



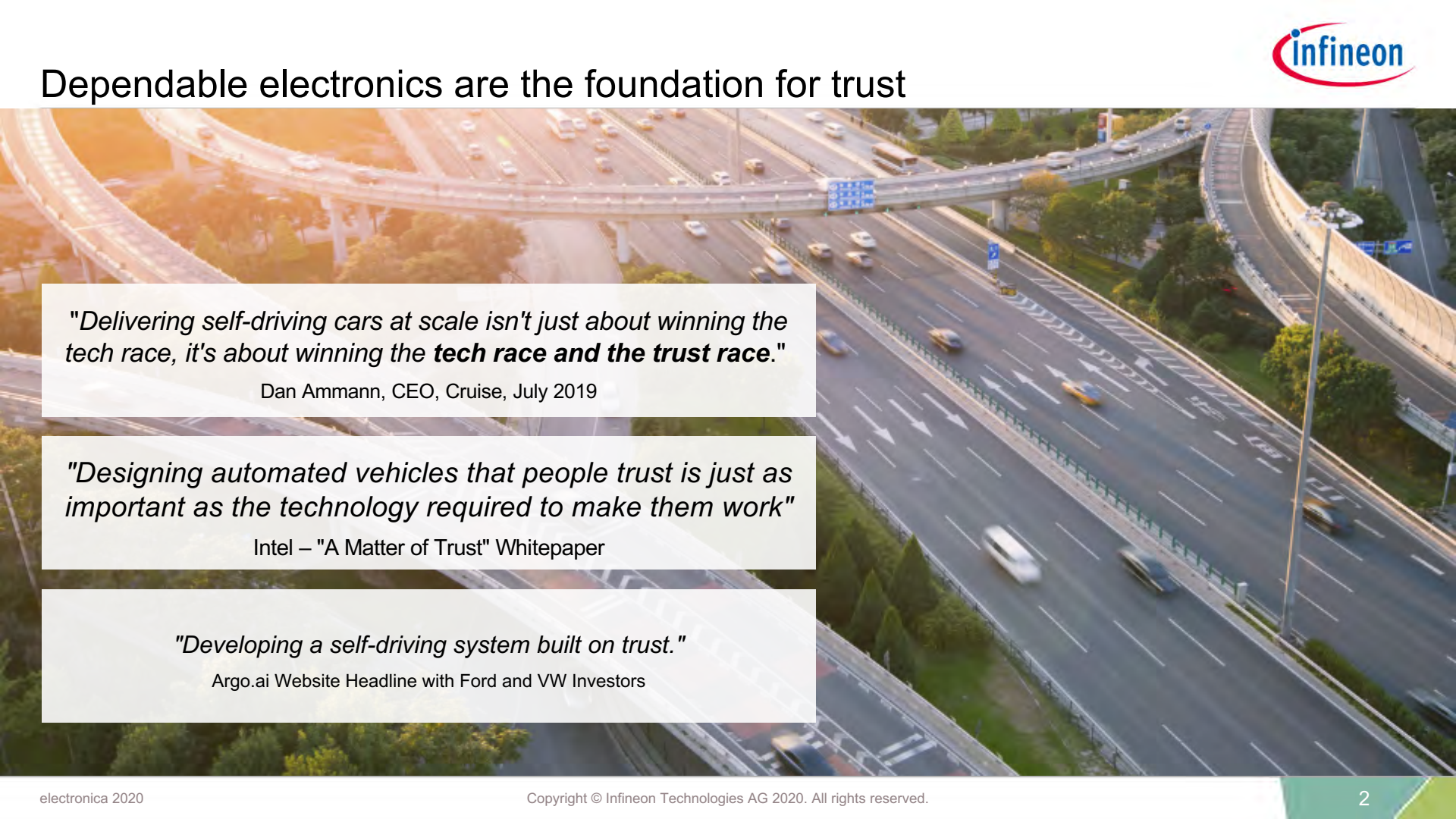
We are the link  
between the real and  
the digital world.

# Infineon Automotive Dependability

Infineon's virtual show 2020



# Dependable electronics are the foundation for trust

An aerial photograph of a complex highway interchange with multiple overpasses and lanes. Several cars are visible on the roads, and there are green trees and grassy areas around the highway. The image is used as a background for the text boxes.

*"Delivering self-driving cars at scale isn't just about winning the tech race, it's about winning the **tech race and the trust race.**"*

Dan Ammann, CEO, Cruise, July 2019

*"Designing automated vehicles that people trust is just as important as the technology required to make them work"*

Intel – "A Matter of Trust" Whitepaper

*"Developing a self-driving system built on trust."*

Argo.ai Website Headline with Ford and VW Investors

# Dependability is the key driver for the megatrend automated driving



**Technology**



**Trust**

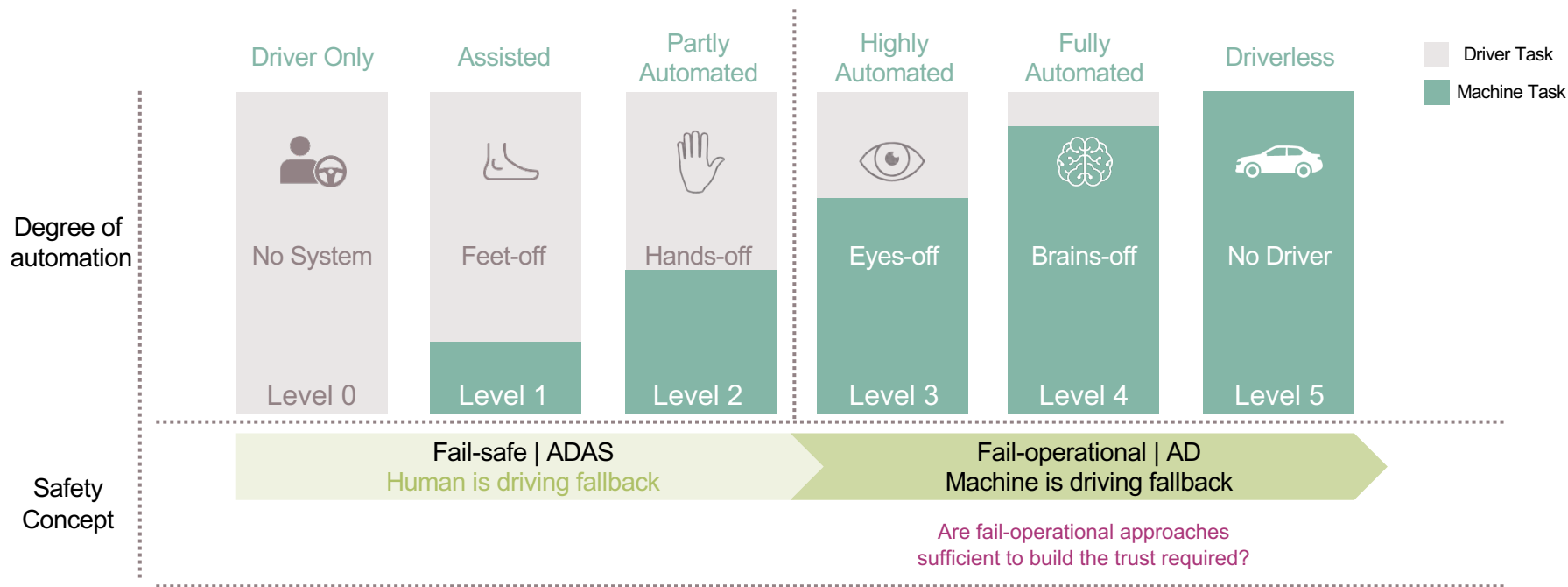


**Autonomous  
Driving**

**Dependability** definition | n.

The quality of being trustworthy or reliable; trust in safety

# Automated driving systems are fueling the need for trust



Higher level of automated driving require trust; trust requires dependable systems

Source: Barclays Research & Infineon



# Dependable systems are highly available and secure systems, increasing the need for more dependable electronics

**High Availability** | Ensure high availability beyond critical operations; a safe and secure system, that operates in all conditions

**Fail-Operational** | Mitigate potentially hazardous effects by ensuring critical operations in the event of a failure

**Fail-Safe** | in the event of a failure, system enters safe state

Automation



Lower levels (ADAS, <L2)

Failure



System enters safe mode

System



Reliable, robust, safe, secure



Higher levels (AD,  $\geq L2+$ )



System continues safety critical tasks



**Fail safe** + available



Higher levels (AD,  $\geq L3+$ )

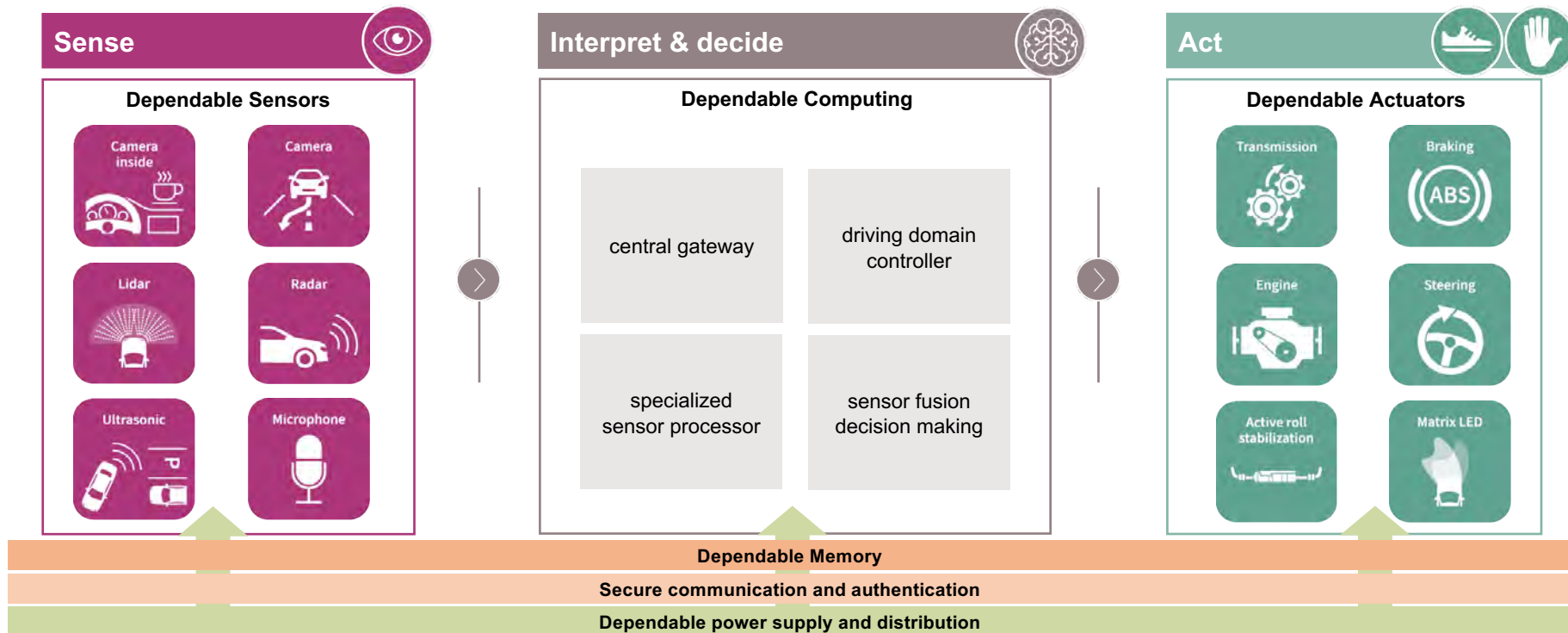


High availability in all conditions



**Fail operational** + highly available

# Trust requires dependable systems which are always available



Dependable systems require **secure** systems, which  
always **sense!** always **compute!** always **act!** are always **connected!** are always **powered!**

# But also, the increasing number of functionalities drive the need for dependable electronics

## Dependable systems

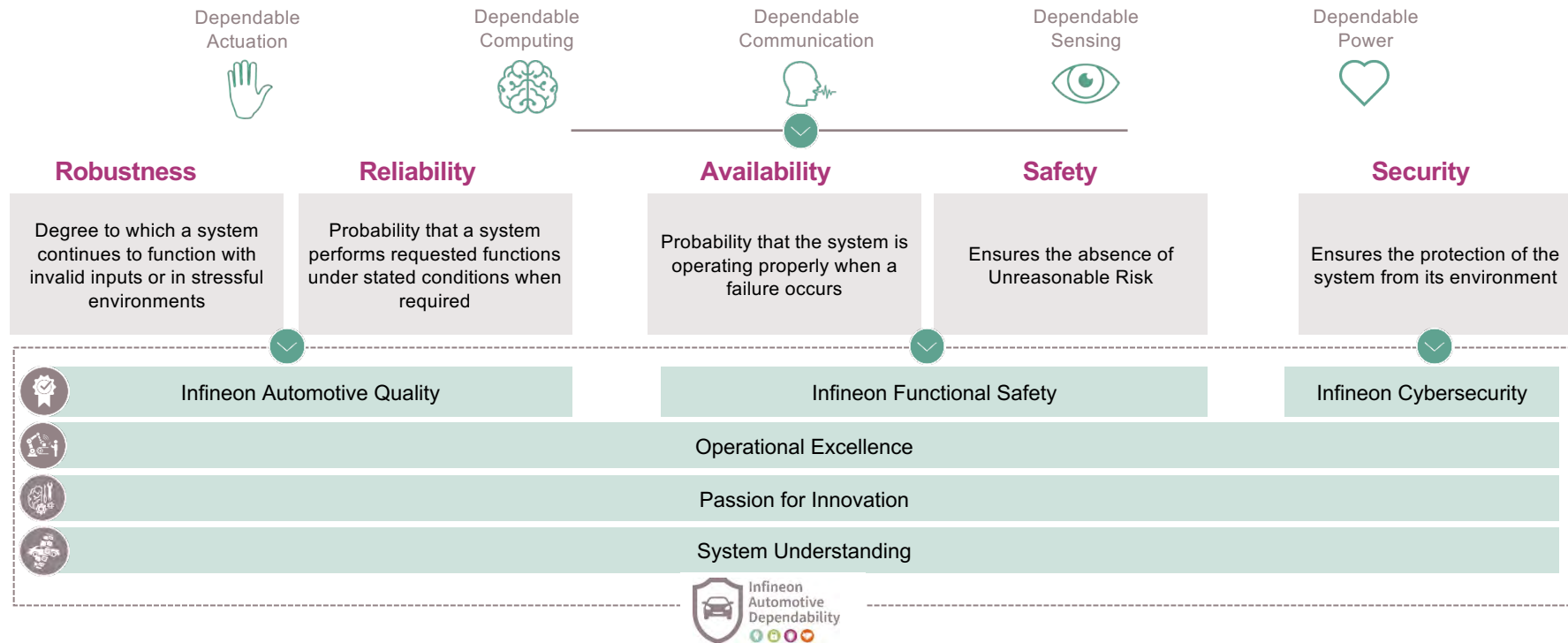
- › ...not only avoid and **mitigate** potentially **hazardous effects** (functional safety)
- › ...but also enable safe & secure autonomous **driving under all conditions** (secure high availability)
- › ... are **key to overcome** the ever **increasing number** of more functionality in cars



# We deliver dependable electronics which enable systems that are the foundation for trust



Secure dependable systems, which always sense, always compute, always act, are always connected, are always powered!





# Infineon is Automotive Dependability



## Dependable Electronics



## Dependable Partner through Premium Service



# Quality beyond the standards with a Zero Defect mindset



✓ Quality

🔒 Cybersecurity

🛡️ Functional Safety

**Dependable Electronics**

# Our competitive advantage: Differentiating as quality leader

## Our path

We do what we promise.  
That's quality made by Infineon.

## Our aspiration

Zero defect regarding the committed

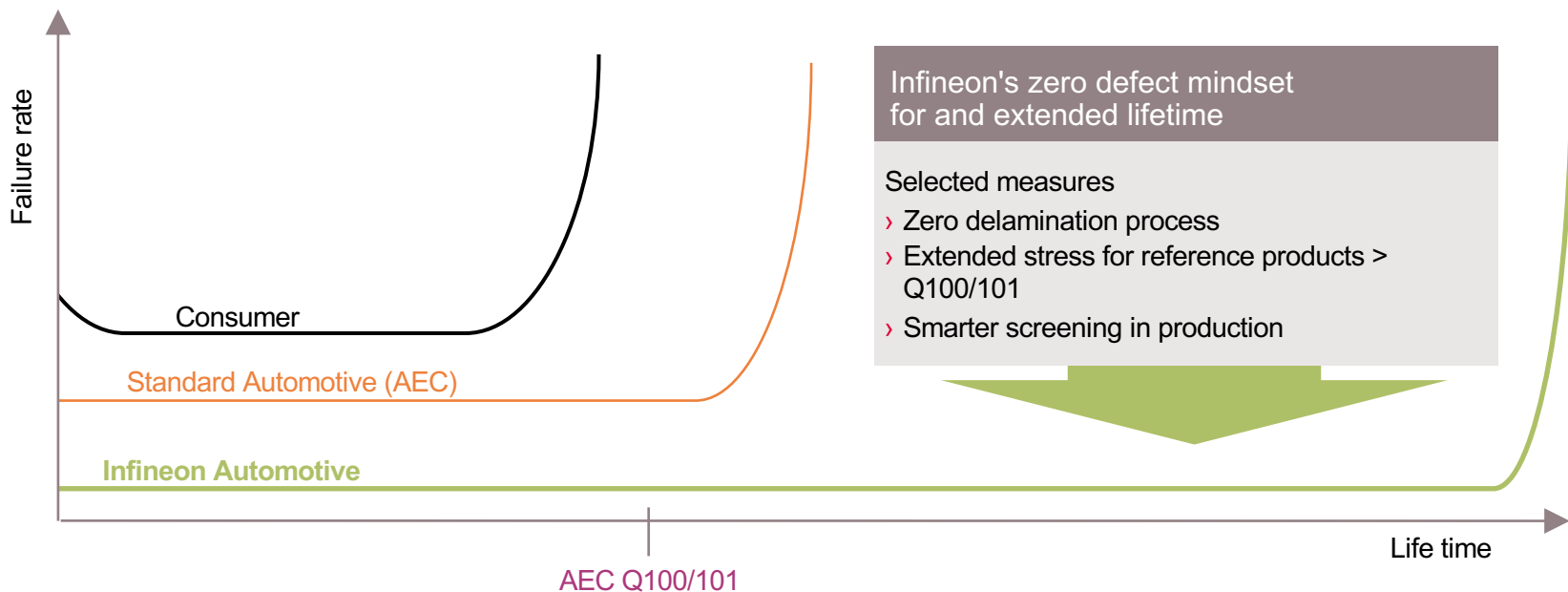
- › functionality
- › reliability
- › time
- › volume & cost

## Our foundation

International standards such as ISO 9001,  
IATF 16949, AS 9100, IEC 17025

# We go beyond the standards to better fit the real application requirements

## Highly engineered products to target Zero Defect over 15+ years of product life time



# Infineon Zero Defect mentality



We reduced our ppm rate significantly to sub ppm levels



We produce 24/7/365 and deliver Zero Defect for all but the last 3 seconds of a year



Most of our 8Ds are closed in less than 14 days



Regional network of failure analysis labs and strong localized competencies



Zero delamination approach



90% of our products are already Zero Defect



Infineon is your trusted advisor  
to make Functional Safety easy



✓ Quality

🔒 Cybersecurity

🔴 Functional Safety

Dependable Electronics












LANE  
ASSIST!



# With our strong Functional Safety experience we provide building blocks for integrating safety features



## ProSIL™ products support a safety use case

Customer use case	System Integration Efforts	Documentation	Safety Feature Description	Infineon Label
Design with safety product to develop its own safety system	 Use case specific	 Use case specific	Product with diagnostic or safety features	
Hardware integration using products developed with Infineon automotive processes	 Medium	 Safety App. Note	Safety analyses and customer documentation supporting ISO26262 system integrations	 ISO 26262 ready
System designed around Infineon components developed specifically for safety relevant applications	 Low	 Safety Manual	Product developed according to ISO26262 process with required documentation	 ISO 26262 compliant

# Agile thinking and approach to innovation builds upon trust to adopt new technology



## Infineon safety objectives

- › **Development** of products in compliance to ISO26262
- › **Innovative solutions** for safety critical applications
- › Future rising requirements of **ISO26262** compliant components with **increasing complexity**
- › **Efficient development processes in place** to design ISO26262 conform products

We have a track record of successful safety solutions, allowing you to focus on your own value-add.


# Infineon's Functional Safety approach



ISO26262

ISO26262 compliant  
development flow for our  
products

Fitted functional safety  
documentation



Robust Safety Mechanisms  
across components



Global support footprint  
simplifying the integration of  
safety features



Embedded software for  
functional safety



Broad ecosystem with an  
extensive partner network



# Next Level of Scalable & Agile Security Beyond the Standards



✓ Quality

🔒 Cybersecurity

🛡️ Functional Safety

Dependable Electronics



# A dependable communication in an interconnected system has security as an integral part

## No Safety without security

- › Security is a mandatory precondition for Safety
- › Safety is the most important asset to be protected
- › A dependable architecture is secure and safe

## Security is an architecture property

- › A secure EE-architecture is always built around a certified root-of-trust
- › Hardware/Software co-design is key for a strong protection scheme
- › Appropriate security is required on all layers of the EE-architecture

## Security is a moving target

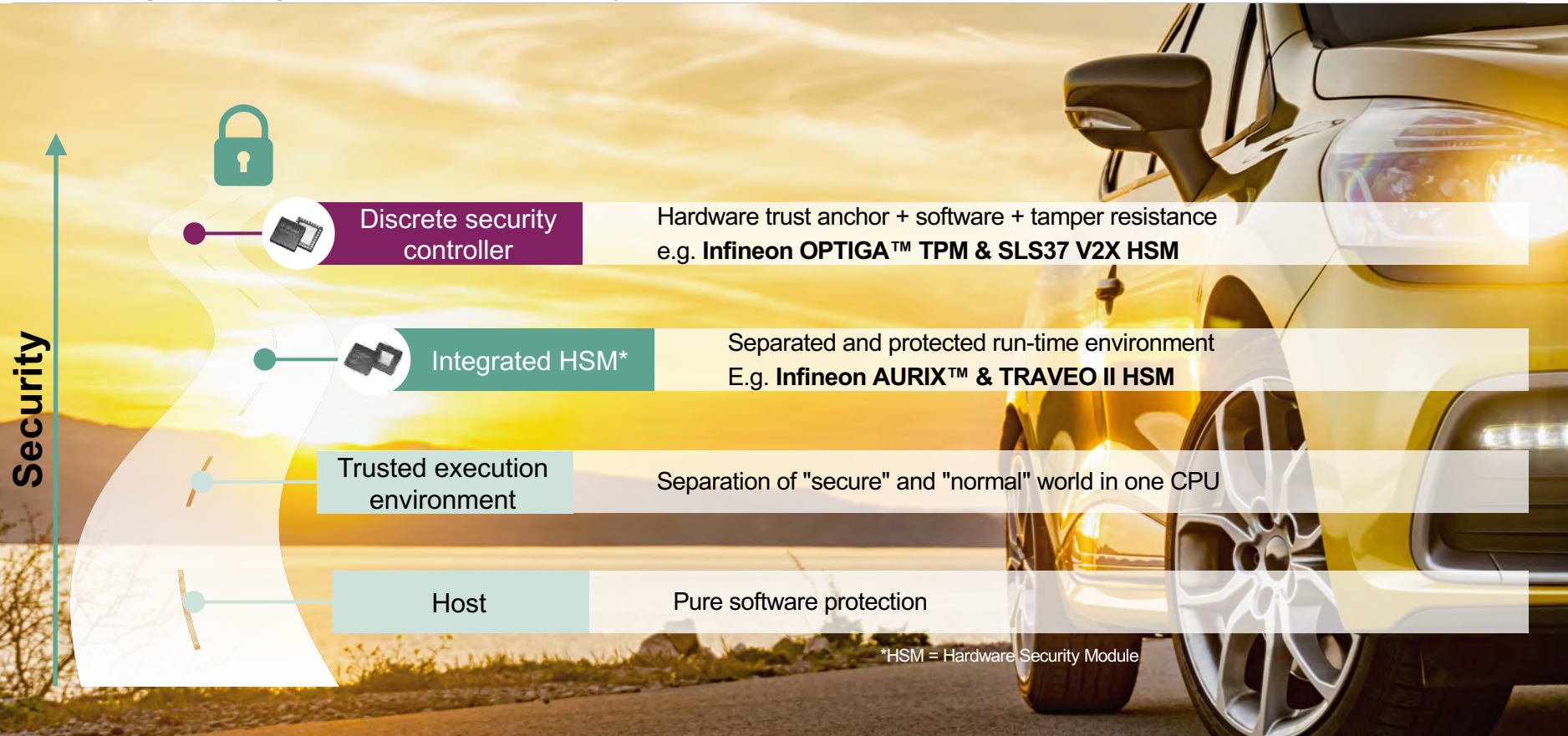
- › Security erodes over time
- › Always be ahead of the attacker's capabilities
- › Crypto-agility is a must – the right hardware is an enabler for this

## Security needs cooperation

- › Security by obscurity is not sustainable
- › Security standards allow transparent risk management over the complete lifecycle
- › Incident management processes across the whole supply chain have to be established



# We offer the most scalable automotive cybersecurity portfolio, meeting the right level of security



# Trusted advisor in security



Most scalable security product offering in automotive



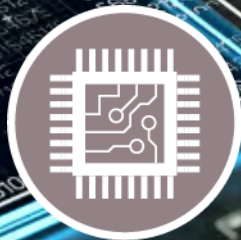
30+ years experience in security



Hardware and software security expertise



Partnership program including software and tool vendors for security



Security by Design



Trusted Advisor in security - standardization



Dependable Partner through  
Premium Service



## We are the number 1 partner in the fast changing automotive world

### Premium Services



#### Operational Excellence



#### Passion for Innovation



#### System Understanding



#### Global customer support and distribution

#### Expert service local to our customers sites

- › We provide expert quality analysis and support close to our customers
- › Consultative & trusted advisor product selection support
- › System & product technical experts to assist customer R&D teams
- › Project management support, safe launch & APQP

#### Operational excellence and automotive quality covering the full product lifecycle process

#### Disaster and risk management operations & logistics planning

#### Rigorous capacity planning & tight supply management processes

- › Continuously investing for reacting quickly to add future capacity
- › Digitized monthly short, mid & long term (5 year horizon) capacity planning
- › Standardized tight supply management system (integrated in planning system landscape)
- › Dedicated CLM organization

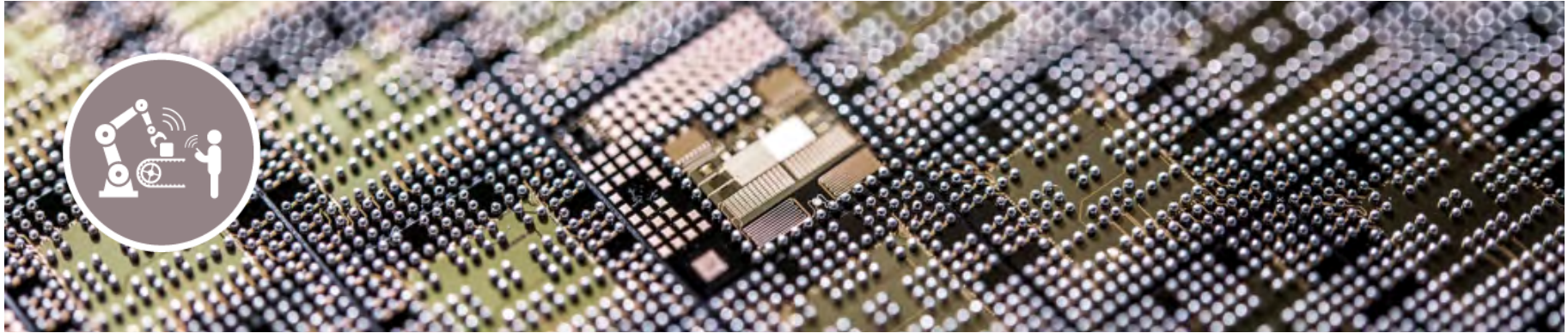
#### Fast T2M

Distribution is a key for Infineon growth supporting over 35k customers all over the world



# Operational excellence

## We continuously increase our supply chain robustness



- › High volume factories including 300mm and multi-site manufacturing **secures your supply**
- › Fully digitized End-to-End planning, short-term and long-term infrastructure preparation including a new 300mm factory in Villach **secures your growth**

- › Regional distribution & customer logistic centers offer close **proximity and fast response**
- › The tight supply management across all factories is digitized and **seamlessly integrated** into our **order management system**

- › Our comprehensive Business Continuity Management ensures **fast and agile response** to potential **threats**
- › Our **logistical excellence** is proven and honored by various awards

# Passion for innovation

## Infineon has long track record as innovation leader

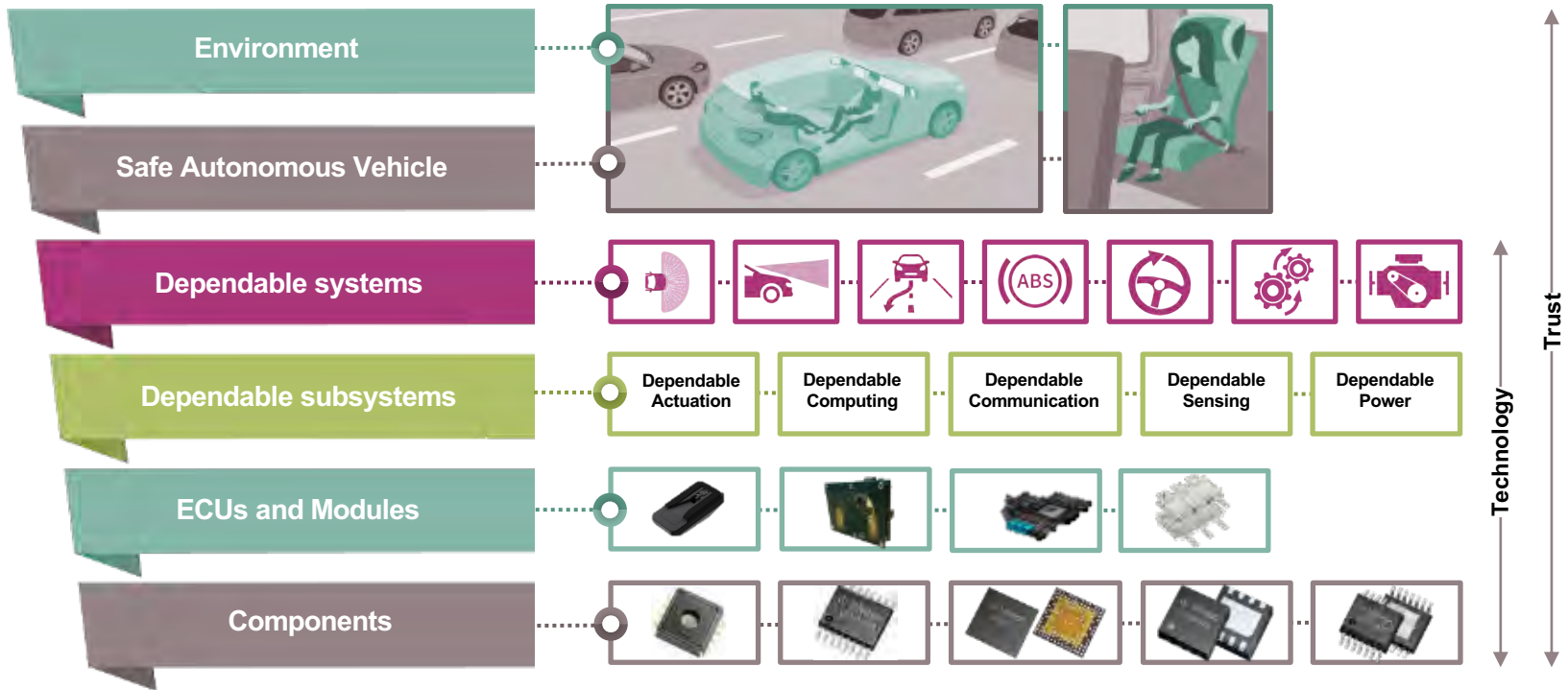


- › We develop technologies, packages and testing procedures, and processes as well as tooling in R&D for functional safety specifically **for automotive use cases**
- › We run a global network of 20+ own development centers providing **access to broad skilled engineering resources**

- › We cover the full R&D value chain from chip design, technology development, manufacturing and dedicated design tooling, **enabling full project ownership**

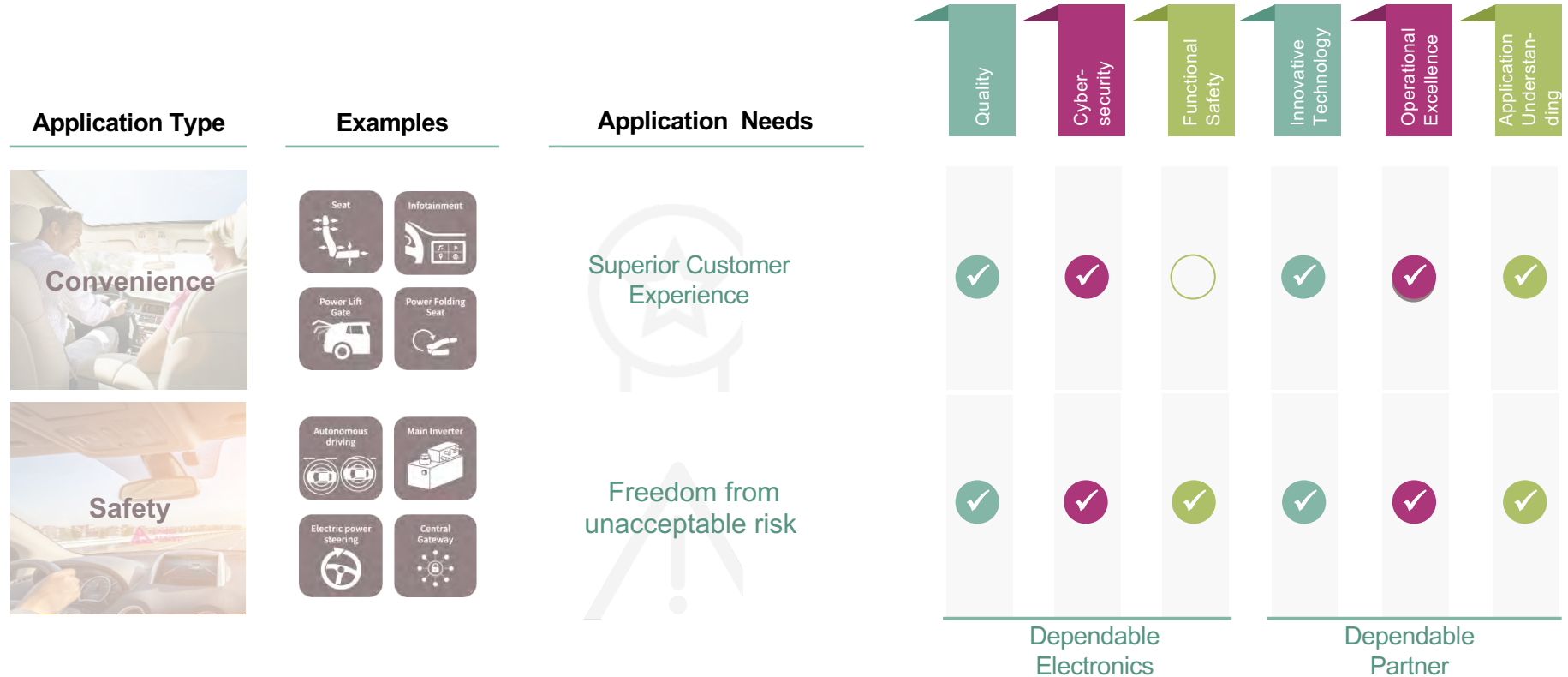
- › We are **innovation leader with a track record** of many successful newly introduced product categories
- › Worldwide collaborations with leading universities and research institutes **to early identify technical trends and develop competences**

# Dependability is part of Infineon's cultural mindset with system understanding as one of its key ingredients



**Infineon leverages a deeply embedded system thinking**

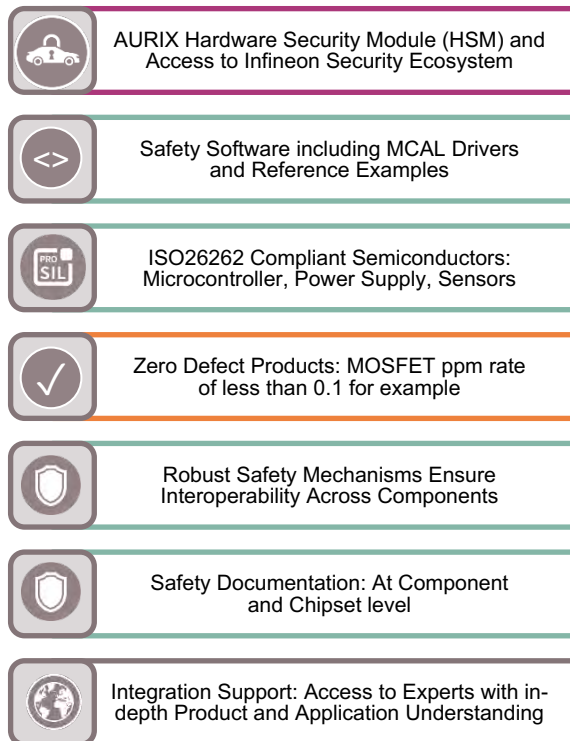
# The interactions of increasing functions require a partner offering premium services in addition to dependable electronics



# Two Examples of Infineon's dependable solution: Fail-operational Electric Power Steering and Radar Sensors



**Result:**  
Robust, redundant system which  
provides fail-operational  
functionality



■ Infineon Functional Safety   ■ Infineon Automotive Quality   ■ Infineon Cybersecurity



**Result:**  
High performance, reliable  
environmental sensing



# Infiniteon's dependable electronics

## We offer technology you can trust



### Passion for Innovation

Partnerships  
Device Performance  
Full R&D value chain

### System Understanding

Functional requirement  
Fail-Operational Systems  
Cybersecurity

### Trusted Supplier

Zero Defect Mentality  
Business Continuity  
Premium Services

Cybersecurity



Functional Safety



Automotive Quality



# Summary



We deliver dependable electronics which enable systems that are the foundation for trust.



Part of your life. Part of tomorrow.