

Month 00, Year

● CONNECTION SYSTEMS. GLOBAL OVERVIEW.

Contents




Aptiv overview

A photograph showing three parallel, bright, rectangular light beams or shadows cast across a dark, tiled floor. The perspective is from a low angle, looking down at the floor.



Connection Systems overview

An aerial view of a dense urban cityscape at dusk or night. The buildings are illuminated with warm lights, and the streets are visible with some traffic. The overall tone is dark with highlights from the city lights.



Manufacturing & engineering capabilities

A close-up, profile view of a person's face, focusing on the nose and cheek. The lighting is soft and warm, suggesting an indoor setting with a light source. The background is blurred.



A comprehensive portfolio

A photograph of a busy multi-lane highway at night. Numerous cars are visible, their headlights and taillights creating a stream of light. The scene is captured from an elevated perspective, looking down at the traffic.



Welcome to Aptiv. Company overview.

We are a global technology company that develops **safer, greener and more connected** solutions, which enable the future of mobility.

• APTIV •



Power and Flexibility of Global Footprint and Talent



\$12.9B 2017 revenue



\$19.3B in bookings



\$1.1B global engineering investment

150,000 Employees in **45** countries



16,000

engineers

6,000

focused on software



109

manufacturing sites

14

major technical centers

Experienced Leadership Team



Kevin P. Clark
President and
Chief Executive Officer



Glen De Vos
Senior VP, Chief Technology Officer and
President Mobility & Services Group



David M. Sherbin
Senior VP, General Counsel, Secretary
and Chief Compliance Officer



Mariya Trickett
Senior VP and
Chief Human Resources Officer



Michael Gassen
Senior VP, Sales and President
Europe, Middle East, Africa and Russia



Joseph R. Massaro
Senior VP and Chief Financial Officer



Tim J. Clark
Senior VP, Supply Chain
Management



Matt Peterson
Senior VP and Chief Information Officer



Bill Guggina
VP Global Operations
and President Mexico &
South America



Christian Koeppe
VP, Strategy



Majdi B. Abulaban
Senior VP and President, Signal & Power Solutions



David Paja
Senior VP and President
Advanced Safety & User Experience



Simon Yang
Managing Director Connection Systems, Asia
Pacific and President Asia Pacific



Wendy Miller
Chief Marketing Officer



Addressing **Mobility's** Toughest Challenges

Urban Mobility **CHALLENGES** by 2050



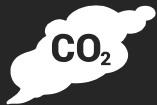
+70%

Of Population



+40%

freight



5x

Emissions



4x

Cost



3x

Travel time

BENEFITS of mobility automation to cities



28%

Fewer Vehicles



87%

Fewer Accidents



66%

Lower Emissions



44%

Fewer Parking Spaces



30%

Shorter Travel Time

Aptiv Addressing Mobility's Toughest Challenges

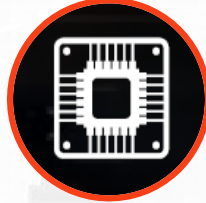
Aptiv provides end-to-end solutions that allow us to commercialize new mobility

SMART VEHICLE ARCHITECTURE

SOFTWARE



SENSING AND COMPUTING



SIGNAL AND POWER DISTRIBUTION

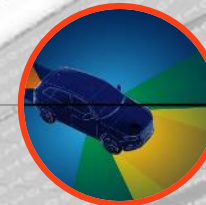


CONNECTIVITY



SMART MOBILITY SOLUTIONS

ACTIVE SAFETY



USER EXPERIENCE



CONNECTED SERVICES



AUTONOMOUS SYSTEMS



• APTIV •

Industry-leading Software Capabilities

Global Footprint



Bangalore, India • Boston, MA • Krakow, Poland
Pittsburgh, PA • Shanghai, China • Wuppertal, Germany

30+ Key Partnerships

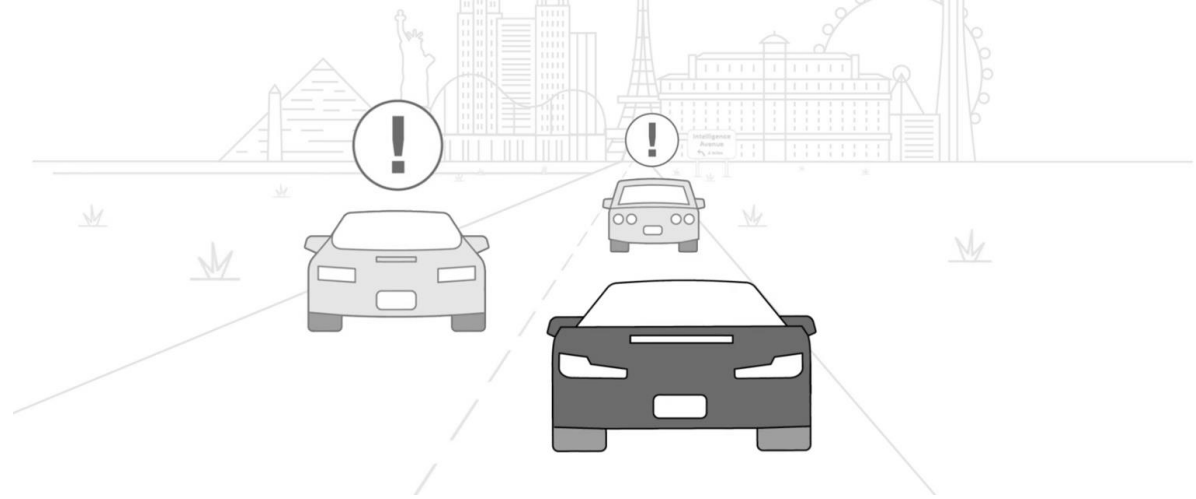


University Engagement



Software

STRONG FOUNDATION IN SOFTWARE AND
ARTIFICIAL INTELLIGENCE EXPERTISE



ENGINEERS DEVOTED TO
SOFTWARE

6,000+

LINES OF CODE
SHIPPED DAILY

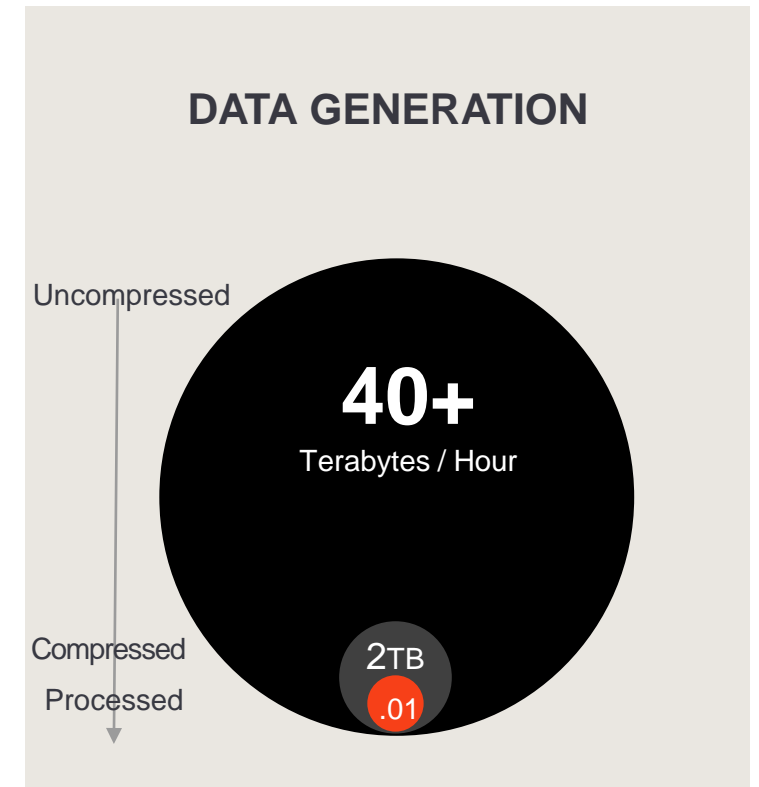
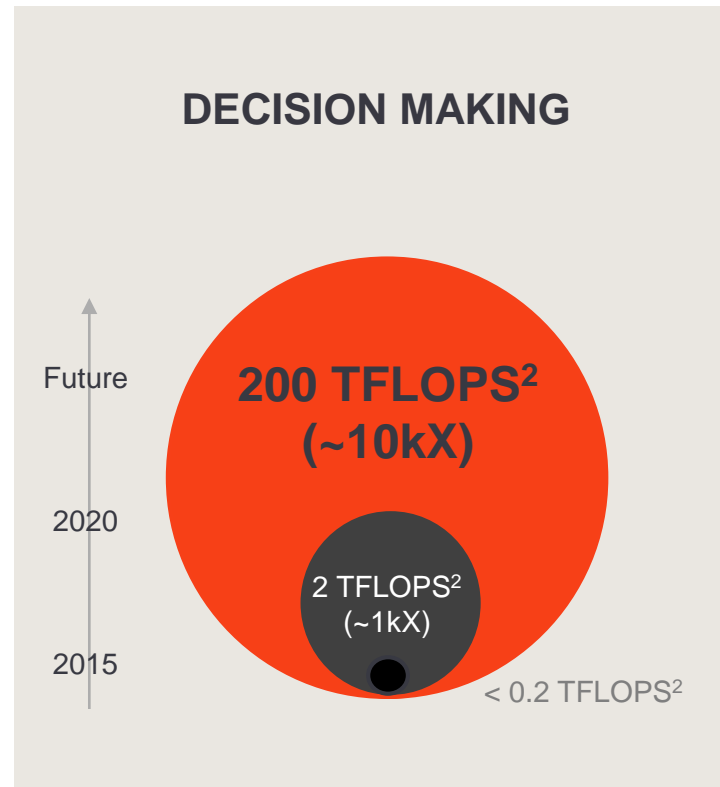
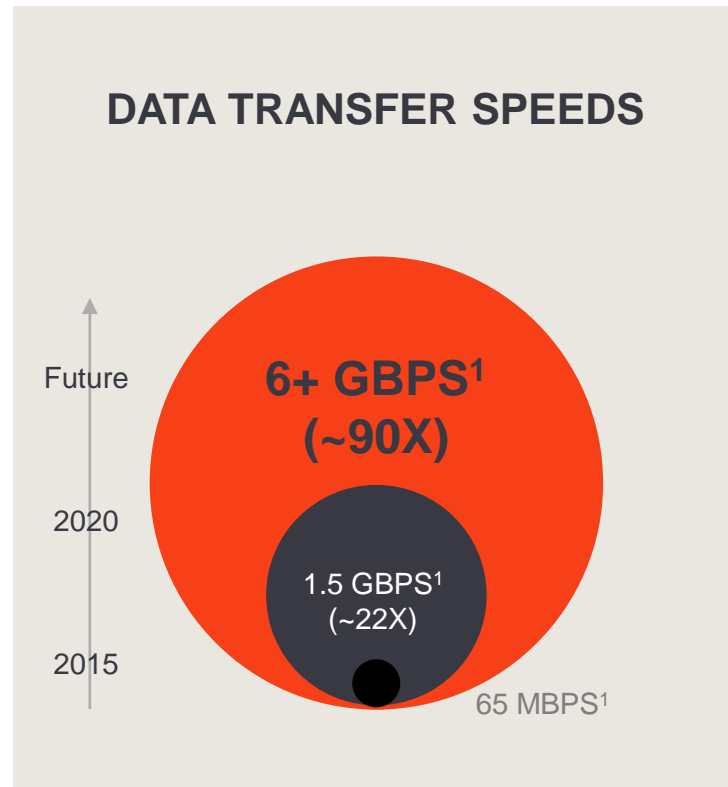
40B

LEADER IN SOFTWARE
DESIGN & USER EXPERIENCE



Sensing & Computing

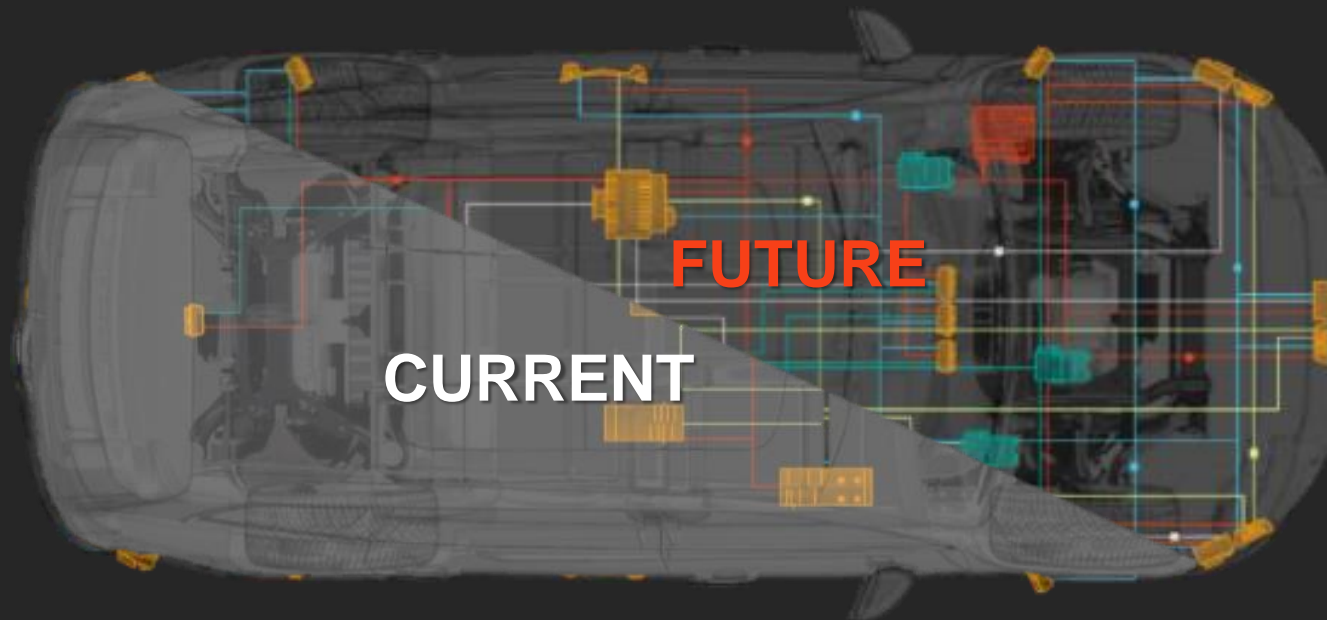
VEHICLES DEMANDING EXPONENTIALLY MORE COMPUTING POWER



1. Megabits per second and gigabits per second
2. Teraflops (TFLOPS) – trillion floating point operations per second

Signal & Power Distribution

SOFTWARE ENABLED FEATURES DRIVING GREATER DEMANDS FOR OPTIMIZED
NEXT GENERATION ARCHITECTURES

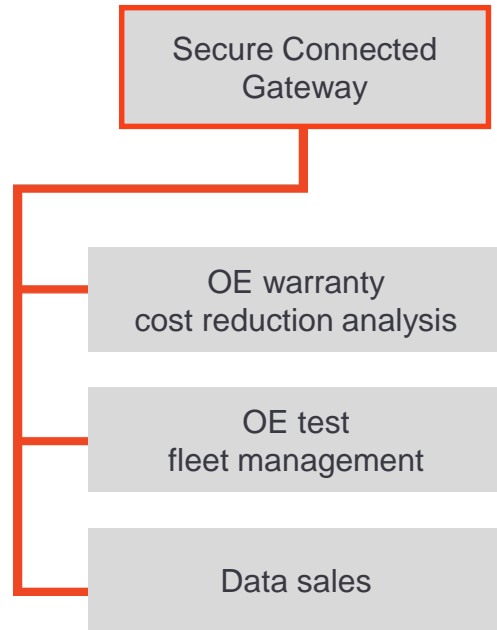


Connectivity

CONNECTED SERVICES

CONTROLTEC
UNLOCKING THE POWER OF DATA

Embedded Edge Processing & Data Acquisition

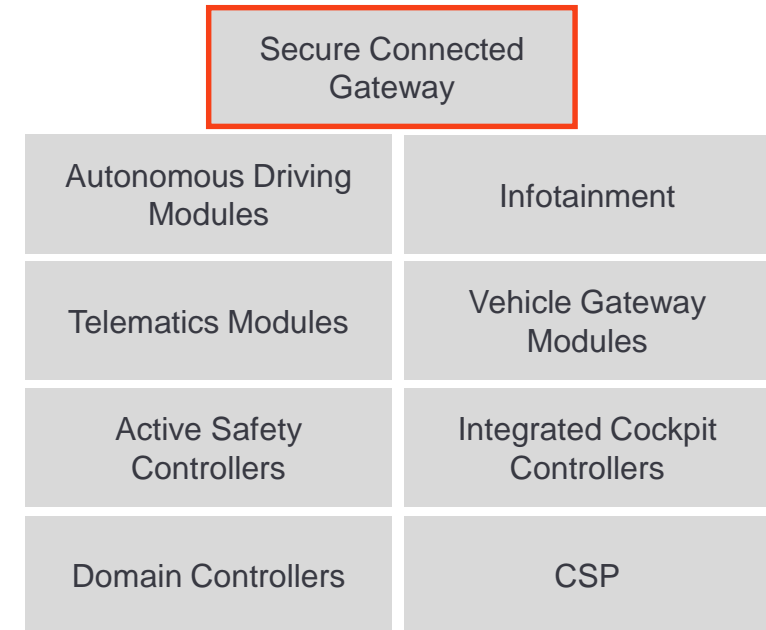


• **A P T I V** •



MOVIMENTO[®]
Ready. Connect. Go.™

OTA Embedded Hardware



Connected Services technology to be embedded in Aptiv products by 2020

Connectivity

SOFTWARE-ENABLED SOLUTIONS

Scalable cloud platform that:

Enables Aptiv to deliver AMoD and Connected Services

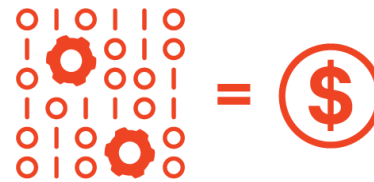
Supports 3rd party application ecosystem and data brokerage



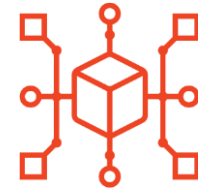
AMoD Services



Connected Services
(e.g. OTA, fleet management)



**3rd Party
Data Brokerage**



**3rd Party Application
Ecosystem**

Enabling End-To-End Mobility Solutions

CONNECTING THE VEHICLE TO THE SURROUNDING ECOSYSTEM; DATA SERVICES AND SMART MOBILITY MOVE BEYOND THE VEHICLE TO CREATE VALUE.





Global Mobility & Services Capabilities

UNMATCHED POSITION IN MOBILITY & SERVICES WITH DEEP CAPABILITIES IN SOFTWARE DEVELOPMENT, AUTOMOTIVE GRADE INDUSTRIALIZATION AND SYSTEMS INTEGRATION



Expanding Las Vegas Presence

NEW AUTOMATED DRIVING TECH CENTER AND EXPANDED LYFT DEPLOYMENT



OPERATIONS AND COMMAND CENTER

Hub for operational support, while also enhancing development and testing



TECHNOLOGY SHOWCASE

Innovation and customer demonstration showcase



DEPLOYING 30 APTIV AUTOMATED VEHICLES ON LYFT NETWORK

Multi-year agreement represents clear step toward commercialization

Continued strong progress on Las Vegas deployment

16,000+ RIDES GIVEN
ON THE LYFT
NETWORK

4.94 OUT OF 5
RIDER RATING

Hertz[®]

FLEET
MANAGEMENT
PARTNER FOR
LAS VEGAS



Global Connection Systems overview.

APTIV's Business Segments

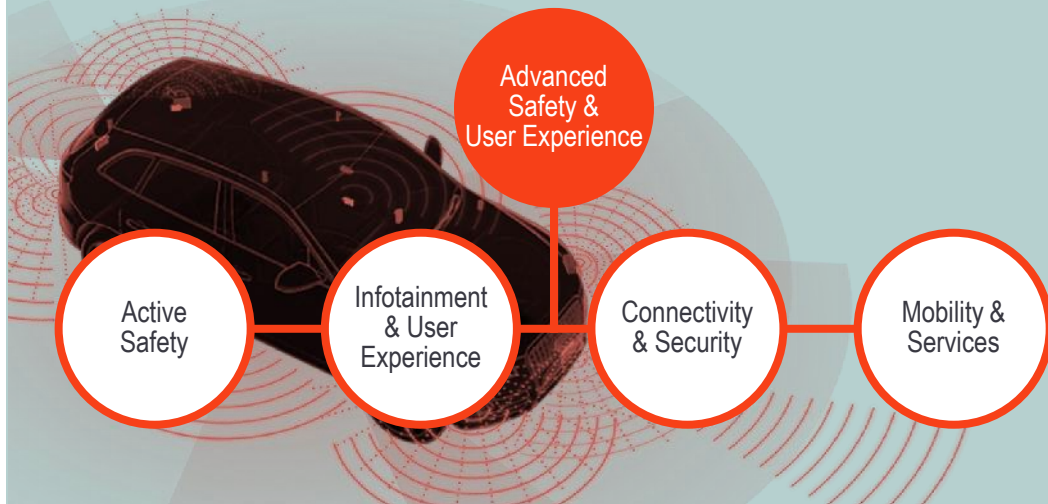
SEGMENTS REFLECT EVOLVING CAPABILITIES AS THE ONLY PROVIDER OF INTEGRATED BRAIN AND NERVOUS SYSTEM

ADVANCED SAFETY & USER EXPERIENCE



Formerly Electronics & Safety

Encompasses our deep expertise in **software, centralized computing platforms, advanced safety systems** and **automated driving**, while acknowledging the growth in areas that enrich the **in-vehicle experience**.

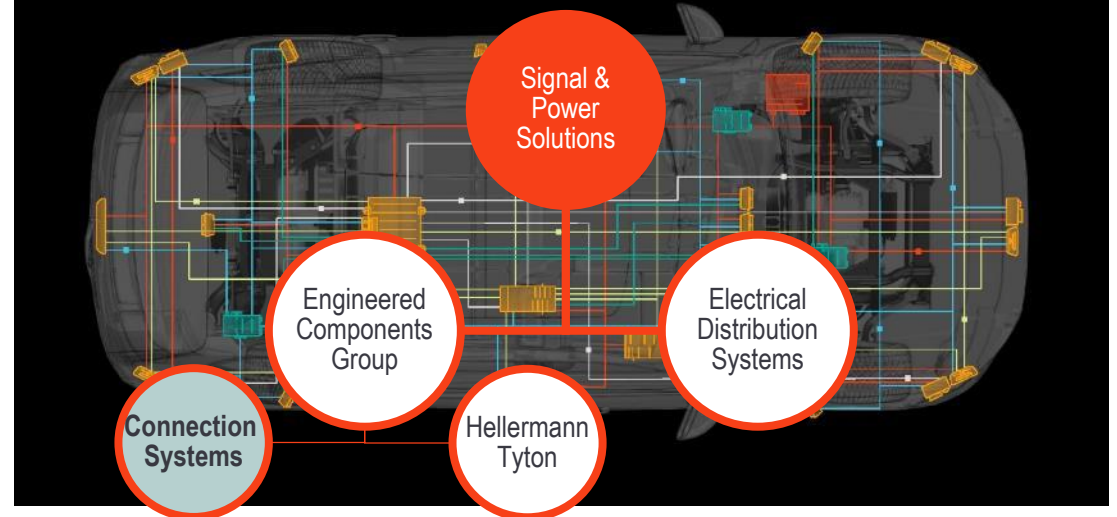


SIGNAL & POWER SOLUTIONS



Formerly Electrical / Electronic Architecture

Reflects the growing significance of **next-generation architectures** with **high speed data** and **electrical power distribution** as the foundation necessary for future mobility.



Our Valued Customers

Continental®



MOBIS

Delphi Technologies



HITACHI
Inspire the Next



Sensata



FCA
FIAT CHRYSLER AUTOMOBILES



PORSCHE



TAKATA



PEUGEOT
MOTION & EMOTION



Audi



Ford

MANDO



CITROËN



Mercedes-Benz

PACCAR



HYUNDAI



KIA MOTORS



LEAR CORPORATION



NISSAN



HONDA



TOYOTA



TATA



Great Wall



CHANGAN



吉利汽车
GEELY AUTO



JAGUAR

APTIV

LEONI



SUMITOMO



system

oem

wiring tier

Power and Flexibility of Global Footprint and Talent



\$3.5B 2018 revenue



10 strategic product lines

17,000 employees



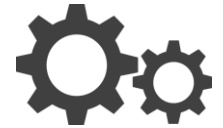
2,431

engineers



37

manufacturing sites



12

major technical centers

Driving Standards Through Leadership



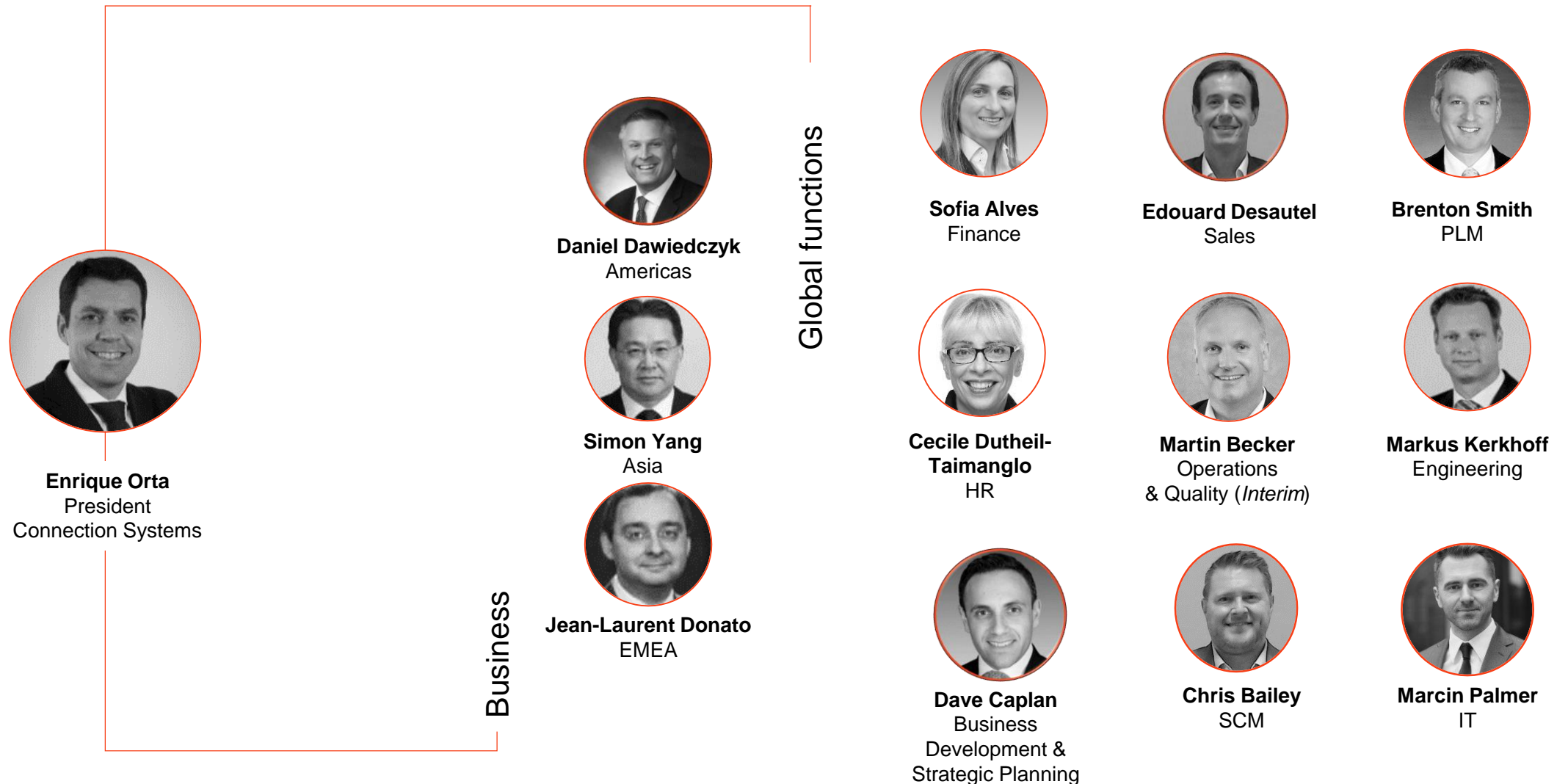
88 Standards Representatives

Supporting **77** Standards Committees

Within **30** Standards Organizations



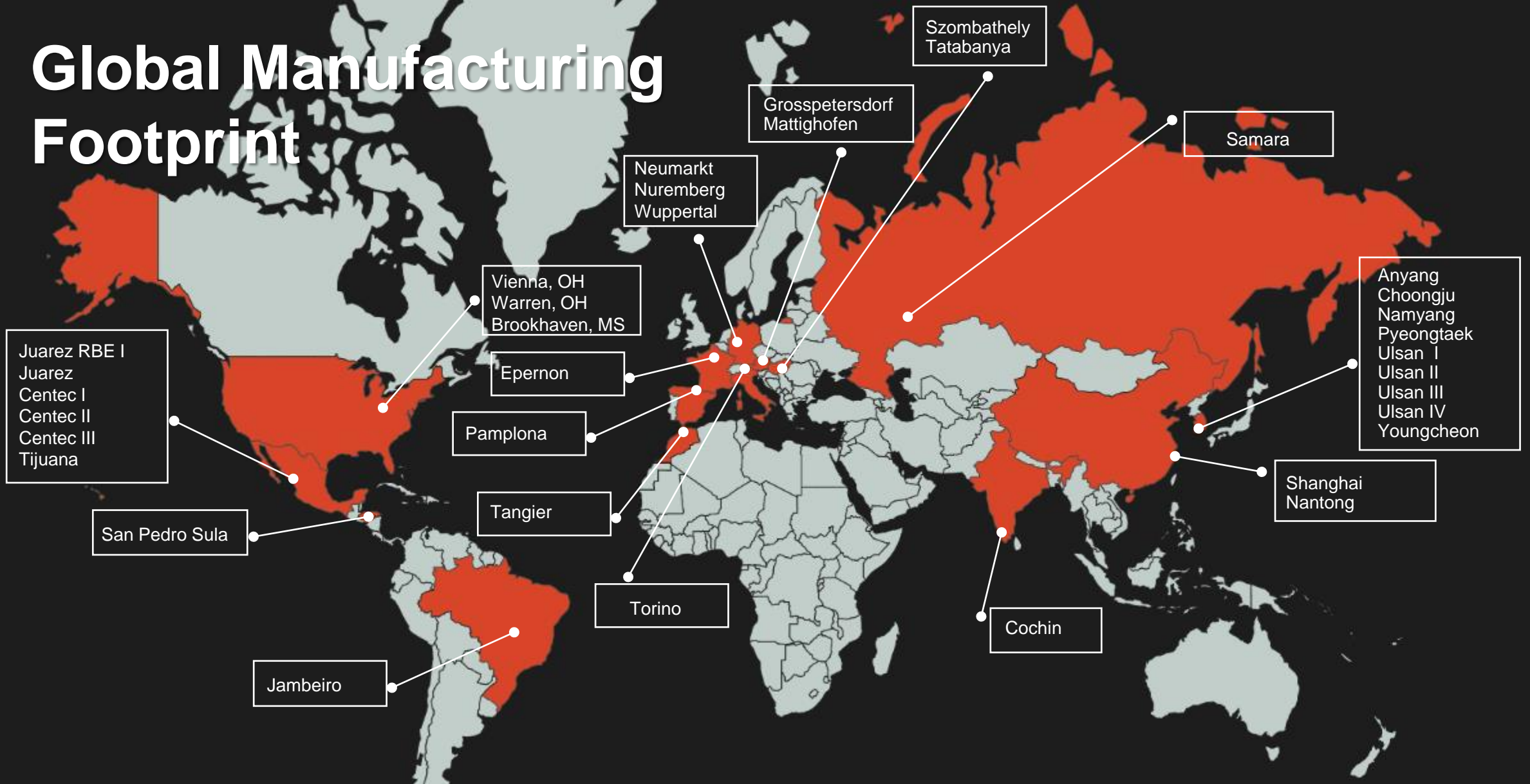
Connection Systems Leadership Team | Global



A person's profile is shown in silhouette, looking out of a window. The view outside the window is a cityscape at sunset or sunrise, with a warm, golden glow. The text "Manufacturing & engineering footprint." is overlaid on the image. The word "footprint." is in a larger, bold, orange font, while "Manufacturing & engineering" is in a smaller, bold, black font.

Manufacturing & engineering footprint.

Global Manufacturing Footprint





Global **innovation.** Local **implementation.**

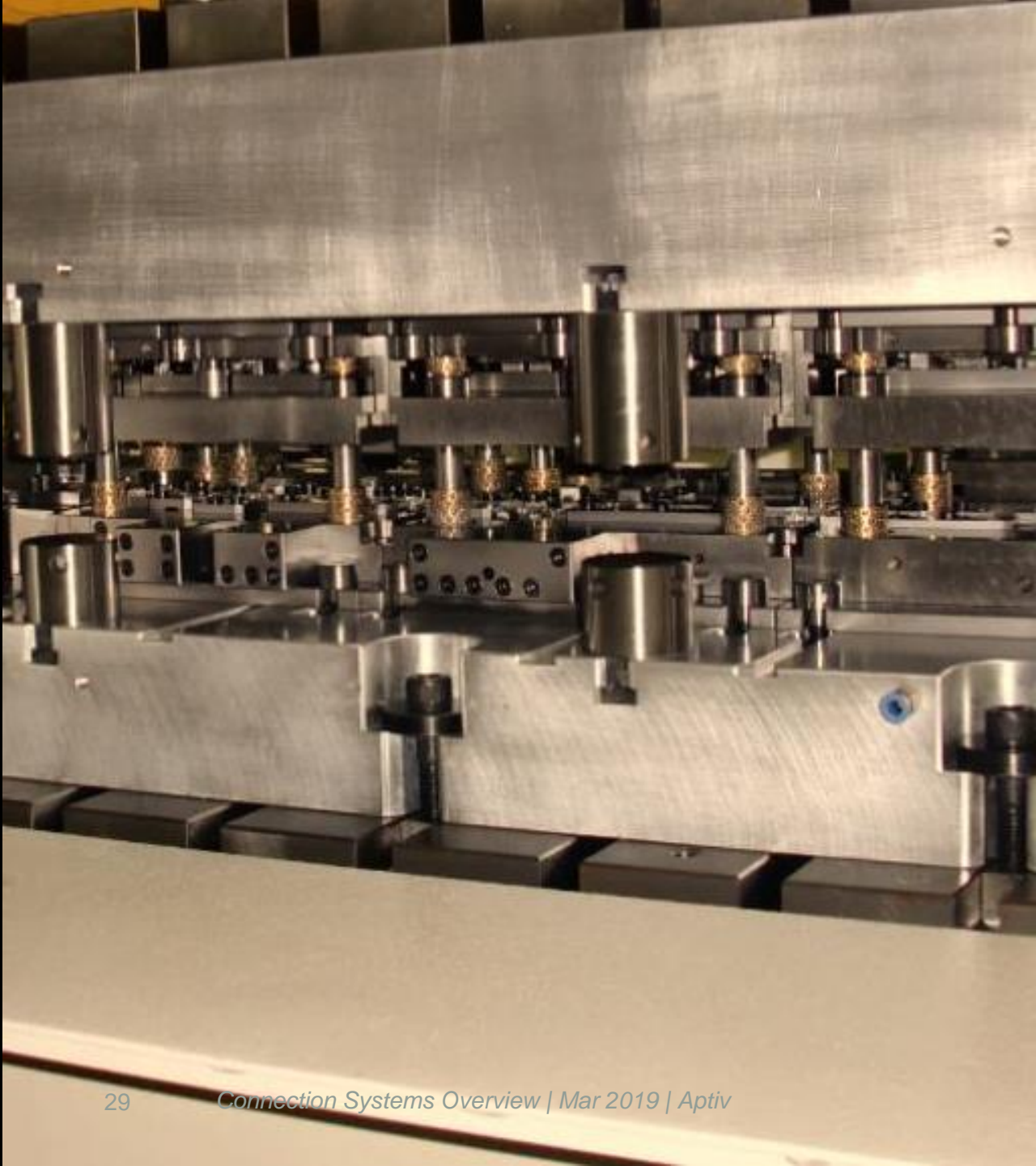
12
technical
centers

>2,000
scientists &
engineers

9
test labs,
14,000 m²

R&D and engineering capabilities:

Design | Mold flow | Metrology | Vibration | Locking efficiency
| High Voltage testing | Temperature & Humidity cycling |
Corrosion tests | Waterproofness tests | CT scanning



Leveraging global **tooling capabilities.**

- Strong competitive advantage
 - Global tooling centers in China and India
 - Regional tool factories in Mexico
- Footprint
 - Largest tool room in Shanghai
 - Incremental expansion in Mexico and India
- Investing in capabilities
 - Expanding the usage of tool and sub-tool standards
 - Focus on quality and lead time



Delivering global **test & validation capabilities.**

- Strong competitive advantage
 - Industry and key customer certified
 - State-of-the-art test technologies
 - Regional capabilities, global coverage
- Investing in capabilities
 - Tripled Shanghai floor space
 - Launched new laboratory in Mexico
 - Expanded laboratories in Krakow and India









	Americas	EMEA	AP
Electrical	✓	✓	✓
Mechanical	✓	✓	✓
Environmental	✓	✓	✓



Our **scalable portfolio**
enables smart mobility
solutions.

Advanced Technology Drives Connection System Evolution

Consumer demand and regulatory driven

<p>Next generation architecture challenges</p>	 <p> Safety</p>	 <p> Electrification</p>	 <p> Connectivity</p>	 <p> Miniaturization</p>
<p>Technology drivers</p>	<p>Detection and mitigation Addressing driver distraction Improving reaction time</p>	<p>Fuel economy improvements Emissions reduction Electric/Hybrid vehicle penetration</p>	<p>“Always Connected” consumers Smart phone users Linkage to safety</p>	<p>More content Architectural complexity</p>

Technology focused on megatrends drives market growth

A Comprehensive Product Portfolio



12 strategic product lines aligned with market needs, trends, and growth opportunities.

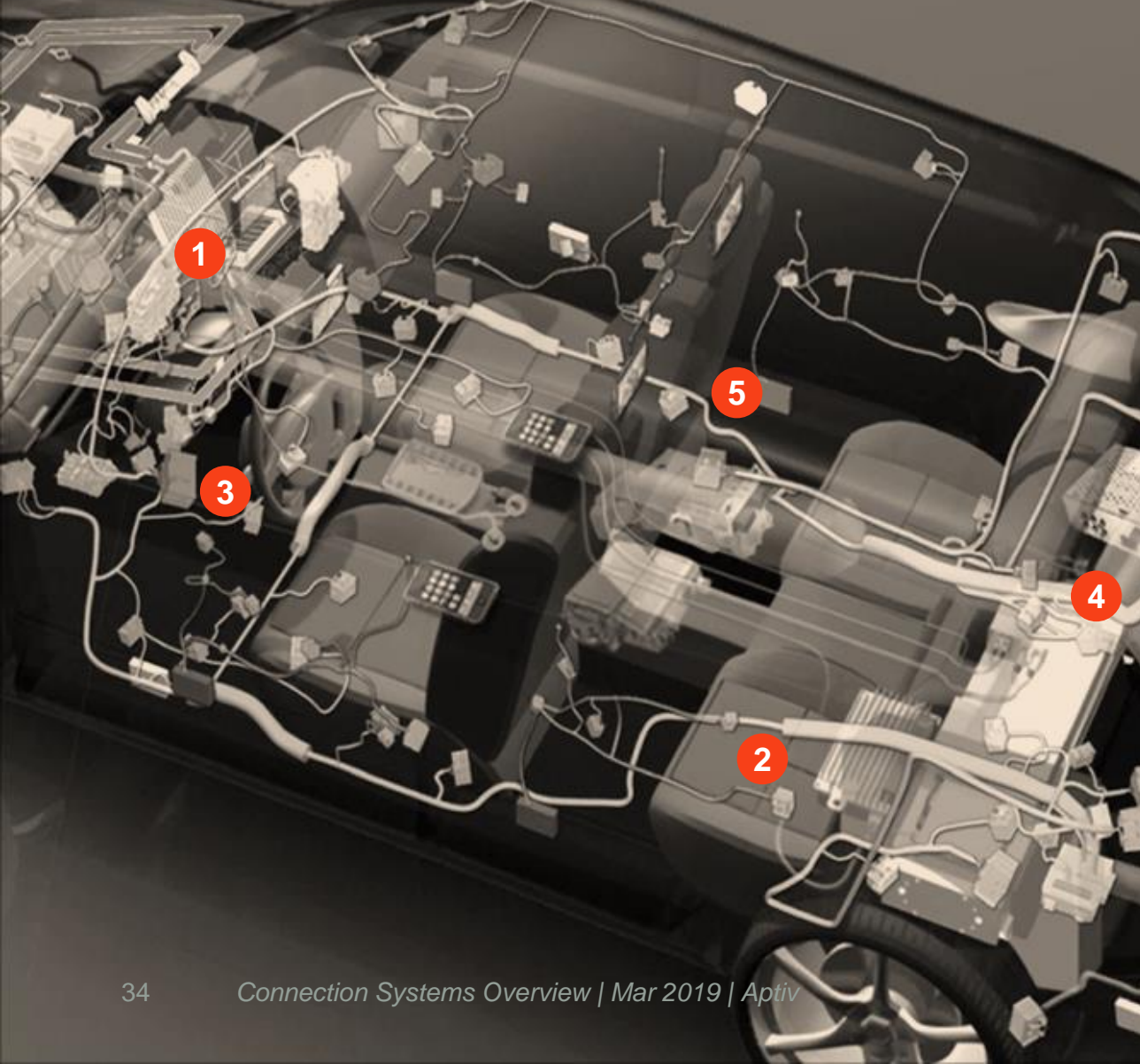
1 automated driving features

2 aluminum cable

3 safety restraint system connectors

4 hev/ev power systems

5 electrical architecture



The most sophisticated electronic device you own, your vehicle, has more computing power than a space shuttle. Today, you find **up to 2200 terminals in up to 280 housings** to power it.

Connection Systems: Housings

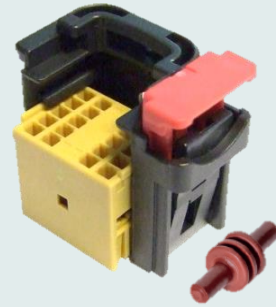
One of the industry's most complete automotive connection system portfolios. Available for device and in-line connections for most vehicle applications, with various terminal type options.



Segments



Powertrain & Engine Area



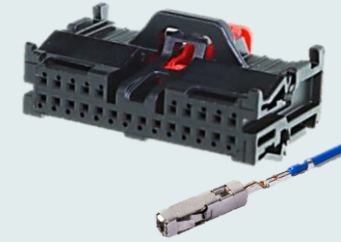
Active & Passive Safety



Body & Chassis



Multimedia



Interior

Applications

- Engine sensors
- Fuel injectors
- Wiper systems
- Cruise control
- Engine control module

Active:

- Anti-lock braking
- System / electronic
- Stability control
- Electronic park brake
- Traction control

Passive:

- Passenger occupant detection system
- Sensing diagnostic module

- Seat systems
- Ride control
- Power steering
- External lighting
- Door controls
- Mirror features
- Body control module

- Radio
- Speakers
- Amplifiers
- Rear seat entertainment
- Navigation
- Telematics

- Climate control
- Multifunction switch
- Ambient lighting
- Accessory power outlet
- Overhead systems
- Clusters

Connection Systems: Terminals

A full range of terminals providing a perfect combination between electrical and mechanical performance.



Segments					
	Standard One-Piece	Standard Two-Piece	Ring Terminals	Bus Bars	Other
Applications	<p>Products:</p> <ul style="list-style-type: none"> • OCS • SICMA • APEX (Male) • MTS-ST • GTS • GT • Metri Pack • HES 	<p>Products:</p> <ul style="list-style-type: none"> • CTS & TTS • DCK • DSQ • DCS • MTS • DuoTwin • DTK • BTS • APEX (Female) • DUCON • HDK • HETS 	<p>Products:</p> <ul style="list-style-type: none"> • Standard • With integrated nut • Stackable • Battery terminals • AI cable application • Special application 	<p>Products:</p> <ul style="list-style-type: none"> • One-piece • Clinched • With bolts 	<p>Products:</p> <ul style="list-style-type: none"> • Clips • Splices • Tuning Forks • Tabs

Mechatronic Packages and Pin Headers



Segments



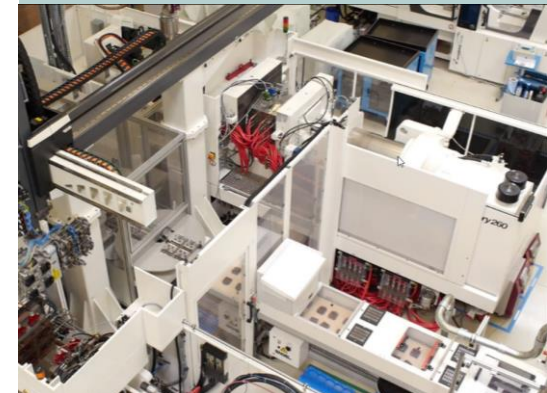
Mechatronic Packages



Pin Headers



Press-fit Based Pins



Assembly Technology

Applications

Pin count @ 2 ~ 100 pins
Product outline > PCB dimension
Includes other mechanical functions

- ABS & ESC housings
- Radar & Lidar housings
- Sensor housing (pressure, acceleration)
- Air management (TPS cover, sensor)
- Fuel supply (injector headers)
- Sub systems
- Transmission
- Exhaust treatment

Pin count 2 to 300+
Product outline < PCB dimension

- Engine control
- Body & security
- Comfort
- Passive safety
- Steering
- Data ports

0.40, 0.60 & 0.80 product family

- Engine management (ECUs)
- Restraint controller (SDMs and PODS)
- Radar housings (SRR, MRR)
- Other modules (Body controller, Seat Modules)
- In-house high speed stamping

Automated manufacturing capabilities

- Globally aligned processes for best-in-class production capabilities
- Tailored to customer & product
- Complex over molding & multi-component molding
- Highly integrated assembly solutions
- Fully automated EoL inspection

Safety Restraint Systems (SRS)

The world's leader in safety restraint connection systems. A critical part of each vehicle's safety systems.



Segments



**SRS Pigtails
Cockpit Applications**



**SRS Sealed
Harsh Environment**



**SRS Jumper
Sub-Assemblies**



Retainers

Applications

- Frontal airbags (driver, passenger, knee, steering column)
- Side airbags (thorax, pelvis, head)
- Pretensioners (belt, buckle)
- New Applications (center airbag, inflatable belt)

- Hood lifters
- Windshield airbag
- Battery disconnect


- Adapter assemblies directly delivered with the SRS module

- Igniter interface inserts for all major standards (ABX-5, AK-2, AK2+, AK-1, FCI)

Data Connectivity: High Speed Cable Assemblies

A complete line of data connectivity products enabling the linkage of vehicle occupants with the vehicle environment. Seamlessly transmitting gigabits of data.

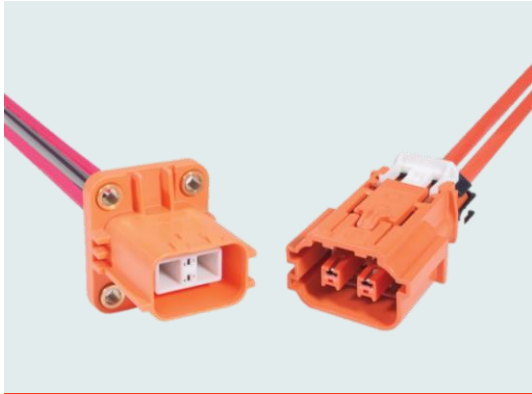
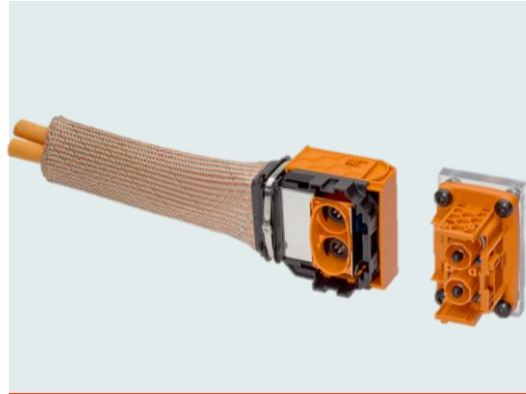


Segments	 Multicore Links	 Coax Links	 2-wire Links
Applications	<ul style="list-style-type: none">• USB Standard A / mini B• USB / LVDS / multi-protocol connections• Data rates up to 2.5Gbps• Camera & infotainment	<ul style="list-style-type: none">• Fakra stamped & formed sealed and unsealed• RF Antennas• LVDS / APIX connections• MiniCoax with optimized package size & performance	<ul style="list-style-type: none">• AMEC: Unshielded 100Mbps / shielded 1Gbps Ethernet• H-MTD: Shielded 1G/5G/10G Ethernet• High data rates for ADAS / Autonomous driving

High Power / High Voltage: Interconnects

Leading the way in vehicle electrification solutions for OEMs and device manufacturers globally.



Segments	 High Voltage Auxiliary Modules	 High Voltage Power Conversion
Applications	<p>Applications up to 40A, 1000V Integrated HVIL 2W-4W systems, inline, splice systems</p> <ul style="list-style-type: none">• DC converter• On-board charger• Electric air conditioning• Electric heater• Coolant heater control	<p>Applications up to 250A, 1000V Integrated HVIL 2W, 3W systems, pass-thru systems</p> <ul style="list-style-type: none">• Inverter• Drive motors• Motor generator unit• Battery

High Power / High Voltage: Inlets

Leading the way in vehicle electrification solutions for OEMs and device manufacturers globally.



Segments



Charging Inlets

Applications


All global vehicle interfaces
Temperature sensing
Custom designs for OEM needs

- SAE J1772
- IEC type II
- GB-T
- Combo 1/Combo 2 fast charge

High Power / High Voltage: Charging

Leading the way in vehicle electrification solutions for OEMs and device manufacturers globally.



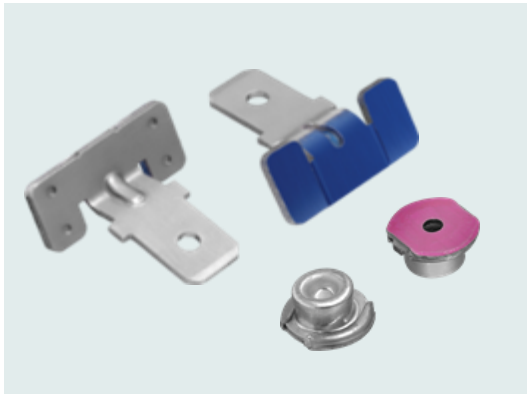
Segments	 <p>Chargers and Charging Cables</p>
Applications	<p>Global certifications Global vehicle interfaces Temperature protection grid plug Charging up to 11KW power</p> <ul style="list-style-type: none">• Mode 2 EVSE• Mode 3 cable assemblies• Interface pigtails for charging

On-glass Connection Systems

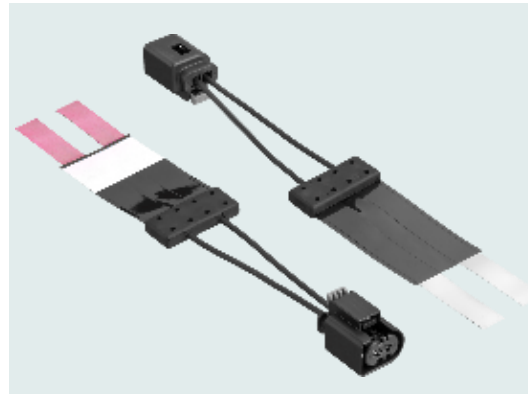
Providing the complete part and process solution for power and signal applications.



Segments



Pre-soldered and Pre-fluxed Terminals



Specialty Cable Assemblies



Soldering Systems

Applications

Customized terminal solutions with precise solder dimensions

- Power connection for heated rear window
- Ergonomic and low profile button terminals with low contact resistance
- Lead or lead-free solder
- For use on laminated or tempered glass

Customized specifications for space, weight, packaging, and functionality requirements


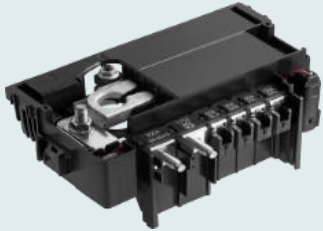
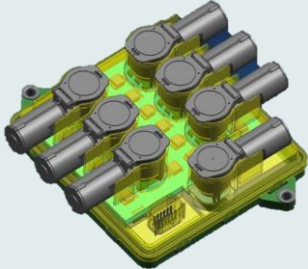
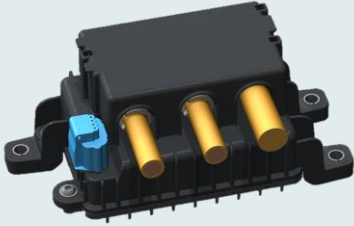

- FFC's for heated windshield connections
- Braided wire assemblies for high current applications
- Coaxial and wave trap antennas
- Anti-theft glass sensor connections

Q Box soldering controller is the base of the system

- Customized resistance soldering application equipment
 - Single or multiple solder joints
- On-Glass application engineers located globally to setup, monitor, and troubleshoot process conditions

Electrical Centers: Power Distribution, Switching and Circuit Protection



Segments					
	12V Electrical Centers	Battery Electrical Centers	48V Electrical Centers	12V (Stop/Start) High Power Switching	Discrete Solid State Controls
Applications	<ul style="list-style-type: none"> • Power distribution, switching, and circuit protection • Solid State, PCB or Hard-Wired technology 	<ul style="list-style-type: none"> • On-battery circuit protection • Optional battery disconnect, start/stop load switching 	<ul style="list-style-type: none"> • 48V solutions • Traditional and Solid State circuit protection • Arc fault prevention and detection 	<ul style="list-style-type: none"> • Dual power source smart switching • Voltage stabilization • Solid State 	<ul style="list-style-type: none"> • Capable of driving resistive, capacitive and inductive loads • Replaces EM relays and discrete circuits • 10 to 40 Amp applications

Consumer Connectivity: Media

Aptiv offers a complete set of digital data connectivity solutions allowing an easy connection to charge and broadcast passenger media within the vehicle environment.



Segments		
	Consumer Connectivity Media Modules	RSE (Rear Seat Entertainment) Peripherals
Applications	<ul style="list-style-type: none">• USB 2.0 and 3.0 data hubs• Support for Apple CarPlay™• USB Type A and Type C connectors• USB Type A and Type C chargers• Type C USB power delivery• HDMI data serializers	<ul style="list-style-type: none">• Analog headphones• Digital headphones• Transmitter solutions• Remote controls

Consumer Connectivity: Wireless Charging

Aptiv offers a range of wireless charging solutions allowing for user-friendly wire-free device charging.



Segments

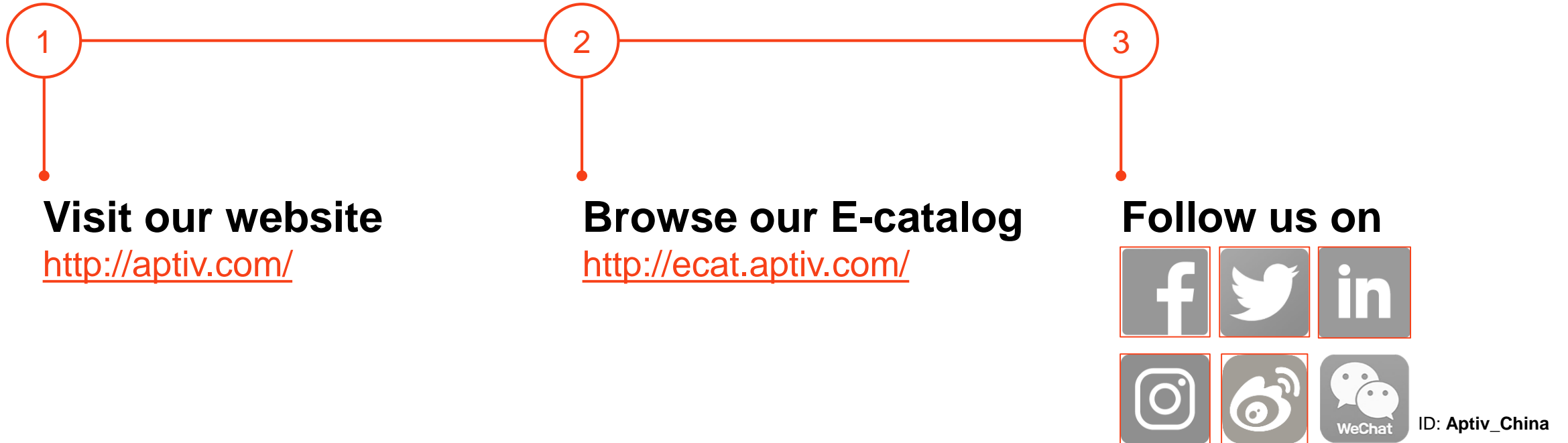


Wireless Charging Systems

Applications

- Wireless charging for end user devices (mobile phone, Apple series products, tablet)
- Meets WPC Qi standard
- Near Field Communication (NFC) capability
- Automotive compliant design incorporating CAN/LAN interfaces
- Low standby power and Foreign Object Detection (FOD)

To Learn More About Us



Thank you.