Smart Mobility in Action

@ EcoMobility World Congress 2017

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Who We are

- A global semiconductor leader
- 2016 revenues of $6.97B
- Listed: NYSE, Euronext Paris and Borsa Italiana, Milan

Approximately 43,500 employees worldwide
- Approximately 7,500 people working in R&D
- 11 manufacturing sites
- Over 80 sales & marketing offices

As of December 31, 2016
Application Strategic Focus

The leading provider of products and solutions for Smart Driving and the Internet of Things

Smart Driving
- Safer
- Greener
- More connected

Internet of Things
- Smart Industry
- Smart Home
- Smart City
- Smart Things

Addressing a Serviceable Available Market (SAM) of around $150B
2016 Revenues

% by product group

- Analog and MEMS Group (AMG): 23%
- Microcontrollers and Digital ICs Group (MDG): 33%
- Automotive and Discrete Group (ADG): 40%
- Others: 4%

% by location of order shipment

- Americas: 15%
- EMEA: 27%
- Asia Pacific: 58%
The way ahead, Smart Mobility
Megatrends in Smart Mobility

- Mobility On-Demand
- Autonomous Driving
- Electrification of Vehicles
- Large increase of Semiconductor content
Societal Changes: MOD will replace Private Cars
- 30% to 60% of people in Large Cities will switch to Autonomous MOD -

Cost of Vehicle Ownership today:
0.9$ / Mile in MSA’s, 0.75$ Nationwide

Alternatives keep proliferating
Cost of Alternatives keeps decreasing

Service Experience: cheaper, more convenient, safer, efficient, more clean, waiting time

- In the US it will reduce the number of Cars on the Road by 18.5 Munits by 2030
- The entire Population of Singapore could be served by 1/3 of the Vehicles if they were Autonomous MOD’s

Source: Deutsche Bank, 2016
Automation will increase and will bring an estimated **120BUS$ opportunity**, The Semiconductor Content per car will be **1000US$**

- From today 350$ and 450$ will come from ADAS alone.
Automation worth 120B$ for SW and HW - by 2030-

50% of the 100M Cars produced will have 1000$ of technologies (ADAS…)

50M Cars x 1000$ = 50B$

35% will have Active Safety (AEB)
3.5 M Cars x 300$ = 10B$

15% will be full Autonomous and will have 4000$ of Technologies
15 M Cars x 4000$ = 60B$
Key Factors for Automation

Power of Computation
- New Artificial Intelligence Development Tool
- Multi-Agent Interactions, Probabilistic Predictions
- Path Planning, Self Learning

Advanced Mapping
- Improvement in 3D Map
- Wide dissemination of GPS, with Redundancy for localization and accuracy

Everything Sensed and Connected
- Accurate Vision Sensors (360 degrees), with Redundancy

Smart World
- Internet of Things
- Smart Environments
- Connected car
- Wearable technologies
- Secure world
ST: Global and Diversified Automotive Leader with over 30 Years Experience

Broad Automotive Offer
- Automotive Microcontrollers
- Infotainment and Telematics
- V2X
- Radar & Vision
- Automotive Sensors
- Power & Smart
- Power & Smart

Market Share (on SAM)
- 32% of ST revenue
- 9%
- 2016
- >$2.2B Revenue
- +6% Y-o-Y
- 2015
- $2.1B Revenue

ST Leadership in key Automotive Applications
- Engine Management
- 24 GHz RADA
- ADA S Safet
- Entry & Mid-end Telematic
- Car Audio Amplifier
- GNSS
- Smart Power

Source: Strategy Analytics, ST
Strong Commitment to Automotive

36 ST components on average for each new car produced, up to 800 ST components in premium models

Increasing Component Count by ST: 2015 → 2017

Electric Premium Model

(*) including surround view
Today, a premium class vehicle contains on average
• **130** electronic control units (ECU’s) and
• about **150** motors and actuators

Within the new Audi A8 (2018 model) there is an average of about **8,000** total active semiconductor components, including
• more than **1,000** LEDs and LASER diodes
• **several hundred** microcontrollers, ASICs, memory, processing units
• as well as more than **1,000** power semiconductors
• and **several hundred** sensor elements

ST provides between ~**720 to 1040** semiconductor components in the new Audi A8, depending on the options and car version
The Building Blocks of Smart Vehicles are here

**Sensors & Actuators**
- Vision Sensors
- Actuators
- Ranging Sensors: Radar, Lidar, Sonars
- ASIC’s

**Processing**
- CPU, GPU, MCU
- Sensor fusion

**Connectivity**
- Ultra-low power connectivity
- PMIC’s
- Analog

**Power**
- IGBT, MOSFET for Energy conversion
Other Smart Mobility requirements

- **Vertical integration**: Focus on few big pilot projects for vertical applications, such as Autonomous Driving for On-Demand Mobility.

- **Ecosystem**: Gathering the full chain: Semiconductor Suppliers, Tier1, Automakers, Digital Companies, Start-ups.

- **Standardization**: Define the level of Automation And Build up the associated infrastructures.

- **Regulation**: Governments play a big role as an enabler or a blocker.
Thank you!

ST stands for life.augmented