AUTONOMOUS a2z

# Safety Report
# a2z Smart City Solution

2022 Voluntary Safety Self-Assessment

a2z
AUTONOMOUS

# CONTENTS


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# A Letter from the CEO and Co-Founders

Autonomous driving has the potential to dramatically change our future. Everyone agrees with this. But in order for this vision to become a reality, we need to maintain two key things. These are safety and sustainability.

**The top priority of autonomous driving is safety.** We are well aware that safety cannot be compromised by any other value. However, it is very difficult to answer the question, "How safe is safe enough?" We are constantly exploring to find answers. In addition to simulations, safety performance should be verified through a lot of actual driving—not only the ability to respond to scenarios that are difficult to encounter in daily life, but various edge scenarios that are likely to occur in real life as well. And in order to ensure public trust, the superiority of autonomous driving over excellent human drivers must be verified. At any given moment, there are hundreds of millions of cars running on the roads around the world. Some people have accidents, but most people get to their destination safely. However, that's not to say that cars are safe. Even people who have never been in a traffic accident understand and accept the importance of seat belts and airbags, because no one knows when and where traffic accidents will occur. The same is true of the development of autonomous driving systems. The value of safety should not be underestimated until a system is created that can prepare for emergencies, even if the driving is mostly safe.

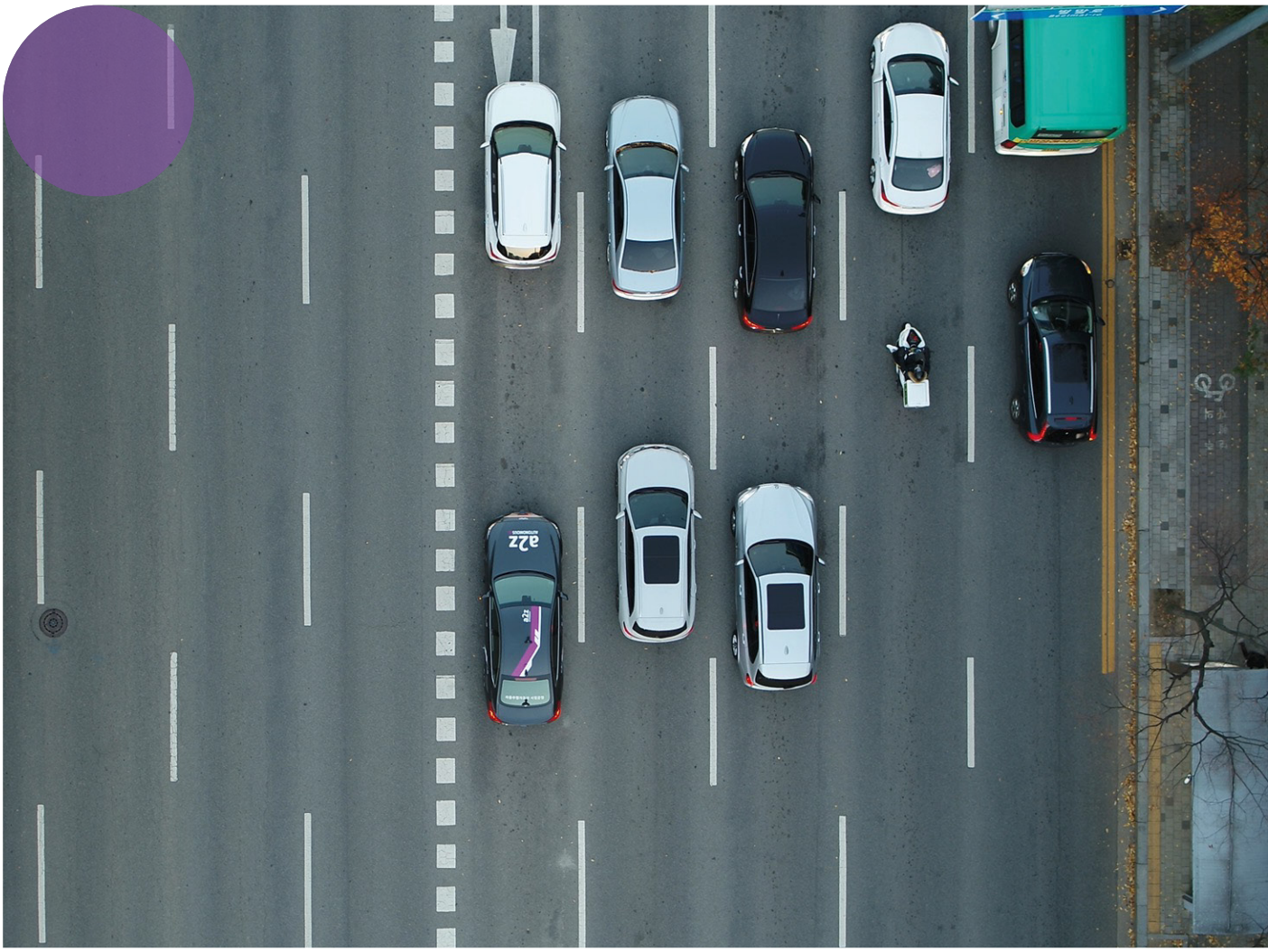
**We must also take note of sustainability.** In other words, the technology of autonomous driving must continue to benefit and improve the lives of people. The era of fully autonomous driving will not come overnight. Establishing safe autonomous driving technology in a partial and limited environment first will allow people's lives to flourish. In limited and repetitive sections, there are relatively low hurdles for autonomous driving technology in terms of both technical issues and acceptance. Logistics and human transportation under these conditions can benefit those who need autonomous driving technology. For example, in the United States, job shortages in the logistics market are emerging as a major social issue. There is a risk that the burden on workers could lead to a decline in physical strength and concentration and cause safety accidents. Autonomous driving technology has the potential to not only increase productivity but also increase safety performance as the amount of labor currently performed by humans is shared. And as self-driving technology becomes more advanced and people's trust in it grows deeper and deeper, it can be commercialized in more areas.

Therefore, we have a corporate value that will always prioritize safety and increase the benefits our safe technology can bring to people. This report will show what efforts are being made to ensure the value of safety, especially in the process of making our corporate value a reality.

Sincerely,
**Jihyung Han**, CEO & Co-Founder

We have a good understanding of the Department of Transportation's latest autonomous driving guidelines, **Preparing for the Future of Transportation: Automated Vehicle 3.0 and Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicle 4.0,** distributed by the Executive Office of the President of the United States.

This VSSA was written to address the value of 'safety first' highlighted in these two documents, which are at the heart of the federal government's framework for autonomous driving in the United States.



a2z AUTONOMOUS

# Our Mission

is to develop safe and reliable autonomous driving technology, providing people an opportunity to enjoy an equal and prosperous life through

## “Mobility for Everyone“


# about Autonomous a2z

**116,639 miles (2021)**

1st demonstration of autonomous driving in S. Korea

**40 %**

Professional engineers from automakers

**21 cars**

1st autonomous vehicle holder in S. Korea

**8 types, 1 S/W**

From buses to garbage trucks using only 1 algorithm

**48 R&D projects**

National R&D project revenue over $20 million


We are a self-driving startup created by four self-driving experts in 2018. We've been working on the development of self-driving technology under the chief value of 'safety first.' Demonstration projects are being carried out in various regions by utilizing self-driving solutions developed in-house, and autonomous driving solutions optimized for smart cities are being prepared for the future leap into industry.

We are continuously upgrading performance and embedding progress through self-development using the C programming language in all processes of perception, judgement and control. In particular, we are using a low-volume vector map which is composed of dots and lines rather than a point cloud map with high-volume information. So we can optimize quickly through self-developed perception, judgment algorithms and organically matched structures. On top of this, we have location perception technology using LiDAR and Map matching, not GPS (accuracy is around 20 cm).

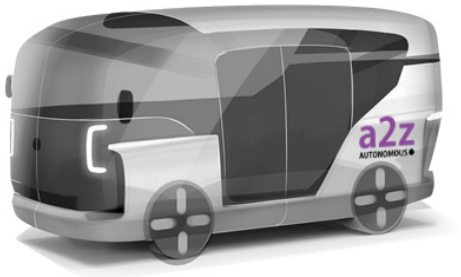

Our a2z solution can be used to create different business models in collaboration with companies from various mobility related fields, and we are also working on technology development and demonstration projects for commercialization.

We are expanding this technology to the development of fully-compatible, automated vehicles to complete our integrated Smart City Solution. We are developing an electric vehicle platform named Smart City Platform, which includes a mid-sized vehicle for up to 12 passengers that can be used for passenger transportation as well as delivery, patrol and street cleaning applications. A mid-sized platform is also being developed that will cater to logistics uses. a2z has completed AV projects with a top Korean IT company, KAKAO, to demonstrate the integration of their technology with traffic control and mobility service platforms for robotaxi and BRT (bus rapid transit) shuttle applications. To aid the transition from primarily a software company to an automaker, a2z has forged partnerships with leading Korean tier 1 automotive suppliers, including SL Corporation, SAMBO Motors and PHC Valeo.


## SD

(**S**mall platform **D**elivery)

- **40** kph — Maximum Speed
- Max Load ≤ 300 kg
- Remote Monitoring
- **24** hours — All-day Delivery




## MS

(**M**id platform **S**huttle)

- **40** kph — Maximum Speed
- Easy for Disabled Persons
- **240** km — Range per Charge
- 12 People (6 Seated + 6 standing)

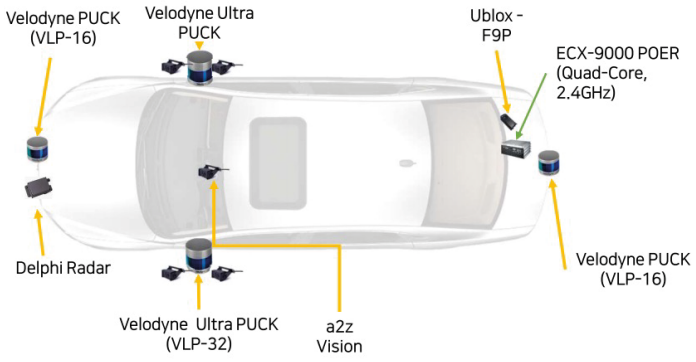

Paid Robotaxi,
a KAKAO platform service
SKT 10:40
86%
한옥마을전주비빔밥 세종
세종특별자치시 반곡동
출발
도착
8분 예상
세종특별
자치시청
카카오 모빌리티의
자율주행 기술로 이동합니다
자율주행
자율주행 이동 서비스
예상 8,000원
일반호출
주변 택시 호출
예상 6,200원

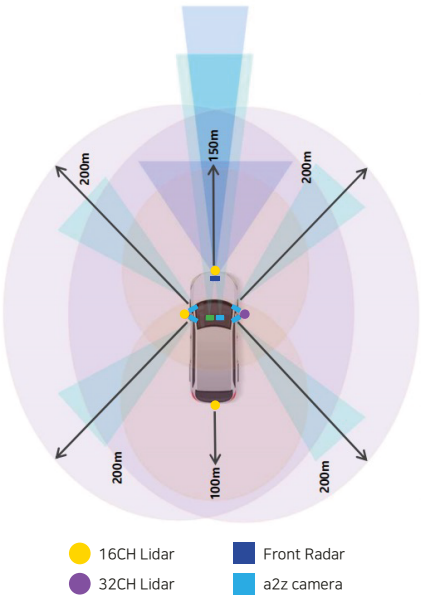
# 01 System Safety

We are developing a full-stack autonomous driving system that performs cognitive, judgment and control functions. LiDAR, cameras, radar, and GPS are used for cognitive functions. Notably, multiple LiDAR signals can be processed simultaneously, and fast recognition and positioning performance with minimized latency has been achieved by utilizing a low-capacity map based on the technology and vector map of the camera, which utilizes object recognition based on deep learning. Depending on the results of recognition, it responds safely to various scenarios that may occur on the road, such as a vehicle cutting in, entering an intersection, or a vehicle driving close behind. Furthermore, it also responds safely to unpredictable scenarios, such as traffic signal violations, illegally parked vehicles, and the unexpected behavior of pedestrians. In order to ensure that all of these can be performed continuously and reliably, we have clocked a cumulative mileage of more than 200,000 miles in Korea, which is the highest record among domestic companies.

In the event of a cancellation of the self-driving system due to a system error during evaluation driving, an appropriate notification system is in place so that the backup driver can safely receive the transfer of control, and training is also provided for the driver. All assessment vehicles have two backup drivers. One is the safety driver, whose responsibility is to monitor the surrounding environment, and the other is the safety operator, whose responsibility is to monitor the system. In order to fully respond to all contingency and safety-related variables, having at least two backup drivers on board to share their roles professionally is an essential part of the process of safe evaluation.


Our newly developed unmanned autonomous driving platform is being developed in accordance with ISO 26262. The safety level and design are being evaluated by system, subsystem, and component, and if there is a design change, it must be applied to vehicles operating on public roads after the completion of the evaluation, so the risks of a malfunction of the system will be prevented in advance. Also, because there are no drivers, a wide variety of redundancies are being included in the design. First of all, the main controller is duplicated, and in the event of a problem, the communication controller plays the sub role of the main controller. In the event of a problem with a dual controller, a remote control can be used to control the vehicle with information obtained through the camera. In addition, by securing redundancy capacity through the redundancy of the CAN line and the separation of the network, the system's safety performance is being enhanced as much as possible.



# 02

# Operational Design Domain (ODD)

Currently, evaluation is being conducted on public roads in Pangyo, Daegu and Sejong in Korea, as well as in areas with air force bases where public access is restricted. We will be able to drive using only ODDs which have been verified. And as development advances further, ODDs will expand. Our ODDs are defined in detail by utilizing the ODD classification system described in the Testing Automated Driving Systems Report, the 2018 NHTSA research report. Checklists will be drawn up as ODDs are subdivided, such as by the type of road, which is physical infrastructure, the speed of driving restrictions, the traffic situation, the weather, which is an environmental factor, light conditions, school zones, which are an area factor, and construction.

**21 autonomous vehicles***
**in 10 different regions in South Korea**

* 10% of total AVs in S. Korea (196 vehicles, Dec/2021)

The ODD definition should include compliance with safety regulations, such as the Road Traffic Act, as well as the performance of technology. Even if it performs well, it should not be over-regulated (e.g., driving above the speed limit). If regulations are a barrier to the ODD's expansion, we will first contact the authorities and try to reach an agreement whereby optimization of both safety and performance can be achieved. The definitions and confirmation of these segmented ODD components allows the vehicle to drive in autonomous mode as safely as possible and is essential for the prevention of safety accidents caused by human error. Furthermore, a highly defined ODD also helps determine the performance of OEDR to be introduced in the following chapters. The OEDR ability can only be clarified if the ODD is specified as much as possible.



Sangam, Seoul

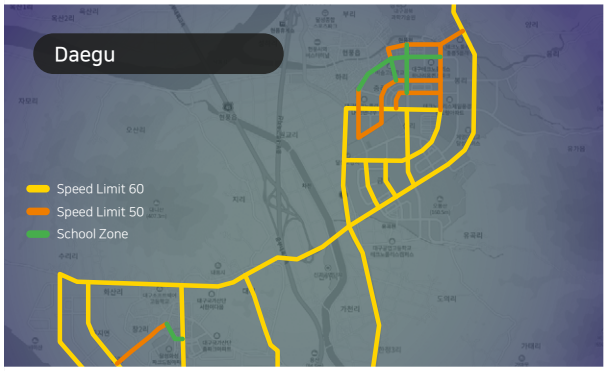

Pangyo, Gyunggi


Anyang, Gyunggi

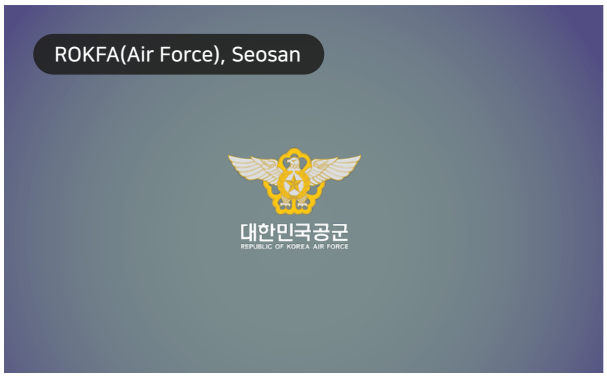

Gwangju

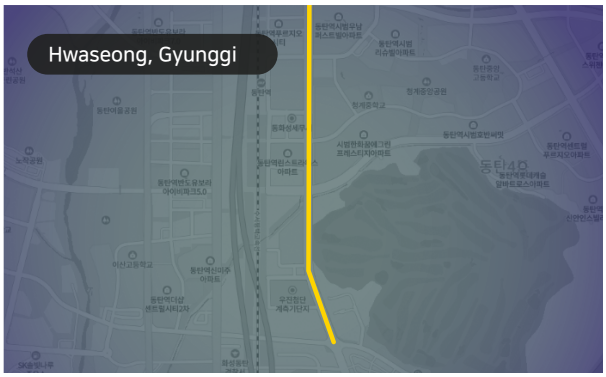

Sejong
Speed Limit 50
Speed Limit 40
Speed Limit 30
School Zone

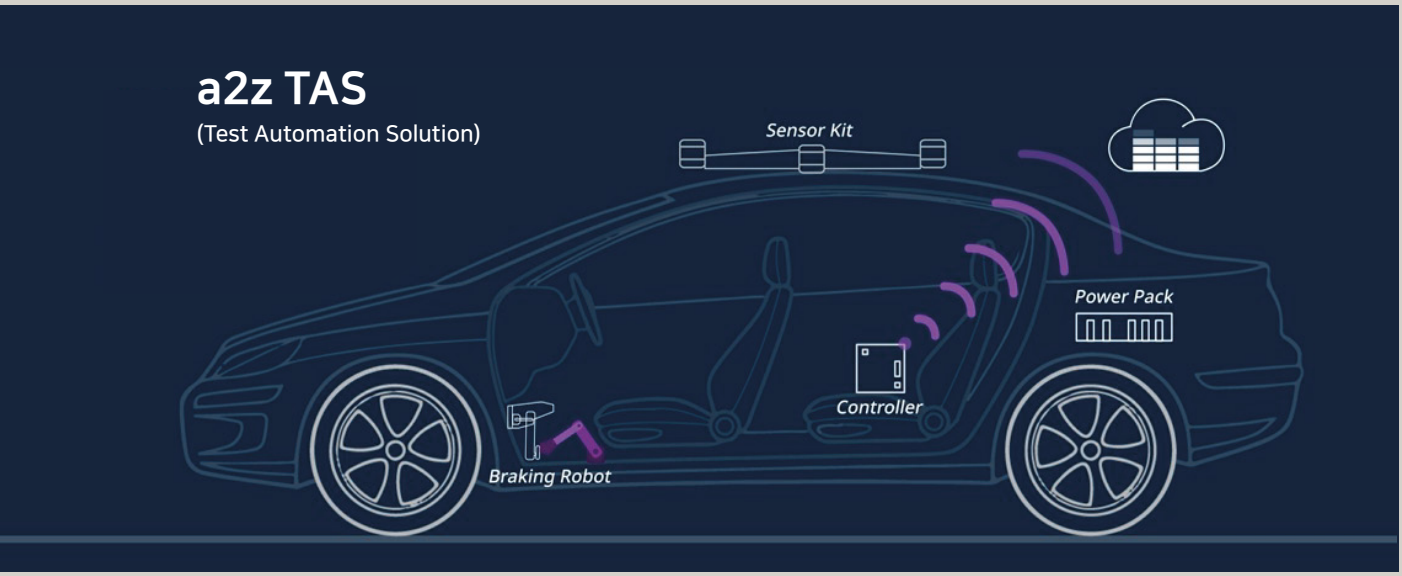

Ulsan
Speed Limit 80


Daegu
Speed Limit 60
Speed Limit 50
School Zone


Kyungll Univ, Daegu


ROKFA(Air Force), Seosan
대한민국공군
REPUBLIC OF KOREA AIR FORCE


Hwaseong, Gyunggi

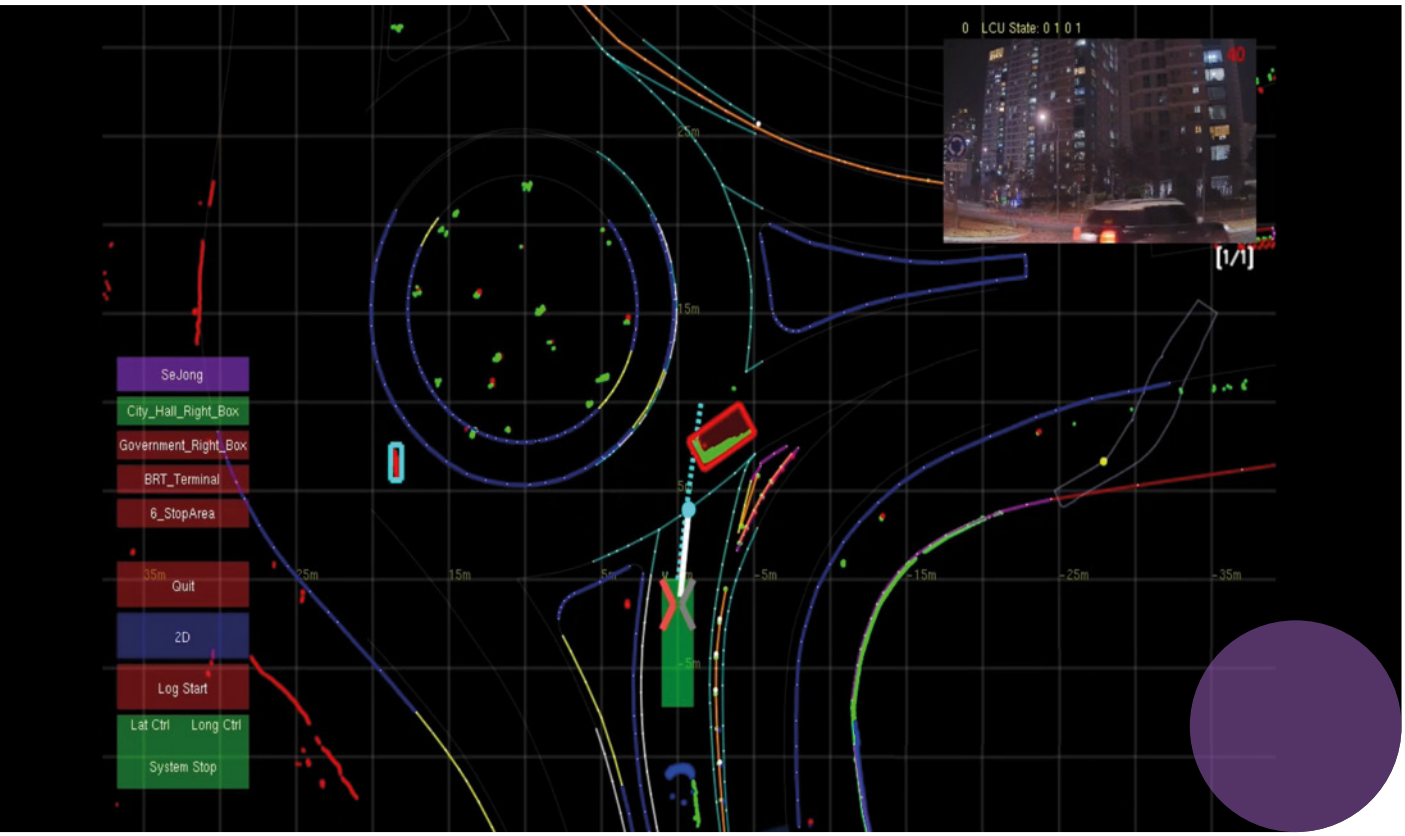



Watch the video “a2z Test Automation Solution” on YouTube.

In addition, we set the proving ground(PG) of automakers as ODD and developed solution that automatically performs tests (e.g. homologation) conducted in the proving ground. We call this system TAS (Test Automation Solution). This solution is leading the way in dangerous testing phases such as lane departures by surrounding vehicles, obstacles, exit strategies and more.

The TAS provides multiple vehicle tests with the lowest manpower. Humans have only to monitor and remotely control, and vehicles installed with the TAS run tests automatically, including braking tests and durability tests (Belgian/wash-board/cobblestone roads). Furthermore, they can perform repeatedly, 24/7.

This robotic automation solution costs much less than trained durability drivers operating the same vehicle. Also, there is reduced variability between robot drivers when compared to similar data from human drivers and they are able to complete a series of tests in about half the time that it would take human drivers to complete that same series of tests.




03

# Object and Event Detection and Response (OEDR)

OEDR is a sub-DDT (Dynamic Driving Task) challenge where the driving environment is accurately monitored, and appropriate responses are implemented for certain obstacles and events. The results of a 2007 NHTSA study showed that collisions between cars were most common when the vehicle in front stopped (21%), during movement at an intersection without traffic lights (11%), and when the vehicle in front decelerated (9%). Therefore, one important function of OEDR is to ensure that not only is the object accurately recognized, but the physical state and future behavior of the object is also predicted so that the appropriate DDT is carried out.

Our flagship evaluation vehicle, the Genesis G80 model, is equipped with four LiDARs (two long distance, two short distance), three radar (one long distance, two short distance), six cameras (two front, four side), and one precise GPS. We are checking whether the data comes in every 100 ms, and when the data does not come in more than several times (the standards are different for each sensor), we judge by the situation of fault and diagnosed in detail. The suite of various sensors provides a 360-degree view and the FOV between the sensors overlaps, so even if one sensor fails, the vehicle can drive safely based on the cognitive ability of the rest of the sensors.

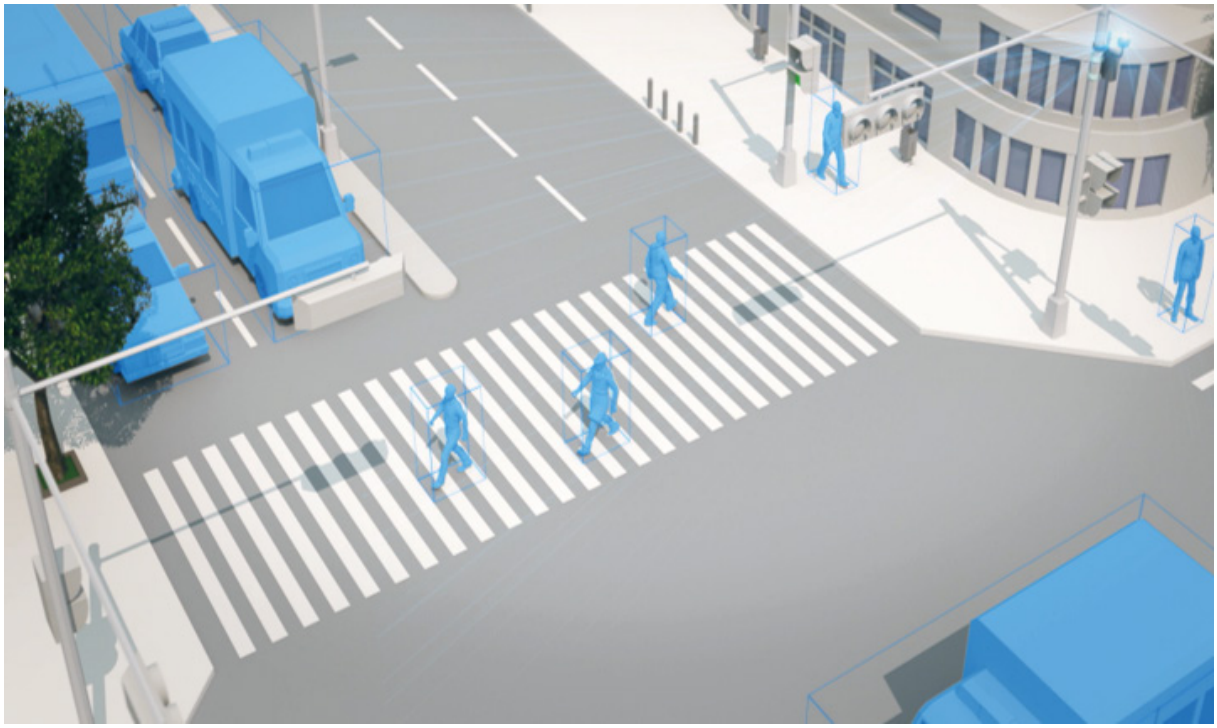
In particular, since the cameras were developed in-house and have completed domestic certification, it is easy to process data obtained through the sensors and to optimize our autonomous driving system, such as by modifying the FOV. In order to optimize the OEDR performance, the HD vector map provides not only the performance of each sensor but also the information of fast positioning. With information collected from positioning and sensors, the subject's recognition and subsequent movements will be predicted, and accordingly, the autonomous driving system will perform safely for each DDT.

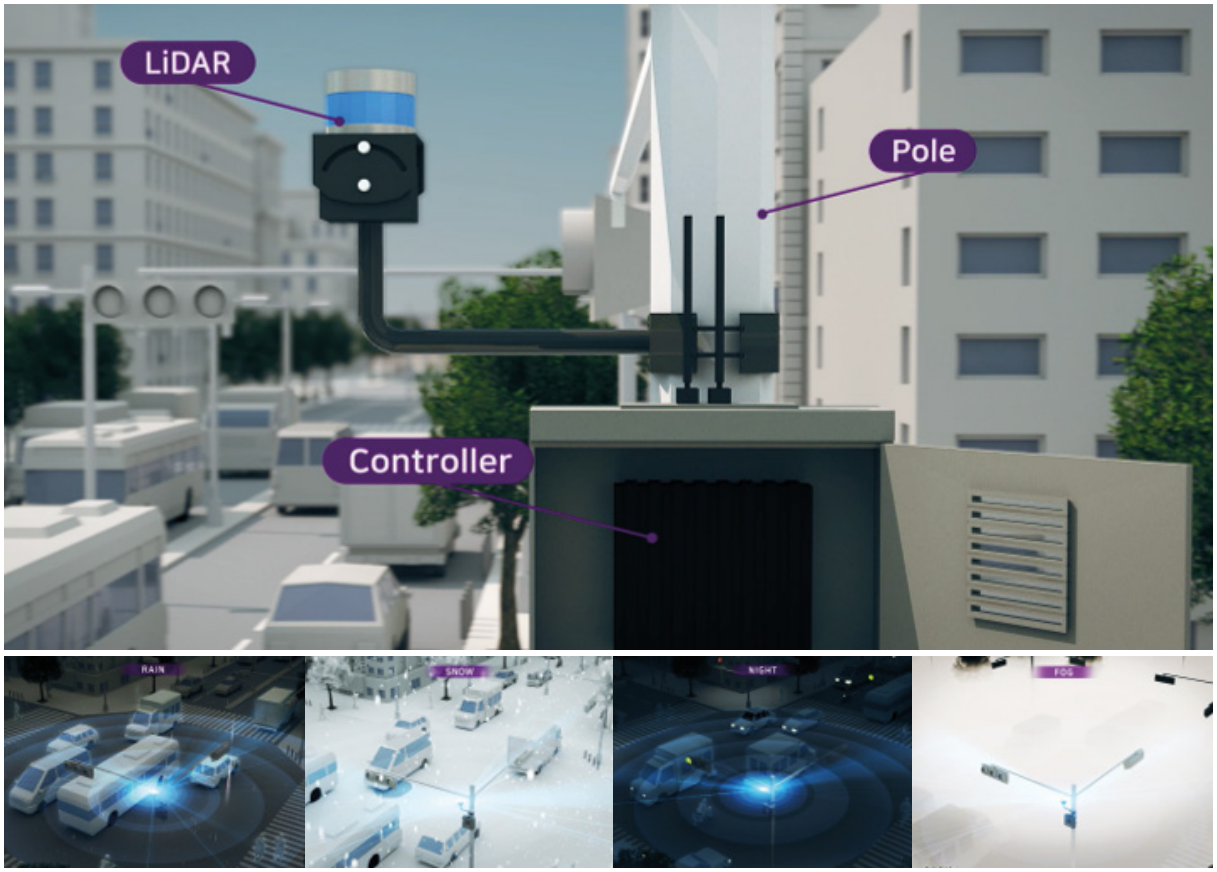
We also have our own V2X technology called "Lidar Infra System (LIS)." Our Lidar Infra System is based around individual lidar sensors and control units which are mounted on existing roadside traffic infrastructure, such as traffic lights. The system is capable of real-time object recognition and can identify the different classifications of road users, such as cars, pedestrians and cyclists, along with their precise location (within 10 cm), speed and direction.

Traffic infrastructure, such as traffic lights and lane markings, is also accurately recognized. A proprietary HD mapping system using an efficient vector map and localization algorithm is key to the rapid processing, resulting in an overall system latency of less than 500 ms. This also helps with the relatively low-specification processor required for the control unit. Information on traffic and weather conditions is gathered and the system can identify traffic offences and the functioning of traffic lights. Information collected by the system can be shared in a number of ways, such as by sending appropriate data to a traffic control center or to automated vehicles. Additionally, the information can be sent to drivers of non-automated vehicles and pedestrians.

Our objectives in developing this system are to improve traffic and pedestrian safety and also to support traffic management as part of a city's ITS. The benefits of the LIS include its relatively low hardware and installation costs due to its simple architecture, real time object recognition with minimal latency, accurate and reliable operation in all weather and lighting conditions, and the ability to share information with third parties.

The Lidar Infra System has been deployed in the municipalities of Pangyo, Sejong, Daegu and Seosan in South Korea. In Pangyo, the objective has been to demonstrate the guidance of automated vehicles at junctions. Vehicles entering the monitored junction box are identified and a signal is sent to the onboard units of automated vehicles to provide guidance to enable them to perform right hand turns at the junction.






In Sejong, the purpose of the pilot project is to ensure safety at a school intersection by gathering real time data on pedestrians and traffic at the intersection and sharing this with approaching automated vehicles. Traffic violations and jaywalking pedestrians are also identified to inform automated vehicles and potentially city traffic enforcement. a2z's V2X system is currently being demonstrated in certain districts of Daegu utilizing 5G connectivity. The Seosan demonstration is primarily focused on providing notifications on the status of a junction, with information on current vehicle activity within the junction.

Furthermore, a2z is in collaboration with KT, a major Korean telecom company, on AV projects to develop a 5G-based communication system for the Smart City Platform. The key objective of this partnership is to develop a dedicated 5G module to be embedded in the Smart City Platform. These projects include local government pilot projects designed to address the Korean government's V2X standardization for this 5G module. Technologies including RTK (real-time kinematic) and LDM (local dynamic map) have been applied during these projects with the aim of enhancing the safety and efficiency of autonomous cooperative driving. RTK and LDM enable the transmission of data and precise routing information to AVs. Additionally, a similar project was completed for ROKAF (Korean Air Force) based on the application of mobile edge computing for 5G convergence. This resulted in the deployment of an autonomous shuttle bus for the air force in December 2021.

Watch Video "a2z Lidar Infra System" in YouTube.

**Lidar Infra System**
in Seosan, Chungcheong

Moreover, we developed our own camera, "a2z View," to improve image processing performance. Image processing and original image storage are possible at the same time through our in-house camera and controller. Equipped with a lens with two angles of view (60° and 120°), it can be used for various purposes, and as it has completed waterproofing and certification, it can be installed outside the vehicle.

In particular, it is more specialized in recognizing traffic light colors than other competing camera products, so autonomous driving at intersections is possible without the help of infrastructure (V2I). It is possible to classify objects such as lanes, pedestrians, motorcycles, and automobiles in various traffic environments, and even rubber cones and quadrupedal animals.

The self-developed TAS and a2z View are all helping us to perform safer DDT, which in turn leads to improved OEDR performance.



a2z View - Side


# 04 Fallback (Minimal Risk Condition)

Fallback and MRC refers to a protocol in which it is deemed difficult for the system to drive on its own due to the departure of the ODD or because control of the vehicle is handed over from the system to the safety driver when a safety-related system error occurs. A similar protocol is implemented not only in autonomous vehicles, but also in driving assistance. Currently, the function of excellent driving assistance is performed when there is no continuous response after the driver is warned due to the obligations of OEDR and DDT, and it is performed with MRC, such as by stopping or slowing down in the lane in the absence of fallback. But this is literally a condition of 'minimum' danger. We must continue to work on a safer MRC scenario.

Currently, we have two backup drivers on board the vehicle at all times so that the movement of the surroundings and the vehicle can be monitored. Thus, most of fallback's subsequent MRCs are performed safely by backup drivers. In addition, a movement command can be transmitted remotely so that the vehicle can be controlled, the surroundings of the vehicle can be recognized by a remote camera, and the vehicle can be directly controlled from the remote control center.

Fallback may occur at the system's request, but the system may be voluntarily disengaged and fallbacked for safe driving based on the judgment of our well-trained backup drivers. All these scenarios are recorded, and the situation is analyzed and reflected in the development of safer autonomous driving systems.


05

# Validation Methods

Currently, the self-driving system we developed is being verified by utilizing a model of Hyundai Motor Company which complies with all the laws and regulations of global automobiles. Before evaluation on public roads, we conducted closed track evaluations at the Korea Automobile Testing & Research Institute (KATRI).

The Korea Automobile Testing & Research Institute (KATRI) has not only a large-scale driving test site, but also K-City, which can implement various autonomous vehicle scenarios. K-City has established the five main road traffic environments (vehicle-only road, city center, community part, suburban road, automatic parking facility) and integrative communication environments (5G, WAVE, 4G (LTE), etc.) for automatic driving vehicle technology development support and safety verification. Also, K-City reflects domestic road traffic characteristics such as bus-only roads, school zones (child protection zones), tollgates, automatic parking facilities, noise control walls, etc.

The Korea Automobile Testing & Research Institute (KATRI) also has a large-scale driving test site, allowing our autonomous driving system to be safely evaluated and verified. After the evaluation at the closed track was fully completed, we obtained approval for operation from Korea's Ministry of Land, Infrastructure and Transport and began to evaluate the actual road, and the site is gradually expanding.

The newly developed self-driving platform will also be introduced safely on the road with regulatory approval following thorough completion of in-house evaluations such as simulation and closed track evaluations.

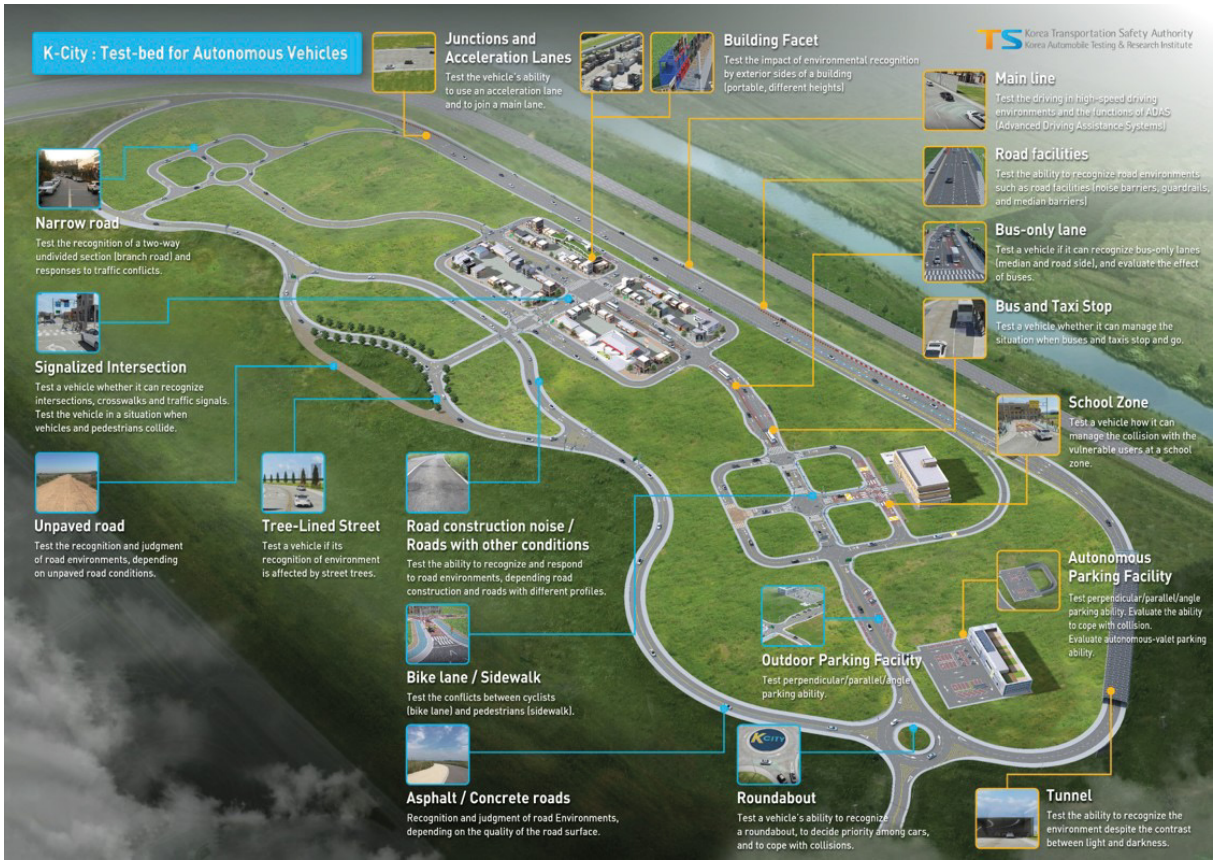
K-City is managed by the Korea Automobile Testing & Research Institute(KATRI), within the Korea Transportation Safety Authority. The test bed was built in KATRI, which is located in Hwasung city in Gyeonggi Province, southern Seoul. Automakers Hyundai Motors, Kia Motors, Renault Samsung Motors and GM Korea, along with local IT giants Naver, Kakao and others, are also located within 60 kilometers of K-City.

About $9.8 million has been invested in the autonomous driving test center, which will span 363,000 square meters. K-City will consist of five different driving environments: city roads consisting of buildings and bus lanes; community roads with school zones and parking areas for autonomous cars; suburban roads; and roads built for the exclusive use of cars.

In December 2021, test facilities to help develop fully autonomous driving were added to the K-City autonomous driving test site and the second phase of the K-City advancement project was completed as a result. The project was launched in 2019 so that the development of Level 4 and 5 autonomous driving could be facilitated at the test site built in 2018.

The newly added facilities have three different purposes. One is to test vehicles under various weather conditions, another is to assume communication failures and the like, and the last is for testing in the presence of pedestrians and bicycles. The third phase of the project is scheduled to start in 2022. The third phase will cover actual vehicle movements such as lane changes and overtaking.

Watch the video “K-City” on YouTube.



a2z
AUTONOMOUS

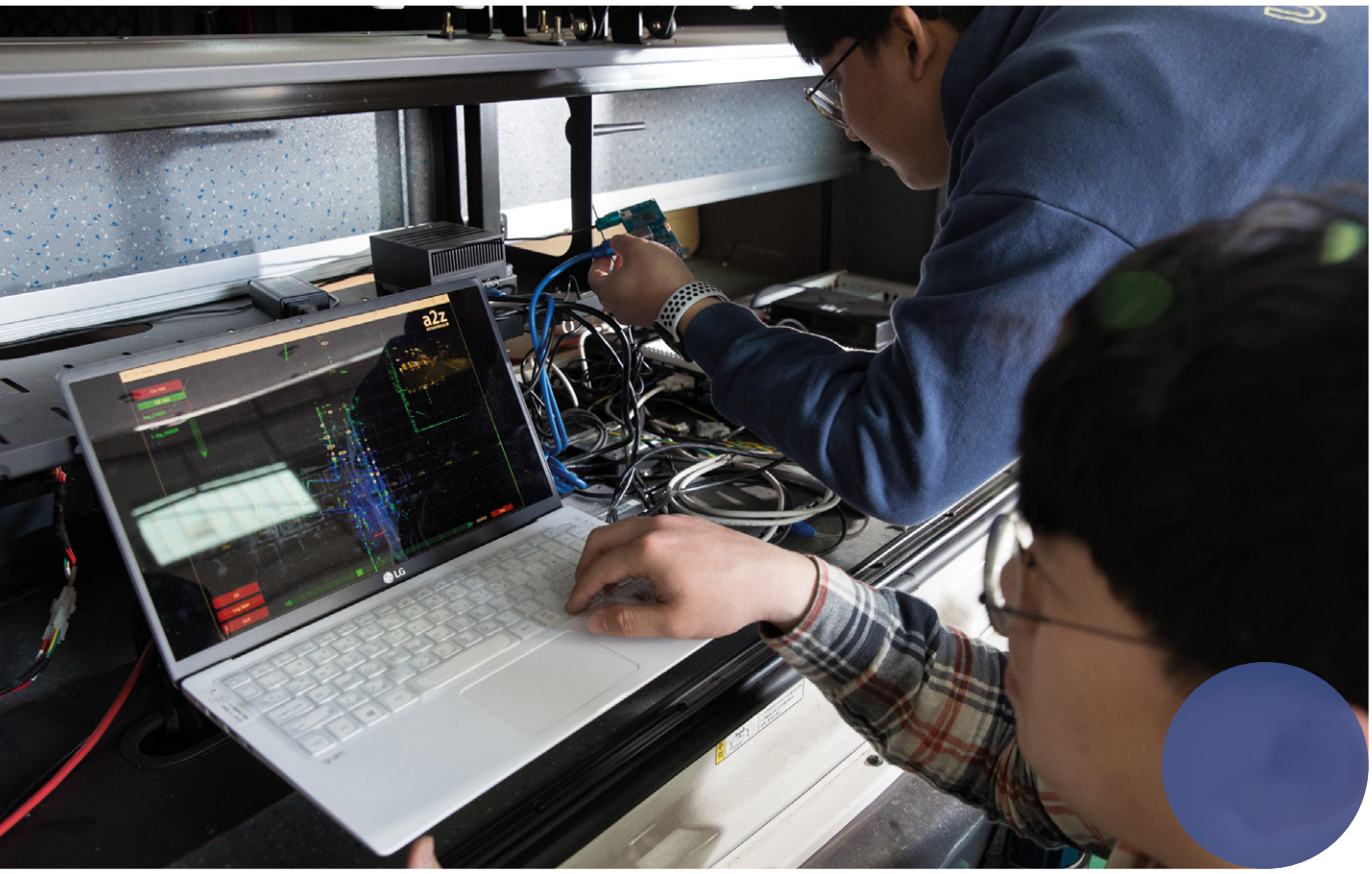
in K-City


# 06 Human Machine Interface

Because the vehicle we are evaluating is a mass-production model and backup drivers are on board, the current HMI is optimized for backup drivers to perform their work safely. Fallback has an HMI that can intuitively send notifications and warnings to prevent dangerous situations in advance.

The driverless self-driving platform that we will develop in the future could be in the form of shuttles with humans on board and vehicles in which logistics are delivered. In the case of self-driving shuttles, the key is to make sure that the role previously played by the driver is sufficiently implemented by the HMI. In particular, an HMI that can consider the disabled and the elderly is needed to achieve one of the core goals of autonomous driving: that the value of equal mobility is provided to people with transportation difficulties. Recently, the trend of automation has led to a growing number of orders using kiosks in many stores, and the inconvenience experienced by the elderly who are not familiar with the digital ecosystem has become a major social issue. The HMI of autonomous shuttles should not remain a barrier to use for them. In addition, various HMIs for the usability of space, convenience of getting on and off, emergency calls in the case of an emergency, and so on, should be considered in order to enhance the use of as many disabled people as possible.

In the case of vehicles in the delivery of logistics, there is no component of the HMI inside the vehicle because no one is on board. Therefore, the HMI provided from the outside of the vehicle is important. The convenience and safety of loading and unloading workers and the final customer's convenience of receiving the last mile delivery should be implemented through HMIs. At the same time, the composition of HMIs based on universal design should be considered very important to ensure that people with various physical restrictions who have transportation difficulties experience no problems in use. However, in the case of external HMIs, there may be designs that may violate the current federal or surrounding road traffic laws. It is important that regulations in areas where autonomous vehicles will be used, as well as federal safety regulations, be satisfied and commercialized. In this regard, we are willing to actively communicate with local authorities wherever necessary.



07

# Vehicle Cybersecurity

Autonomous vehicles have a much wider range of cyber attack routes and scenarios than ordinary vehicles due to their highly battle fielded and connected nature. We are trying to establish a procedure for strengthening robust cyber security. In the vehicle currently being evaluated, the main control PC is separated from communication control PC and physical security HW is installed between the two control PCs, preventing the threat of cyber attacks through the communication control PC. The security HW (security switch) is product prepared to defend against cyber attacks with the acquisition of South Korea's NIS and CC EAL 4+ certification (Common Criteria, ISO 15408).

Our unmanned autonomous driving platform under development is being developed in collaboration with external cyber security specialists. In order to remove the intermediate security switch and devise measures for cybersecurity in the communications control PC itself, research is underway in cooperation with KT, the nation's leading telecommunications company. In addition, in scenarios where system errors can be directly linked to safety performance, a higher weight will be used to secure cyber security capability.

Cyber security requires responses across the vehicle lifecycle. At the stage of development, cyber security capabilities should be reflected as much as possible, and the in-house perception that security is quality is being raised. In addition, the ability to respond to cyber security issues will be emphasized for many partner companies that we will work together with in development in the future. It is essential to establish the capability for monitoring cyber attacks even after the actual technology has become widespread in the market. We will build internal capabilities and communicate with customers to ensure that proper follow-up responses are made even after vehicles are safely developed and distributed to the market in the future.


# 08 Crashworthiness

We are currently conducting autonomous driving evaluations using Hyundai Motor Company's G80 and Sonata models. These two models have been recognized for their safety in major markets such as the United States and South Korea. The G80 won the 5-star NHTSA NCAP and was recognized for its top rating, while also earning the Top Safety Pick+ in the IIHS crash safety performance evaluation. The Sonata earned five stars at the NCAP, earning Top Safety Pick in the safety evaluation for the IIHS crash. The Sonata was also ranked first in the KNCAP, an evaluation of the safety of Korea's new cars, and earned very high scores, especially in crash safety.

2022 TOP SAFETY PICK+

**2022 Genesis G80**

LARGE LUXURY CAR / 4-DOOR SEDAN

**Crashworthiness**

| | |
|---|---|
| Small overlap front: driver-side | G |
| Small overlap front: passenger-side | G |
| Moderate overlap front | G |
| Side: original test | G |
| Roof strength | G |
| Head restraints & seats | G |

2022 TOP SAFETY PICK

**2022 Hyundai Sonata**

MIDSIZE CAR / 4-DOOR SEDAN

Award applies only to vehicles with specific headlights

**Crashworthiness**

| | |
|---|---|
| Small overlap front: driver-side | G |
| Small overlap front: passenger-side | G |
| Moderate overlap front | G |
| Side: original test | G |
| Roof strength | G |
| Head restraints & seats | G |

We are developing an unmanned mobility platform with an autonomous driving system that is completed based on the mass production model. It is a low-speed unmanned driving system based on electric power and is used for the purpose of logistics delivery and shuttles. The platform corresponds to low-speed vehicles, which have a smaller size and lower weight than ordinary vehicles and travel at a maximum speed of less than 25 mph, as defined in the U.S. federal safety regulations. Low-speed vehicles not only have low driving speeds, they also provide more time and space for collisions to be avoided on the road than ordinary vehicles, which can more effectively prevent collisions with other vehicles, pedestrians, and cyclists.

09

## Post-Crash ADS Behavior

Various procedures are being strictly followed to prevent accidents in self-driving cars. Not only is the ODD specifically defined and the vehicle designed to run only within the ODD, the HMI is configured to ensure that two backup drivers are accurately aware of the situation when deviation from the ODD is expected. Because our vehicles have regular backup drivers on board, accidents can be prevented before a crash, and even if an accident occurs, the driver on board can be safely controlled. In addition, in the event of a collision, the central control center will be able to check the situation in real time and support necessary measures.

10

## Data Recording

Since all laws and certifications have been met and acquired for vehicles currently under evaluation, EDRs are also normally equipped and can be used. On the other hand, the autonomous driving control PC stores all data related to the movement of the vehicle separately, including all the items of storage required by the UNECE DSSAD regulations. In addition, the stored data is transferred to the central server with the OTA and can be checked in real time if necessary.

The unmanned autonomous driving platform currently under development will also have the ability to store and process data at an equivalent level or higher. In addition, the cyber security capability to ensure that the data obtained while driving can be protected is important, and current global privacy issues will be recognized while the relevant regulations will be monitored and reflected in the development of the system.


11

# Consumer Education and Training

'Safety' is a value that should be prioritized for self-driving cars. Not only must the technology be safely developed, it is very important that consumers be trained correctly so that they can use can the technology safely, and that misleading does not. The functions and limitations of autonomous driving should be clearly explained. Otherwise, the risk of accidents due to consumer misleading will remain in the era of autonomous driving. Currently, we are working with Kakao Mobility, the nation's largest transportation platform company, to provide robo-taxi services in the Sejong area. In addition to improving the completeness of self-driving technology, we will continue to work with service providers to ensure that self-driving cars can be used safely.

We're ensuring that two safety drivers are on board all autonomous vehicles in the stage of business of demonstration. From the development of autonomous driving to the stage of business demonstration, the role of safety drivers is very important. The final ability to prevent an unexpected accident of an assessment vehicle, which has yet to be fully developed, depends on the concentration and ability of the safety drivers. Indeed, we have seen accidents, both large and small, occur in the self-driving industry due to the mistakes of safety drivers. We believe that ongoing efforts will be made, defining the training of safety drivers as well as the development of technology, as an important part of the process of development.


12

# Federal, States, and Local Laws

We understand the legal framework surrounding autonomous driving in the United States very well. We have seen that the United States is largely divided into the roles of federal and state governments, and that theses work together to improve the traffic safety on roads. Currently, there is a federal safety regulation called the Federal Motor Vehicle Safety Standards in the United States, and its regulations must be fully complied with for the commercialization of autonomous vehicles. We thank the U.S. Department of Transportation and the National Highway Traffic Safety Administration for their efforts to revise regulations so that the existing Federal Motor Vehicle Safety Standards do not become a barrier to the development of self-driving cars. The Federal Motor Vehicle Safety Standards will need to be revised in the age of autonomous driving because they are designed for human-driven cars, and as revisions are currently under way, new laws related to autonomous driving will need to be made. We will not just wait until the legislation is amended or renewed. Rather, the ongoing process of enacting legislation in the U.S. Senate and the House of Representatives is being monitored, the contents of public hearings held by various committees are being analyzed, and efforts are being made to preemptively understand what concerns policymakers and stakeholders have in the process of legislating autonomous driving. We will continue to study future federal regulatory trends in the United States to ensure that all the regulations required to produce autonomous vehicles are met.

Furthermore, it is becoming very important for vehicles to satisfied the Road Traffic Act and other local regulations. As we scale up projects for real-world demonstrations, commercialization and the evaluation of autonomous vehicles, it is expected that the developmental capacity to satisfy the Road Traffic Act and state laws will become very important in the future. Before entering the U.S. market, we will review areas where our self-driving technology is safest and most available to local citizens, and then actively communicate with local governments so that we can fully comply with local regulations, including the Road Traffic Act, to protect the traffic safety of citizens.

# Thanks to

Our continuous efforts to realize the mission of “Mobility for Everyone”,
we have made the achievements of
**“100 colleagues,” “South Korea's largest autonomous driving demonstration distance,” and "the holder of the most autonomous vehicles in South Korea”** within three years of our establishment.

Now, based on our advanced technology and good understanding of the Department of Transportation's latest autonomous driving guidelines
distributed by the Executive Office of the President of the United States,
we hope to challenge ourselves to enter the US market, the shining stage of autonomous driving technology.

We believe that this VSSA will be the starting point for expressing our safety philosophy and spirit of facing challenges.

# Acronyms

| | |
|---|---|
| AV | Automated Vehicle |
| ADS | Automated Driving System |
| ADAS | Advanced Driver Assist System |
| BRT | Bus Rapid Transit |
| CC EAL | Common Criteria Evaluation Assurance Level |
| DDT | Dynamic Driving Task |
| DSSAD | Data Storage System for Automated Driving |
| EDR | Event Data Recorder |
| FOV | Field Of View |
| HMI | Human Machine Interface |
| ITS | Intelligent Transport Systems |
| KATRI | Korea Automobile Testing & Research Institute |
| LDM | Local Dynamic Map |
| LIS | Lidar Infra System |
| MRC | Minimal Risk Condition |
| NHTSA | National Highway Traffic Safety Administration |
| ODD | Operational Design Domain |
| OEDR | Object and Event Detection and Response |
| OTA | Over The Air |
| ROKAF | Republic Of Korea Air Force |
| RTK | Real Time Kinematic |
| SOTIF | Safety Of The Intended Function |
| TAS | Test Automation Solution |
| UNECE | United Nations Economic Commission for Europe |
| V2I | Vehicle to Infrastructure |
| V2X | Vehicle to Everything |
| VSSA | Voluntary Safety Self-Assessment |

a2z
AUTONOMOUS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2022 Voluntary Safety Self-Assessment

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