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Automotive Infotainment & Telematics: What's Their Purpose & How Do They Differ?

Robert Kinder, Jr., BSME

In the automotive industry, vehicle technology continues to advance to satisfy consumer driven functions. Whether the expectation is increased safety, comfort, or options, in-car technology demands are on the rise. One of the measures taken by automakers to mitigate these demands is the implementation of state-of-the-art infotainment or telematic systems. Although there is some overlap between these two systems, such as sharing the same visual display monitor, there are functional differences. The basis of infotainment involves the combination of entertainment and information, which may be obvious given the name "infotainment". Common infotainment functions include GPS navigation, listening to music, and Bluetooth phone operations. More recently, infotainment systems have gained the ability to store cell phone related data when tethered by USB or Bluetooth. Infotainment systems also allow drivers to link their phones through integration software such as Apple CarPlay and Android Auto.

Vehicle telematics merge telecommunication and informatic functions. When comparing telematics and infotainment, the most notable difference is that telematics utilize two-way communication. The communication provides a platform to send and receive data. The exchange of data is necessary for features like vehicle location for navigation, collision reporting for police or insurance providers, and remote vehicle diagnostics. Telematic systems can be built-in (onboard) or aftermarket. Built-in or OEM telematics are commonly subscription based such as OnStar by GM. Companies are beginning to use aftermarket plug-in telematics to track their vehicles and how or where they are driven. The devices are plugged into and powered by the diagnostic port usually located in the driver's footwell area. Insurance companies offer similar devices to track driver behavior to possibly yield a discount on premiums.

Regardless of the type of system, infotainment or telematic, accessible data is potentially stored in the vehicle or in a cloud. The data is not only obtained for insurance discounts or safety related purposes, but also for incident related situations being investigated at a forensic capacity. ***Telematic/Infotainment information can include all data stored on a phone that was synced to the car (including rental cars) such as texts, email and internet searches; GPS data; when the car is turned on and off; and even when the car doors were opened. One can easily identify how this type of data would be useful in criminal and civil applications.***

Fatal Arson Investigation

Nicholas Palumbo, MS, CFEI

Case Synopsis: The subject dwelling suffered an extensive amount of fire damage. The examination commenced on the exterior where most windows and doors were covered over by plywood. There were deep and extensive burn and char patterns, which emitted from the opening in the walls of the dwelling. The interior exam began at the rear, ground level doorway. The interior of the dwelling was heavily burned with many wooden members burned away. There was a major portion of the roof burned completely away and the roof had been covered over with a tarp for weather protection. The interior inspection revealed numerous burn patterns throughout, with many being detached from one another. This is the typical pattern when an accelerant of some type is used to initiate a fire at numerous locations. According to reports, the resident succumbed to injuries suffered within the fire. He was found lying on the floor at the top of the front stairway by firefighters.

Expert Analysis: It was ascertained from a discussion with members of the local Arson Task Force, that the resident had set the fires in a suicide attempt. He had also removed his wife's clothing from her closets, and placed them along with two (2) suicide notes within her car in the driveway. The patterns noted during the inspection were consistent with the findings of the public sector investigators. It was concluded that the fires were intentionally set by the deceased resident as he had been alone at the time of the fire. The fire was set by the resident to both destroy the property, as well as to kill himself. When interviewed, his spouse stated that she was not aware of any reason, physical or emotional, as to why he would have done this. A deeper investigation into the resident's financial status revealed that he was in debt and owed numerous companies and the IRS monies totaling over $150,000.00. He had caused his own death hoping that his life insurance would pay off, thus allowing his spouse to pay off his debts.

Result: A thorough investigation into the resident's life and finances led this investigation to a successful conclusion by both the public and private sector investigators. This caused the case to be denied by the homeowner's insurance carrier and the life insurance carrier as well.

Traffic Light Controller Fail

Robert Peruzzi, Ph.D., PE

Case Synopsis: A police officer on a high-speed chase ran a red light and crashed into a vehicle in an intersection whose traffic light controller included an emergency vehicle preemption system. The driver of the vehicle was mortally injured and died the next day. The estate of the deceased driver sued the police officer, the municipal police department, and the manufacturer of the emergency vehicle preemption system. An expert was retained by council for the estate of the deceased to review the documentation and manuals for the preemption system and traffic light controller, traffic controller event logs leading up to time of the crash, and Department of Transportation regulations, among other documentation, in order to answer the following questions:

- Did the preemption system operate properly before the crash?
- Did the preemption system confirmation lights activate before the crash?
- Was the confirmation lights' behavior consistent with the requirements and specifications for the preemption system?
- What is the maximum speed at which an emergency vehicle could approach the intersection where the crash occurred and be assured of receiving a green light upon reaching the intersection?

Expert Analysis: In the subject case, the evidence showed that the preemption system did work properly, but the system's confirmation lights were improperly programmed. The confirmation lights were programmed to not begin flashing until after the traffic signal turned green in favor of the emergency vehicle. By state regulations, if an emergency preemption system equipped with confirmation lights is installed, the confirmation lights must begin flashing as soon as the emergency vehicle approaching the intersection is detected, thus providing warning to other drivers near the intersection. Also, the police officer was driving too fast for the traffic light controller to cycle through its sequence before the officer reached the intersection. A maximum speed was calculated at which a preempted green light for emergency drivers would be assured.

Result: Following expert's deposition, the municipality accepted responsibility for the incorrect programming.

Machine Guard Defense

John Yannaccone, PE

Case Synopsis: While operating a piece of industrial equipment, a machine operator was injured when a metal shaving flew from the machine and entered the operator's eye. The operator claimed the machine should have had a guard, or shield, to prevent shavings from coming out of the machine and reduce the risk of operator exposure to flying debris.

Expert Analysis: Documents related to the machine indicated it was originally equipped with a clear hinged shield that flipped down into position between the cutting tool and the operator to reduce their exposure to flying debris. The shield was also equipped with a sensor connected to an interlock system, which required the shield to be in a down position for the machine to start. The inspection of the machine revealed the shield and interlock switch were not present; however, the machine did have threaded holes where they would have been mounted. Additionally, there was a wire connecting the two terminals where the interlock switch should have been connected.

Review of the employer's records revealed they had purchased the machine when it was approximately twelve years old from a used industrial equipment dealer. There was no evidence to indicate if it came with the shield and interlock at the time of purchase, or if they had been removed prior to the employer acquiring the machine.

Result: The equipment manufacturer was able to demonstrate they supplied the equipment with the shield and interlock that prevented the machine from operation without the shield in place. They were also able to show there were holes consistent with these components being installed on the subject machine. The defendant filed a motion to dismiss the claim against them since the alleged defective condition was created by an unknown party after the machine left their control. The motion was granted and the claim against the equipment manufacturer was dismissed.

Failure to Diagnose Squamous Cell Carcinoma of the Oral Cavity

Michael Pliskin, DDS, Ph.D.

Case Synopsis: In 2003, J.D. was diagnosed with erosive lichen planus bilaterally on the buccal mucosa and the left lateral border of the tongue. J.D. was seen regularly by her dentists for examination including oral cancer screening which was reported as normal. However, in August of 2009, J.D. was diagnosed with squamous cell carcinoma of the left lateral border of her tongue. The clinical strategy of the tumor was T2N0M0 as it measured approximately 3.0 cm in diameter. Treatment consisted of a partial glossectomy (removal of her tongue) and radiation therapy. Prior to the diagnosis, the last visits with J.D.'s dentists were on November 25, 2008, and December 18, 2008, and the oral cancer screening was noted as normal. The dentists were subsequently sued for negligence because they failed to detect the cancer on either November 25th or December 18, 2008. The dentists testified at their depositions that there was no cancer clinically visible on those dates.

Expert analysis: Erosive lichen planus has a small but significant potential risk to develop into squamous cell carcinoma. The dentists testified at their depositions that they were unaware of this malignant potential of erosive lichen planus. The essential and most important question was whether or not the cancer was clinically detectable in either November or December of 2008. The scientific literature and studies on the kinetics of tumor growth revealed that squamous cell carcinoma of the oral cavity has cell doubling times ranging from 45-78 days with an average of 62 days. Utilizing this data, a 3.0 cm tumor at diagnosis would have been clinically detectable (i.e., 0.5 c) at any one of the doubling times (i.e., 45, 62 or 78 days) on either November 25th or December 18, 2008. In addition, the dentists should have known about the malignant potential of erosive lichen planus.

Conclusion: The jury found that the dentists were negligent in their failure to detect the squamous cell carcinoma on either November 25, 2008 or December 18, 2008. This study demonstrated that basic science information can be applied directly to a clinical situation.

Cause & Origin of Tractor-Trailer Fire

R. Scott King, BSME

Case Synopsis: A tractor-trailer, as well as its load of high-end consumer electronic equipment, was severely damaged by a fire that reportedly began in the tractor. A preliminary fire investigation revealed that the fire began in the engine compartment; however, the cause was initially reported as indeterminate. Carriers for the tractor, trailer, and load retained an independent engineer to evaluate the available data and physical evidence to determine, if possible, the fire's cause.

Expert Analysis: The investigation began with a review of the driver's statements indicating the fire originated in the engine compartment. Research of the vehicle's recall and service history revealed an on-going safety recall related to lose fuel injector lines within the engine compartment. A subsequent vehicle inspection identified heat and burn patterns consistent with the fire originating within the right side of the engine compartment, near the fuel injectors. Further examination revealed that one of the fuel injector lines, located within inches of the engine exhaust manifold, was indeed loose. After documenting the looseness with measurements and video, the vehicle was placed in a secure forensic storage facility to preserve the evidence for possible future examination.

The analysis demonstrated that the injector line had loosened during vehicle use because it was not properly tightened after a routine engine service. Based on the testimony, the technician that performed the service did so using the tools and procedures prescribed by the manufacturer; however, testimony also revealed that numerous engine accessories made it impossible to properly tighten the fuel lines with those prescribed tools and procedures. As a result, fuel lines were subject to progressive loosening, resulting in increased risk of fire.

Result: The various parties successfully subrogated against the defendant engine manufacturer and settled the matter.

Another Shallow Water Blackout Case Results in a Large Settlement

Tom Griffiths, Ed.D. / Rachel Griffiths

Recently, The Redwoods Group, which primarily insures YMCAs, JCCs, and Boys and Girls Clubs, conducted a study regarding Shallow Water Blackout in their insureds' swimming pools. The study involved 73 YMCAs in 17 states and just under 100 lifeguards. It should be noted here that both the Redwoods Group and the YMCAs have been aggressively campaigning and educating to stop needless Shallow Water Blackout deaths in their pools for decades. Their study revealed some alarming results. In short, there is a major disconnect, or "Awareness Gap", between policies and procedures at YMCAs attempting to prevent Shallow Water Blackout, and their lifeguards' practices regarding those prevention strategies. Sixty-nine percent of the lifeguards interviewed were unaware of the Ys policies about preventing Shallow Water Blackout. Of the 31% of lifeguards who knew about the rules against extreme breath-holding, only 7.5% enforced those rules. Only 52% of the YMCAs involved in the study displayed a sign warning against prolonged breath-holding.

Considering this data, it comes as no surprise when a YMCA in the Northeast quickly settled a Shallow Water Blackout Death case against them. The security camera footage clearly illustrated a lifeguard who was on duty for far too long and who was bored and/or tired with the task at hand of watching lap swimmers in the pool. The lifeguard did in fact see the victim in the corner of the swimming pool, repeatedly hyperventilating and then submerging for prolonged breath-holding bouts on the bottom of the pool, while wearing a weight belt. The gentleman who died was practicing these deadly skills for nearly an hour. The lifeguard not only saw him engaged in this dangerous and banned behavior, but walked over to him more than once to get a closer look. Eventually, the victim surfaced for the last time, became suddenly unconscious, then sank to the bottom of the pool. Even with the man motionless on the bottom of the pool, the lifeguard on duty paced on the pool deck above him, wondering if, and when, she should respond. Eventually, with the help of other swimmers, the victim was brought to the surface; however, it was too late for effective resuscitation and recovery. This case reinforced the data the YMCAs and the Redwoods collected. Even though the Ys had aggressive rules and regulations in place to avoid such breath-holding tragedies, the young lifeguards on duty are simply unaware or unable to enforce those polices.

This problem surely exists not only in Y swimming pools but others as well. To correct this problem, more effective signage must be posted in ALL swimming pools, and lifeguards must be empowered with tools, scripts, and corrective strategies to prevent future Shallow Water Blackout Deaths.

Vehicle Speed: Is That *Always* the Smoking Gun?

Steven M. Schorr, PE

Here is the scene: Two-lane, unlit, back road upstate. Evening. Southbound passenger vehicle turning left into her driveway. Northbound pickup truck approaching from opposite direction with its headlights properly on. A collision occurs when the front of the pickup truck hits the passenger side of the left turning passenger vehicle. Event data from both vehicles was captured by the police. The left turning vehicle's speed and turn path was defined by the captured data. The pickup truck speed and braking was defined by its event data. The pickup truck was traveling 49mph, in a 35mph speed zone.

Simple, right? Pickup truck speeding therefore it must be at fault. However, when a proper analysis is completed using the event data from both vehicles, it is clear that the left turning vehicle could see the approaching headlights prior to and while turning. Also, when the left turn path was plotted, the left turning vehicle was actually in the process of executing the turn across the northbound lane for only 3 seconds. Further, due to the curve in the roadway, the approaching pickup truck operator would only recognize the passenger vehicles' headlights as a *turning* vehicle for about 1.5 seconds. 1.5 seconds is not sufficient to allow the pickup truck operator to perceive, react and avoid the left turning vehicle, even if it had been traveling 35 miles per hour.

The analysis showed that the collision occurred when the left turning vehicle turned in front of the visible and approaching headlights of the pickup truck, thereby not providing the pickup truck operator sufficient time and distance, *even had it been traveling at the speed limit*, to avoid the impact.

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Additional Case Study on Reverse Side . . .