

Autonomous Driving in Singapore

As a city state with one of the highest population densities in the world and the urge to spearhead technologies which can be relevant for its urban lifestyle, Singapore has embraced autonomous driving early on. No wonder then that in the 2019 KPMG Autonomous Vehicles Readiness Index, Singapore tops the global ranking in the areas of policy and legislation as well as consumer readiness and holds its overall second ranking.

Since 2014, the Singapore government has been paving the way for the development of a driverless vehicle mobility system as part of its 'Smart Nation' movement. The 'vision', as it were at the time, was to design a "totally new mobility concept for a green-field, future town" where there are green and open spaces for residents and pedestrians to walk and cycle as a mode of intra-town travel, supplemented by environmentally friendly, autonomous vehicle-enabled point-to-point type of public transport that is free of the smoke, noise, congestion and safety concerns posed by vehicles today. A Committee on Autonomous Road Transport for Singapore (CARTS) was thus set up 6 years ago to chart the strategic direction for autonomous vehicles (AV) enabled land mobility concepts in Singapore, and a Memorandum of Understanding was also signed with the Agency for Science, Technology and Research, a research and development statutory board, to set up the Singapore Autonomous Vehicle Initiative for the purpose of exploring the technological possibilities AVs can create.

Since that time, several AV research and development trials have begun in Singapore and are well underway. These include driverless taxis developed by US-headquartered company nuTonomy, on-demand driverless shuttle buses deployed in Sentosa Island, driverless shuttle buses connecting student halls in the Nanyang Technological University campus, and even self-driving golf-buggies developed jointly by the National University of Singapore and the Singapore-MIT Alliance for Research and Technology.

Just a few years later, Singapore's Transport Minister announced in November 2017 that self-driving buses will be deployed in 3 districts during off-peak periods starting from 2022 and at the same time autonomous shuttles will provide first-last mile connection for residents and workers in these districts. The Land Transport Authority announced in October 2019 that it would be expanding its test-bed from the said 3 districts to further include all of Western Singapore, spanning more than 1,000 km of public roads.

In the midst of these developments, the legal implications of AV was first thrown into the public spotlight in October 2016 when a self-driving car by nuTonomy was reported to have collided into a lorry during a test drive. nuTonomy later announced publicly that the accident was caused by an "extremely rare combination of software anomalies" that nuTonomy claims to have since eliminated following extensive testing both in simulation and on private roads. Although no one was injured during the collision, the incident highlighted the need to consider the apportionment of liabilities for accidents involving AVs. The topic of liability has been the subject of detailed studies ever since CARTS was first set up back in 2014, but the collision drew greater public attention and focus on how future accidents involving AVs should be dealt with, especially given the increase in the number and scope of AV trials in Singapore.

The regulatory environment for AVs

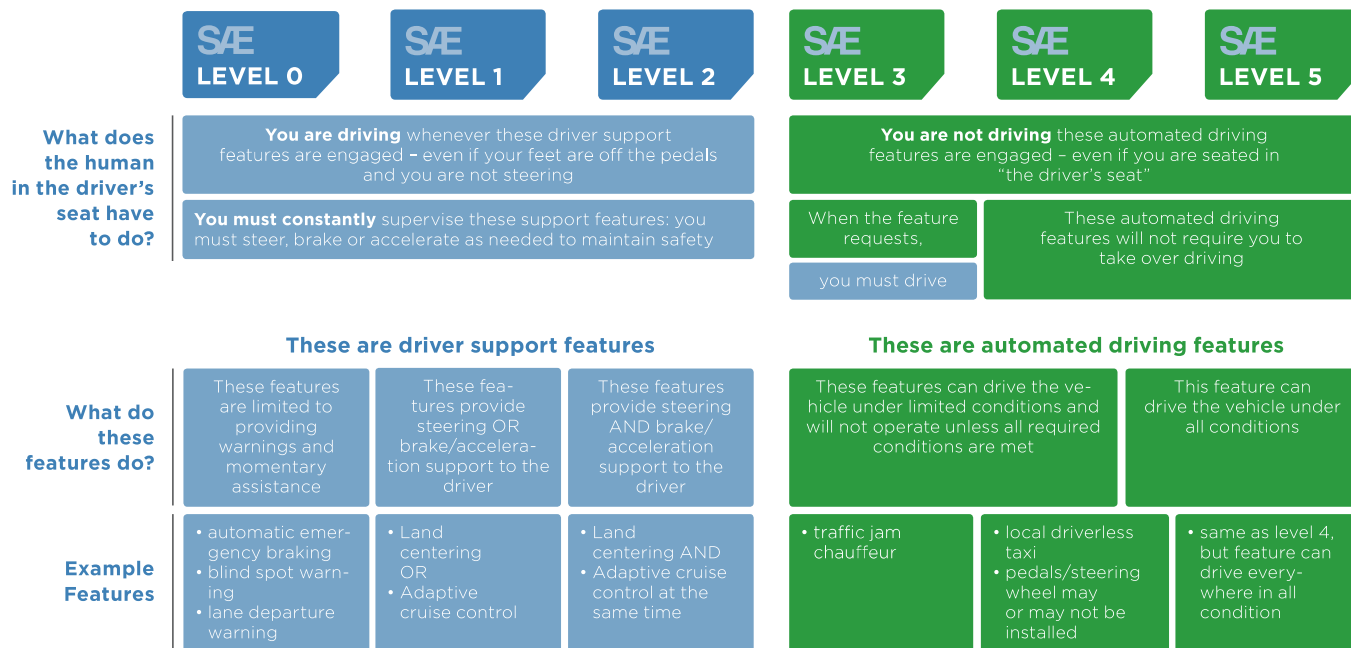
A few months after the incident, the Singapore Parliament passed a slew

of amendments to Singapore's *Road Traffic Act* in February 2017 to, among other things, establish a regulatory framework for the undertaking of trials and use of AVs on Singapore roads.

The amendments did not and were not intended to provide a comprehensive prescription of liability for AV incidents – rather, the amendments were intended to give the Land Transport Authority, which is the local regulatory authority for land transport matters, the flexibility to impose or amend rules and requirements on AV trials and use as and when the need arises given the myriad of possibilities and unforeseen circumstances that may occur, as the nuTonomy incident had demonstrated. The Minister who moved the amendments likened them to a "regulatory sandbox" where the Land Transport Authority could study the legal consequences of AV trials for a period of 5 years to assess the appropriate regulatory response to AVs.

And, for the first time ever in Singapore parliamentary proceedings, the Minister also made reference to the Society of Automotive Engineers (SAE) Standard International J3106 and said that the amendments would apply to Levels 3, 4 and 5 of J3106, because "*at levels 3, 4 and 5, it is the autonomous vehicle which monitors the driving environment, and the human driver is no longer required to actively monitor the vehicle. The amendments are not meant and not intended to capture vehicles outfitted with just driver assistance systems like cruise control and assisted parking functions.*"

SAE J3016™ LEVELS OF DRIVING AUTOMATION



Under the SAE Standard the driving automation is generally divided into 6 levels – starting from Level 0 (no automation) via automated driver assistance systems for functions such as steering or braking (Level 1 and 2) to automated (Level 3 – driver is still required for specific situations) and autonomous (Level 4 and 5 – no driver required) driving. Subsequently in January 2019, the Singapore Standards Council released a 4-part industry standard known as Technical Reference 68 (TR 68) to guide the local AV industry in the development and deployment of fully autonomous vehicles. TR 68 is an industry-led effort comprising represen-

tatives from the AV industry, research institutions, institutes of higher learning and governing agencies aimed to promote the safe deployment of fully driverless vehicles in Singapore. In a joint press release by Enterprise Singapore, Land Transport Authority, Standards Development Organization and Singapore Standards Council, TR 68 was touted as the “first such national standard in world” based on industry feedback. TR 68 covers 4 key areas of AV deployment: vehicle behavior, vehicle functional safety, cybersecurity and data formats, and it is applicable to “a vehicle designed to be operated exclusively by a level 4 or 5 automated driving system for all

trips within its given operational design domain (ODD) where the vehicle is designed to perform the sustained dynamic driving task (DDT) and its fallback without the presence of a human operator on board”.

It must be noted that TR 68 is only a provisional standard and therefore does not presently have any force of law or binding effect in Singapore. However, it is anticipated that as AV technology matures and more feedback is gathered from the AV industry, TR 68 will continue to be refined and eventually form a basis for the development of further legislation in the field of AV.

→ About the author:



Jaryl LIM Zhi Wei
Associate (Singapore)
I.N.C. Law LLC , 4 Battery Road, Bank of China Building #26-01, Singapore 049908
jaryl.lim@inc-law.com

→ About the author:



Dr. Thomas Hufnagel
Rechtsanwalt/Attorney-at-Law, Partner
Luther LLP, 4 Battery Road, Bank of China Building #25-01, Singapore 049908
thomas.hufnagel@luther-lawfirm.com