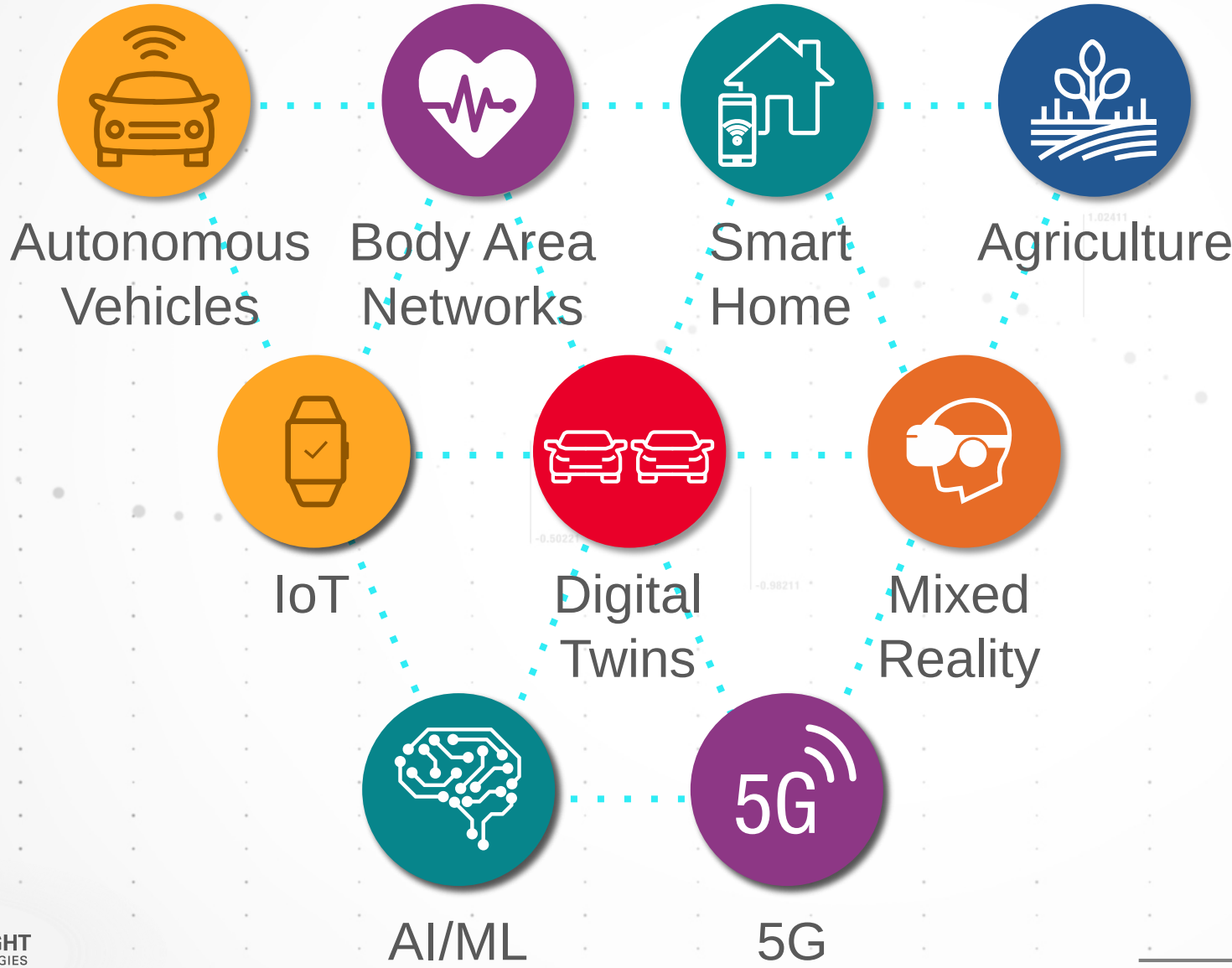
KEYSIGHT WORLD 2019

Connecting the Dots

Donna Majcen
Vice President, Keysight Global Marketing

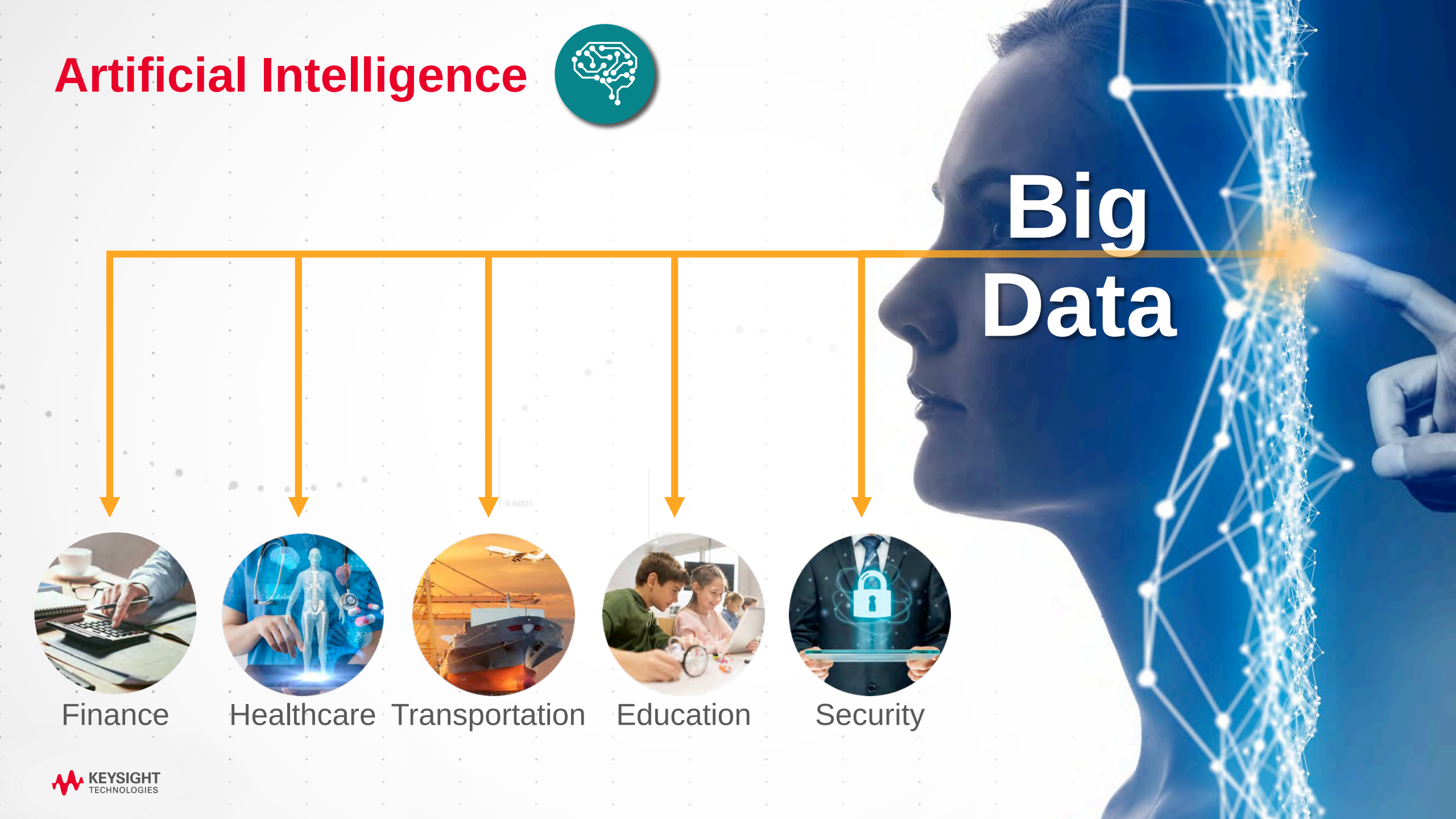
Connecting the Dots



Business at

Keysight

Artificial Intelligence



Finance

Healthcare

Transportation

Education

Security

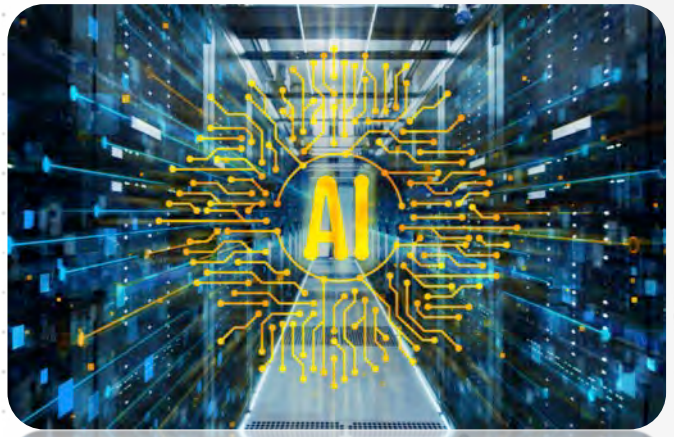
KEYSIGHT TECHNOLOGIES

Artificial Intelligence

Metropolis

Industrial Revolution

Future of AI



Massively Scalable Datasets + Compute Power to Interpret

Solutions to Difficult Problems

Artificial Intelligence

Early Experiments

AI-Assisted Crime Prediction

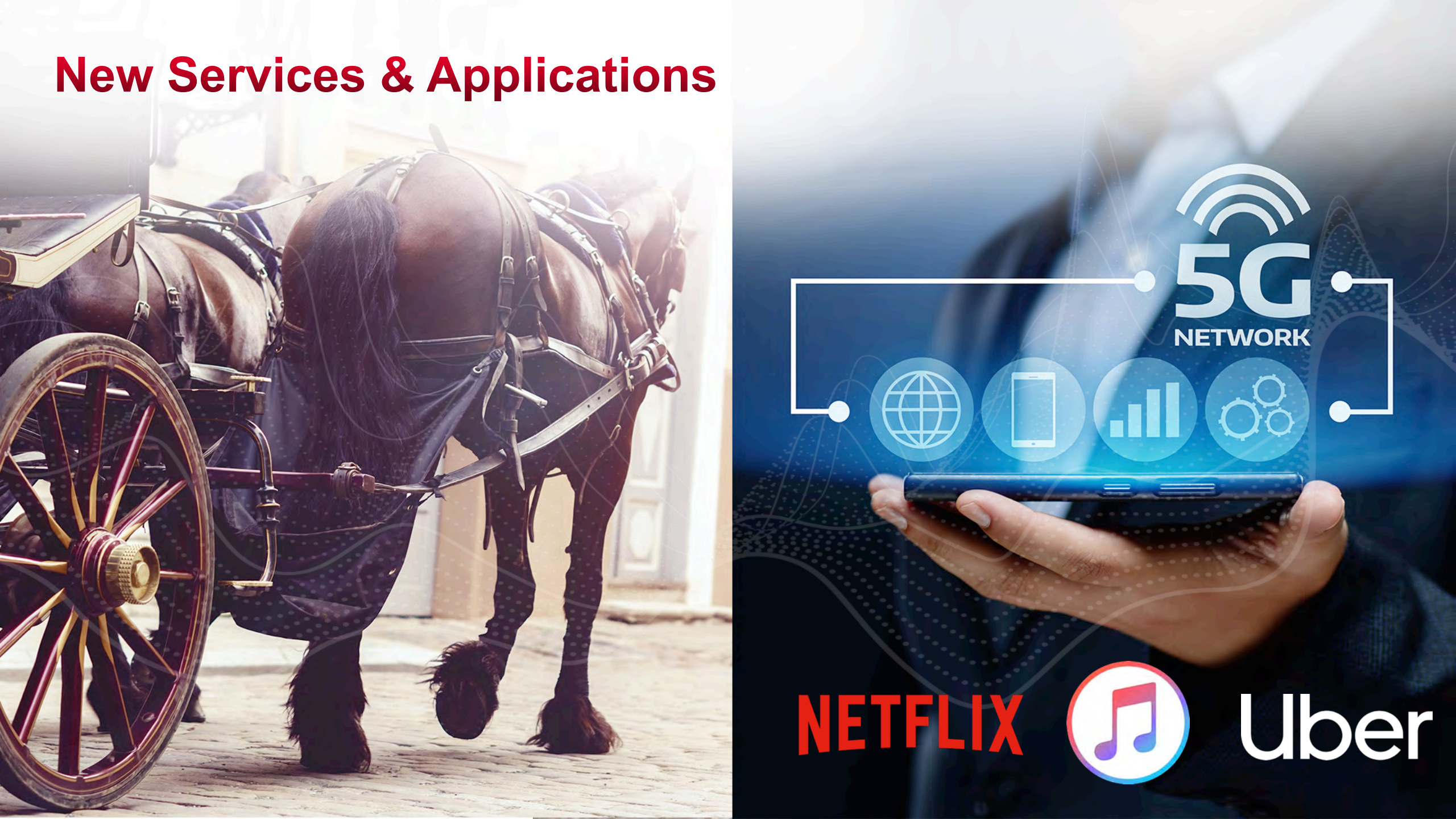
Police Department

KEYSIGHT TECHNOLOGIES

5G

Becoming Real Very Soon

New Services & Applications



5G “Trapped Value”

4G vs 5G

Re-Architecting Data Networks and the Cloud:
Rise of **Edge Computing** and **Micro-Cells**

What is the Edge?

Edge Computing

Fog Computing

Micro Data Centers

Edge Cloud

Cloudlets

Enterprise?

CORD?

Evolving Network Architecture

Millions

Edge Computing

LOCALIZED
1-10 Equipment Racks

10,000s plus

Regional Data Centers

MORE INTELLIGENCE...

100s

Cloud

Offering Layer 1 to Layer 7 Testing

Layers 2-7

Mobile Device Test

BTS Drive Test

Drive Test

Mobile Network Test

Customer Experience Mgmt.

Network Test, Visibility and Security

Layer 1

Electrical, Optical and Wireless Test

Channel Emulation

Internet of Things & Industrial IoT

Industry 4.0: Linking **Operational Technology (OT)** and **Information Technology (IT)**

Reduce Downtime **Lower Cost**

Industrial IoT

Industry 4.0

Retail	Healthcare	Connected Car	Smart Cities & Energy	Natural Resources	Connected Industry
• Digital signage • In-store offering & promotions • Supply chain • Smart ordering & payment • Vending machines	• Adherence & support • Clinical • Virtual care • Wellness & prevention	• Assisted & autonomous driving • Fleet management • In-vehicle infotainment • Shared mobility • Smart navigation • Vehicle assistance	• Construction • Education • Energy • Environmental • Roads, traffic & transport • Social & security • Water & waste	• Agriculture • Mining • Oil & gas	• Connected field • Digital factory • Product design & engineering • Smart maintenance • Supply chain management

Less Industrial → More Industrial

Bangkok's Digital Economy

Industry 4.0 Development Program

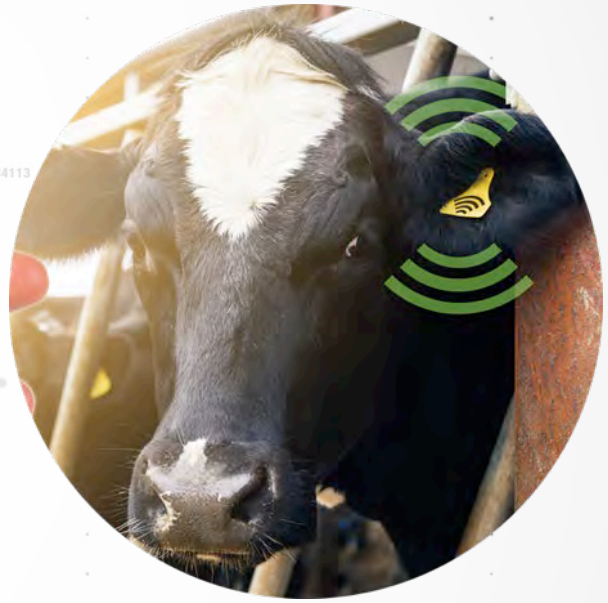
Investing in Digital Transformation of Manufacturing Sector

Evolving Requirements of IoT

IOT ARCHITECTURES WITH 5G IN MIND

RF, WiFi, 2G
Not Real-Time
Simple Calculations

5G Bandwidth
& Latency



Battery Run Time:
10-15 Years

Does the Internet Go Away?

22B IoT connected devices by 2025

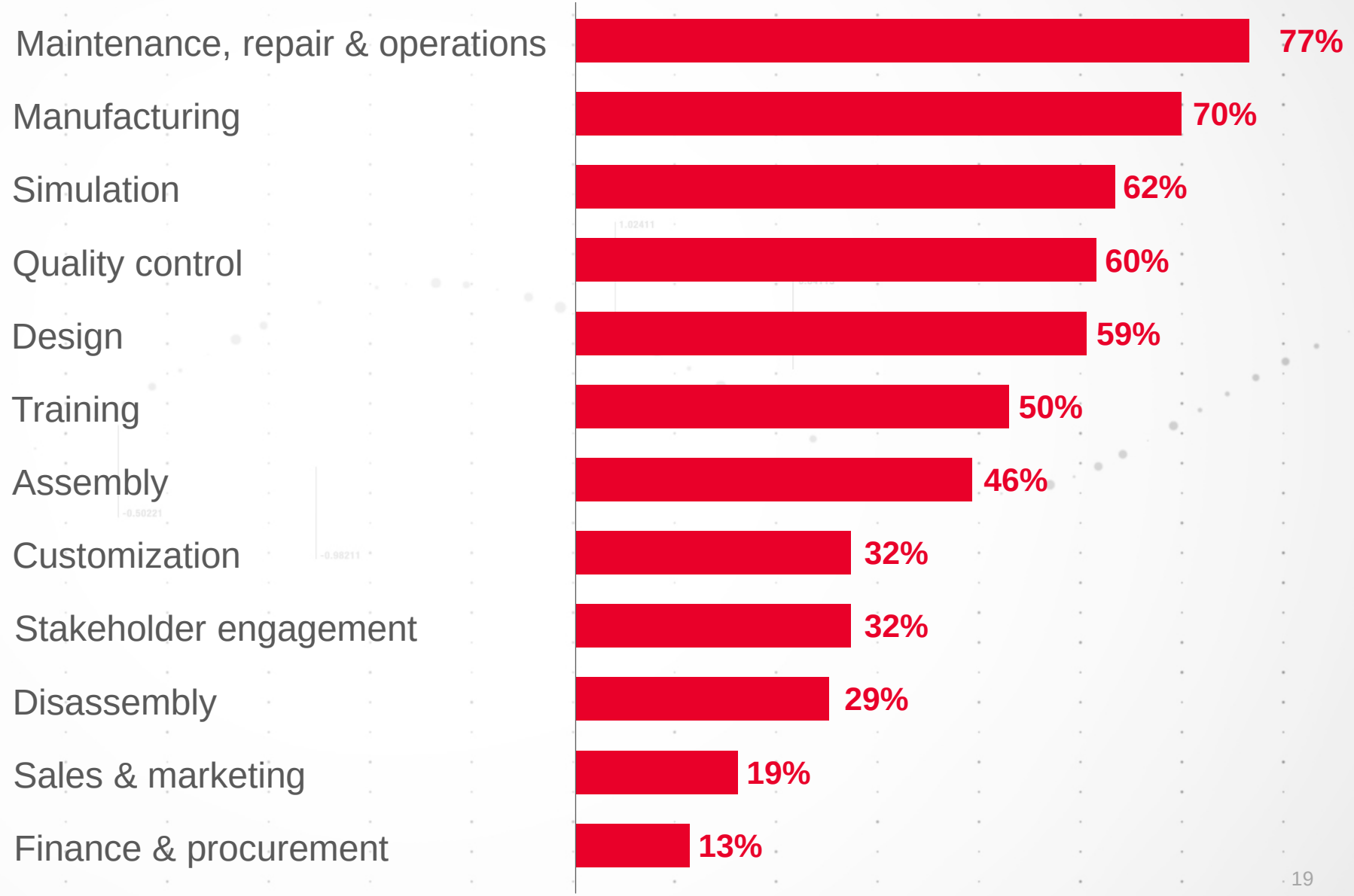
Digital Twin

IBM, Microsoft, GE, Chevron, Tesla Are Early Adopters

* Gartner

Product Life Cycle

In which stages of the product life cycle do you see the digital twin offering greatest value*?



* Based on survey of 150 UK Engineers by www.themanufacturer.com

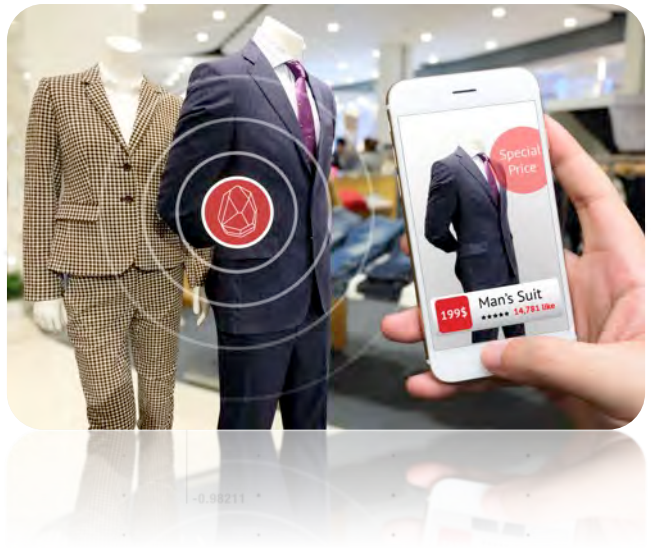
Mixed Reality: Virtual / Augmented / Extended

More and Faster Data Creates Shift from 100GE to
400GE Virtualized Network Architecture
Need for New Gen5 Interfaces: **PCIe 5.0** and **DDR 5.0**

Mixed Reality Applications

Healthcare

Retail



Customer Support

Mirror-World

Autonomous Vehicles

5G + IoT + Telemetry + AI + Edge Cloud + Digital Twins

Edge Cloud is Here for Autonomous Vehicles

Apollo Rocket

iPhone 6

NVIDIA chipsets: Drive AGX
Rated at 320 TOPS

Autonomous Car

32K FASTER

3B FASTER

Mobility 1.0

3
METERS
in 1940's

Mobility 2.0

Fewer Injuries

Less Pollution

3 Million New Jobs

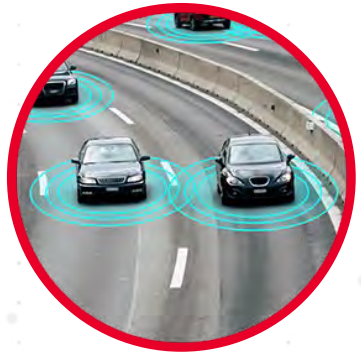
$500 billion GDP contribution over the next 7 years

Shift to shared vehicles used 80% of time vs. 5% of private

ACES: $200 Billion Invested Since 2010

AUTONOMOUS, CONNECTED, ELECTRIC AND SHARED

Level 0: There are no autonomous features.



Level 1: These cars can handle one task at a time, like automatic braking.

Level 2: These cars would have at least two automated functions.

Level 3: These cars handle “dynamic driving tasks” but might still need intervention

Level 4: These cars are officially driverless in certain environments.

Level 5: These cars can operate entirely on their own without any driver presence.

ACES: $200 Billion Invested Since 2010

AUTONOMOUS, CONNECTED, ELECTRIC AND SHARED

Within 1 Year

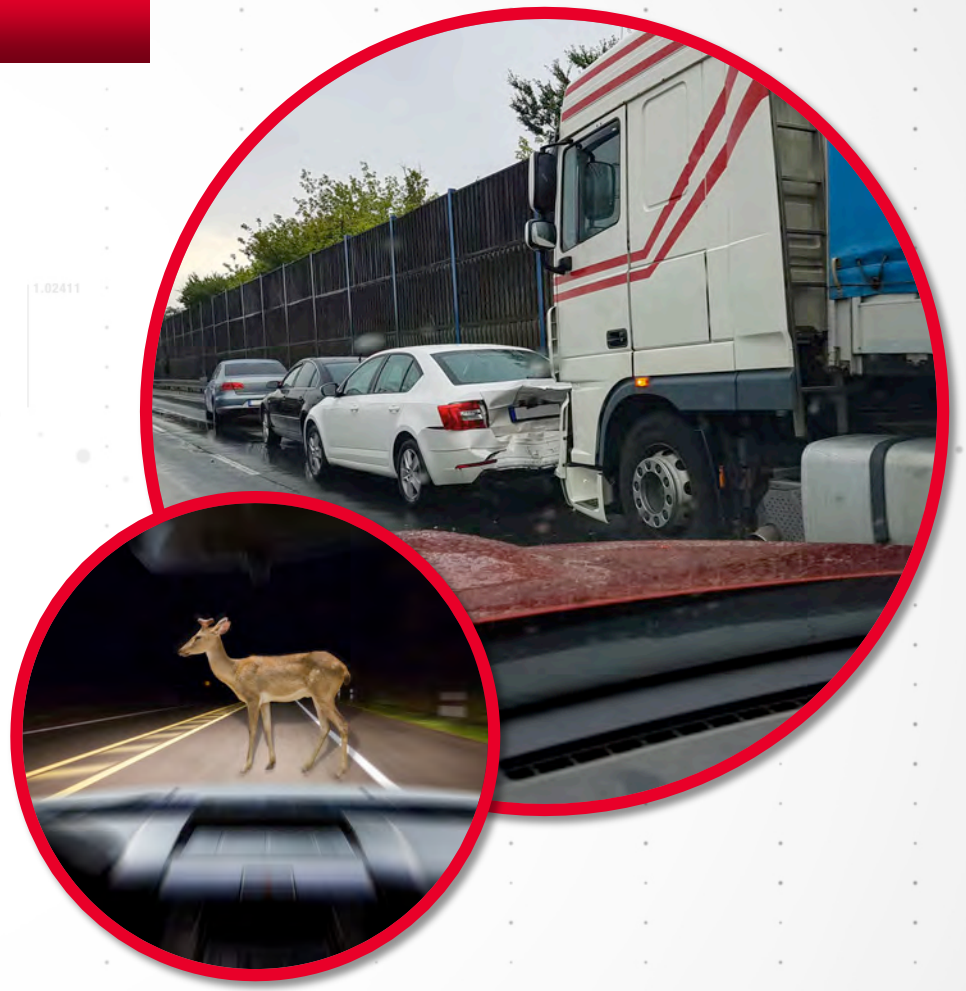
Level 3: These cars handle “dynamic driving tasks” but might still need intervention

Level 4: These cars are officially driverless in certain environments.

70% of all miles in 5 years”

Vehicle-to-Everything (V2X) and Cellular V2X (C-V2X)

MORE STRINGENT TESTING AS LIFE CRITICAL



V2X

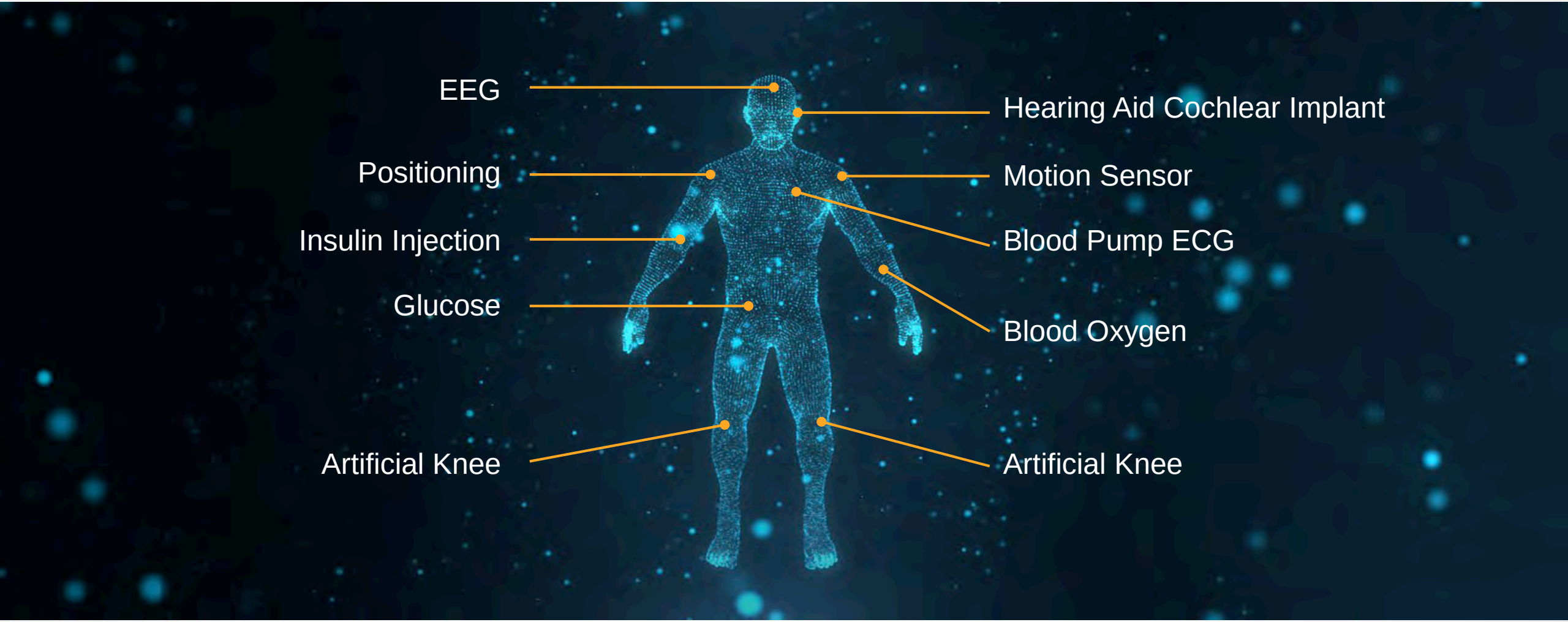
- See-through, 360-degree non-line-of sight sensing and extended range
- Convey intent by sharing sensor data and path planning
- Improve situation awareness via increased electronic horizon for soft safety alerts

CV2X

- Real-time warnings to prevent chain collision and better accident prevention
- eCall when the vehicle senses an accident

Significant market reaching $62.7 Billion by 2023

Body Area Networks



Smart Homes

Amazon

Apple

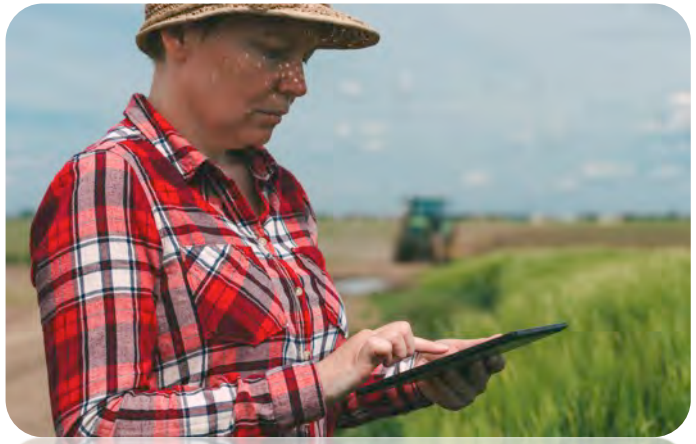
Google

Smart Home Operating Systems

Smart City Utility

Agriculture

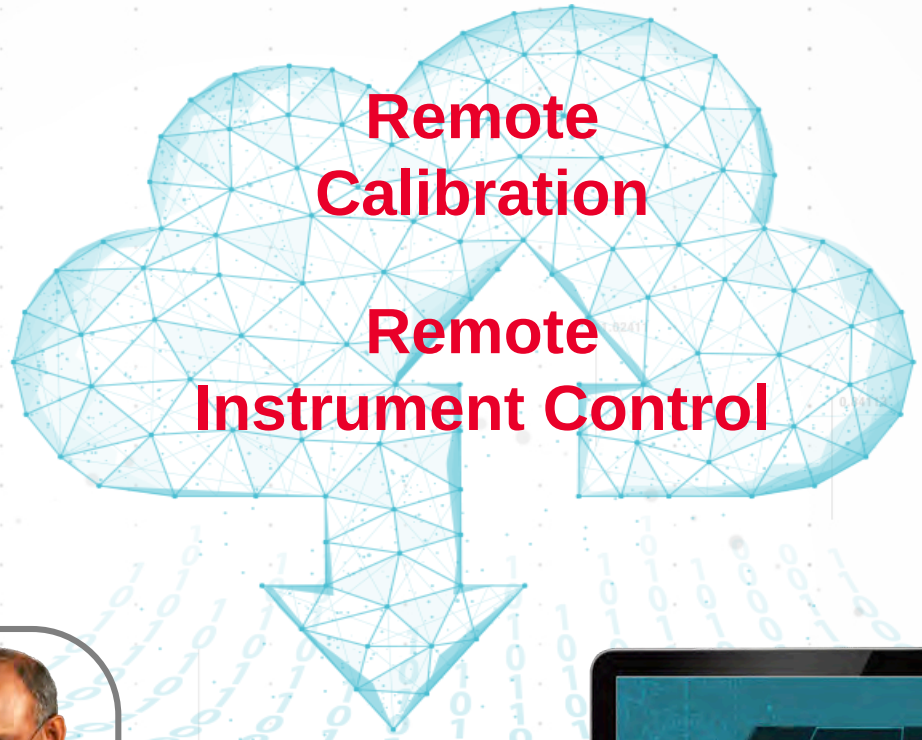
Monitor Climate / Fertilization

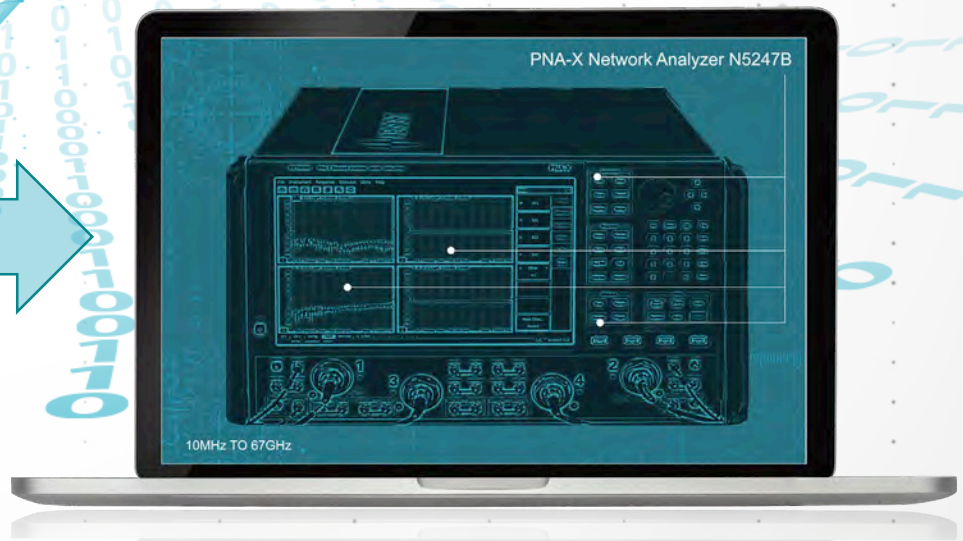


Minimize Wasted Water

Livestock Location & Health

Impact on Keysight





TestOps: A New Approach for Design & Test

PATHWAVE

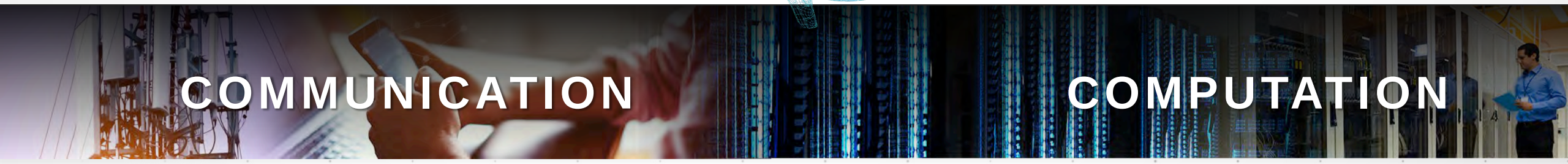
Helping Our Customers Create the Bicycle for the Minds

UNDERSTANDING, PREDICTING, AND DELIVERING SOLUTIONS

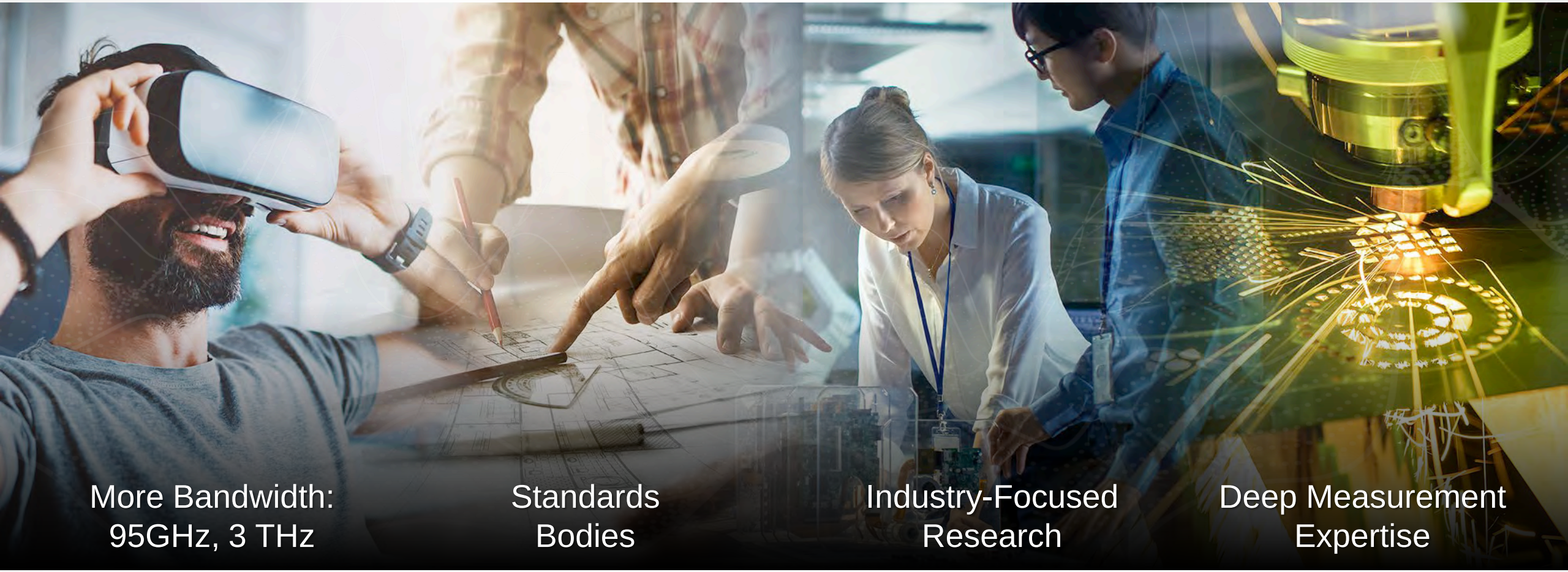
Advanced software technologies (AI and ML) + deep pool of human-driven experience and talent

PEOPLE

Ensure safe and effective communication



Summary



Partner with You

KEYSIGHT WORLD 2019