



AUTOMOTIVE ADAS SYSTEMS - THE NEW CHALLENGE TO THE INSURANCE INDUSTRY

From the pen of
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The reason I've left my scanner and scope today and jumped behind a pen is I honestly think the pen is the greatest tool anybody can own, and if used properly will move boundaries beyond any imagination.

The second reason is that our ADAS EXPERTS team wanted to identify the "unknowns" and challenges which modern cars present to the Insurance Industry.

So how am I related to ADAS and the Insurance Industry?

Currently I am a technical trainer and researcher at ADAS EXPERTS, but let's go back to when it all started.

I was born as the son of an Auto Electrician and spent much of my childhood and adult life around cars well..."under cars" or at least "under the hood". Yes, I did a bit of off-road racing but my time was mostly spent testing and fixing broken cars. About 50,000 of them, if I'm being modest in the famous Croatian style.

I spent my father's (company) money on German Hefe Weissen beers during my early trainings with Bosch in Wernau and Vienna. Later I enjoyed pizzas and prosecco during TEXA factory sessions in Venice. I also managed to sell off my family company to Croatian National Insurance which helped me enjoy a bit of sailing and fresh air. I guess this also connected me with the Insurance Industry.

More importantly I have travelled the last 7 years through New Zealand and Australia avoiding kiwis and kangaroos on local roads, trying to help automotive technicians to understand diagnostic processes and implement the world's latest technologies. I supply training and diagnostic tools. I also meet great hard-working people, some of whom are now part of the ADAS EXPERTS network.

So, I consider myself an Automotive Industry guy.

The new challenge to the insurance industry



The questions that need to be asked:

To tell the story of Advanced Driver Assistance Systems (ADAS) and the challenge they present to the Insurance Industry I have considered some key questions and will work from there.

- *What is ADAS and what's the buzz about? Can ADAS be trusted and is there any risks around it?*
- *What is the diagnostic process and how are we fixing cars? What is a modern car and how do modern car systems works?*
- *How do ADAS affect assessors and the Insurance Industry?*
- *When will ADAS cars will be replaced with AV (Autonomous Vehicles) and MaaS (Mobility as a Service)?*

So, let's go in the style of Tarantino movie and jump randomly and then mix it all together to unwrap this story.

Firstly, we need to talk about Modern cars. So, let's then explain what a CAR is and how it works?

I am sure that you are now thinking hmm, is this guy really trying to explain what a car is? I mean we have more cars in NZ than people. We all know very well what a car is. So, let's challenge some beliefs.

QUESTION: What % of the cost of a new modern car goes on the vehicle electronics?

If you didn't cheat and use Google to help with the answer, and your estimate is 40 - 50% of the total price, you were right.

Why does this matter? Because as Frank Terlep likes to say "cars are computers on wheels" and computers are more prone to fail then good old metal.

So as an Insurance company are you looking at cars as computers on wheels or as sheet metal? Are you making assessments based on pictures? I am sure we can agree pictures can't represent the state of electronic components or the condition of software in ECUs (Electronic Control Units). Do you only have half the picture? I think you know what I mean.

The average number of ECUs in cars is currently around 40 to 50 units with high-end cars having up to 100 ECUs. Add on 50 to 90 sensors then multiply this by the average price and you will understand why shareholder meetings of Insurance companies are getting tense.

The systems of modern vehicles need constant maintenance and proper service, otherwise the cost of repair can easily burn the value of second-hand vehicles.

Significant risk and cost is present in the complex electro/opto mechanical sensors, often placed in areas which are the first to receive impact during a collision event.

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Bumpers are not great protection for radar units, and we are seeing even on mid-range Mazda's, five radars positioned in the front and back bumpers.

The problem becomes even worse when you realise these complex sensors and ECUs are interconnected, and that after replacing one unit in the bumper you maybe need to reprogram or recalibrate another one mounted in the windscreen. This provides an additional challenge to assessors and cost for the Insurance Industry.

Insurance Industry Outtake:

I dare say for most users a car is a car (excluding Alfisti and their relationship with Alfa Romeo) but for me the modern car is actually a PC and the bad news is that the car's expiry day is not based on sheet metal longevity, but on the average life span of its electronics. Unfortunately, this life span is not the 40 years predicted back in early days but now is estimated on average **4.5 years**.

So, if you are insuring a 10-year-old high-end car with 40 ECUs I officially put you in the category of BRAVE.

But it's not all doom and gloom. For any challenge, there is solution. One example is having the data and a deeper understanding of this problem. Through data we can identify models and brands that are better to avoid, and some which are still a safe bet even at an older age.

The future of Insurance is 100% data driven.

The complex process of fixing something you don't know is broken:

It is always good to start by agreeing on something.

So, let's agree that if we are going to fix something, we normally need to have a complaint. Usually, the owner of vehicle lets us know that something is going wrong. Sounds logical? Well, it is. So where is problem?

The problem is that the owner needs to be aware that something is wrong.

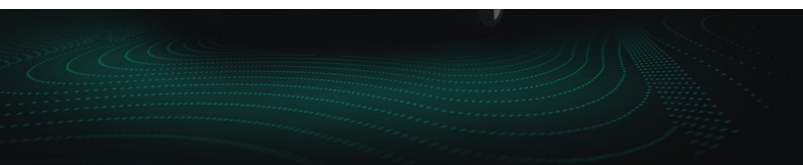
They need to have a reference point for what is good, and they need to notice when a behaviour changes from "known good" to "new bad". Then they can start noticing when this "new bad" happens and how often. For example, is it intermittent like every morning, or only when driving up hills? This process is needed to spur a driver into making a call to book their vehicle for a check and repair.

So far, we can likely agree on this above. So, let's then assume our driver drives a modern car with an Autonomous Emergency Braking (AEB) system but without Adaptive Cruise Control. But what does this mean? If you need some help with the flashy terms, we detail them all at www.adasexperts.co.nz with cool videos. For now let's simplify and translate this into a more real-life example.

Let's take a Mazda CX7 imported from Japan and build around 2015. We love low milage imports from Japan here in NZ.

So, our driver has a Mazda CX7 with AEB and he never notices any discrepancy between good and bad behaviour of his AEB system.

Why? It is designed to engage only where the driver fails to brake and the vehicle



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encounters an obstacle. For example maybe another vehicle stops quickly in front, or a pedestrian walks into our lane while distracted with modern life gadgets and constant catching up with his online social tribe.

So, in the milliseconds before impact many things need to be taken into account and will determine the destiny of our distracted community member. But if the AEB system isn't working as it should, can we blame the driver that he failed to know that the AEB system wasn't working? No – the system doesn't do anything until it is critical to perform that action. So how would he know it wasn't working and wouldn't save our pedestrian? Please read this paragraph again and take time to think about this...

I hope that I have wiggled your mind with this simple case. Trust me, in my life I have testified much more complex situations than one above.

So how do we fix something if we don't know it is not working correctly?

Well, the only thing that can be done is to properly maintain these systems and regularly test that the sensors are set correctly. In ADAS systems we call this procedure **calibration** of a sensor. You will see later that the best solution will be regulatory mandatory checks of ADAS system /sensors.

Properly maintaining these systems can be as simple as cleaning the windscreen in the area where the camera sensor is positioned, or randomly checking if the windscreen camera area has any small stone chips or scratches – smaller than those which will cause a fail during a WOF.

So, let's move forward and assume that our driver recognized that his MAZDA CX7 was, from time to time, giving a text warning on the dash that the AEB system was not operational. Our driver still isn't noticing any pattern or "problem" as everything is working as normal.

So, what are the steps in diagnostic process?

Let's dive as deep as possible without compromising our ADAS EXPERT Intellectual Property. In random order:

- **Visual Checks:** An important part of the diagnostic process. At ADAS EXPERTS our checks involve 40 something points which we call the VISUAL 40 POINT CHECK. We think it sounds better than the 47 point check. Agree?
- **Collect Data:** As much as possible and as accurate as possible.
- **Test Drive:** When checking and fixing modern cars one thing that is very important... performing test drives.



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- **Put the data into context:** Collected data needs to be put into context to become information. Additional external Original Equipment Manufacturer (OEM) information is important when dealing with safety systems as the OEM information is most comprehensive. Unfortunately, this OEM information is still not available to general aftermarket services in New Zealand. We recommend that the sharing of this information be made mandatory. This will ensure that all calibrations are performed with the best information possible for the safety of the driver.
- **Pre-Scan, Post-Scan and calibration reports:** Documenting the whole process with reports and photos ensuring that each sensor is aligned by OEM or OEE instructions, equipment and performed in OEM prescribed conditions and space.

Isn't that a lot of time and money for a diagnostic check?

If we are looking from an Insurance perspective this already looks like a lot of cost. YES, it is true that modern cars are not the same as old school cars – a new approach is needed.

We need to remember one important thing. Any diagnostic process needs to finish with 100% correct confirmation of what is the source of the fault or complaint! Note: In a small number of cases (under 5%) the process can finish with an uncertainty due to the electronic and software nature of these components.

If we want to provide an efficient and cost-effective solution, we need to monitor our process, investigate cases randomly, analyse them, and make improvements as technology changes rapidly. Rather than only fixing what is known to be broken we

need to change our processes to catch the unknown. To do this we need to foresee the future challenges with this technology.

More about ADAS...

So, let's talk a bit about ADAS itself.

ADAS is a complex field as it involves multiple systems with complex sensors connected together through sensor fusion. So, how should it be dealt with?

Well, think of this. Let's say we have a room full of people and a loaded gun. Some people will feel fear or feel unsafe. Others will understand what the trigger is doing and how to handle barrel direction, which means they can safely handle this situation. They naturally make the others in the room more comfortable.

Translated to ADAS field. From our experience so far, there are some who shouldn't touch it. They can cause more damage than good. Proper training is paramount here.



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ADAS systems are in every new car coming into New Zealand. AEB has just become mandatory on new cars (just like ABS was in the past). Therefore we need people able to handle these systems to service, check, and, repair them.

ADAS is a field which brings risks, but we have identified 6 categories of risk with many subcategories, and we build and implement our procedures to manage potential hazards.

ADAS EXPERTS is the NZ market leader with capabilities which are growing steadily, and we can support the Insurance Industry with solutions in this niche field.

So, when will ADAS cars disappear from roads and our fleet become Autonomous Vehicles MaaS (Mobility as a Service)?

In the near future drivers will begin to rely on these systems more and more as is the nature of humans. As technology and the infrastructure further improves, reliance on

ADAS will decrease as cars will no longer have a driver to assist! At this point maintenance of Autonomous Vehicle (AV) technology will become even more important, as its human back-up is taken away. I won't dare to put a time frame on this as I believe we will stay in Hybrid Traffic for a long time.

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The above thoughts are from the pen of a diagnostic technician and founder of ADAS EXPERTS. All examples, opinions and predictions are based on 30 years' experience in the field.

Since we love being distracted with social media too, you should check us out on Facebook @adasexperts and don't forget about our flash website adasexperts.co.nz.

If you've got questions for us, don't hesitate to use the contact us form on the site.

