ADAS and Autonomous Driving Industry Chain Report 2018 (VII) - L4 Autonomous Driving Startups

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STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES

- To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- To help company to succeed in a competitive market, and

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

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Abstract

ADAS and Autonomous Driving Industry Chain Report 2018 (VII) - L4 Autonomous Driving Startups at 205 pages in length focuses on researching L4 autonomous driving startups as well as HD map and V2X for L4 autonomous driving.

Of the report series (seven reports), the previous five introduce commercialized ADAS, vision, automotive radar, computing platform, system integration, and low-speed autonomous driving which is to be commercially available soon. The last two reports highlight eventually to-be-commercialized commercial vehicle automated driving and L4 passenger car autonomous driving, respectively.

There have long been two camps in the implementation path of automated driving: Camp A mainly comprised of European and Asian OEMs advocates a progressive path evolving from L2 and L3 to L4 and L5 step by step; Camp B represented by Google stands for a radical path going straight to L4 and above.

In 2018, Camp A believes more firmly that L3 cannot be avoided and L2.5 and L2.75 should be derived from between L2 and L3, and L3.5 from between L3 and L4. To secure the reliability of human and computer driving together, it becomes an important subject to monitor human driver.

Camp B is more confident as well, as WAYMO sees its market capitalization climb to USD175 billion and tests tens of thousands of self-driving cars on roads.

The operational design domain (ODD) of WAYMO self-driving car is confined to just hundreds of square kilometers for the moment; L2-L3 self-driving cars at Camp A can travel on most roads. So the two camps will continue to live in peace with each other in the short run.

In July 2018, John Krafcik, WAYMO’s CEO, admitted that it would take a longer time than expected for the prevalence of autonomous vehicles.

Comparison between L4 Autonomous Driving Startups (Jul 2018)

Company	Country	Founded	Autonomous Driving Investment (USD mln)	Team Size	Commercialized/Mass -produced
WAYMO	USA	2009	>5,000		2018
GM Cruise	USA	2013	>4,000	800	2019
Ford Argo	USA	2017	4,000	330	2021
Drive.ai	USA	2015	77	Around 150	
NuTonomy	USA	2013	Acquired by Aptiv for $450 million	200+	
ZOOX	USA	2014	750	500	2020
Nuro	USA	2016	92		
Aurora	USA	2016	96.5		2021
ZMP	Japan	2001	$9 million in 2017 revenue		2020
Momenta	China	2016	Around 150	400+	
Pony.ai	China	2016	230	100+	
JingChi.ai	China	2017	82	100+	2020
RoadStar.ai	China	2017	>128	70	
Almotive	Hungary	2015	50	190	

There are at least four technical barriers needing to be surmounted in pushing ahead with L4 from designated scenarios to public roads: first, mass-production of powerful computing platforms; second, stronger sensing capabilities and lower cost of sensors; third, improvement of related technical standards; fourth, inadequate infrastructure. L4 automated driving start-ups will still depend on raised funds to survive in the next two to three years.

We have discussed computing platform and sensor in the previous reports. But L4 development will affect the existing landscape of sensor companies.

Considering too high sensor cost, WAYMO develops by itself all sensor systems it needs, including LiDAR. GM Crusie bought Strobe, a LiDAR company, and Ford Argo acquired Princeton Lightwave, a company engaged in LiDAR. WAYMO can cut 90% cost by developing LiDAR independently; GM Cruise indicates that it can use Strobe's system to integrate all sensors into one chip, lowering LiDAR cost by 99%.

In addition to sensors, the automated driving leaders also design core computing chips themselves, for example, WAYMO, Tesla and Baidu are all developing their own AI-powered chips.

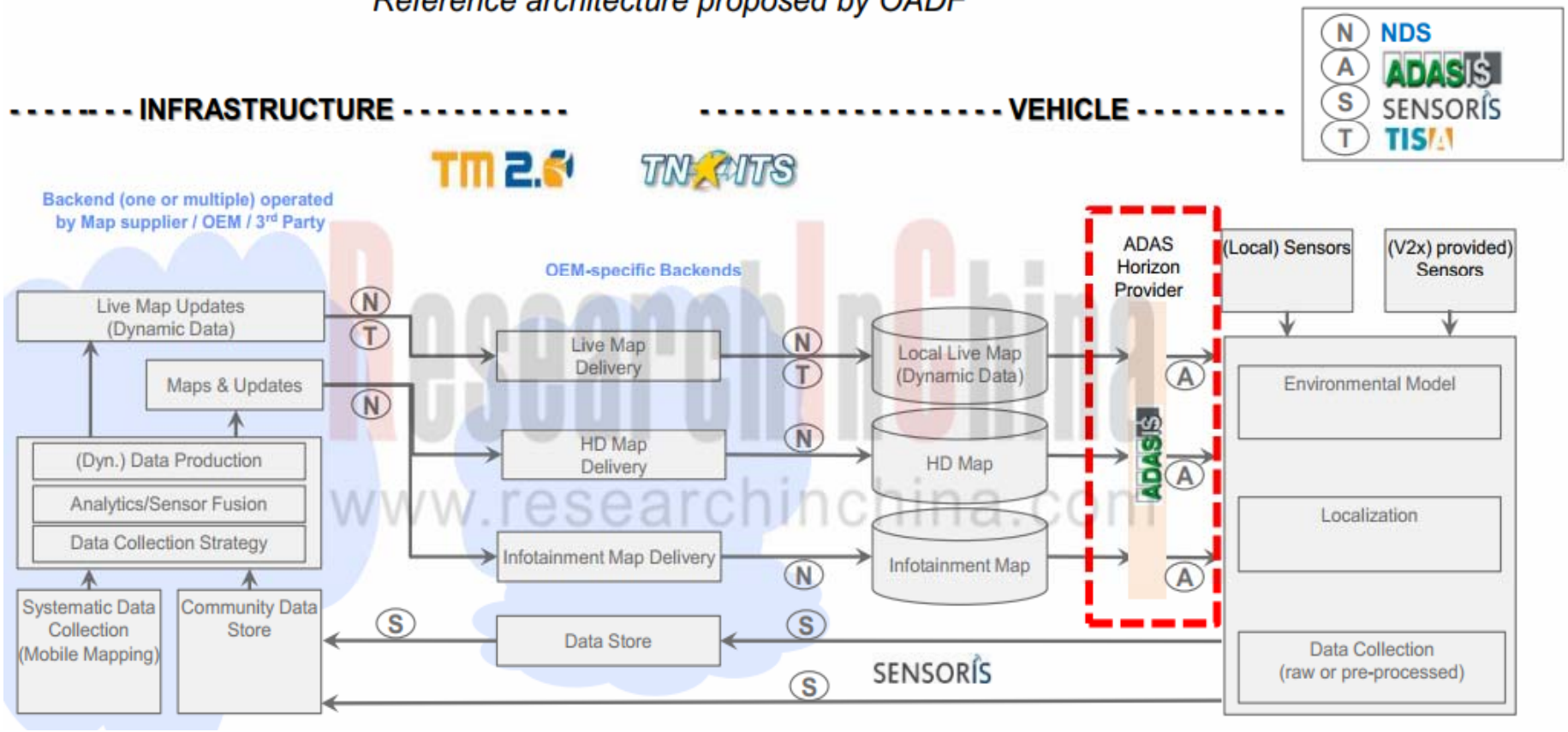
Singulato, an emerging Chinese automaker indicates that: conventional automotive design is a kind of separate design when it comes to intelligent driving capabilities, that is, separate data cannot be combined for multi-scenario application. In other words, a front ADAS company has a set of sensors of its own and another automated parking company also uses different sensors from others. They cannot share sensor data, which means the waste of resources. Singulato adopts integrated design at the beginning, using same sensors to implement more than a dozen of ADAS functions. And such design also makes subsequent OTA update easier.

Against the backdrop of growing integration, traditional ADAS and sensor companies need to rethink their market orientation in an era of L4. The number of sensors grows to a dozen and even dozens in the evolution from L2 to L4, generating a data traffic surge. Improvement in supporting facilities, mainly a better perception system, includes introduction of HD map and V2X, which also bring about massive data flow. Data confluence of various perception systems make acquisition, fusion and processing of autonomous driving data flow a focus in industrial competition and cooperation.

Absence of a universally accepted standard for acquisition and transmission of sensor (including HD map) data hinders the development of the industry. Hence, standards organizations like ADASIS, SENORIS, SIP-ADUS, CAICV HD MAP WG and ONEMAP have been initiated.

Automated driving data chain and ecosystem

Reference architecture proposed by OADF



The year 2018 sees continued improvement in autonomous driving industry chain and influx of capital. As the market prospects of L4 become more visible, HD map and V2X, the auxiliaries of L4, are chased by enterprises and capital.

ResearchInChina tries to make an overall view of several hundreds of enterprises in autonomous driving industry and present a full picture of the industry via seven industrial-chain reports, 1,400 pages in total, whilst many problems are found, such as irrational layout, unclear orientation, disconnection from industrial chain, and lack of security policy.

As shown in the following diagram, the autonomous driving industry chain is so complicated that it's a challenge for any enterprise to have a overall grasp of development trends.

Dozens of times larger than the L2 market, the L4 market will take more than five years to grow mature in China. Tracking autonomous and ICV industry, ResearchInChina will release a weekly report every week and ten monthly reports every month, helping enterprises to see where the industry goes, take in competitive landscape, and seize opportunities in intelligent & connected and autonomous driving markets.

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