

#### The Path to Highly Automated Driving An Evolutionary Development

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#### Continental Corporation Overview 2013



#### Sales by division in %

Status: December 31, 2013



# **Continental Corporation** Five Strong Divisions

Chassis & Safety	Powertrain	Interior	Tires	ContiTech
Vehicle Dynamics	Engine Systems	Instrumentation & Driver HMI	PLT, Original Equipment	Air Spring Systems
Hydraulic Brake Systems	Transmission	Infotainment & Connectivity	PLT, Repl. Business, EMEA	Benecke-Kaliko Group
Passive Safety & Sensorics	Hybrid Electric Vehicle	Body & Security	PLT, Repl. Business, The Americas	Compounding Technology
Advanced Driver Assistance Systems (ADAS)	Sensors & Actuators	Commercial Vehicles & Aftermarket	PLT, Repl. Business, Asia Pacific	Conveyor Belt Group
	Fuel Supply		Commercial Vehicle Tires	Elastomer Coatings
			Two Wheel Tires	Fluid Technology
				Power Transmission Group
PLT - Passanger and Light Tru	uck Tires			Vibration Control



#### **Reshaping Automotive**



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#### **The Cloud Enables Automated Driving**

- Driver Assistance Systems are a good start
- The cloud is the missing element for automated driving
- Cars need to send, receive and act on real-time data insights
- Cars need to communicate with each other





#### The World of Connectivity Internet of Things (IoT)



2013: 15 billion connected objects 2020: > 50 billion connected objects



#### **Internet of Things: Business Opportunities** \$14.4 Trillion Value At Stake in the upcoming 9 years\* Devicos Devices Locations HAC. Locations Servers Iransport, e Education Storage Hospitality Application Groups File & Safety. Application Groups PCs. Routers Lighting Switches Commercial (83 Security. PEXs, etc. Institutional Process IT/Data Center Clean Room Access, acc Service Sectors Service Sectors Compus office Private Nets Industrial Enterprise Radac/Satolicte, Enviro Power Gen, Trans & Malinary Socurity, Turbines IT & Networks Dist, Low Voltage Surveillance Unmanned, Fored Tanks, Fighter Jets Windmills Power Quality, Supply/Demand Weapons, Vehicles, Ships Energy Mgmt Battelfield Comms Equipment UPS Aircraft, Gear Human Animal Postal Food/ Jeeps, Cars, Ambulances Tracking Batteries Solar, Wind, Energy Alternative **Public Safety** Health, Packaging, Baggage Co-generation, Public Infrastructure Breakdown Lone Worker Water Treatmint, Building Generators Electrochemical Environ, Gen. Environ. Oil/Gas **Emergency Services** Homeland Security, Fire Meters, Drills Sumellance Rios, Derricks, Well Consumer & Equip. & Personnel Enviro, Monitor, etc. cads, Pumps, Pipelin Infrastructure Police, Fire, Regulatory Fuel Cells, etc. Home Specialty Awareness & Safery Fuel Stations, Wiring, Network Access Energy Momt Gaming, Bowling. Hospitality

Transportation

Trans Systems

Distribution

Converting/ Discrete

Stores

Ale Ball Adara

Flancs Signage

Tolls, etc.

Vehicles, Lights, Ships

Non-Vehicular

Vendes

& Life

Science

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Convenience 8

Entertainment

Telemedicine, etc

Care

\*According to a Cisco White Paper; Value at Stake is the combination of increased revenues and lower costs that is created or will migrate among companies and industries.

Pumps, Valves, Vats, Conveyors, Pipelines

Motors, Drives, Converting, Fabrication

Assembly/Packaging, Vessels/Tanks, etc.

uld/Processes

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Digital Cameras.

Power Systems, MID,

Dishwashers, effeaders

**Desitop Computers** 

Beecham

Research

Washer/Dryees,

Meters, Lights, TVs, MP3

Games Consoles, Lighting Alarms, etc

Fire Safety calety

Protectio

MRI, PDAs

Implants, Surgical Eulpment

Pumps, Montors

Cinemax Discos,

POSTeeminals

Tags

**Cash Rogisters** 

Vending Machines

**TTS (Intelligent** 

**Transportation** 

Systems) as major

part of Transportation

Sions, etc.

Special Events

Hotels, Resourants

Bars, Cales, Clubs

#### **Traveling Gradually Becomes Automated**



# PARTIALLY AUTOMATED

System monitoring requiredDrivers must be able to take over the task of driving at any time

#### Example: Stop & go up to 30 km/h





#### The Legal Framework Has Yet to be Created



Lawmakers have a decisive role to play in determining when and how market introduction will take place.



**Partial automation** 



**High automation** 



**Full automation** 



# **Optimal Solutions Require a Systems Approach**





# **Suppliers Must Prove Their Systems Expertise**



In 2013, Continental is investing over €100 million in R&D for driver assistance systems and automated driving. 1,300 employees are working intensively on this topic.

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Continental portfolio

# Intelligent Transportation Systems - String of Pearls Consideration of End-to-End Solutions





#### The Benefit for the Driver: Connectivity Increases the "Visual Range"



#### **Example Use Case**

#### Why you need an eHorizon system



#### Your Challenge

Imagine you are driving to O'hare airport. Shortly before arrival you pass an area that is usually is very foggy.

Wouldn't it be great to be warned ahead to be able to adapt your driving style and optimize the ADAS functions of your car?

#### **Our Solution**

If one driver is using the fog lights it might be an user error. If 20 cars use fog lights at the same position and drive slower afterwards, it is very likely that there is heavy fog in this area.

With Connected eHorizon, drivers entering the area can be warned to adapt their speed accordingly. Less accidents happen.

### Vehicle Networking and Partnerships Strong Partners in the IT Industry





#### Technical Solution Connected eHorizon System Concept



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#### eHorizon at a Glance System Architecture



#### eHorizon at a Glance

#### How your vehicle knows what you are up to



- Current most probable path (MPP) implementation has a look ahead length of up to 8 km (configurable)
- Along this stretch (i.e. for all road segments), required ADAS data are put onto the CAN
- Those ADAS data are provided also for connected road segments (e.g. at intersections) to ensure that the ADAS data are available in case the vehicle leaves the MPP
- In future, a self-learning MPP will be supported (locally in the vehicle)

#### **Connected eHorizon**

Three Update Cycles ensure Data Availability and Reliability



### We fit your needs... and increase Comfort, Safety and Efficiency!

Comfort Safety Efficiency Maximized comfort **Increased safety** Improved cost efficiency by adjusted routes by providing latest road by reduction of fuel based on real time traffic and weather conditions consumption up to 4%



#### **The Future Starts Earlier With Continental**