Created leading portfolio of advanced technologies
UNMATCHED POSITION IN MOBILITY & SERVICES WITH DEEP CAPABILITIES IN SOFTWARE DEVELOPMENT, AUTOMOTIVE GRADE INDUSTRIALIZATION AND SYSTEMS INTEGRATION.

~50 PhDs in applicable fields

250+ Engineers devoted to automated driving

~70 cars today with 150+ on the road by end of 2018

10M controllers with embedded OTA by 2020

Mountain View

Pittsburgh

Boston

Wolfsburg

Singapore

Shanghai
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
Commercial applications will be first to market and pave the way for consumer applications

- **Economics**
  - Adoption driven by economics rather than just safety or convenience (autonomous mobility on demand, ...)

- **Regulatory / legal environment**
  - Simplified regulatory and legal environment at the local level vs. federal/state

- **Use cases**
  - Limited use cases in commercial applications in contrast with the consumer market – geofenced areas with tele-operations and infrastructure support

Aptiv focused on deploying in AMoD market to develop and validate products and technologies for OEM market

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**Autonomous Driving Market Evolution**

- Global fully autonomous (L4+) vehicle sales penetration (%)
- 2020 - 2035
- Personal AV
- Autonomous mobility on demand (AMoD)

**Increasingly complex driving scenarios**

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*Aptiv Overview Presentation | February 2018 | Aptiv*
Autonomous driving technology overview

**What do I see?**

**Where do I go?**

**Let’s go!**
Sensing and perception: Why autonomous driving needs all three modalities

Fusion of the three modalities delivers the most robust, safest system

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L1 – Simple Architecture
L4 – Future Architecture
Planning and behavior software is the core of the autonomous driving system

**Need for planning and behavior software**

- Planning creates the “path” for the vehicle to drive along
- Leverages both long-term plans (“where am I going”) as well as near-term planning (milliseconds)
- Enables vehicles to have “look and feel” of humans on the road
- Follows traffic rules, understands and learns from how humans behave

**Case for two redundant software stacks**

Automotive grade functional safety requires fully redundant software stacks for fail-operational capability
- Separate world model, path planning, and behavior and arbitrating control system required

Two redundant software stacks provides performance benefit over one stack and therefore faster time to market

Two redundant software stacks becoming automotive industry standard

Automotive-grade autonomous driving software solution requires mix of deep robotics and automotive functional safety capabilities
Developing an autonomous driving platform

**Autonomous Driving Technology**
Sensors, compute platform, software

**Vehicle Platform**
Partner to deliver vehicle chassis, shell
- **2018-2019**: Passenger vehicle
- **2020+**: Custom vehicle built for mobility

**Aptiv Autonomous Driving Platform**

**Mobility Cloud**
Aptiv cloud elements/infrastructure and APIs to external partners

**Infrastructure**
Platform to integrate urban and intrastate mobility services to deliver end-to-end solution
THANK YOU