Conclusion Panel

CONNECTED & AUTONOMOUS CARS
tens of millions of Lines of Code

Moderator: Philippe Gicquel

Egil Juliussen, IHS
Laurent Meillaud, journalist
Roger Lanctot, Strategy Analytics

How will automotive industry overcome the challenge?

Open Source Software  Standardization  Ecosystem  ...

Genivi
Egil Juliussen

BACKUP SLIDES
Infotainment: Connected Car vs. Head-Unit

**Head-Units**
- 3 main segments
  - Audio only
  - Display audio
  - Navigation

**Driver-Centric Content**
- Internet radio
- Cloud content
- Apps

**Connected Car**
- 1 or more connections:
  - Embedded modem
  - Via Smartphone/MP

**Car-Centric Content**
- Remote diagnostics
- OTA software updates
- Cyber-security
- VRM

**Autonomous Driving**
- ADAS, SDC, DLC

**HMI Tech**
- CSD, HUD
- ICD display
- Speech
- Gesture

**Smart Home**
- Mostly via SP

**Wearables**
- Mostly via SP

**SOURCE:** IHS Automotive

MP=Mobile Phone; SP=Smartphone; VRM=Vehicle Relationship Management; SDC=Self-Driving Car; DLC=Driverless Car; OTA=Over-the-Air; C-S=Cyber-Security
Auto Software Complexity Path

“Embedded Controllers”
- Simple SW control program
- Fixed middleware
- Fixed function app or apps
- BoM cost minimization
- LoC* counted in thousands

“Apps Computers”
- Complex operating system
- Computer middleware
- Industry-specific middleware
- Multiple changeable apps
- LoC* counted in millions

Software Complexity

LoC=Lines of Code; IT=Infotainment

SOURCE: IHS Automotive
High-Tech Impact Evolution

H-T as
DLC CaaS
Competitor

H-T as
T1-OEM
Competitor

H-T as
T1-OEM
Supplier

Battery EV
• Luxury BEV: Tesla
• More start-ups

Connected Car
• Smartphone Apps
• Content via CP-AA

Connected DLC
• Content consumption
• Content for work

SDC & DLC BEV
• CaaS business model
• Ownership model

ECU Chips
• MPUs & memory
• Sensors & more

ECU Chips
• MCUs & SoC
• ADAS sensors

ECU Chips
• Multi-core SoC
• SDC-DLC sensors

ECU Software
• Operating System
• Middleware & apps
• Navigation maps

ECU Software
• Remote SW update
• Cyber-security
• ADAS & DL apps

ECU Software
• SDC & DLC SW
• Cyber-security & OTA
• HD maps & DL apps

DLC CaaS Fleets
• Mobility services
• Anyone & Everything

CP=CarPlay; AA=Android Auto; DL=Deep Learning; CaaS=Car-as-a-Service; SDC=Self-Driving Car;
DLC=Driverless Car; OTA=Over The Air; SoC=System on Chip

SOURCE: IHS Automotive