Uconnect Goes Global

“We are global,” said Alan Amici, head of Global Uconnect at Fiat Chrysler. “Uconnect systems are in nearly all Fiat Chrysler cars. There are still some Fiats that are migrating from legacy Blue&Me systems, but they are all moving to Uconnect.” The Uconnect brand, praised by Consumer Reports for its ease of use, will cover all the carmaker’s audio, navigation and telematics offerings, from the basic radio, with no touch screen, to the 5-, 6.5- and 8.4-inch touch screen systems.

The Blue&Me handsfree phone and navigation platform is based on Microsoft software. While Microsoft Windows Embedded Automotive software now underpins the Uconnect 5-inch touch screen product line introduced in May 2013, it appears that Microsoft won’t be part of future Uconnect products.

“We are looking at the operating system trends in the market,” Mr. Amici said. “We have a close relationship with QNX, our biggest operating system provider right now. We also have a relationship with Google and we joined its Open Automotive Alliance.” Future Uconnect products might have more than one OS.

Continental produces the basic radio and the 5-inch product line. Harmon supplies the 6.5- and 8.4-inch lines, which are based on the QNX operating system.

Given the likelihood that Android Automotive software could be running native on some head units, I asked Mr. Amici if investors in suppliers such as Harmon should be worried that Google or Apple will wrest market share away from them.

“I wouldn’t count the tier-ones out,” he said. “We have some really good tier-ones with many years of experience integrating their infotainment products with the vehicle electrical systems and providing high performance audio systems.” Alpine, Mitsubishi Electric and Panasonic are also Fiat Chrysler infotainment suppliers.

Ultracapacitors Still Showing Promise

More Applications Coming

Ultracapacitors can do things that batteries can’t: They can provide an instantaneous power boost, and they can be charged and discharged millions of times, making them a perfect complement to batteries. Batteries provide significantly greater energy density and are best at providing power over a longer period, but over time the charge and discharge process degrades their ability to store energy.

Ultracapacitors are well suited to powering start-stop applications, especially when fast restarts (in 300 milliseconds or less) are required, and for maintaining the vehicle’s supply voltage, as frequent restarts can drain the battery. Electric turbochargers, which require frequent power bursts, are another promising application, as is brake recuperation, because ultracapacitors can quickly take big gulps of power.

In 2010, Maxwell Technologies began shipping its ultracapacitors to Continental on behalf of a voltage-stabilization system that supports start-stop functionality in PSA Peugeot-Citroën vehicles. When the voltage from the lead acid battery falls too low, two ultracapacitors, connected in series, temporarily add five volts to the negative side of the battery to power engine starts and maintain sufficient bus voltage.

As of May 2014, Continental had produced one million voltage-stabilization systems.

Since 2010, only one other ultracapacitor application has come to light. In August 2012, production began in Japan and Europe for the Mazda6 (non-hybrid) wagon, which featured Mazda’s i-ELOOP (intelligent energy loop) regenerative braking system. The system includes a 12-25 volt, variable-voltage alternator connected to an electric double-layer capacitor (ultracapacitor) module. A DC to DC converter steps the alternator’s output from 25 volts to 12 volts for distribution to the vehicle electrical system. i-ELOOP converts the vehicle’s kinetic energy into electricity as the vehicle decelerates.

The Mazda6 with i-ELOOP, available in the U.S. since May 2013, is rated for 40 mpg on the highway. i-ELOOP is also available on the Mazda3. The double-layer capacitors are made by the Japanese company Nippon Chemi-Con.

High Costs

Historically, high costs have limited ultracapacitors’ use in automotive applications, but costs are headed downward. According to Maxwell senior product manager Jens Keiser, carmakers have targeted a cost of a half-cent per farad. “We are starting to get there in high volume with our cells,” he said. Maxwell offers 2.7-volt cells in 3,000-farad, 1,500-farad and 1,200-farad versions. At 2.7 volts per cell, a module

Turn to Ultracapacitors, page 8
Enormous economic, technical and legal hurdles remain before fully autonomous driving from point A to B is ready for mass production, but considerable advances have been made since Google first announced it was working on self-driving cars in 2010. While the industry, and to some extent government regulators, have a clear vision of the safety and fuel-saving benefits to be gained by automating more driving functions, those automated systems must perform flawlessly to convince consumers the expensive options are both dependable and worth the money. The J.D. Power 2014 U.S. Automotive Emerging Technologies Study found that only 24% of respondents were interested in an autonomous driving mode in their next vehicle if the price was $3,000. In 2013, the interest in autonomous driving was 21%, and J.D. Power analysts say the small increase is a result of growing consumer exposure to advanced driver assistance systems (ADAS) features.

ADAS features such as adaptive cruise control in stop-and-go traffic, autonomous emergency braking (AEB), lane-keeping assist, automatic parking, and speed-limit and traffic-sign recognition are becoming more widely available in new vehicles, including some non-luxury vehicles, but are still only operating in one to three percent of vehicles on the road, according to Automotive World. Continental AG forecasts sales of ADAS will increase by 21% per year through 2020, from $2.5 billion in 2013 to $9.5 billion.

Lane-departure warning systems have been around since the 1990s on commercial trucks and for more than a decade on passenger cars. Nissan and Toyota had lane keeping assist systems that nudged the steering wheel on the road in Japan in the early 2000s. Because they rely on cameras to track lane markings, they have been most effective on well-marked, snow-free highways in daylight hours when the weather is clear. A 2014 study by the market research firm AutoPacific found growing consumer interest in lane-keeping systems: interest among the 92,000 respondents increased by 26 percentage points compared with interest in 2013. That may be due to better, cheaper cameras and smarter image processing algorithms improving the performance, or simply greater consumer awareness as penetration increases. Volvo says its cars can recognize the edge of the roadway without any markings.

Low-priced, high-performance cameras have also enabled a sharp increase in the availability of forward-looking collision warning and mitigation systems as well as pedestrian detection in moderately priced vehicles. Collision avoidance systems with automatic braking are on the rise since automatic emergency braking (AEB) is now required for a five-star Euro NCAP rating.

In the U.S., more than 20% of 2014 models in the Highway Loss Data Institute’s Vehicle Features database offer a front crash prevention system with automatic braking capabilities, twice as many as in 2012. Forward collision warning is offered as an option on nearly 40% of 2014 models. Mercedes, soon to be followed by Volvo, is the first carmaker to offer nearly autonomous driving. Mercedes’ Distronic Plus with Steering Assist, introduced on the 2014 S class as part of a suite of features called Intelligent Drive, requires the driver to remain engaged, with hands on the wheel. But the system is capable of full longitudinal and lateral control at low speeds. In the U.S., the take rate for the Driver Assistance Package, which includes all Intelligent Drive features, is 85% on the S550/S550 4MATIC models and 90% on the S63V4.

According to Volvo, its new XC90 SUV due at the end of the year is the first car in the world with automatic braking if its driver turns in front of an oncoming car. Volvo’s City Safety automatic braking feature is standard across all models. Usually paired with blindspot detection systems, radar-based rear cross traffic alert systems, which assist when a driver backs out of a parking space in situations where side vision is limited, are now widely available from many carmakers including Volvo, Ford, Hyundai, Toyota, General Motors, Mazda, Chrysler, BMW, Mercedes,

## Euro NCAP 2020 Roadmap

<table>
<thead>
<tr>
<th>Domain</th>
<th>Possible Changes to NCAP Test/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupant Protection</td>
<td>Adaptive restraints, seatbelt airbags, rear-seat occupant detection</td>
</tr>
<tr>
<td>AEB for Cars and Vulnerable Road Users (pedestrians, cyclists, motorcyclists)</td>
<td>Advanced capability AEB, e.g. for turning into oncoming traffic and for intersections, standardized driver warnings, updated test and assessment procedures to encompass pedestrian/cyclist detection, V2x, adaptive headlights</td>
</tr>
<tr>
<td>Lateral Assist Systems</td>
<td>More intuitive, intelligent, integrated lane keeping assist. (Consumer acceptance of lane keeping and blind spot monitoring has been low in Europe.)</td>
</tr>
<tr>
<td>Speed and Impaired Driving</td>
<td>Semi-autonomous driving functions, intelligent speed assist and attention assist (driver monitor)</td>
</tr>
</tbody>
</table>

More Connectivity and ADAS Features for 2015
A dozen equities analysts employed by Citi Research, a unit of Citigroup Markets Inc., combined to produce one of the most comprehensive reports I have ever encountered covering the future of the global automotive electronics industry. While the report, published in May 2014, is especially optimistic and friendly to numerous publicly traded automotive electronics suppliers—many of which either receive financial services from Citigroup or Citigroup owns positions in them—it will provide thoughtful readers with an abundance of information about where our global industry might be headed. Below is just one page from the 105-page report.

For access to the full 105-page report “Auto Electronics in a Global Context,” follow this link.

The Future of Automotive Electronics According to Citi Research

Auto-related developments driven by electrification (2010, 2015, 2020). Number of electronic devices used in vehicles to expand

<table>
<thead>
<tr>
<th>Automotive industry condition</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global market size ('000 units)</td>
<td>73,496</td>
<td>91,000</td>
<td>111,300</td>
</tr>
</tbody>
</table>

Principal environmental regulations
- Fuel economy regulations in Europe (2015~)
- Fuel economy regulations in China (2015~)
- China tightens fuel economy regulations (2020~)
- EU tightens fuel economy regulations (2021~)
- US tightens ZEV regulations (2018~)

Principal safety regulations
- ESC becomes compulsory for new vehicles in Japan, Korea, the EU (2014~)
- ESC becomes compulsory for certain models in some regions (2011~)
- NCAP points introduced for safety devices (2014~)
- NCAP points added for safety devices (2017~)
- Automated-driving related legal framework drafted

Technology sector trends
- Smartphone diffusion starts (2007~)
- Smartphone market approaches maturity (2013~)
- Cloud computing advances (2010~)
- Big Data advances (2012~)
- Internet of Things advances
- Automation of specific functions
- Machine to Machine advances
- Telecom technology convergence driven by LTE (2011~)
- LTE Advanced diffusion starts (2015~)
- 5G telecom standards commercialized (2020~)

Market outlook by products

<table>
<thead>
<tr>
<th>Fuel cell vehicles</th>
<th>R&amp;D • restricted lease sales</th>
<th>Toyota and Honda introduce mass-production models (2015)</th>
<th>Diffusion phase starts (2020~)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preventive safety technology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major applications in ADAS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automated driving</td>
<td>Automation of specific functions</td>
<td>Commercialization of combined-function automation systems</td>
<td>Commercialization of semi-automated driving systems</td>
</tr>
<tr>
<td>Informatics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car Navigation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telematics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic devices</td>
<td>Units per vehicle ($)</td>
<td>Market size ($bn)</td>
<td>Units per vehicle ($)</td>
</tr>
<tr>
<td>ECU (units per vehicle, mn units)</td>
<td>19.6</td>
<td>14,444</td>
<td>22.5</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>300</td>
<td>22.0</td>
<td>337</td>
</tr>
<tr>
<td>Connectors</td>
<td>126</td>
<td>9.3</td>
<td>137</td>
</tr>
<tr>
<td>Lithium-Ion batteries</td>
<td>3</td>
<td>0.2</td>
<td>47</td>
</tr>
<tr>
<td>Automotive cameras</td>
<td>5</td>
<td>0.4</td>
<td>41</td>
</tr>
<tr>
<td>Automotive radars</td>
<td>10</td>
<td>0.8</td>
<td>36</td>
</tr>
<tr>
<td>Automotive motors</td>
<td>200</td>
<td>14.7</td>
<td>275</td>
</tr>
</tbody>
</table>

Source: Company data, Wards, Anfavea, AEB, JAMA, JAPA, CAAM, SIAM, GAIKINDO, TMT, TSR, Marklines, Gartner, JETIA, Bishop, Citi Research estimates.

Note: By "electrification" the report is referring to all new electronics, not just those associated with hybridization of the powertrain. ISS: idle stop systems

## The Company Profile... Nuance Communications

### Thumbnail Sketch

**Headquarters:** Burlington, Massachusetts, USA; Tel. 781-565-5000; www.nuance.com  
**Fiscal 2013 Revenue:** $1,855.3 million; 72.2% is from the United States  
**R&D:** 15.7% of revenue  
**Interest Expense:** 7.4% of revenue  
**Operating Margin:** 2.6%  
**Net Margin:** (6.2%)  
**Cash Flow from Operating Activities:** $395.0 million  
**Working Capital:** $595.9 million as of June 30, 2014  
**Long-Term Debt:** $2,122 million  
**Stockholders’ Equity:** $2,594 million as of June 30, 2014  
**Market Capitalization:** $5.26 billion as of August 18, 2014  
**Employees:** 12,000  
**Revenue per Employee:** $154,608  
**FY 2014 Estimated Revenue:** $1.97 billion to $1.98 billion  
**FY 2014 Automotive Revenue:** $150 million, roughly

### Nuance Revenue and Net Margin

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Net Margin</th>
<th>Operating Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>950.4</td>
<td>(2.0%)</td>
<td>$258.7 million</td>
</tr>
<tr>
<td>2010</td>
<td>1,118.9</td>
<td>(1.7%)</td>
<td>$296.3 million</td>
</tr>
<tr>
<td>2011</td>
<td>1,318.7</td>
<td>2.9%</td>
<td>$357.4 million</td>
</tr>
<tr>
<td>2012</td>
<td>1,651.5</td>
<td>12.5%</td>
<td>$473.0 million</td>
</tr>
<tr>
<td>2013</td>
<td>1,855.3</td>
<td>(6.2%)</td>
<td>$395.0 million</td>
</tr>
</tbody>
</table>

FY 2009 to 2013 CAGR: 18.2%

### Nuance Automotive Revenue Estimated

- **2007 to 2014 CAGR:** 25.8%
- **FY 2007:** $30 million
- **FY 2014:** $150 million

### Nuance Revenue and Profit Margin by Business Segment

- Healthcare, 46.6%
- Mobile and Consumer, 24.4%
- Enterprise, 16.5%
- Imaging, 12.4%

FY 2013 Total Segment Revenue: $1,957.7 million*

*Segment total includes ($102.4 million) in acquisition related revenue adjustment.

**Nuance’s Automotive Speech Division, part of the Mobile and Consumer segment, accounted for an estimated 8.6% of total segment revenue.**

### Mobile and Consumer Revenue by Fiscal Year, in $ Millions

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>393.3</td>
</tr>
<tr>
<td>2012</td>
<td>508.3</td>
</tr>
<tr>
<td>2013</td>
<td>479.2</td>
</tr>
<tr>
<td>2014 (Est.)</td>
<td>465</td>
</tr>
</tbody>
</table>

- **FY 2011:** 10.4%
- **FY 2012:** 12.5%
- **FY 2013:** 24.4%
- **FY 2014:** 25.8%

### Standard and Poor’s Credit Rating

- **Non-investment or junk grade:** BB-
- **Meaning:** The company faces major ongoing uncertainties to adverse business, financial and economic conditions.

### Automotive

- **Automotive has been a relatively small part of Nuance’s business historically, given the challenges associated with producing accurate speech recognition in the noisy car environment, but automotive revenue has grown very quickly over the last seven years, from about $30 million in FY 2007 to an estimated $150 million in FY 2014, a 25.8% annual growth rate. The bulk of automotive revenue today is still embedded speech (speech recognition and text-to-speech), although connected speech and connected content is a quickly growing product segment.**

- **According to Nuance’s estimates, 50% of new cars in the United States are being equipped with speech recognition. In Europe the penetration is lower, currently at approximately 40%. In 2013, about 25 million new vehicles were equipped with Nuance speech or language technology.**
Nuance Communications

While Nuance supports some 50 different languages, English is the most frequently used. Most speech-equipped cars in the European market support English, French, Italian, German and Spanish. The premium European brands have more language capability including Northern and Eastern European. In the North American market, vehicles typically support U.S. English, Canadian French and U.S. Spanish.

Traditionally, most automotive revenue has been generated on a license-per-vehicle model, according to Fatima Vital, Nuance’s director of marketing for automotive.

“Now, as we move into connected services and connected speech, the revenue model can depend on several factors, for example whether the feature or functionality is available in every single car and just needs to be enabled, or if it is a feature the driver needs to subscribe to.” An OEM might opt to pay per transaction with Nuance’s server, or pay a flat fee for the lifetime of the service or for a defined period of service. “We see that there are hurdles if consumers have to subscribe. We expect the features we enable will be included more and more as standard by the OEMs, even if the features are not used by all consumers,” said Ms. Vital.

According to the company, automotive customers buy from Nuance because they know they’ll get high quality backed by more than a decade of in-house experience and expertise. Another reason Ms. Vital noted is that they can get a customized, integrated product from one supplier: “What is unique about Nuance is we now have a solution that combines content, speech recognition and natural language understanding. By combining those elements you can get a much better user experience than doing it separately.” Nuance can also provide customers with a global solution that combines content, speech recognition and natural language understanding. By combining those elements you can get a much better user experience than doing it separately.” Nuance can also provide customers with a global solution that combines content, speech recognition and natural language understanding. By combining those elements you can get a much better user experience than doing it separately.”

Continued on page 6

Automotive Related Acquisitions

Tweddle Connect
Content service delivery platform acquired from the Tweddle Group in 2013

SVOX
A privately held provider of voice solutions for in-car systems and consumer electronics, acquired in 2011

Harman’s Speech Technology Business
Acquired in 2009 for its experience in executing automotive projects.
In a move that brings it one step up the supply chain closer to the carmakers, Nuance acquired the Tweddle Connect business from the Tweddle Group in May 2013, for $83.3 million in cash. Tweddle Connect is now incorporated into Nuance’s Dragon Drive Connect platform.

Used by Toyota since 2011 to support its Entune and Lexus Enform infotainment systems, the service delivery platform integrates the vehicle’s embedded infotainment software with cloud-based and smartphone-based applications, services and content. The platform provides authentication services and aggregates cloud-based services such as Bing, OpenTable, Pandora and iHeart Radio.

“The acquisition of the Tweddle Connect business follows the 15-year evolution that speech technology has taken in the auto industry, from phone messaging, to navigation with destination entry, to music search by voice,” explained Arnd Weil, vice president and general manager for automotive. “Now, as carmakers penetrate more deeply into connected car scenarios, while dealing with the concerns about distracted driving, natural speech has become a required feature. But natural speech only works if you have a good handle on the content you are trying to access. So we decided that we need to deliver not only the natural speech interface but also the content. The Tweddle platform was not only proven by Toyota, but it is also the most robust.”

Nuance has a long-term contract to support Toyota with the Dragon Drive platform, “into the next decade,” according to a Nuance press release. Thus far, nearly all the revenue for the platform has come from Toyota. Fiat Chrysler just began using Dragon Drive for off-board voice recognition. Nuance’s Dragon Drive platform supports 1.6 million Toyota/Lexus vehicles on the road.

The Connect platform is similar to Harman’s Aha Radio cloud platform. Like Aha, Nuance will be focused on connected infotainment. However, Nuance offers a customizable, OEM-focused and fully integrated solution that supports a broader portfolio of content providers.

Nuance won’t compete with telematics service providers such as OnStar, Sirius XM, Verizon and Sprint in safety and security telematics and hopes those companies will be open to partnering with Nuance to provide connected infotainment.

Nuance’s all-in-one automotive solution integrates the company’s voice and language software embedded in the vehicle with applications and content in the cloud, and/or with connectivity and applications on a brought-in smartphone.

Nuance’s Dragon Drive Connect accesses Nuance’s cloud-based speech technologies and processes content retrieval from the cloud. The Connect architecture keeps the dialog between the speech processor and the content provider (the arbitration logic) in the cloud, without involving the head unit, so latency is minimized. Furthermore, since Dragon Drive Connect and its Transform Engine are in the cloud, the APIs to Web-based content can be updated without the involvement of the head unit supplier or the carmaker, minimizing the need for software updates to the head unit itself.

Dragon Drive Link manages cross-platform connectivity between the vehicle and smartphones—carrying an in-process app interaction on a smartphone directly into the in-car system. For example, people can enter destination detail on their Dragon Drive navigation smartphone app, which then automatically becomes available via the app in the head unit. Dragon Drive Link automatically authenticates the driver’s user profile information for apps and services once he enters the car.

Dragon Drive Embedded combines all embedded speech components such as text-to-speech, natural language understanding, and speech signal enhancement.

Car Owners Unhappy with Today’s Speech Interface

The J.D. Power 2014 Initial Quality Study identified speech recognition as the biggest problem reported by new vehicle owners. Of all the problems reported, 23% had to do with the infotainment system, and one-third of those were problems with the voice recognition.

Nevertheless, Nuance says it offers the best speech recognition engine on the planet. “Wherever we have benchmarked VoCon [Nuance’s speech recognition technology], no matter which country, or against which competitive offering, we have won,” declared Mr. Weil. “However, the
research people are working on automotive features has grown quickly, providing more exposure to customers who find them lacking.

Some of the dissatisfaction with the vehicle’s speech interface is due to rising expectations. Many car owners have experienced the speech interface on their smartphones and find it works much better. Also, the number of speech-enabled features has grown quickly, providing more exposure to customers who find them lacking.

“Clearly, those of us in the automotive industry need to do a much better job with the speech interface,” said Mr. Weil. “One of the problems is that carmakers take much longer [than smartphone makers] to get things introduced. Even with very concrete project work, it takes a year or two before you see that on the road. Today our research people are working on automotive speech interfaces that won’t hit the road until 2018 or 2019. Carmakers are not competitive with the latest and greatest smartphone features. It is not a fair comparison.”

Big improvements are on the way. More automotive speech interfaces will soon be able to accommodate natural speech, making them more robust against variations in the way people speak. According to Mr. Weil, systems will understand what is being said without maneuvering through a menu tree, the car understands every command, whether you are talking about a music selection or entering a destination into the navigation system, or asking for a content service like weather or stock information.”

As more cars are connected the speech interface will benefit not only from improved embedded speech technology, but also from a lot more intelligence and content coming from the cloud. “We clearly see a trend for nearly all carmakers to use both, the intelligence that’s embedded and the intelligence in the cloud, accessed by the car,” Mr. Weil noted.

Improvements are also coming in the way the speech interface deals with the noisy car environment. “For a long time we have offered things like noise cancellation algorithms, echo cancellation techniques and beam forming from two or more microphones. We have clearly seen a large uptake of that technology over the past year,” he added.

Driver Distraction and Texting by Voice

According to a 2013 report by the American Automobile Association (AAA), Measuring Cognitive Distraction in the Automobile, “The adoption of voice-based systems in the vehicle may have unintended consequences that adversely affect traffic safety.” Using state of the art speech-to-text equipment not yet available in production vehicles, and with no visual interaction or hand held devices, AAA found that sending speech-to-text messages was more than three times more cognitively distracting than the single task of driving.

That conclusion differs from Nuance’s. The company believes that sending text messages by voice is safer if the task doesn’t require visual or manual interactions. “We have built speech interfaces in our labs and found that dictating messages while driving is no more distracting than controlling anything else in the car,” said Mr. Weil. “If you can have a dialog that is voice only, that doesn’t involve looking away from the road at a display, you can safely minimize distraction.”

Nuance R&D Locations

Burlington, Massachusetts, USA
Cambridge, Massachusetts, USA
Seattle, Washington, USA
Montreal, Canada
Shanghai, China
Beijing, China
Tokyo, Japan
Aachen, Germany
Ulm, Germany
Gent, Belgium
Zurich, Switzerland

Nuance Communications

Nuance partners with a network of content service providers so it can optimize its natural language understanding software to fit each CSP’s data format for how content is searched and how the search results are presented to the driver.

CSPs for Navigation
Autonavi – A map and navigation service leader in China
Bing – Microsoft’s global search engine
HERE – POI, maps and routing data from Nokia, formerly known as Navteq
Infogroup – U.S. POI data provider
INRIX – Real-time traffic data based on input from more than 100 million mobile phones
TomTom – POI, maps and routing data, formerly Tele Atlas
Accuweather – Weather forecast for all parts of the world
Sina – A Chinese language Web portal offering various content including weather
OpenTable – Restaurant reservations
OPIS – Fuel price information in the U.S.
Parkopedia – Parking availability and pricing for more than 6,000 cities in 45 countries
Yelp – A leading restaurant review service in North and South America and Europe

CSPs for Infotainment
iHeartRadio – U.S. radio streaming portal with more than 50 million users
Deezer – Headquartered in France, Deezer has 26 million streaming radio users
Pandora – Available in the U.S. and Canada, with 250 streaming radio subscribers
Rdio – U.S. streaming radio service with several million users
Slacker – Available in the U.S. and Canada, offers 10 million songs and 200 expert/genre stations
Tuneln – U.S. radio streaming provider with 50 million users offering access to more than 100,000 radio stations
NASDAQ & Dow Jones – Financial news and stock information
Reuters – The latest news from around the world
STATS – Sports data and content

CSPs for Social Media
Facebook
Twitter
Wibo – Social network and micro-blogging service in China with more than 600 million users

final benchmark is a 50-, 60- or 70-year-old person trying to use the car’s speech interface for the first time. Or the 25- or 30-year-old person who is used to the speech experience on a smartphone.”

Nuance’s Network of Content Service Providers (CSPs)
Orders for some of Infineon’s power devices, specifically MOSFETs and protected switches, are beyond the company’s capacity to deliver them, so Infineon has put those parts on allocation, meaning customers are getting fewer parts than they ordered.

The reason for the shortages, according to Shawn Slusser, vice president of Infineon Automotive for the Americas, is that business is much better than expected. “The automotive semiconductor market has historically grown at about 6% per year. But over the first half of 2014 we saw nearly five times that growth rate for these particular products.”

The shortages first showed up on the back end, in assembly and test. Capacity was added, but then the shortages moved to the wafer fab. “We’ve got our new wafer fab in Kulim, Malaysia, with enough floor space, but we still have to wait for the new fab equipment to be delivered,” said Mr. Slusser.

Mr. Slusser thinks the increase in demand for Infineon’s power devices is a result of the steps carmakers have taken lately to improve fuel economy and reduce CO2 emissions, by electrifying such things as power steering and the fuel pump. On top of that, luxury carmakers have been adding more comfort and convenience features involving small motors, which require power devices to drive those motors.

But some of the increase in demand is probably a result of over-ordering by some of Infineon’s customers who want to be sure they have enough parts, despite the allocations. “That would be typical behavior,” said Mr. Slusser. “People say, ‘If I can’t get what I want, I’ll double my orders. If I get half I’ll get what I need.’ We base our investments in capacity on business awarded and 12 months of order visibility. If the orders suddenly increase, we make a judgment call to determine how much of it is real. ... We have already made investments to add capacity and could be out of this allocation situation in one or two quarters. We continue to invest in the future, we have room to grow, and we are committed to working with our customers.”

In the fiscal year ending September 30, 2013, Infineon’s capital expenditure totaled 378 million euros for the corporation, down 58% from the prior year. In FY 2014 capex rose to 650 million euros.

Features...

Infiniti and Audi. The Infiniti QX60 and Jeep Cherokee will automatically apply the brakes if an oncoming car is detected.

Connected

The inclusion of 4G LTE connectivity in cars from Audi and especially GM creates an array of possible use cases, from mobile hot spots for brought in Wi-Fi devices to over-the-air software updates for vehicle systems and diagnostics. (See the June 2014 Hansen Report for more from AT&T on leveraging the 4G data pipe.)

Working with AT&T as its carrier, GM plans to roll out 4G OnStar as a standard feature in roughly 30 MY 2015 models. GM has been offering new car buyers a free, three-month or 3-gigabyte trial of the service and the company reports a 98% take rate. How many of those free subscribers will opt to pay for a data plan remains to be seen.

While still based on 2G and 3G connectivity, eCall, Europe’s emergency accident notification mandate, was finally scheduled to go into effect in Europe in October 2015, after a decade of debate. The system requires embedded modems in all new vehicles, which would automatically notify emergency service providers if an airbag deployed, or the call could be initiated manually. Vehicle location and identification data are to be transmitted over a voice channel. Yet another eCall delay was recently announced, moving the roll out to 2017. Several OEMs in Europe have already implemented their own smartphone-based safety and security systems, and more are likely to do the same.

Ultracapacitors...

with six cells is needed for operation at 14 volts. At a half-cent per cell, six 3,000-farad cells would cost $90, not including the module’s housing, wiring and assembly.

Some carmakers have considered using ultracapacitors in 48-volt applications, but that would require 18 cells at a cost of $270 for the capacitor cells alone. Even at the target half-cent per farad price, most of the early ultracapacitor applications will be for 12 volts.

More Ultracapacitors Coming

Despite the fact that only two ultracapacitor automotive applications have thus far reached production, suppliers of them are confident that significantly more business is coming their way. Maxwell Technologies hasn’t yet booked any orders beyond the PSA Peugeot-Citroën application but has lately been talking to a lot of carmakers and sees momentum building.

In correspondence with The Hansen Report, Nippon Chemi-Con describes the market for its double-layer capacitors as “very promising [given] the growing concern for the environment, worldwide.” The company writes that it has already landed additional business beyond Mazda’s i-ELOOP application.

Bosch hasn’t yet sold a system with an ultracapacitor but has proposed systems that use them. “We see a lot of promise for ultracapacitors in multiple applications, not only in the automotive world but in subway and bus systems and in green energy applications,” said Scott Averitt, a technical expert with Robert Bosch LLC. “As those volumes increase, ultracapacitor prices will come down, and that will drive more automotive applications.”

Continental wrote: “We see high potential for double-layer capacitors, especially in 12-volt networks. ... We see more potential for DLCs in vehicles with start-stop systems equipped with pinion starters, where the customer expects fast restarts and support for cold starts.”