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This Guide provides an in-depth analysis of how and where legislation is impacting on active safety systems within the car.

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#814

AUT

Autonomous Vehicles

Autonomous Guide for L4+ Vehicles & Trials

Today, there are more than 140 pilot services of Level 4 autonomous vehicles in Europe, China, and the USA. The trials vary significantly on a number of levels – including the level of maturity, the use cases being targeted, and the sectors that would benefit from the autonomous technologies being trialed.

While these trials share the same level of autonomy, in which all pilots are investigating solutions that would not require a safety driver, and the same development phase – the surrounding ecosystem is already very competitive. Key players within it include legacy OEMs, mobility service providers, start-ups, and even tech giants like Apple and Alphabet. Likewise, players looking to conduct their own L4 trials will equally face a number of legal and regulatory hurdles to ensure their autonomous vehicles can operate safely on public roads.

The Autonomous Guide for L4+ Vehicles & Trials works to understand these services as they get closer to becoming a commercial reality. To do so, it benchmarks the maturity of L4 pilots on the road today while highlighting the latest trends and developments from the space. The key players within this space, alongside their partners, are thoroughly profiled by region to account for the development of L4 autonomy around the world.

COVERAGE	FREQUENCY	PUBLICATION FORMAT	PAGES
GLOBAL, NA, CHINA, EUROPE	ANNUALLY, QUARTERLY, ONE-OFF	PDF, POWERPOINT, EXCEL, ONLINE	35+

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Key questions answered

- What L4 pilots are the most mature?
- How far have these pilots scaled across to new geographical areas?
- What types of segments and use cases are they targeting?
- What partnerships are behind the services and how is the ecosystem evolving?

This research supports

- PRODUCT PLANNERS
- C-SUITE
- MARKETING
- ENGINEERING

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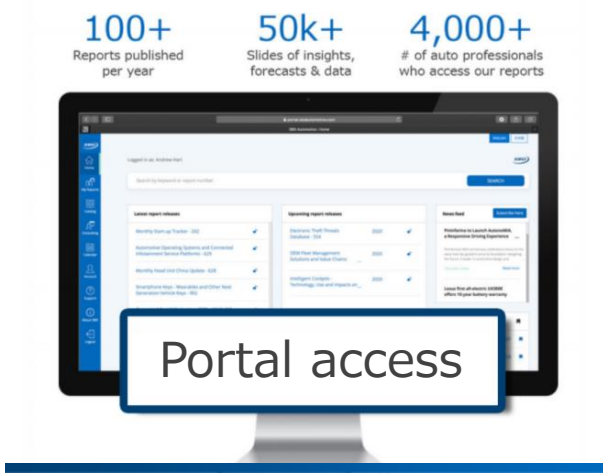

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Autonomous Guide for L4+ Vehicles & Trials
Annual Report for 2022

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2022

Autonomous Guide for L4+ Vehicles & Trials

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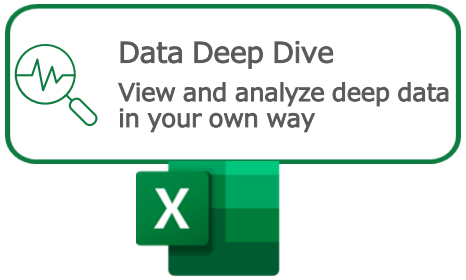

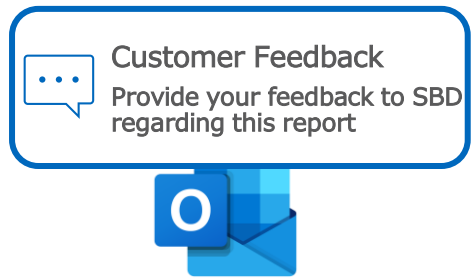

Total number of pages - 38

Introduction

Purpose of this guide

There are now over 130+ pilot services of L4 vehicles in the USA, Europe, China and rest of the world that includes South Korea, Australia, UAE, Canada, Japan etc. These vary significantly in the level of maturity and use cases being targeted. As some of these services get closer to becoming a commercial reality, this Guide helps clarify what segments they are targeting, what technologies they are relying on and what partners are involved.

The data supporting this guide is organised in an accompanying Excel database which enables deep dives into each of the pilots studied, with the ability to filter and sort the data by service category, operator, technology, geographical location etc. This guide draws on the data set to illustrate key activities in L4 pilots.

Regional policy is particularly significant on L4 pilots, so in this guide the chapter of regional summary tables provides at-a-glance views of which regions are supporting pilots of which L4 use cases.

To dive deeper into the technologies and partnerships that are supporting the L4 pilots, please refer to the accompanying Excel 'deep dive'.

If you have any questions or feedback on the report, please contact us at info@sbdautomotive.com.

Example slides from the report

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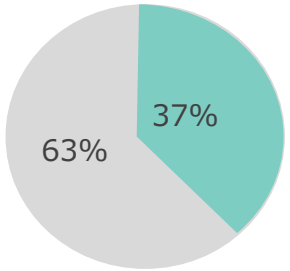
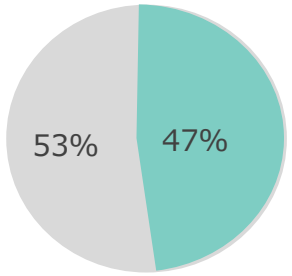
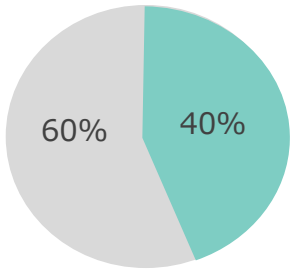
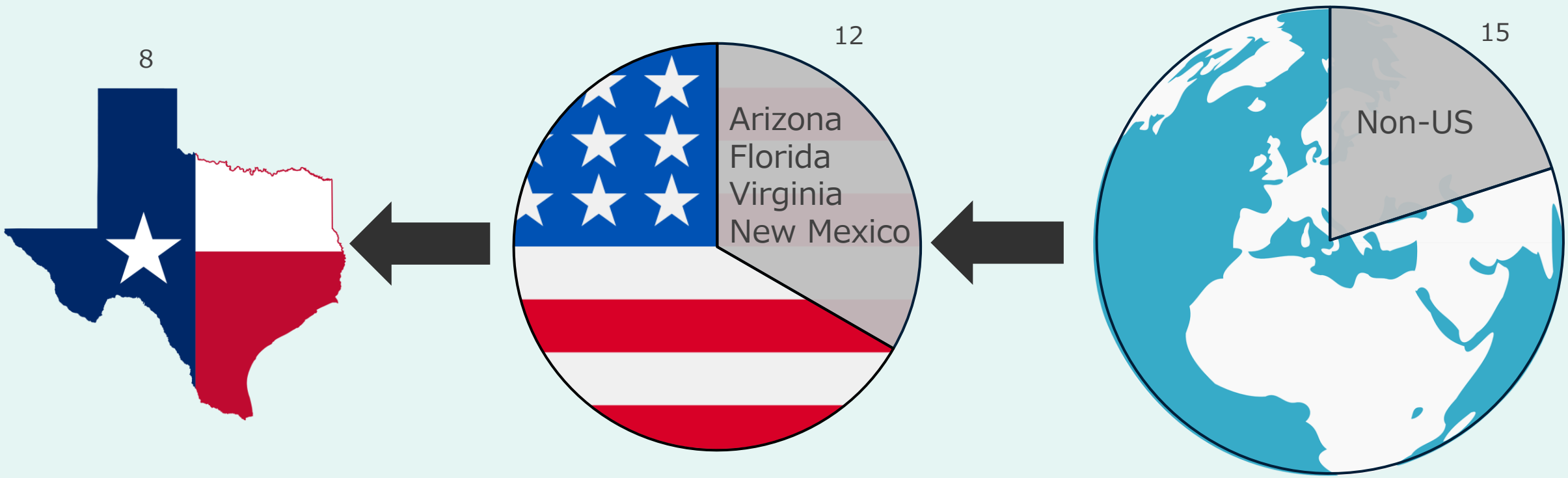
Europe is leading in unmanned L4 pilots, US/China slowly catching

Regions	Proportion of manned and unmanned L4 pilots	Key takeaways
	 Unmanned: 22 Manned: 37	• **USA is leading in terms of the number of active L4 pilots** being conducted across the country. **Most unmanned pilots are in the 'Last-mile delivery' segment** as the vehicles/pods used in these trials are small and move on the pavements/sidewalks at a very low speed. Shuttles and ride-hailing pilots are starting to move from manned to unmanned. • A notable exception is Serve Robotics' autonomous food delivery trial in Los Angeles that is unmanned but may need remote monitoring/controlling to carry out the driving maneuvers at intersections.
	 Unmanned: 14 Manned: 16	• The European L4 trials are predominantly **focused on passenger mobility** (shuttles & robotaxi) and **nearly half of the active pilot projects are without safety drivers.** • Some of the pilots, though unmanned need remote supervision. For e.g., the Starship's last-mile delivery pilot which is commercially operating in a few countries are constantly monitored by a remote operator.
	 Unmanned: 11 Manned: 16	• China L4 trials are predominantly focused on robotaxis and automated trucks and **roughly 40% of the L4 pilots are unmanned**. • Like US and EU, some robotic autonomous delivery pilots in China that use small delivery pods do not need a safety driver but require constant monitoring by a remote operator for navigating the intersections.

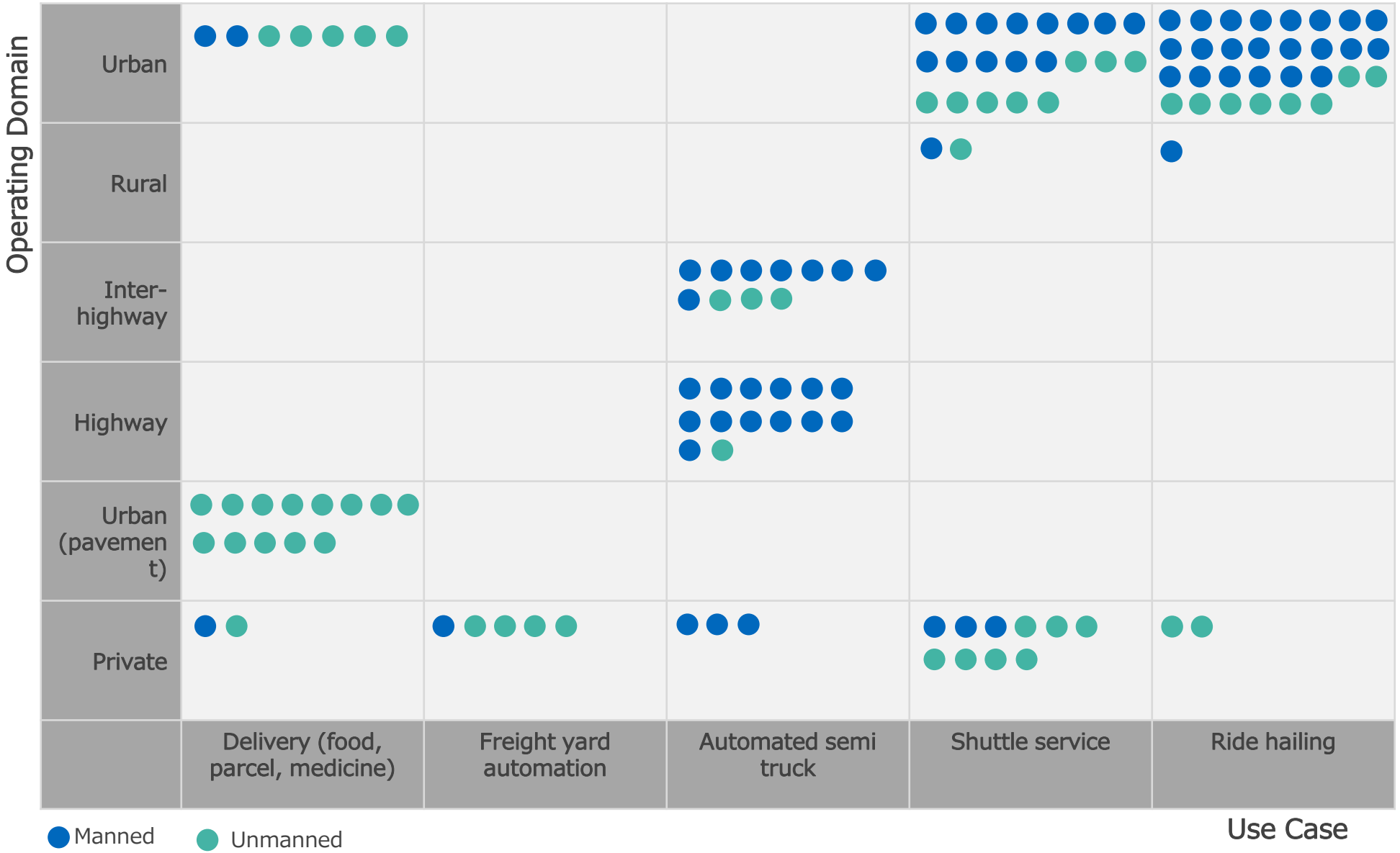
Texas is the global hotspot for L4 trucking



Key highlights

- **8 out of the world's 15** live or planned L4 trucking trials are in Texas
- Compared to most other US states, **Texas has highly permissive testing** and deployment policy, with the TxDOT pursuing a collaborative approach with the industry.
- **Aurora, Daimler, UPS and Waymo** are among those who are present in the state.

Summary of L4 trials – Manned/unmanned



Key Highlights

- **Most 'unmanned' SAE L4 pilot has been conducted in 'Urban' scenarios** which are further divided into 'Urban roads' and 'Urban (pavements/sidewalks). The 'unmanned' ride-hailing and shuttles trials that predominantly took place on private roads or in closed premises are being expanded to various public roads, within a speed limit.
- The **autonomous last-mile delivery and freight yard automation pilots are mostly 'unmanned'.** The vehicles/pods/robots used in these pilots are designed significantly different than traditional vehicles and don't usually have a cabin for drivers.
- The long-distance pilots on Highways/inter-highways are all automated trucking pilots mostly led by OEMs. These pilots started with a safety driver but now **companies like Daimler, Aurora, and Plus are planning 'unmanned' projects.**
- The L4 trials in rural areas are significantly lower than other 'domains' indicating a lack of interest from the stakeholders.

What? Are the latest key announcements in the SAE L4 space

Latest News

Pony.ai and SAIC AI Lab to Develop Fully Driverless EV Robotaxi
SAIC AI Lab, Pony.ai launched a concept vehicle based on the SAIC Marvel R model and will build out a fleet of autonomous vehicles equipped with Pony.ai's L4-level driverless solutions, over time. The collaboration with SAIC allows Pony.ai to increase its footprint in Shanghai and strengthen its leading position in Tier-1 cities in China.

Pony.ai plans to mass produce robotrucks in China.
Self-driving tech start-up Pony.ai announced Thursday it plans to mass produce autonomous driving trucks in China with equipment manufacturing giant Sany Heavy Industry.

Baidu Unveils Next - Gen Autonomous Vehicle

Apollo RT6 is purposefully designed for fully autonomous driving, with a detachable steering wheel unlocking space for a more versatile in-car experience. Apollo RT6 will be put into operation in China in 2023 on Apollo Go, Baidu's autonomous ride-hailing service.

Aurora Innovation demonstrates autonomous vehicles safely navigation on-road.
Aurora Driver's ability to detect system issues and respond by safely pulling over to the side of the road without any human involvement. A reliable Fault Management System is essential for safely operating autonomous vehicle fleets for commercial customers and enabling broad commercialization.

DeepRoute.ai announced the results of the latest fully-driverless test of its Driver 2.0 L4 production-ready completes test of its autonomous driving solution
DeepRoute.ai released a video exhibiting a driverless vehicle retrofitted with a production-ready L4 solution on Central Business District roads in Shenzhen, demonstrating its advanced capacity in complex and challenging traffic environments.

Waymo to test autonomous Cascadia on public roadways
Waymo and Daimler are beginning autonomous driving pilots on public roads with test fleets.

SAIC AI LAB to arm Robotaxis with high-level autonomous driving 2.0 architecture
SAIC AI LAB provided a self-developed software/hardware integrated L4 autonomous driving solution for the newly released 2.0 technology architecture. SAIC AI LAB launched its latest high-level autonomous driving 2.0 technology architecture on August 16th.

Lyft announces new battle plan in the autonomous vehicle race
Lyft is planning to deploy a massive driverless car fleet beginning in 2023. In anticipation of that milestone the company, which has partnered with self-driving car developer Motional,

What the Excel Version Contains

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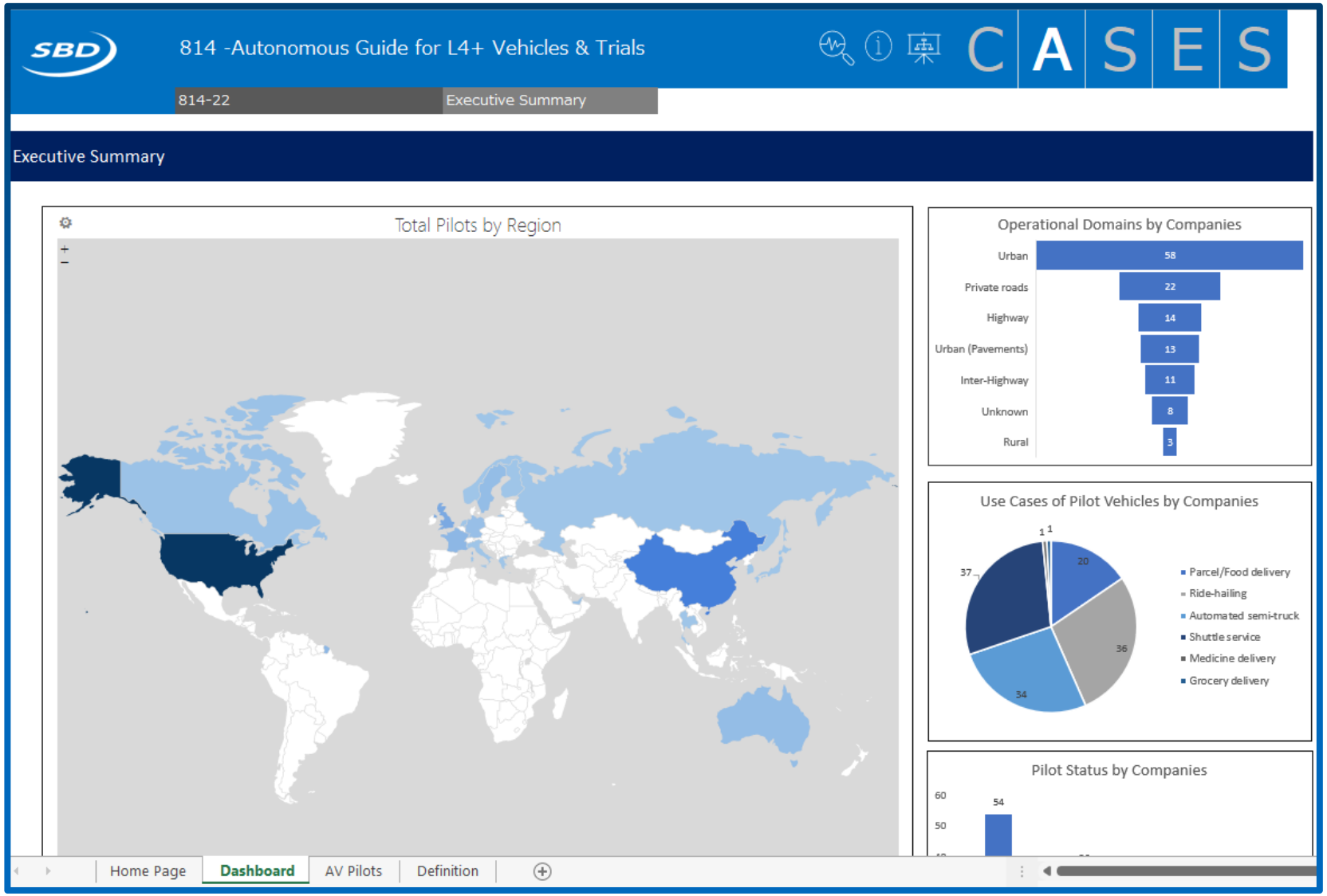
Excel Database Includes



Excel Data Points:	Pilot Company's Covered:	Excel Tabs:
5,000+	60+	4

Excel Database Includes

814 -Autonomous Guide for L4+ Vehicles & Trials C A S E S

814-22 L4 AV Pilots

Pilot company (Level 4)	Project name	Type of company (OEM/ AV Tech)	Investment	Investment information (if any)	OEM Partner	Partner Firms				Other partner companies
						Infrastucture Support Company	Hardware Support	AV Software Company	Mobility Company	
UPS	-	AV Tech	-	-	-	-	-	-	-	-
UPS - North American Air Freight division (NAFF)	-	AV Tech	-	UPS has bought a minority stake in TuSimple, and has been testing the startup's autonomous trucks.	-	-	-	-	-	TuSimple
UPS - North American Air Freight division (NAFF)	-	AV Tech	-	UPS has bought a minority stake in TuSimple, and has been testing the startup's autonomous trucks.	-	-	-	-	-	TuSimple
Utopilot	-	AV Tech	-	-	SAIC Motor	-	-	Utopilot (Honghu intelligent driving system)	-	-
Volvo	Vera	OEM	-	-	-	-	-	-	-	DFDS, APM Terminals

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Excel Data Points:	Global OEMs Covered:	Excel Tabs:
3,000+	40+	5

Excel Database Includes

814 -Autonomous Guide

814-22

Pilot company (Level 4)	Project name	Type of company (OEM/ AV Tech)	Vehicle Segment				Use Case of pilot vehicle(Logistics, Grocery, Medicines, etc)	Pilot status	Operational Domain	Fleet Size	Total Miles Covered	Country	State/ City/ Province	Area of City/ Province			
			Passenger		Goods										Chipset	No. of sensors/Cameras	Ultrasonic
			Robotaxi	Autonomous Public Transport (shuttle & bus)	Autonomous trucks	Autonomous last mile delivery (On-road & side-walk)											
Cruise	-	AV Tech	Yes	-	-	-	Ride-hailing	Active	Urban	-	20,000,00	USA	Phoenix	-	Cruise had developed four in-house chips so far - a computing chip called Horta, the main brains of the car. Dune which	-	-
Cruise	-	AV Tech	Yes	-	-	-	Ride-hailing	Planned	Urban	2	-	UAE	Dubai	-	-	-	-
Daimler Truck North America(DTNA)	-	OEM	-	-	Yes	-	Automated Semi-Truck	Planned	Inter-Highway	-	-	USA	Dallas	Public freeways	-	-	-
Daimler Truck North America(DTNA)	-	OEM	-	-	Yes	-	Automated Semi-Truck	Planned	Inter-Highway	-	-	USA	Phoenix	Public freeways	-	-	-
Daimler Trucks	-	OEM	-	-	Yes	-	Automated Semi-Truck	Active	Highway	-	-	USA	Virginia	Highways in southwest Virginia	-	-	-

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Excel Data Points:
3,000+

Global OEMs Covered:
40+

Excel Tabs:
5

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