Historically these have been the jobs that have provided incomes to recently arrived immigrants and to people without college degrees. Without them yet another trajectory into the middle class will be eliminated.

What of Uber drivers themselves? These are the poster people for the gig-economy, "entrepreneurs"–which is to say freelancers–who use their own cars to ferry people around. "Obviously the self-driving car thing is freaking people out a little bit," an Uber driver in Pittsburgh named Ryan told a website called TechRepublic. And, he went on, he learned about Uber's plans from the media, not from the company. "If it's a negative thing, they let you find out for yourself." As media critic Douglas Rushkoff has written, "Uber's drivers are the R&D for Uber's driverless future. They are spending their labor and capital investments (cars) on their own future unemployment."

All economies have winners and losers. It does not take a sophisticated algorithm to figure out that the winners in the decades ahead are going to be those who own the robots, for they will have vanquished labor with their capital. In the case of autonomous vehicles, a few companies are now poised to control a necessary public good, the transportation of people to and from work, school, shopping, recreation, and other vital activities. This salient fact is often lost in the almost unanimously positive reception of the coming "mobility revolution," as Bill Ford calls it.

Also lost is this: the most optimistic estimates of the safety and environmental benefits of the transition to fleet-owned autonomous vehicles, and the ones often used to tout it, are based on models derived from cities with high-capacity public transit systems. Obviously there are many cities without such systems. Where they exist, according to the Boston Consulting Group, it would take only two passengers sharing an autonomous taxi to make the per-passenger cost comparable to that of mass transit. Perhaps not surprisingly, lawmakers in this country are now using the autonomous vehicle future laid out by companies like Uber and Google to block investment in mass transit.

But why take a train or a bus to a central location on a fixed schedule when you can take a car, at will, to the exact place you want to go? One can imagine Google offering rides for free as long as passengers are willing to "share" the details of where they are going, what they are buying, who they are with, and which products their eyes are drawn to on the ubiquitous (but targeted!) ads that are playing in the car's cabin. Like websites that won't load if you block ads or disallow cookies, or like Gmail, which does not allow users to opt out of having their mail read by the company's automated scanners, one can also imagine feeling as if one had no choice: give up your data or take a hike.



Lipson and Kurman worry that the software driving driverless cars, like all software, will be ripe for hacking and sabotage. While this is not a concern to be taken lightly, especially after a pair of hacker/researchers were able to take remote control of a Jeep Cherokee speeding down the highway last year, this is an engineering problem, with an engineering solution. (To be clear: the hack was an experiment.) More worrisome is the authors' suggestion that autonomous vehicles, with their high-definition cameras and sensors, could "morph into ubiquitous robotic spies," sending information to intelligence agencies and law enforcement departments, among others, about people inside and outside the car, tracking anyone, anywhere. Welcome to utopia, where cars are autonomous, but their passengers not so much.

AUGUST 2017

8 GLASSBORO, NJ: SPONSORED BY NATARI. APPLICATION SUBMITTED BY JUNE 9, REGISTER BY JULY 9. HELD AT ROWAN UNIVERSITY BEFORE 2017 JOINT CONFERENCE. STARTS AT 0800 HOURS.

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SEPTEMBER 2017

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18 WESTCHESTER, OH: APPLICATION SUBMITTED BY SEPTEMBER 19, REGISTER BY OCTOBER 19. HELD AT WESTCHESTER POLICE DEPARTMENT. 9577 BECKETT ROAD, SUITE 500. EXAM STARTS AT 0800 HOURS.

DECEMBER 2017

6 LATHAM, NY: SPONSORED BY NYSTARS. APPLICATION SUBMITTED BY OCTOBER 7, REGISTER BY NOVEMBER 6. HELD AT COLONIE FIRE TRAINING CENTER, 100 WADE RD. EXAM STARTS AT 0800 HOURS

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Caltrans is doing away with its signature raised white discs on freeways

They're called Botts' Dots

ELIJAH CHILAND | MAY 22, 2017 | LACURBED.COM

Commuters driving on California freeways may notice something missing along the side of the road in the near future. That's because Caltrans has decided to stop installing the raised white markers that alert drivers when they are drifting out of their lanes, as the *Orange County Register* reports.

Known as Botts' Dots, the porcelain discs were named for Caltrans engineer Elbert Dysart Botts, who invented them in the 1950s. Originally, the dots were meant to serve as lane markers, but they became popular for their rumbling effect when driven over––a helpful cue for drowsy or distracted drivers. But Caltrans spokesperson Vanessa Wiseman tells Curbed the dots are limited by their inability to reflect light: "They're just big ceramic discs," she says.

By contrast, the small reflectors already in place along California freeways can be spotted by drivers in low-light conditions––and give cars a similar jolt when run over. Wiseman says that installing Botts' Dots was becoming hazardous and disruptive to traffic on busy freeways. As the *Register* notes, the discs originally lasted up to 10 years, but now must be replaced every six months or so.

Wiseman says that's because freeways have gotten more use in the days since the Botts' Dots were first introduced. The automobiles on the road have also gotten larger, with more trucks and other weighty vehicles capable of breaking apart the discs. She says that the rectangular reflective markers are more durable.

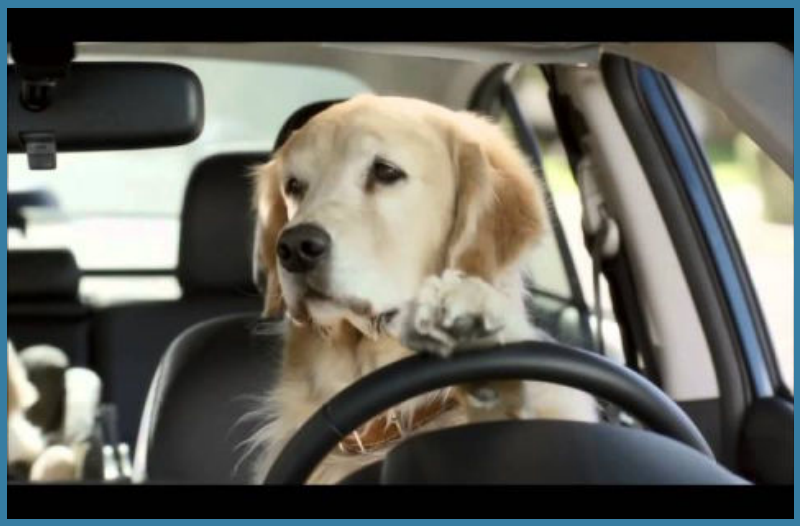
New technologies are also helping to phase out the Botts' Dots. Caltrans now divides lanes with slightly raised thermoplastic striping, which contains tiny glass beads that make the lane lines visible at night.

Meanwhile, grading along the shoulder of the road can provide the jolt drivers need to let them know they are drifting. Wiseman acknowledges the sentimental attachment many drivers feel toward the Botts' Dots (the *Register* interviewed multiple drivers who said the bumpy discs saved their lives in moments when drowsiness caused them to veer out of their lanes). But she argues that the dots don't make drivers safer at this point in time, citing a recent multi-year Caltrans study that found no difference in accident rates on roads with and without Botts' Dots.

Caltrans has already stopped replacing missing or broken Botts' Dots and will remove them when resurfacing roads going forward.

parting shot
parting thought

A study by AAA in March 2017 found that 75 percent of US drivers report feeling "afraid" to ride in a self-driving car (and only 10 percent report that they'd actually *feel safer* sharing the roads with driverless vehicles).



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