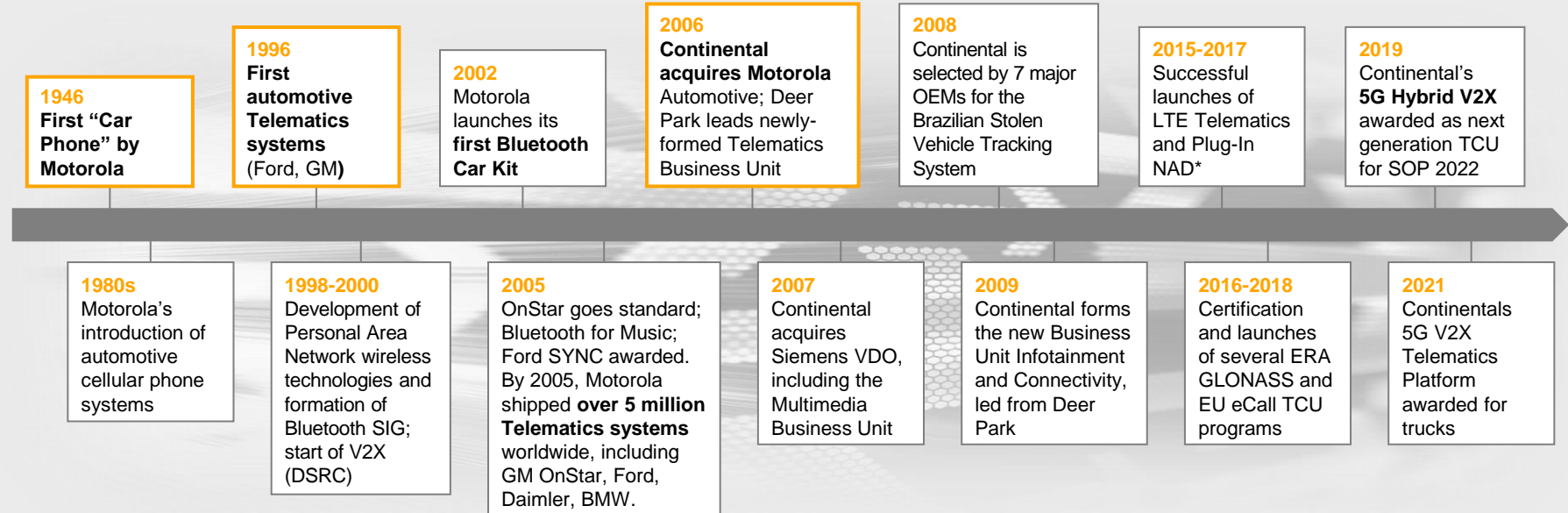


The Connected Vehicle: State of the Art



25 Years of Telematics

75 Years since Creating the First “Car Phone”



* NAD: Network Access Device (cellular modem)

The history of vehicle connectivity has been evolutionary and long-term.



WHAT WE DO

Continental Connectivity Product Portfolio

TechShow
2021

Antennae
Powered by
Kathrein acquisition



NAD
Network
Access
Devices



TCU
Telematic
Control Units

Continental offers a flexible and scalable product portfolio:

- › Standalone 4G/5G NAD (Tier 2)
- › Standalone Antenna Solutions
- › Intelligent Antenna Module (IAM)
- › Integrated Telematics Control Unit (TCU)
- › Functions & End-to-End Services
 - › V2X
 - › eHorizon,
 - › Security, OTA



IAM
Intelligent Antenna Modules

V2X
Vehicle-to-Everything



Cloud & Services
eHorizon, OTA, Security, ...



- › Users expect **digital lifestyle** in the vehicle.
- › Vehicles are increasingly **defined by software**.
- › **Connectivity** enables **smartphone-like experience** and **over-the-air updates**.



Vehicles evolve to smart
devices in the Internet of Things

Cyber Security



Connectivity is key to

- › **protect** vehicles from cyber attacks **over their entire lifetime.**



Connectivity in commercial vehicles...

- › reduces **total cost of ownership**,
- › helps to **minimize CO₂ emissions**
- › and **increases safety**.



Driver Assistance Systems and V2X together have the potential to address 90% of crashes between vehicles and vulnerable road users



Seeing through the eyes of others

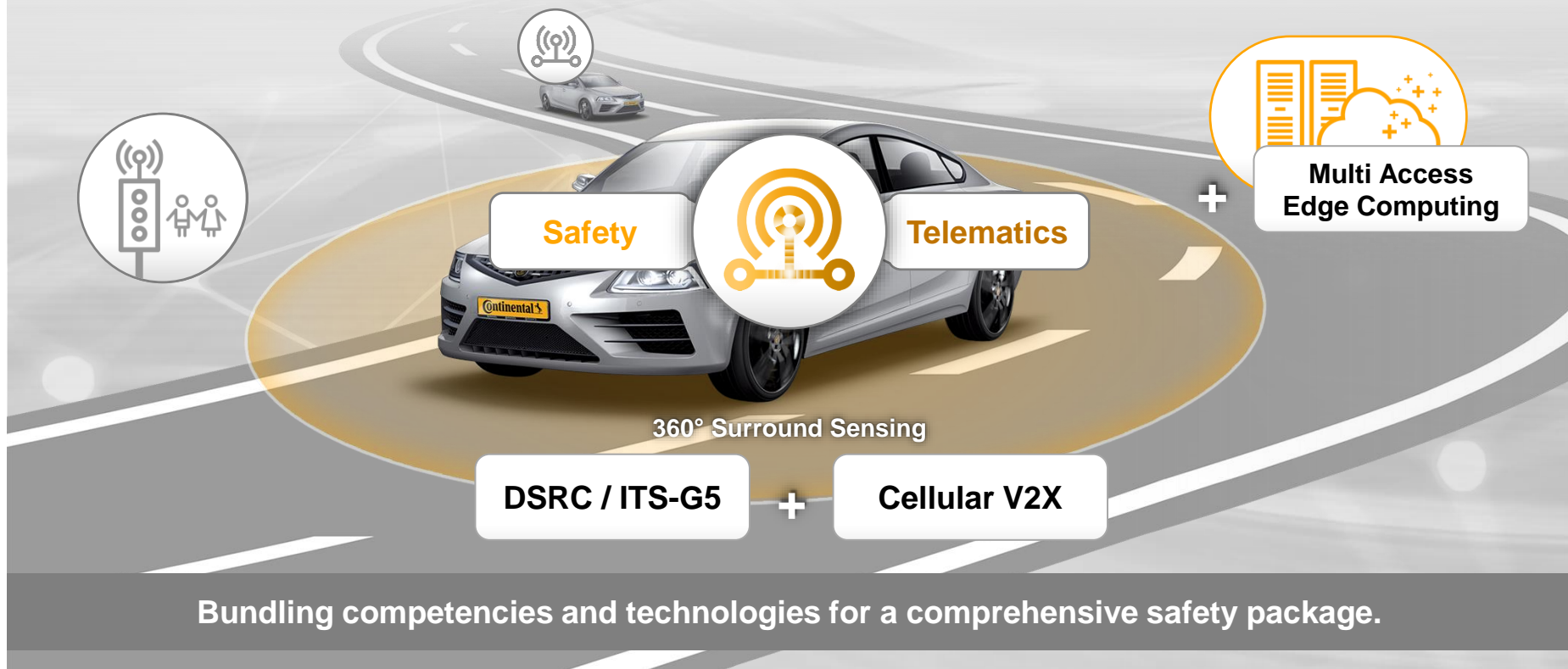
Vehicle-to-X Communication (V2X) allows vehicles to exchange messages with each other, with other road users or the infrastructure.

Examples:

- › Reduce accidents through collision warnings
- › Reduces traffic jams with cooperate driving

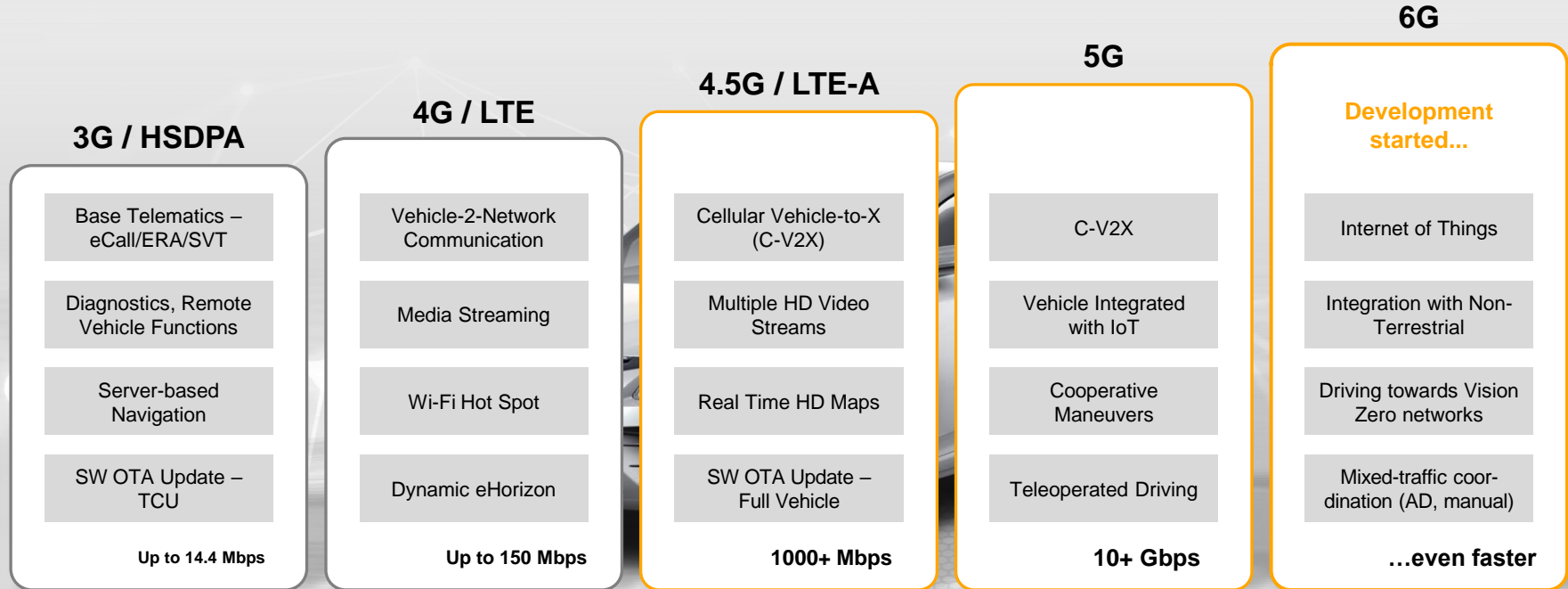
V2X

Addressing with the Global Deployment Challenge



Telematics and V2X

Advancement of the Connected Car



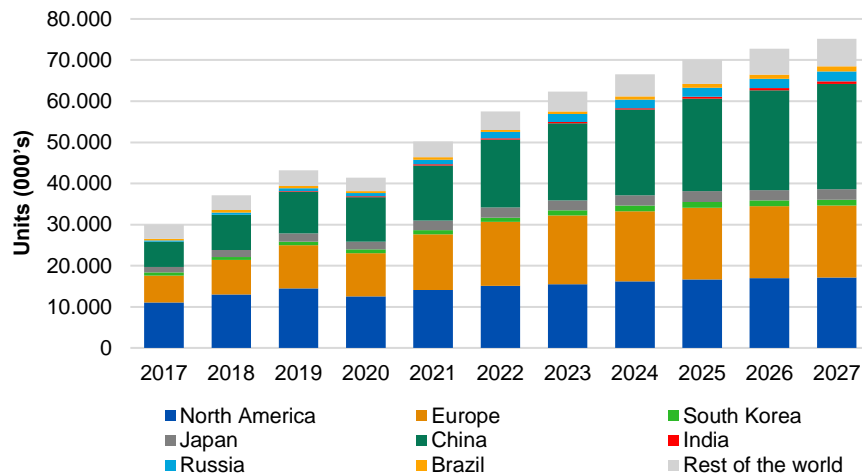


WHAT WE EXPECT

Market Forecast: Regional Embedded Telematics Volumes



Source: Strategy Analytics, Q1 2020



› North America

Telematics highly dependent on car maker strategies

› Europe

eCall telematics highly dependent on regulatory activity and selected OEMs

› Japan

Navigation is still dominant, Telematics roll-out is lead by Toyota

› China

Will be the #1 region for embedded Telematics shipments by 2021 (North America #2)

The global automotive telematics market is expected to attain \$149.9 billion in revenue in 2030 CAGR 16.6% forecast period (2020-2030)*

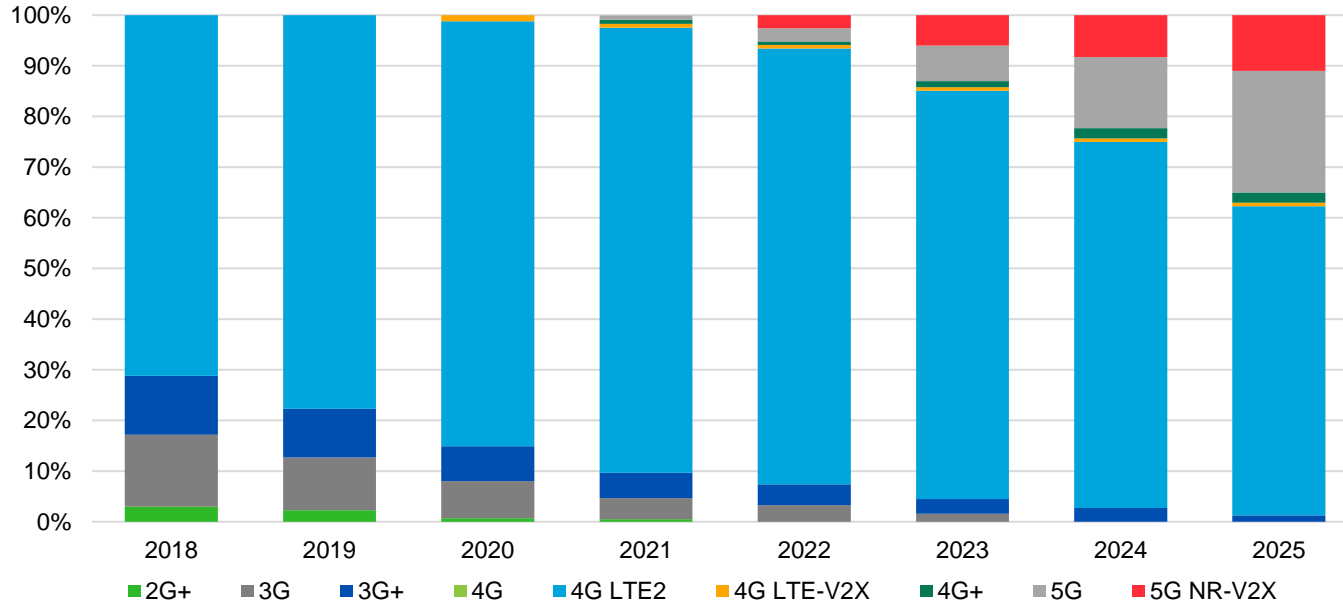
* <https://www.prnewswire.com/news-releases/global-automotive-telematics-industry-forecast-2020-2030-growing-implementation-of-supportive-government-measures--regulations-301036947.html>

Forecast: Automotive Cellular Technology

How does the World of Connectivity look like?



TCU bandwidth share, global



Note: Telematics
Component Forecast
(production).
June 2020

Source: IHS Markit



WHAT WE NEED

V2X: Global Market and Spectrum View



SPECTRUM	30 MHz in 5.9GHz; C-V2X designated by US FCC	70 MHz in 5.9GHz tech neutral	20 MHz in 5.9GHz for LTE-V2X	9 MHz in 760MHz tech neutral; 70 MHz in 5.9 GHz under study.
REGULATION	No deployment mandate planned; US FCC spectrum rule being finalized	Delegated Act rejected in 2019	No deployment mandate planned	No deployment mandate planned
MARKET	Ford announced C-V2X for 2022; Early discussions for NCAP	VW and infrastructure deployments of DSRC; V2X considered for Euro NCAP.	Early adopters launched in 2021. Ongoing standards development.	Toyota launched DSRC in 2015; infrastructure in several cities
SUMMARY	Prior legislative uncertainty and now reduced spectrum have slowed OEM deployment plans	NCAP may encourage development; ongoing discussion of DSRC or C-V2X	Most V2X volumes are from International OEMs/JVs	Additional spectrum under discussion

Except for China, regional uncertainties for legislation and spectrum have slowed V2X deployment. Continental is active in working with governments and consortia to spur deployment of the life-saving features.

NOKIA-DAIMLER TRUCE: HERE'S WHAT'S NEXT FOR SEPS

Sources from Continental and the telecoms industry disagree on whether Nokia and Daimler's patent settlement will put an end to the automotive FRAND wars

(Managing IP)

**Nokia and Daimler
make peace in patent
dispute, but battle
over 5G goes on**
(Politico)

.....

Daimler and Nokia Sign Patent Licensing Pact

(Bloomberg)

DAIMLER TO PAY NOKIA PATENT FEES, ENDING GERMAN LEGAL SPAT

Daimler has agreed to pay Nokia for using its patents, ending a row that highlighted a battle between tech and car companies over royalties for key technologies.

(Reuters)

What are Standard Essential Patents?

Why do they matter?



- › Vehicle connectivity solutions require **SEP licenses for mobile network communications**
- › A SEP is part of a standard: A standard, such as 4G automatically prevents all possible alternative technological solutions. The result is a **dominant position** of the SEP holders.
- › To allow free competition, the SEP holders must offer licenses on fair, reasonable and non-discriminatory ("**FRAND**") terms.
- › **Excluding at least one willing licensee**, means **breaching** the FRAND promise.
- › Excessive and unfair licensing requirements can lead to **less innovation and higher prices for consumers**

Our position at a glance

- › Continental appreciates the work done by **inventors everywhere**
- › **We request licensing to be based on Non-discrimination and Fairness:**



Non-discrimination: Direct SEP licenses for all (willing) licensee at all levels of the value chain



Fairness: Licenses based on the value added by the SEP to the technology implemented in the communication product and NOT at end-product level

- › **Prevent the industry discussions happen under the **threat of injunctions****
- › **Ensure an **overall industrial competitiveness** and not only of a single industry sector at the expense of all others**

Summary

Realizing the Potential of the Connected Vehicle



**Vehicle connectivity is evolving strongly globally!
It has an immense potential for more safety, more sustainability,
and more convenience!**

We continue to build a market environment that fosters innovation by...

- › advocating for a **fast global roll-out of 5G** and deployment of **V2X**
- › driving **fair, reasonable and non-discriminatory regulation** for **Standard Essential Patent** licensing
- › providing **best in-class Cyber Security solutions** for the connected vehicle
- › continuing to show the **potential of vehicle connectivity in all areas**