HOW SEMICONDUCTORS ARE ENABLING THE ELECTRIC VEHICLE REVOLUTION

SIA WEBINAR JUNE 8TH 2021

RAY CORNYN VP&GM, AUTOMOTIVE PROCESSORS
NXP SEMICONDUCTORS WORLDWIDE

60 years of combined experience and expertise
Operations in more than 30 countries worldwide
Approximately 29,000 employees
Headquarters in The Netherlands – Eindhoven

AUTOMOTIVE
Enabling carmakers to develop smarter solutions for complex autonomy, connectivity, and electrification challenges
Accelerating the shift to greater mobility

INDUSTRIAL
Reducing wasted time, money, and effort by helping business run more efficiently.
Enabling more efficient data processing

MOBILE
Giving wearable and mobile devices easier access to the services that make modern life more convenient without compromising security and safety.
Transforming how people and devices connect

SMART HOME
Solutions that listen, learn, and adapt into the places we call home for more comfort, affordability, safety, and convenience.
Powering the intelligence behind the technologies

SMART CITY
Simplifying how people access and interact with local services to achieve new standards of sustainability, efficiency, mobility, and economic growth.
Anticipating the demands of tomorrow

COMMUNICATION INFRASTRUCTURE
Powering insights and inspiring performance with hardware solutions for handling 5G connectivity across the emerging communications spectrum.
Delivering real-time responsiveness at the speed of 5G
NXP AUTOMOTIVE PROCESSORS

SAFETY

ELECTRIFICATION

CONNECTED CAR
## Value Shift from Copper to More Safe and Secure MPUs & MCUs

### Year 2000 vs. Year 2030

<table>
<thead>
<tr>
<th>Category</th>
<th>Year 2000</th>
<th>Year 2010</th>
<th>Year 2020</th>
<th>Year 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Processors per Car</strong></td>
<td>~10</td>
<td>~30</td>
<td>~45</td>
<td>~60</td>
</tr>
<tr>
<td><strong>Domain/Zonal Controllers</strong></td>
<td></td>
<td>EMERGING</td>
<td></td>
<td>~4</td>
</tr>
<tr>
<td><strong>Lines of Code</strong></td>
<td>4K</td>
<td>10M</td>
<td>100 - 200M</td>
<td>500 - 1,000M</td>
</tr>
<tr>
<td><strong>Copper Wiring</strong></td>
<td>20 m</td>
<td>0.5 Km</td>
<td>1.2 Km</td>
<td>COPPER WIRING REDUCED ~50%</td>
</tr>
<tr>
<td><strong>Weight of Wiring Harness</strong></td>
<td>10 Kg</td>
<td>30 Kg</td>
<td>75 Kg</td>
<td>WEIGHT REDUCED ~50%</td>
</tr>
<tr>
<td><strong>Data Generated per Day</strong></td>
<td>MB’s</td>
<td>2-3 GB</td>
<td>50 GB</td>
<td>10-12 TB</td>
</tr>
<tr>
<td><strong>Data Transfer per Day</strong></td>
<td>MINIMAL</td>
<td>50 MB</td>
<td>1-2 GB</td>
<td>40-50 GB</td>
</tr>
</tbody>
</table>

Source: Strategy Analytics, OEM/Tier1 public statements, New York Times, NXP CMI
LOGICAL AND PHYSICAL TRANSITIONS ACCELERATE MPU & MCU NEW FUNCTIONALITY

TODAY
TRADITIONAL
FLAT ARCHITECTURE

2025+
DOMAIN PLUS ZONALIZATION
PLATFORMS

TWO PARALLEL ARCHITECTURAL CHANGES

1. DOMAIN FOCUS: SCALABLE AND CENTRALIZED SOFTWARE DEVELOPMENT
   1. Flexible & scalable software environment
   2. Efficiently supports the user defined vehicle
   3. Centralized OTA, easily upgradable Software

2. ZONAL FOCUS: SIMPLIFIED WIRING AND CONNECTIVITY
   1. Dramatically reduced wire routing and cable costs
   2. Flexible data monetization
   3. Easily upgradable Hardware
AUTOMOTIVE PROCESSORS AND APPLICATIONS:

CORE VEHICLE PLATFORM DOMAINS

Focused on **safe control** and driver comfort

**Auto quality**: Robust, **safe**, **secure** and **reliable**

Foundational across all types of vehicles

OPTIONAL AND MODEL DEPENDENT DOMAINS

Regularly upgraded

Optional features across a vehicle line

Fashion and time sensitive
NXP-AWS CONNECTED ELECTRIC VEHICLE MANAGEMENT SOLUTION DEMONSTRATION

SOFTWARE DOMIAN INTEGRATION

WHAT FUNCTIONS DOES THE PROPULSION DOMAIN CONTROLLER PERFORM?

AWS Connected Mobility Solution

Battery Management System

NXP GoldBox

Service-oriented Gateway with AWS IoT Greengrass

NXP GreenBox II

Powertrain Domain Control

Electric Motor Drive (Left)

Electric Motor Drive (Right)
NXP AUTOMOTIVE PROCESSORS
ELECTRIFICATION FOCUS

Battery Management

Electric Motor Control

xEV Domain Control

NXP AUTO M OTIVE PROCESSORS
ELECTRIFICATION FOCUS
SECURE CONNECTIONS FOR A SMARTER WORLD