



Development trends of global Vehicle-Networking

2015.7.28

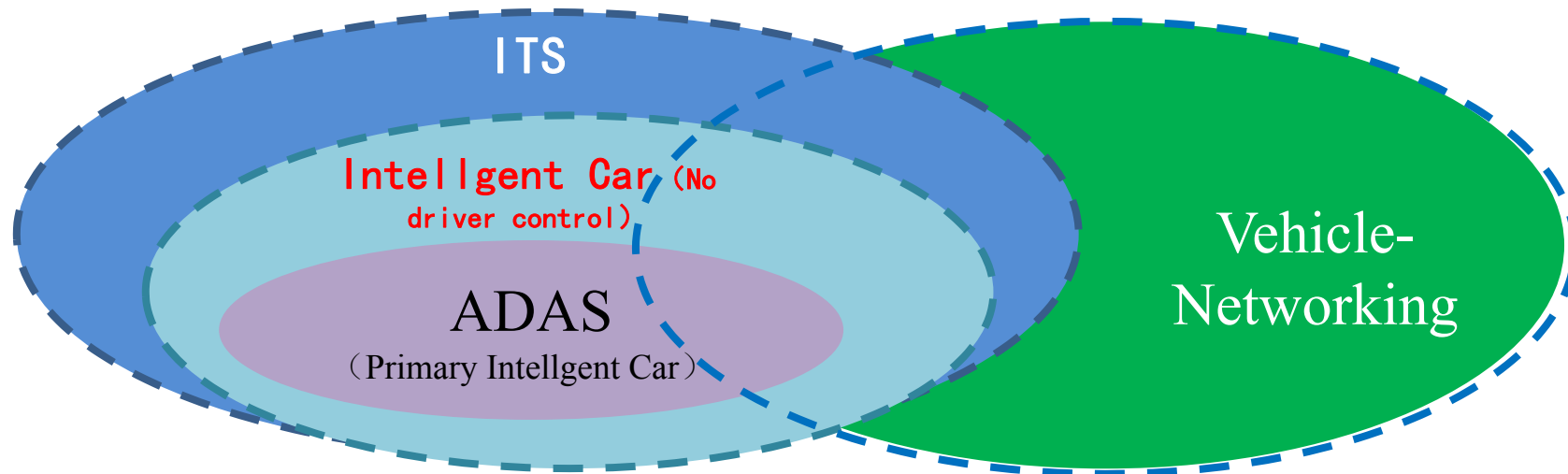
Content

**1.The development trends of global Vehicle-
Networking**

2.The research of Vehicle-Networking in CAICT

3.Conclusion

1.The understanding for vehicle networking and Key elements



Vehicle-Networking: Utilizing the new technologies, such as wireless communication, positioning and navigation, context awareness, etc., to implement the connections between vehicle to vehicle, vehicle to man, vehicle to infrastructure, so that the integrated service can be provided.

2. Development trends of global Vehicle-Networking

-As a whole

2010 ago

- Information service based on vehicle
- 4 industrial sectors related to Vehicle-Networking(vehicle factory, TSP, governmental ITS, commercial vehicle)
- No open environment

Recent years

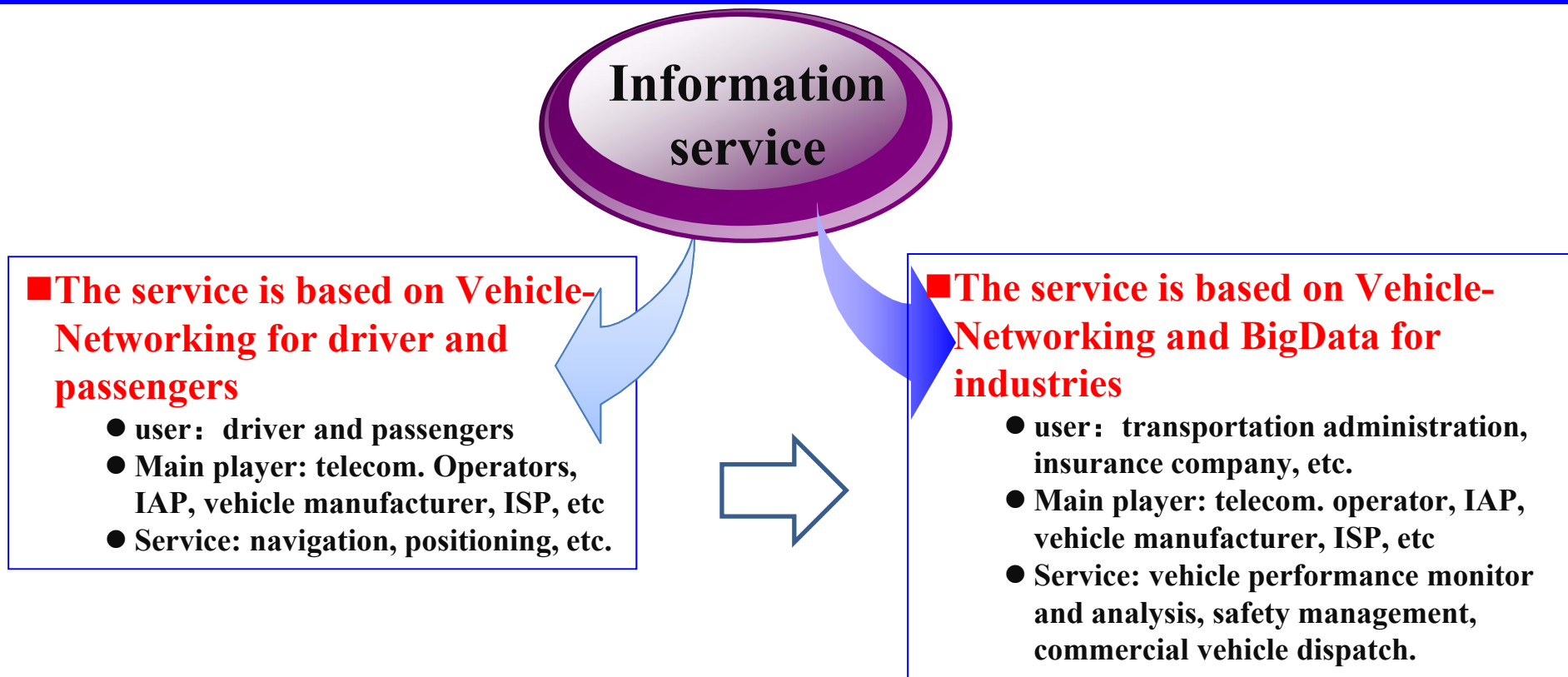
- Smart phone, sensor, LTE, Cloud computing, etc., rapid development
- The service transition from information service to safety and efficiency

After 2015

- The creation of new generation Vehicle-Networking ecosystem which is capable of safety and innovation
- Automatic driving base on Vehicle-Networking

2. Application development trends of Vehicle-Networking

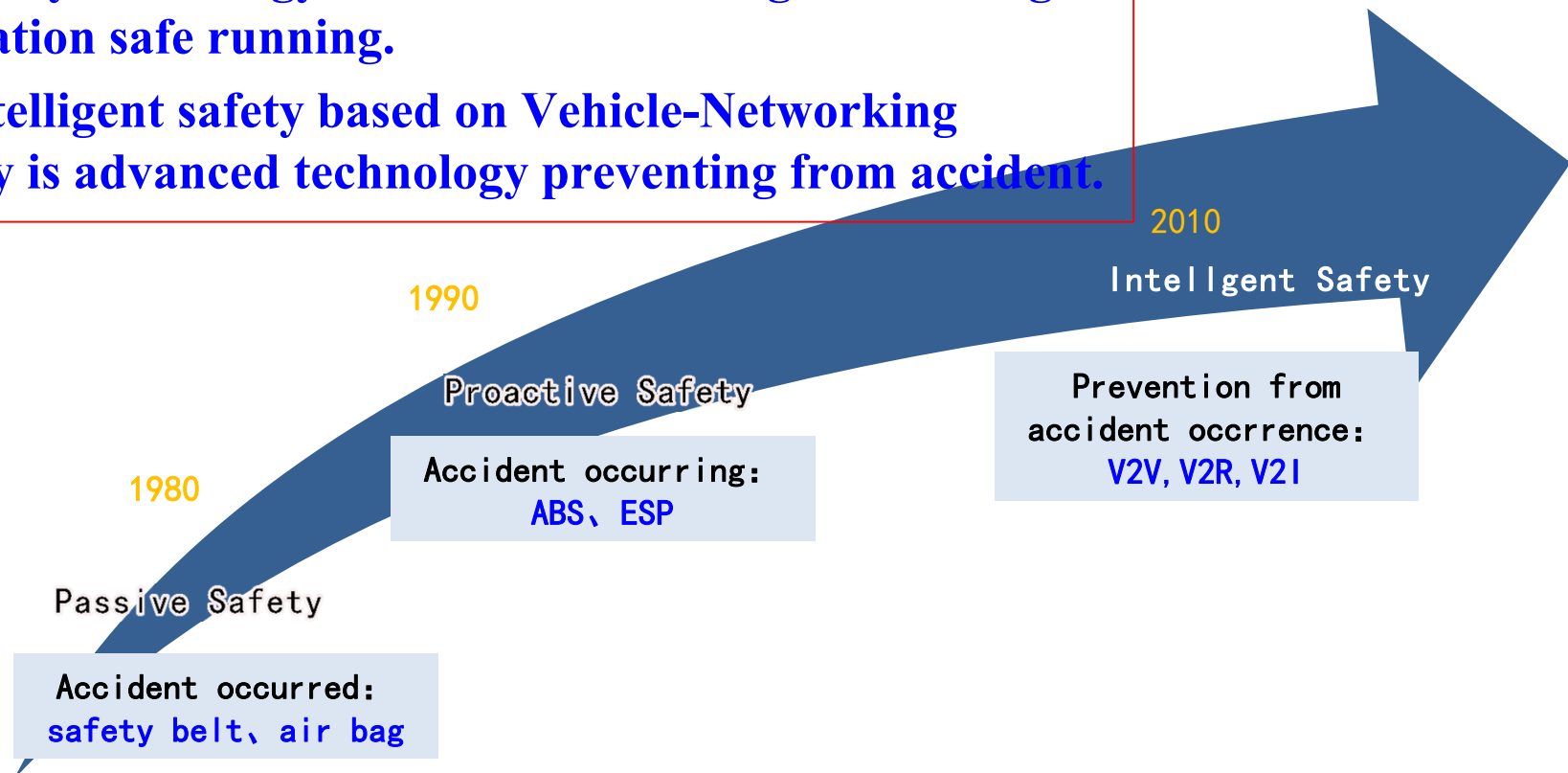
-(1) Integrated information service



2. Application development trends of Vehicle-Networking

-(2) Enhancement of safety and energy efficiency

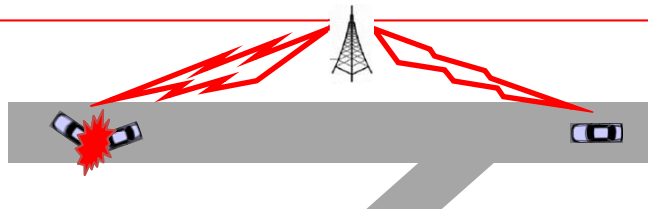
- The safety technology is critical factor for guaranteeing transportation safe running.
- The intelligent safety based on Vehicle-Networking technology is advanced technology preventing from accident.



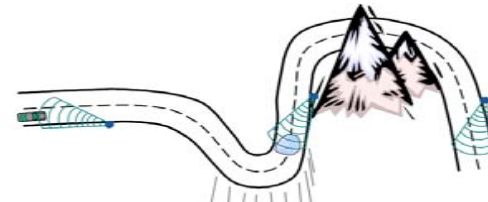
2. Application development trends of Vehicle-Networking

(2) Enhancement of safety and energy efficiency

- The safety technology based on Vehicle-Networking can efficiently reduce accident.



Accident warning



Danger alerting



Collaboratively crossing intersection



Fleet collaboration running

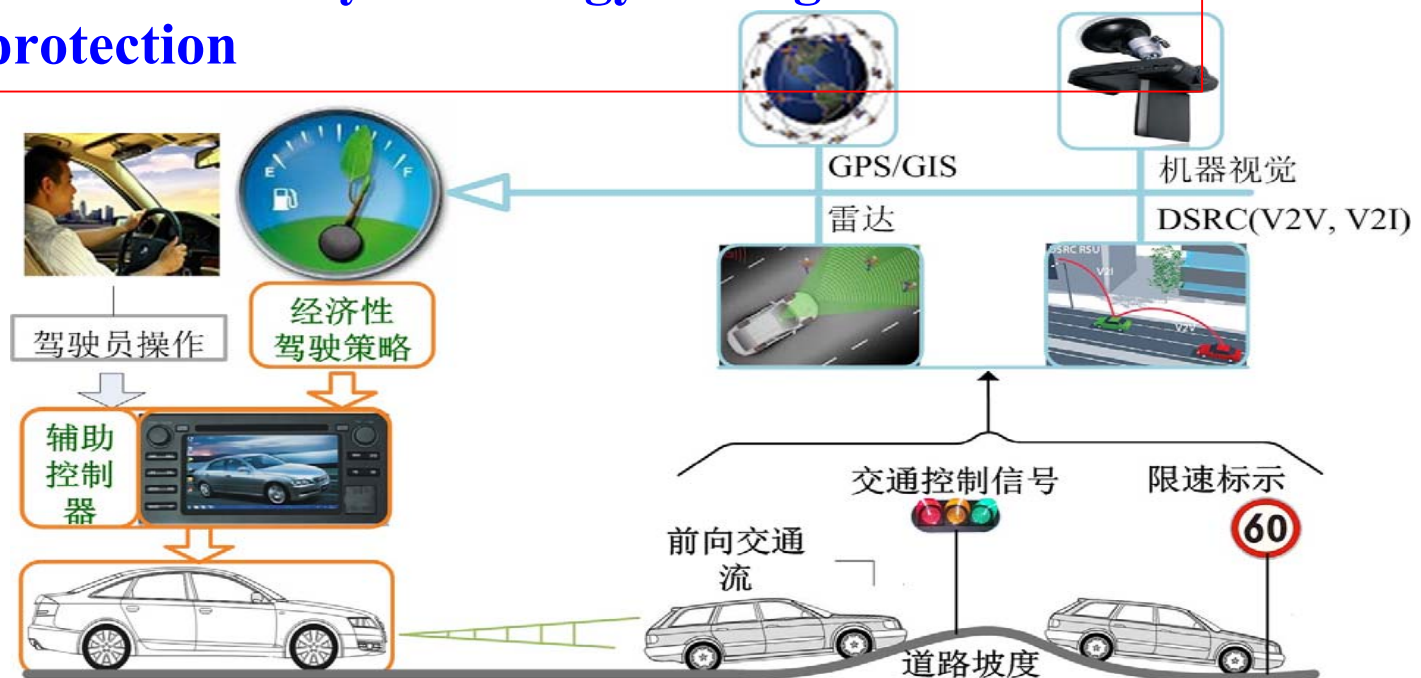


Alerting to pedestrian and Non-motor Vehicle

2. Application development trends of Vehicle-Networking

(2) Enhancement of safety and energy efficiency

■ The safety technology based on Vehicle-Networking can help vehicle to run efficiently for energy-saving and environment-protection

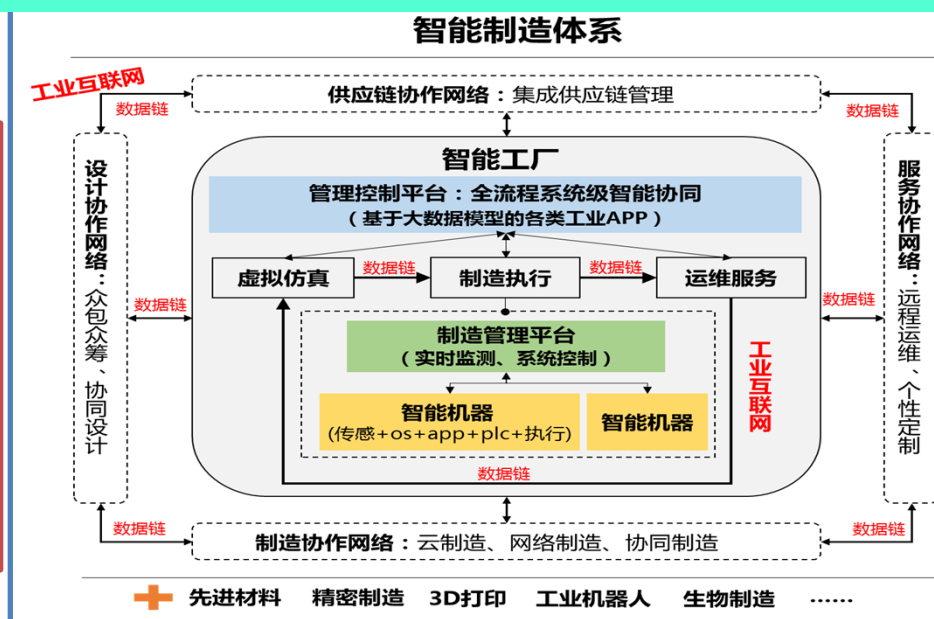


2. Application development trends of Vehicle-Networking

-(3) Smart manufacturing

车联网发展使汽车智能制造开始延伸到用户对汽车的使用过程中，汽车智能制造已经开始具有工业智能制造和用户车联网应用的双重特性。

1、提升汽车设计与开发的支撑服务能力
—优化产品设计标准规范，提升汽车产品研发个性化，促进定制化生产。
—推动迭代式的汽车电子开发模式，缓解汽车电子与消费电子设备和信息服务不同开发周期的矛盾。



2、提升汽车供应链管理
—利用车联网技术与大数据分析，建立汽车供应链协同商务平台，缩短从订单到交付的周期

3、远程运维服务支撑能力
—推动汽车电子供应链的平台化和网络化，实现汽车电子固件和软件的远程管理、更新和适配

3. Technology development status of Vehicle-Networking

Telematics

- OS based on vehicle-networking
- Cloud platform
- Speech recognition
- image perceptual

Smart connected vehicle

- Navigation and information service based on LTE
- Context awareness and Big data application
- Machine learning
- Interaction between man and machine

Convergence among communication, vehicle, transportation

- Open source softare of vehicle
- 3D sensing and automatic driving
- Proactive safety
- Intelligent transportation control

V2X

- Intelligent vehicle and road
- Application and innovation based on V2X

Smart manufacturing

- Innovation from design to manufacturing
- Flattening and networking of supply chain
- The open of design and manufacturing

4. Standardization status of Vehicle-Networking-related



- ◆ SG12
- ◆ SG13
- ◆ SG16
- ◆ SG20
- ◆ CITS
- ◆ ITU-R SG5 WG5



International
Organization for
Standardization



- ◆ ISO TC22
- ◆ ISO TC204



- ◆ 802.11P
- ◆ IEEE 1609 etc



- ◆ ETSI ITS:DSRC, CALM
- ◆ CEN TC278



- ◆ CITS: The intent of the Collaboration is to provide a globally recognized forum for the creation of an internationally accepted, globally harmonized set of ITS communication standards

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The main research achievement of CAICT in Vehicle-Networking

Policy research and support to government

- Research report or White Paper to public
- Private report to government
- Action plan for government

Technology research and standard promotion

- Both international and national
- DSRC
- Wireless communication and Big Data

1. Policy support- "Internet +" action plan

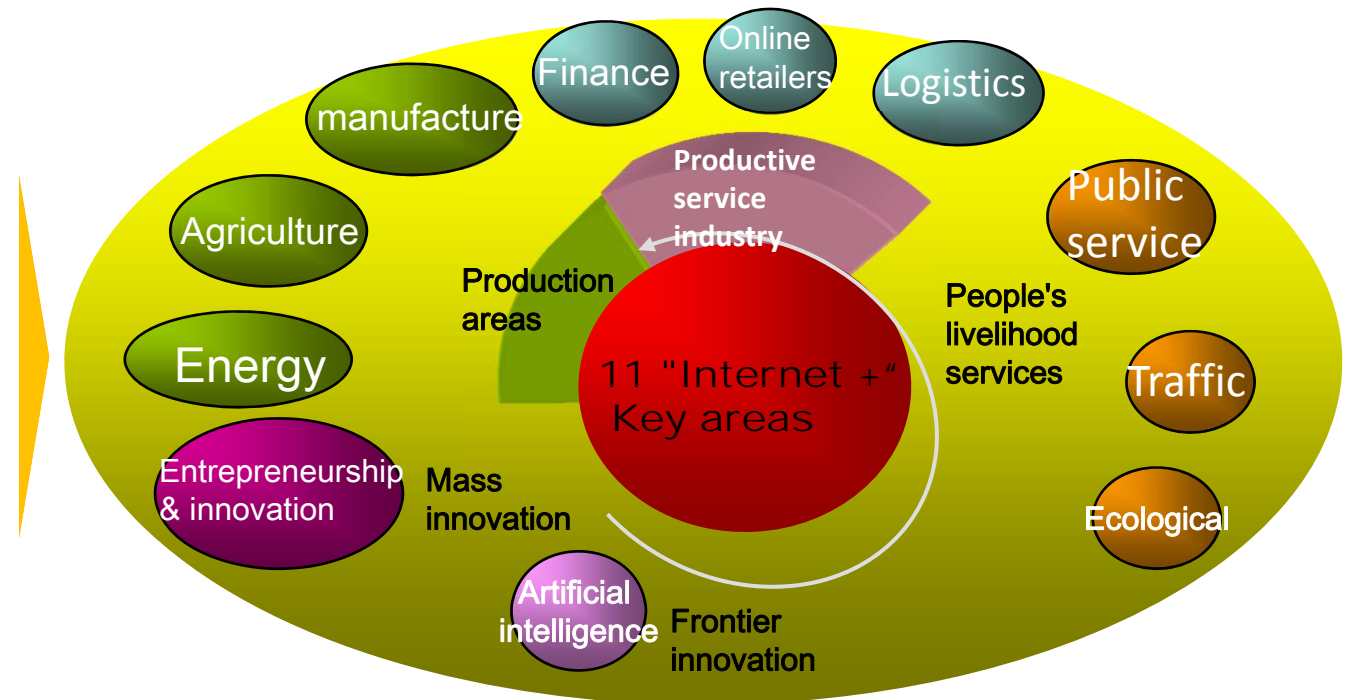
The key direction of "Internet+" action

"Internet+ " Guideline put forward 11 special actions, covering production, human living, innovation and others. "Internet + manufacturing" is focus on industry, which is the most important field.

Key economic areas

Important human living areas

Entrepreneurship & innovation



1. Policy support- “Internet+”action plan-Collaboration manufacturing

Smart manufacturing

- 以智能工厂为载体，推动互联网技术在生产过程中的融合应用，支撑制造业智能化转型，构建开放、共享、协作的智能制造产业生态。

Collaboration online

- 充分发挥制造业骨干企业的带动作用 and 公共服务平台的服务能力，促进全社会多元化制造资源的互联网化，有效实现产业协同。

Customization

- 支持企业利用互联网开展基于个性化产品的服务模式和商业模式创新，并为制造企业开展个性化定制提供决策支撑。

Transition from manufacturing to service

- 鼓励传统企业利用互联网技术面向产品全生命周期开展的增值业务，一方面拓展了产品的价值空间，另一方面也将促进企业有效整合利用数据驱动全环节提质增效。

1. Policy support- “Internet+” action plan-Made in China 2025

"Made in China 2025 "is adapt to global a new round of science and technology revolution and the industrial revolution trend, to accelerate the development of Chinese manufacturing industry, to provide new impetus to the development of China and the global strategic partnership to develop a new era of peace and prosper.



1. Policy support- “Internet+”Action Plan-transportation

1. Upgrade transportation service

推动交通运输数据资源向社会开放，鼓励互联网平台为公众提供便捷出行服务，完善信息服务平台建设。

2. Advance transportation resource integration online

加强对交通运输设施状态与通行信息的采集，推动跨地域、跨类型交通信息的互联互通，形成完善的交通运输感知体系。

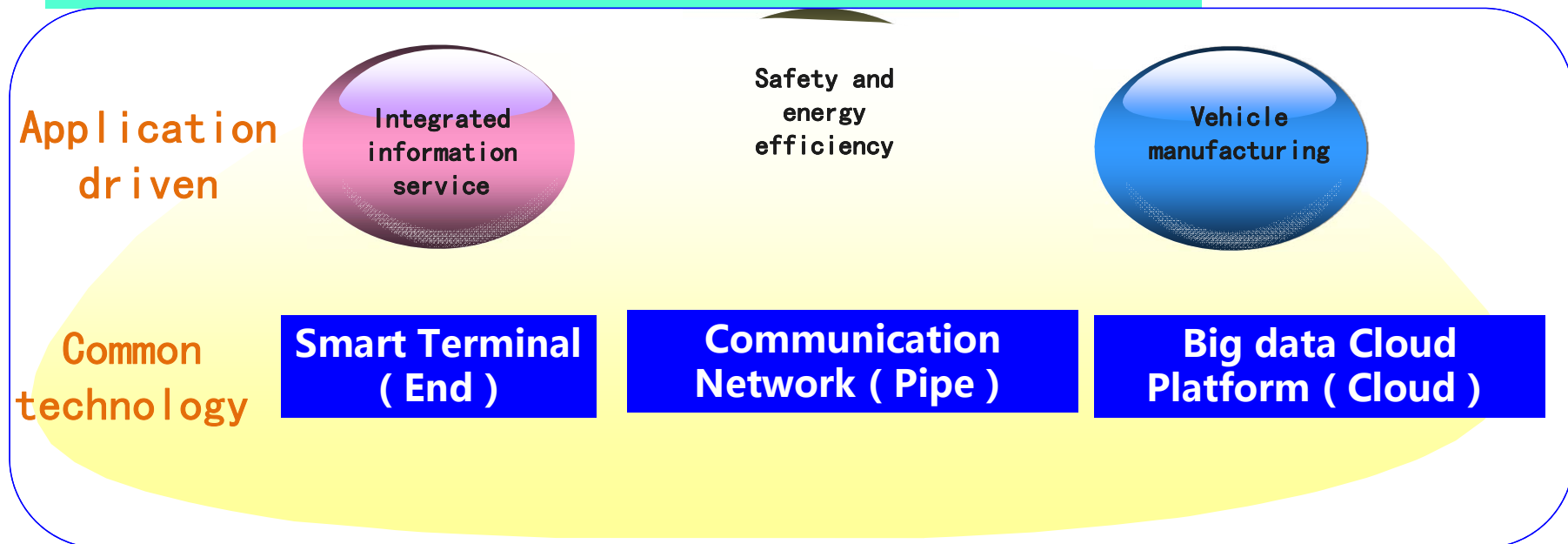


3. Enhance governance capability of transportation

利用大数据分析技术为交通规划、运行、管理提供决策支撑，加强对交通运输违章违规行为的智能化监管。

1. Policy support- “Internet +”action plan-Vehicle-Networking action plan

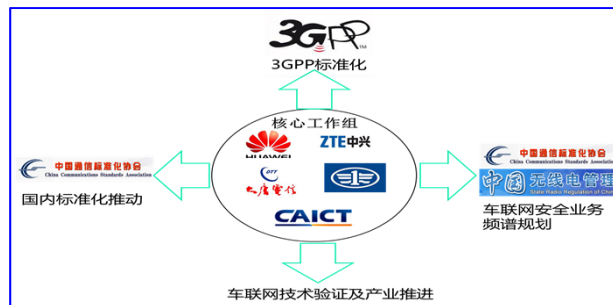
Plan-Vehicle-Networking action plan (2015-2020)



2. Technology research-short range communication for Vehicle-Networking

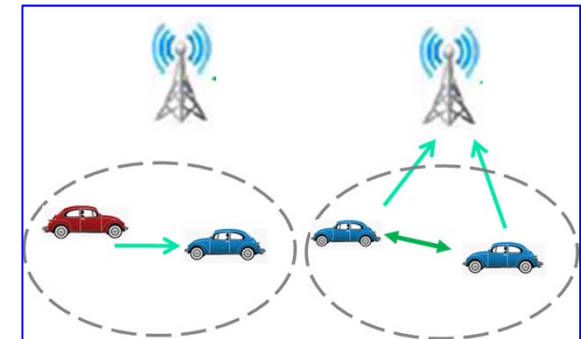
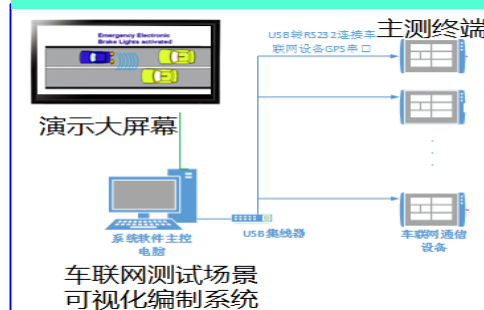
(1) Responsible for national big project which is LTE-V for standard and product prototype.

(2) Aggregate domestic resource to found LTE-V Core Working Group, to advance relevant research.

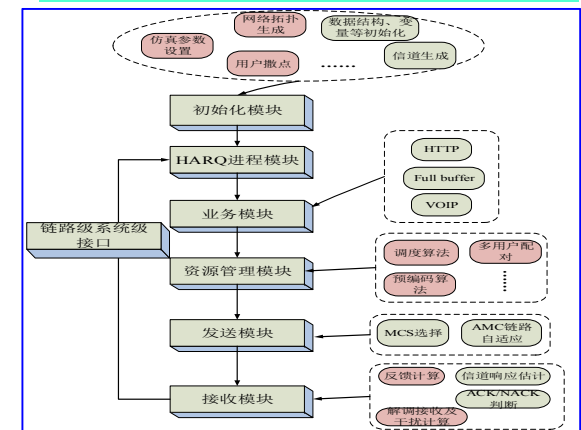


(3) Establish Vehicle-Networking demonstration environment and lab which include both indoor and outdoor

Vehicle-Networking service demonstration

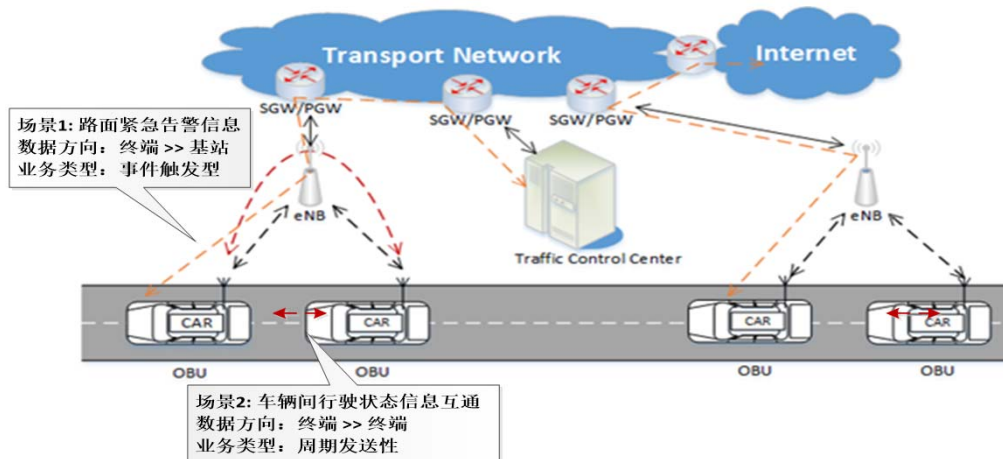


LTE-V emulation platform



2. Technology research- Convergence and innovation between 5G and Vehicle-Networking

Vehicle-Networking is an important use case for 5G



技术指标

用户移动性	a) 低速移动: 3km/h (针对行人步行) b) 中速移动: 60km/h c) 高速移动: 120km/h d) 超高速移动: 240km/h
延迟	端到端单向时延5ms
可靠性	空口传输可靠性达到99.999%

CAICT actively promote Convergence and innovation between 5G and Vehicle-Networking

- Take the lead of IMT-2020 group, promote the key technology of Vehicle-Networking-low latency and high reliability
- ...

2. Technology research-vehicle electronics test lab

1

Handfree audio

- VDA
- ITU-T P.1100
- ITU-T P.1110

2

Positioning and navigation

- 北斗
- GPS
- Glonass

3

Short range communication

- Mirror Link:device、 server、 app
- WIFI:a\b\g\n\ac
- BT\USB

4

Cell communication

- 2G\3G\4G
- RF\PROTOCOL\USIM\RRM

5

EMC、 user experience

- EMC
- Software performance
- Screen

6

other



3. Standardization

International Standard

- ITU-T Y.2060 (06/2012) Overview of the Internet of things
- ITU-T Y.2069 (07/2012) Terms and definitions for the Internet of things
- ISO TC204 《PWI13111 the use of nomadic & mobile device to ITS service provision for travelers》

National Standard

- National standard project –General framework and technique requirement for DSRC
- National standard project –Physical and Mac layer for DSRC
- National standard project –Application and network layer for DSRC

Association and Alliance Standard

- CCSA-2
- C-ITS-10

4. Jointly advance the Vehicle-Networking work

- CAICT actively initiate, participate Vehicle-Networking related activities via set-up collaborating platform.
- The labs of CAICT, Department of Highway Science Research Institute, Qinghua university jointly to advance the test work of Vehicle-Networking.



中国智能交通产业联盟
China ITS Industry Alliance

中国智能交通产业联盟



中国车联网产业技术创新战略联盟



车载信息服务产业应用联盟

MirrorLink

国际车联网联盟
(Car Connectivity Consortium)



长安汽车



Das Auto.



远特科技
CHINA TSP

DESAY SV
AUTOMOTIVE

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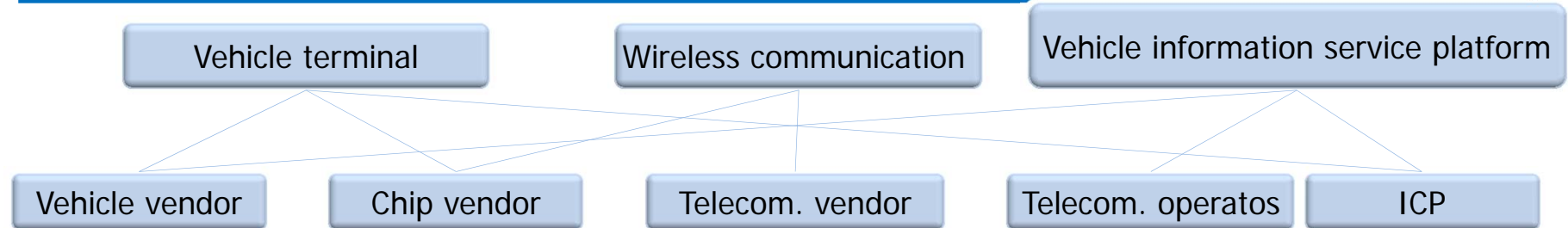
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Conclusion

- 互联网企业、创新型高技术企业等强势介入车联网市场，重点在车联网“手机与车机互通”、“车联网平台服务和应用”等方面开始布局
- 车载终端智能化以及与手机互通，将汽车内部网络逐渐由封闭转向开放，为实现汽车的联网交互和提供丰富的车联网服务创造了条件
- 车联网产业链条长，跨行业，涉及从终端设备到汽车厂商、芯片厂商，再到网络设备、系统集成、软件商、电信运营商、服务/内容提供商（TSP）、交通管理部门等



- CAICT is willing to collaborate with all players and stakeholders in Vehicle-Networking chain to advance the policy, technology, standard and application, etc..

Thanks for your attention!