



EXCLUSIVE INTERVIEW WITH
DOUG MACKENZIE
HEAD OF AUTONOMOUS
VEHICLE ADVANCED
ENGINEERING AT
MOBIS NORTH AMERICA



This September, Automotive IQ hosts the 12th Autonomous Vehicles conference in Detroit. The event will focus on the current manufacturing and solutions, as well as the big issues that Detroit is tackling to bring AVs into production and to the market. The event will showcase use cases and approaches on how to take technology, develop partnerships that are necessary to finish a product, develop a complete AV stack from top to bottom, bring it to market and gain acceptance from consumers or from enterprises.

We know that the delivery of AVs is taking longer than anticipated a few years ago, so attendees will learn where Detroit's AV industry is at right now. There is also the recognition that Michigan and Silicon Valley are going to be geographically segmented ecosystems, with Detroit focusing more on automating existing cars with Level 2 autonomy and working towards Level 3 automation – less on the bells and whistles, more on current manufacturing.

We interviewed Douglas MacKenzie, Head of Autonomous Vehicle Advanced Engineering at Mobis North America, who will be speaking at the AVDT event this September to get an inside scoop of where production of AVs is at, as well as getting some spoilers into his presentation.

Register for 12th Autonomous Vehicles Detroit 2022, Detroit, Michigan, September 20 - 22, 2022.

Q: So, Doug, we'd love to know more about your working day, can you tell us a little bit about your role at the Hyundai Mobis?

Doug:

Hyundai Mobis is the Tier 1 supplier within the Hyundai Motor Group, a sister company to the Hyundai, Kia, and Genesis OEs. I am head of the AV advanced engineering department within the Mobis R&D center covering the Americas. I work closely with the global head of AV in Korea and my peers in Europe. I define and execute advanced development projects that are building capabilities for the retail automotive market, with particular focus on needs in the North American OEMs. We do not target the 'robo-taxi' fleet vehicles.

The sensors, perception, and controls are generally developed in other regions and my team focuses on applications, including the decision logic that decides what the vehicle does and when it does it. For example, when to change lanes whilst following a route on a highway, or which row to drive down in a parking lot when searching for an empty spot. In parallel, I also have responsibility to promote Mobis' ADAS/AV portfolio to the North American OEMs and support them through vehicle SOP.

Q: Your role sounds very varied and like you get to see the bigger picture, due to having close working relations internationally. It's clear the industry is facing real challenges bringing AVs to production and market, so in your opinion, what is the number 1 reason why OEMs are struggling to productionize AVs?

Doug:

It is not possible to fully control the ODD, so it is not possible to fully guarantee the safety of the vehicles

because the AIs are brittle when confronted with novel conditions. Building a system that can safely handle the "unknown unknowns" is a much harder problem than most people realize, and there are a nearly infinite set of "once in a lifetime" events that can immediately change the ODD into an unknown condition (edge case). For example, an airplane making an emergency landing on a highway in front of the AV is unlikely to be part of the AV's ODD.

Q: What do you think is the timeline to get AVs into production and into customer's hands?

Doug:

It is an interesting question. Twenty years ago, people were expecting by now that all cars would be fully L5 AVs, with one in every garage. These days, the AV companies are focused on fleet operations for ride sharing and delivery services due to the cost and fragility of the vehicles. In my personal opinion, it will be another 20 years before these issues are overcome and it becomes common for middle-class consumers to own AVs, who could go shopping for their groceries without anyone in the vehicle.

However, the competency, robustness, and actual value to the owner of the current production L2/L2+ highway driving pilots in luxury retail vehicles is quite good. I expect in the next 5 to 10 years we will see the majority of vehicles that are sold will have these features, and the technology in luxury vehicles expanding to cover most roads, in most conditions, with minimal oversight. One could argue those vehicles will be "good enough" AVs for most people.

Q: What go-to-market strategies/models is Hyundai Mobis adopting?

Doug:

As a Tier 1, Mobis tracks and predicts market needs and proactively develops new components and applications that we expect will be attractive to the OEs. We also take inputs from our OE customers to guide our product roadmap, so we have hardware and software technologies ready for their programs. When we receive an award, we co-work very closely with our customers to match these complex systems to their specific requirements.

Q: We understand partnership across the full AV ecosystem is critical to mass AV adoption. What steps has Hyundai Mobis taken to form partnerships across the ecosystem? How easy/difficult was the process?

Doug:

Mobis has partitioned the space into the Level 4/5 fleet vehicles (so called 'robo-taxis') and the consumer retail L2/L3 vehicles. We have formed partnerships for the fleet vehicles, where Motional is a joint venture between Mobis and Aptiv to develop AVs for ride-hailing services.

Q: In your opinion, what aspects of ODD are vital in terms of what you need to get AV to market?

Doug:

The most important aspect of the ODD is the vehicle must always know if it is in the ODD or out of the ODD. That requires defining the boundaries in terms of physical metrics that the car can measure in real time, which is very difficult. Some aspects change slowly, and the vehicle can predict it is going to leave the ODD and take some actions to prepare. For example, starting to snow so the lane lines will be occluded soon.

Other aspects change abruptly and suddenly the vehicle is outside the ODD; these are the most challenging. For example, the previous airplane landing example - enabling the vehicle to accurately understand it has abruptly left its ODD is the most vital, so proper safety responses can be triggered.

Q: Which topic on the agenda has peaked your interest the most, and who are you most looking forward to hearing from?

Doug:

I am most interested to hear others' opinions on the final two topics on Day One, the L2/L2+/L3 progress.

Q: Ahead of your presentation, can you give us a sneak-peak into what you will be presenting?

Doug:

I plan to give a short talk providing my view of how L2 consumer retail vehicles will add autonomous capabilities in the next few years beyond the highway, to reduce tedium in everyday low speed situations. For example, valet parking and assistance in driving through congested parking lots.

The depth of information about Mobis' plans I can publicly present is still to be discussed, based on permission from HQ, but I expect I can make it interesting. Mobis will have a booth at NAIAS the previous week so I can draw from that material.

Q: Finally, what are your top reasons why the industry should attend the 12th Autonomous Vehicles Detroit 2022 conference, on September 20, 21 & 22 in Detroit?

Doug:

Covid has prevented face-to-face interactions at conferences for too long, and this conference is a great opportunity for the local AV community, and the community at large, to come together again to checkpoint where we are today and continue plotting our course for the future.

A big thank you to Doug for speaking with us. We're looking forward to his presentation at the 12th Autonomous Vehicles Detroit 2022, Detroit, Michigan, September 20 - 22, 2022. If you'd like to attend, please register for the event.



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