



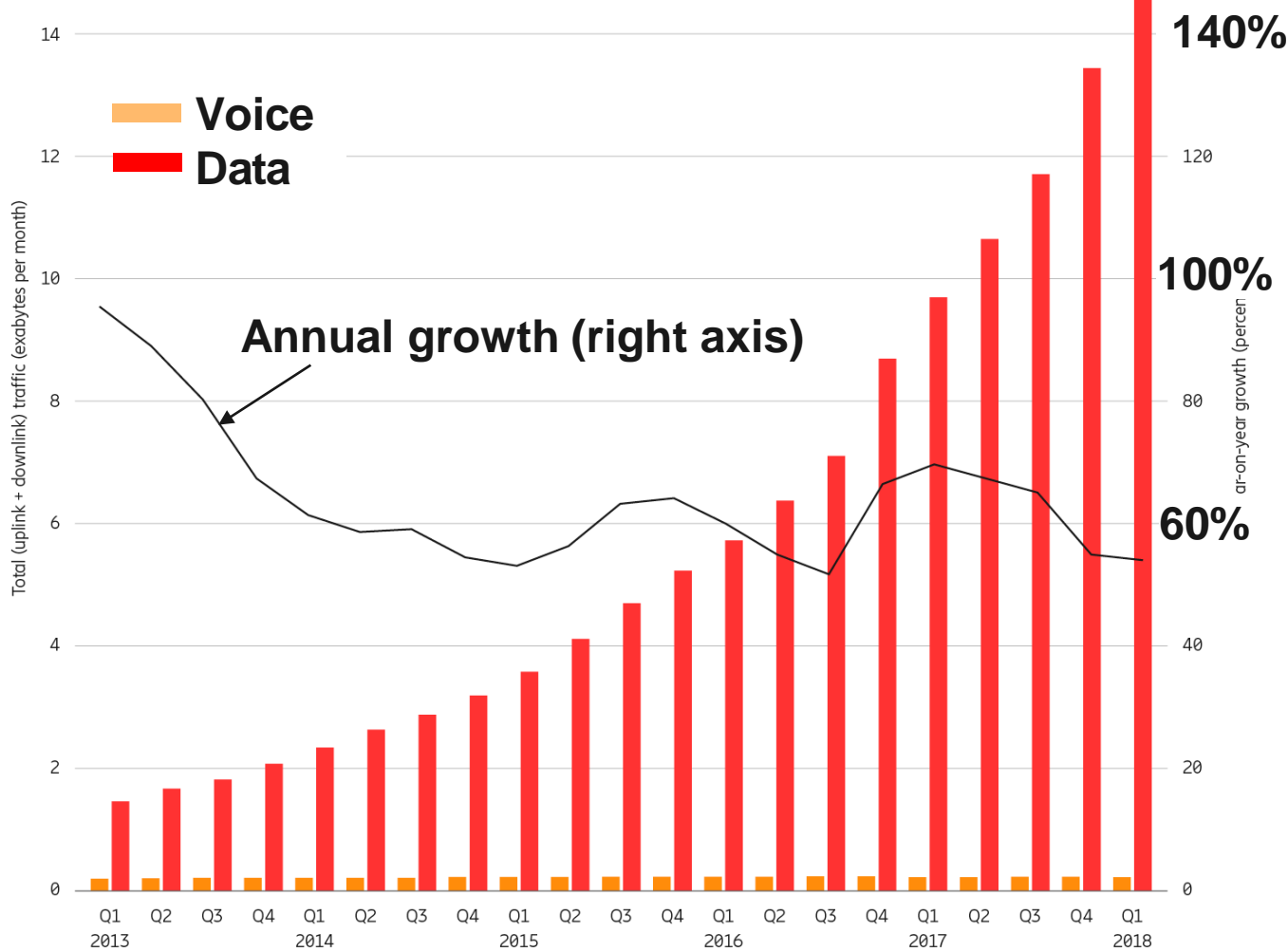
5G and Industry Applications

Masanobu Fujioka
CTO
Ericsson Japan

Why 5G – Traffic Explosion

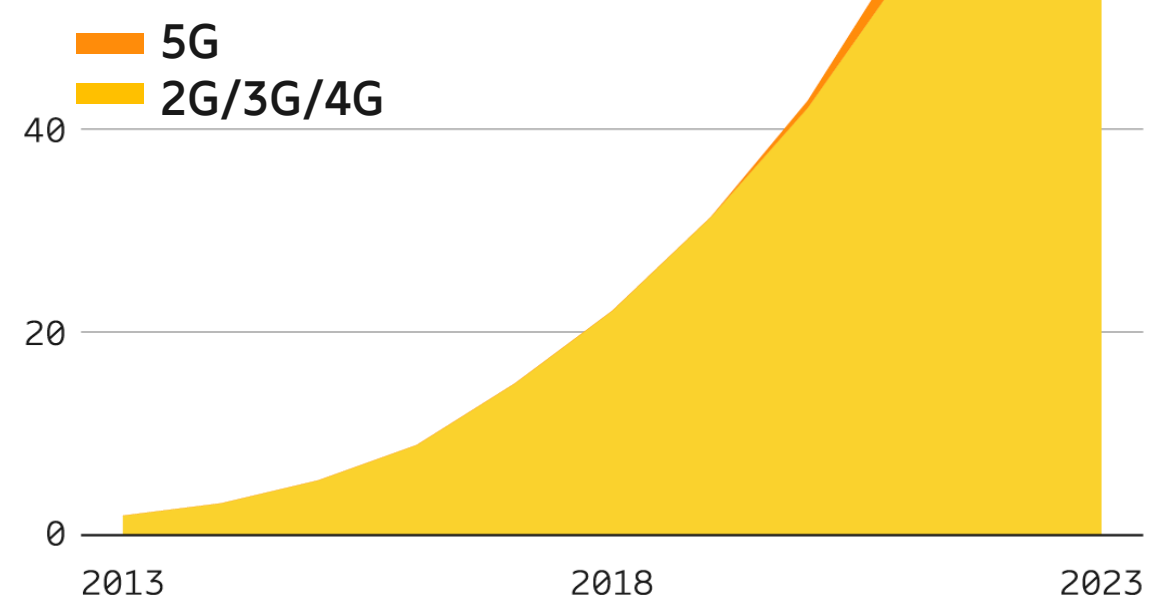


Global quarterly mobile traffic



Global annual data traffic forecast

> 8 times increase from 2017 to 2023 in total



Why 5G – Industrial IoT



Meters, sensors,
“Massive IoT”



Remote controlled
machines



Smart transport
infrastructure
and vehicles



Human/machine
interactions



And much more...



New opportunities and flexibility for the unforeseen

Scope of 5G



Massive IoT (mMTC)



SMART
BUILDING



LOGISTICS, TRACKING AND
FLEET MANAGEMENT



SMART
METER



SMART
AGRICULTURE



CAPILLARY
NETWORKS

Critical IoT (URLLC)



TRAFFIC SAFETY &
CONTROL



REMOTE
MANUFACTURING,
TRAINING, SURGERY



INDUSTRIAL APP
& CONTROL

Enhanced Broadband (eMBB)



Smartphones



Home, Enterprise, Venues,
Mobile/Wireless/Fixed



Non-SIM
devices



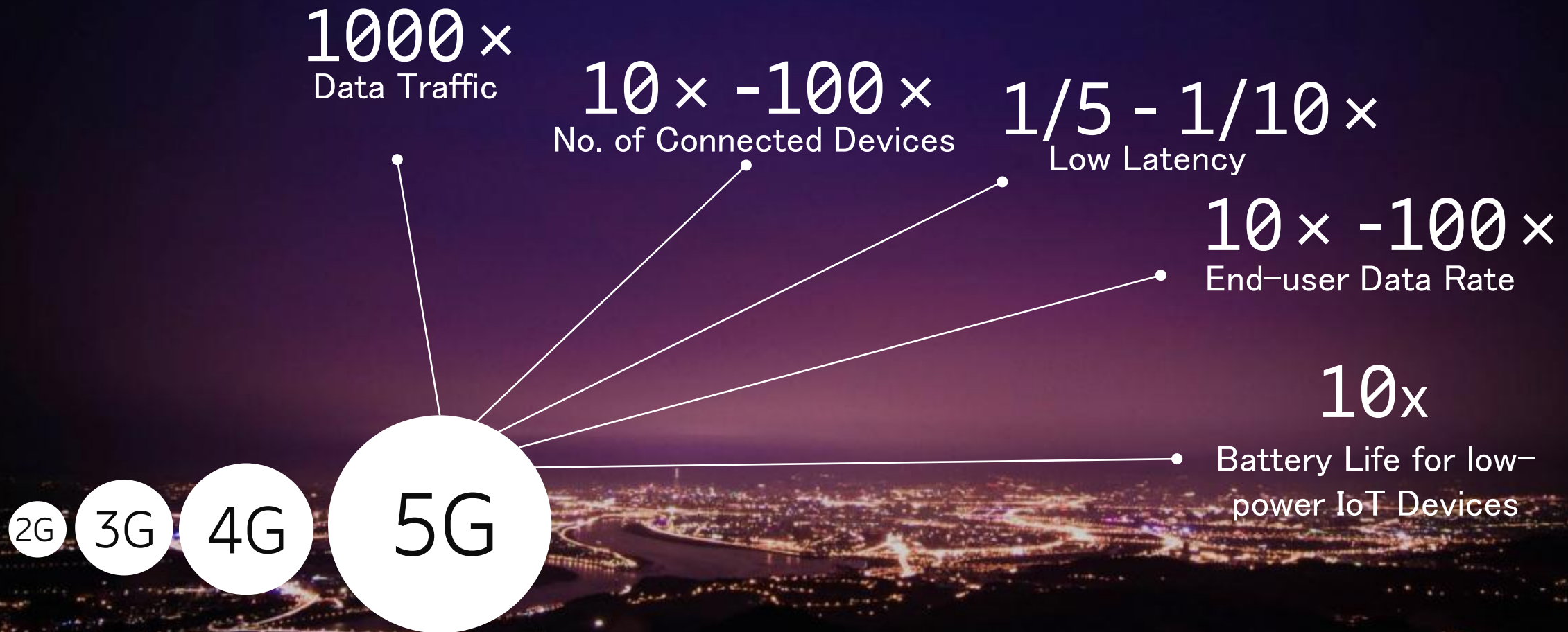
4K/8K UHD, Broadcasting,
VR/AR

LOW COST, LOW ENERGY
SMALL DATA VOLUMES
MASSIVE NUMBERS

ULTRA RELIABLE
VERY LOW LATENCY
VERY HIGH AVAILABILITY

MTC: Machine Type Communications, URLLC: Ultra Reliable Low Latency Communications

Variety of Requirements for 5G





5G

For Industries



AUTOMOTIVE AND TRANSPORT



MANUFACTURING



PROCESS INDUSTRY



SAFETY/SECURITY



AGRICULTURE



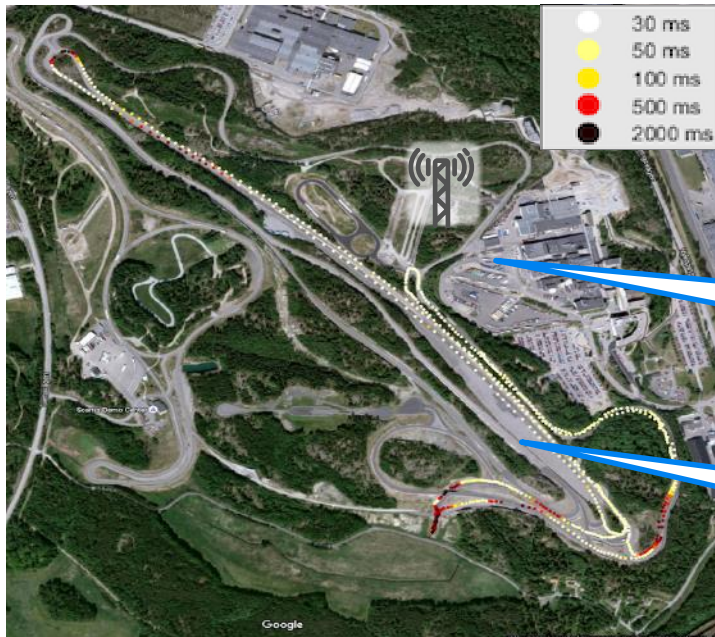
ENERGY AND UTILITIES

Remote Bus Driving



Photo: Scania

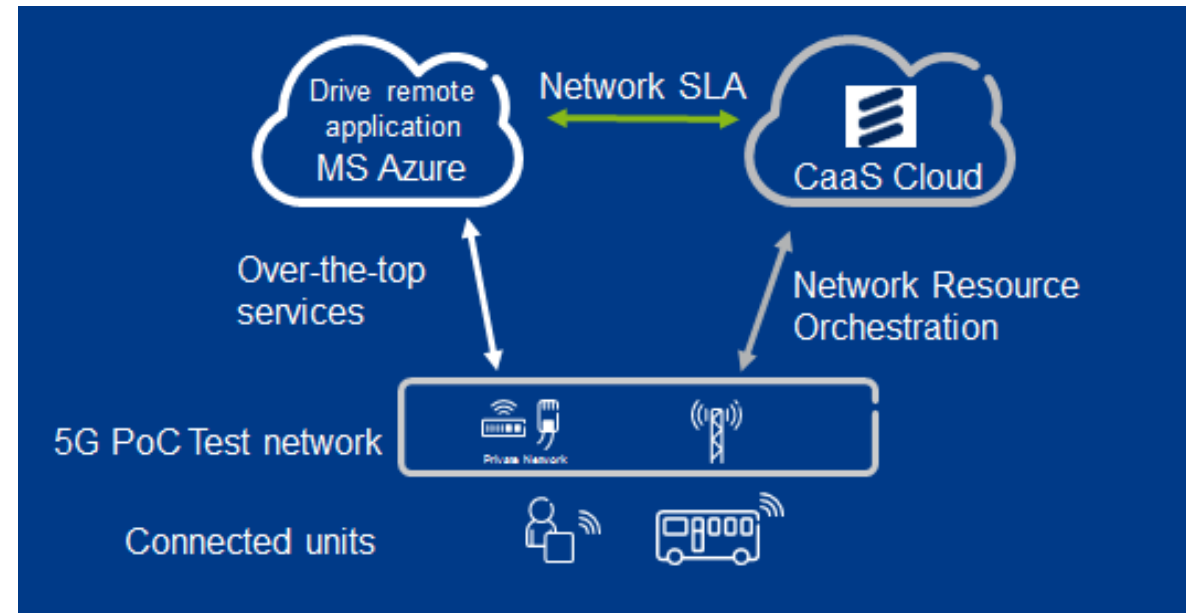
- Demo performed using Ericsson test network on a test track
 - Remote driving from central office watching video from the camera at the bus front
 - Bus successfully driven remotely on test driving area and back to bus parking area



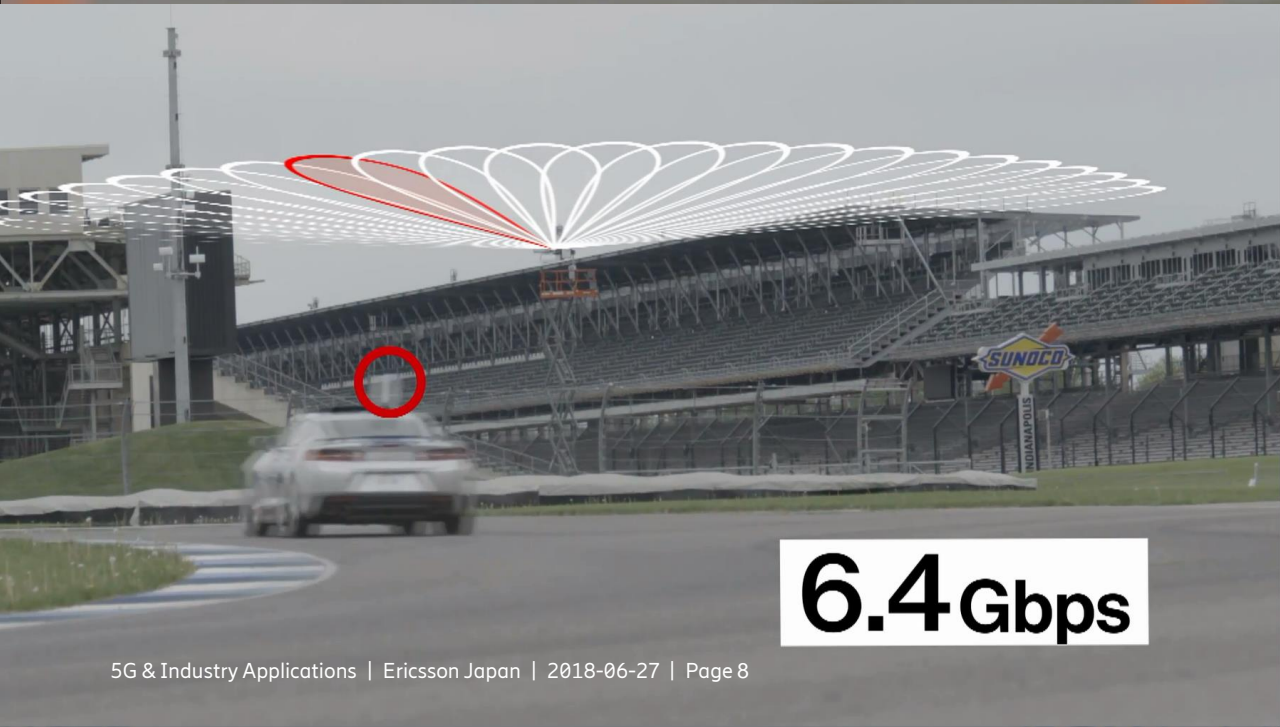
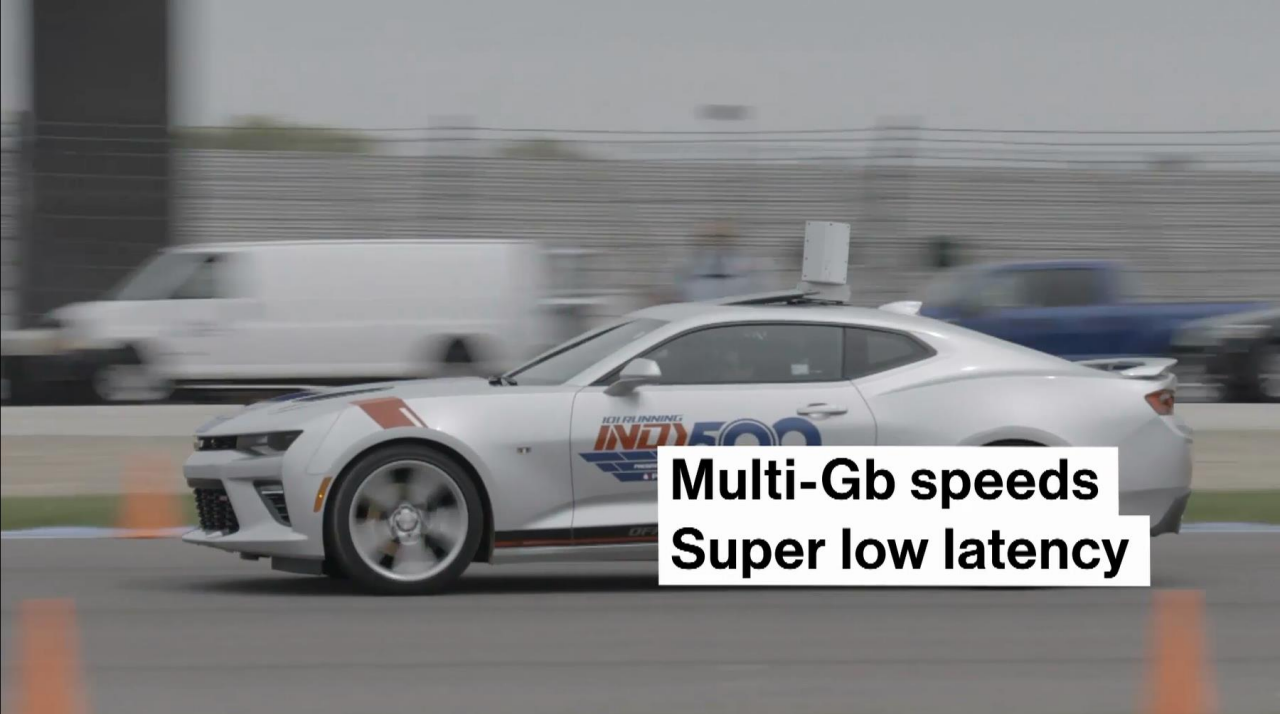
E2e latency
over test track

Remote driver
location

Test driving
area



<https://www.youtube.com/watch?v=IPyzGTD5FtM>



Driving with VR over 5G≡

- Ericsson and Verizon tested a 5G network at historic Indianapolis Motor Speedway
- Video from camera at the car front sent to studio and sent back to VR glass worn by the driver in the car to drive with all the windows with black wrapping
- The tests prove what's possible when you combine super low-latency with download speeds that exceed 6Gbps.



Ericsson and Verizon test the limits of 5G

<https://youtu.be/Dw2GT95Vyxc>

verizon✓



PIMM (Pilot for Industrial Mobile Communication in Mining)

- Explore 5G use cases in mining including remote control, smart ventilation, etc.
- Evaluate mobile communication infrastructure in a rough industrial context



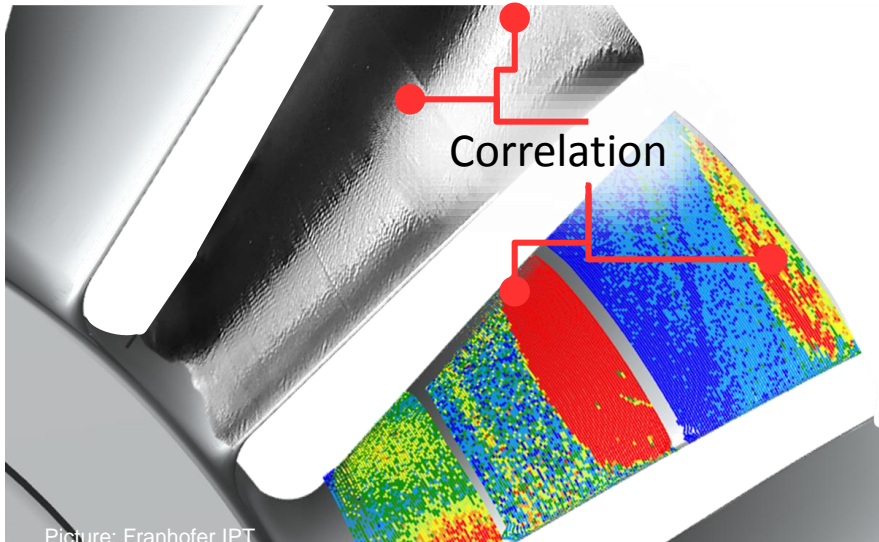
- Increased productivity and safety
- Understand industrial 5G requirements
- Understand eco system, business models



5G BLISK

Connected Adaptable Production

- ❑ Costly BLISK (integrated disk and blades to compress air into jet engine) produced by curving metallic disk for 15-20 hours
- ❑ Acceleration sensor with 5G module built in BLISK to monitor abnormal vibration
- ❑ Ultra-high speed feedback for calibration



Picture: Fraunhofer IPT

<https://www.ericsson.com/en/networks/cases/5g-ultra-low-latency-propels-jet-engine-manufacturing>

World first
5G NR live
use case
testing!

Announced
Hannover
Messe
2018

€ 27M

saving for 1 factory





ERICSSON