SAE INTERNATIONAL

MOBILITY CONNECTIVITY:
THE BIG PICTURE

Excerpts from SAE International study by the same title presented at SAE 2014 Convergence

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The big picture…

Source:

Introduction

The mobility sector shares many similar market drivers: environmental, social political, economic, and technological. SAE International, serving the vehicle engineering needs of the aerospace, automotive, *and* commercial vehicle industries, is in the unique position to review the technological driver of connectivity across the mobility sector. In a recent study on **connectivity**, SAE learned the primary, common themes across the mobility sector, with respect to this topic, to be *"efficiency"* and *"cyber security."*

The study also highlights the possibilities for transferring technologies, best practices, and learnings across all three industries.

Technology transfer among these industries to advance mobility is not new. Sharing of information was the impetus of SAE's earliest standardization efforts. And while information sharing can potentially aid in addressing the complex and challenging issues of connectivity, such as efficiency, it may in fact be paramount to addressing cyber

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threats—similar to what is being done through Information Sharing and Analysis Centers or SACS, which are used in many industries to share intelligence on security incidents, threats, and vulnerabilities.

   With connectivity comes cyber security issues. And with the eventual "Internet of Things" and the connecting of everything—including the ground vehicle and aerospace industries—there will be will an increased need for cross-industry collaboration.

   What follows are the study's findings as related to connectivity trends in each vehicle-producing segment. Overall conclusions are also highlighted. The insights provided into the similar themes and challenges cutting across the three sectors may possibly serve as a starting point for information sharing and mapping the future of mobility connectivity. ■

Aerospace Sector

AEROSPACE - Connected Aircraft

Key Trends

1 → Electronic Flight Bags

The movement toward a paperless cockpit has increased interest in EFBs, setting the groundwork for connectivity. The use of EFBs in flight is expanding exponentially, with several airlines issuing them to their entire operation. Notable security of Class I and II EFBs.

2 → Picocells

Adoption has been slow in Europe, but it is more readily accepted in the Middle East and APAC. Many restrictions on voice for cell phone and also for VOIP over Wi-Fi.

3 → Big Data

Airlines leveraging Big Data to improve the passenger experience. Merging information from several databases helps to bring a more detailed profile of passengers. This allows an element of customization.

4 → Wireless IFE

Wireless IFE offering that allow passengers to stream content directly to their own laptops, smartphones and tablets. In some instances, passenger are even issued an actual device to utilize. Services vary among airlines and are contingent a variety of factors.

5 → Free Flight

The possibility of flight without route structure and without controller intervention is a distant dream, but CPDLC and ADS-B are the enablers for that dream.

AEROSPACE - Connected Aircraft

Connectivity is driven by the airlines.

Equipment purchases are influenced by providers.

OEMs are only recently involved in connectivity but have been intimately involved in aspects of ATM modernization & connectivity issues for some time.

Study Conclusions & Takeaways

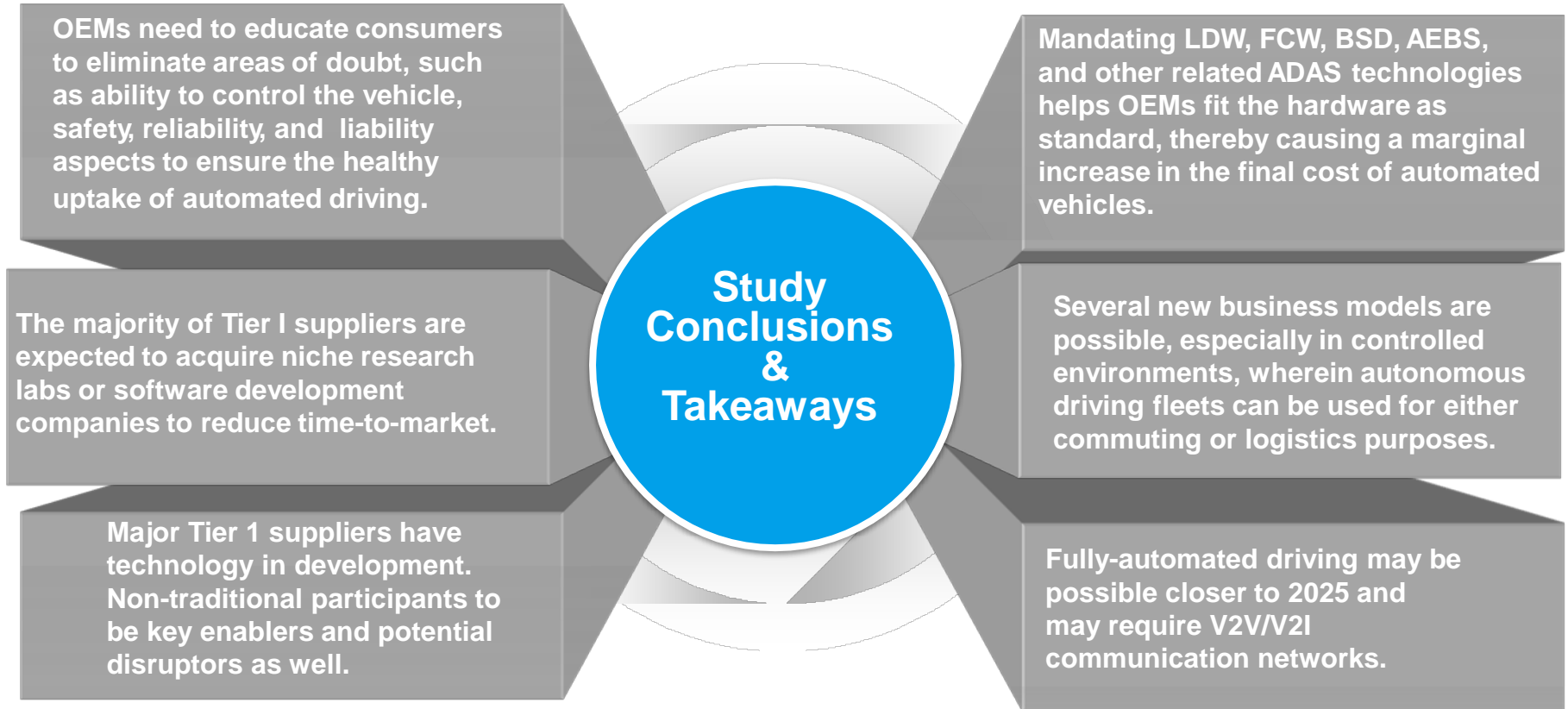**Shared solutions for cockpit and cabin are unlikely.**

Passengers using in-flight connectivity are growing and are beginning to expect it as an offering.

Some connectivity providers not yet profitable.

Automotive Sector

AUTOMOTIVE - Automated Driving

The commercial success of automated driving strongly depends on consumers' willingness to let the vehicle drive itself.

OEMs need to educate consumers to eliminate areas of doubt, such as ability to control the vehicle, safety, reliability, and liability aspects to ensure the healthy uptake of automated driving.

Mandating LDW, FCW, BSD, AEBS, and other related ADAS technologies helps OEMs fit the hardware as standard, thereby causing a marginal increase in the final cost of automated vehicles.

Study Conclusions & Takeaways

The majority of Tier I suppliers are expected to acquire niche research labs or software development companies to reduce time-to-market.

Several new business models are possible, especially in controlled environments, wherein autonomous driving fleets can be used for either commuting or logistics purposes.

Major Tier 1 suppliers have technology in development. Non-traditional participants to be key enablers and potential disruptors as well.

Fully-automated driving may be possible closer to 2025 and may require V2V/V2I communication networks.

AUTOMOTIVE - Cooperative Driving

At the beginning, road users and insurance providers, followed by road operators, would become the principal beneficiaries of cooperative-ITS.

Road users and insurance providers, followed by road operators, would become the principal beneficiaries of cooperative-ITS initially. Automakers and Tier I suppliers can derive benefits from the V2V/V2I services only initial deployment.

DSRC and mobile-based technologies like LTE and 4G are expected to form a futuristic platform for cooperative systems. The communication system is to be augmented by global navigation satellite system (GNSS) and infrared modes.

Study Conclusions & Takeaways

V2V is simpler and less expensive to implement on a large scale. This would be complemented by aftermarket or even smartphone-based dedicated short-range communication (DSRC) solutions, which would accelerate the uptake of cooperative-ITS.

V2X could theoretically become the next generation of tolling systems in the future but it has a long way to go due to large existing 5.8 GHz deployment.

AUTOMOTIVE - Connected Infotainment, Apps & Telematics

North America will continue to lead the connectivity market because of first mover advantage.

Almost 80% of all OEMs offer an app-enabled connected infotainment solution with wide model level availability.

Study Conclusions & Takeaways

Competitive pricing strategies and the availability of smartphone replication technologies will increase the need for smartphone applications. Future infotainment systems will be application based, dependent on a smartphone.

There is a shift of trend from free to freemium app monetization models that are expected to bring revenue to OEMs. On the other hand, GM has moved to the paid model approach, which offers value-added services and is expected to replace the embedded systems.

OEMs looking at ways in which data transparencies could increase customer satisfaction/loyalty levels and monetize benefits for all value chain participants.

NHTSA expected to release phase 2 and 3 of driver distraction guidelines by end of 2014 while a regulation/mandate is unlikely in the near future.

New revenue models are expected with in-vehicle advertisements.

Growing trend to CRM and VRM solutions to reduce cost and time of repair at dealerships and maintain relationships with customers and dealerships. With commercialization of LTE, OEMs will push software and firmware OTA updates expected to reduce vehicle recall bills.

Commercial Vehicle Sector

COMMERCIAL VEHICLE - Fleet Management Solutions

Key Trends
North America

1 → **Smartphone Adoption**

Smartphone solutions are best suited for small fleets and independent contractors as the cost to manage this solution is smaller.

2 → **OEM Telematics**

OEMs have collaborated across the value chain to strengthen their soft products offerings. We continue to see these collaborations to introduce solutions, such as prognostics .

3 → **Big Data**

Big data analytics and business intelligence will strengthen OEM and aftermarket telematics vendors offerings in predictive maintenance and diagnostics reducing the average repair time by 25-50% and reduction in warranty costs by 2-3% resulting in higher customer satisfaction.

4 → **Market Consolidation**

Vendors in North America will continue to consolidate the market. In 2013, Danaher Corporation acquired Navman Wireless and Teletrac, Vista Equity Capital acquired Omnitracs from Qualcomm, and Omnitracs acquired Roadnet Technologies.

5 → **Focus on Services**

The market is focused on high end services such as driver behavior management (in cab driver feed back and in cab coaching), and predictive analytics. These result in fuel cost savings, vehicle uptime, and vehicle and driver safety.

COMMERCIAL VEHICLE - Fleet Management Solutions

Key Findings
North America

1. OEMs are testing the world of truck platooning. Volvo tested one of the earliest truck platooning trials. Scania will lead the European Research Project to develop and implement truck platooning. North America is also on its way of testing assistive truck platooning.

2. OBD II solutions will grow into an elaborate set of newer applications, beyond UBI and fleets. Market will see demand coming from varied sectors like governmental agencies and warranty and service shops.

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4. OEMs form and important part in the value chain. OEMs such as Daimler, Navistar, Volvo have partnered aftermarket vendors to develop solutions. Regulatory mandates, such as EOBR and CSA 2010, is likely to have a huge impact in the medium- and heavy-duty segment.

5. The consolidation trend in North America will continue to enhance vendor portfolios and market shares.

COMMERCIAL VEHICLE - Cooperative Driving

Key Findings

1. US regulatory intervention is possible post 2015, as the government recognizes cooperative systems as a corner stone to their policy objectives of increased traffic safety, efficiency and enhanced environmental benefits.

2. At the core of the ITS Strategic Plan will be IntelliDrive, a suite of technologies and applications that use wireless communications to provide connectivity.

3. V2X integration to smartphones, cloud hosting services, and retro fit modules/portable navigation devises can enable value added services for both driver and pedestrian to supplement ADAS and help progress the business case.

4. The introduction of cooperative-ITS is expected to be an evolution. Customer benefits would grow with increased penetration and improved services in new ITS hot spots and corridors.

5. Michigan succeeded in leveraging roadside equipment for V2X communication, and USDoT will discuss on replicating the same strategy across the country.

A video presentation of the entire study can be found at

https://www.youtube.com/watch?v=cBDFohDo9vU&feature=youtu.be