



Continental LiDAR products

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Chassis & Safety | Advanced Driver Assistance Systems



Agenda

- 1 Continental and BU ADAS**
- 2 Continental LiDAR products**
- 3 Advanced engineering at Continental**
- 4 Start-up cooperation at Continental**

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No Future without a Past Continental since 1871



1882: The rampant horse is adopted as the trademark.

Spirit of Optimism

Inventive Spirit

Racing Success

Internationalization

1871-1900

1901-1930

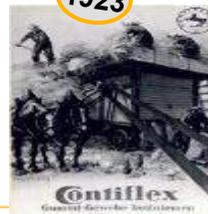
1931-1960

1961-1990

Construction Supplier

Endless drive belts

1923



30's

Solid tires

GOLD SNAKE® hoses

1930



Hose line production

1935



1932

SCHWINGMETALL®
rubber-to-metal-bonded products

60's

Gauges

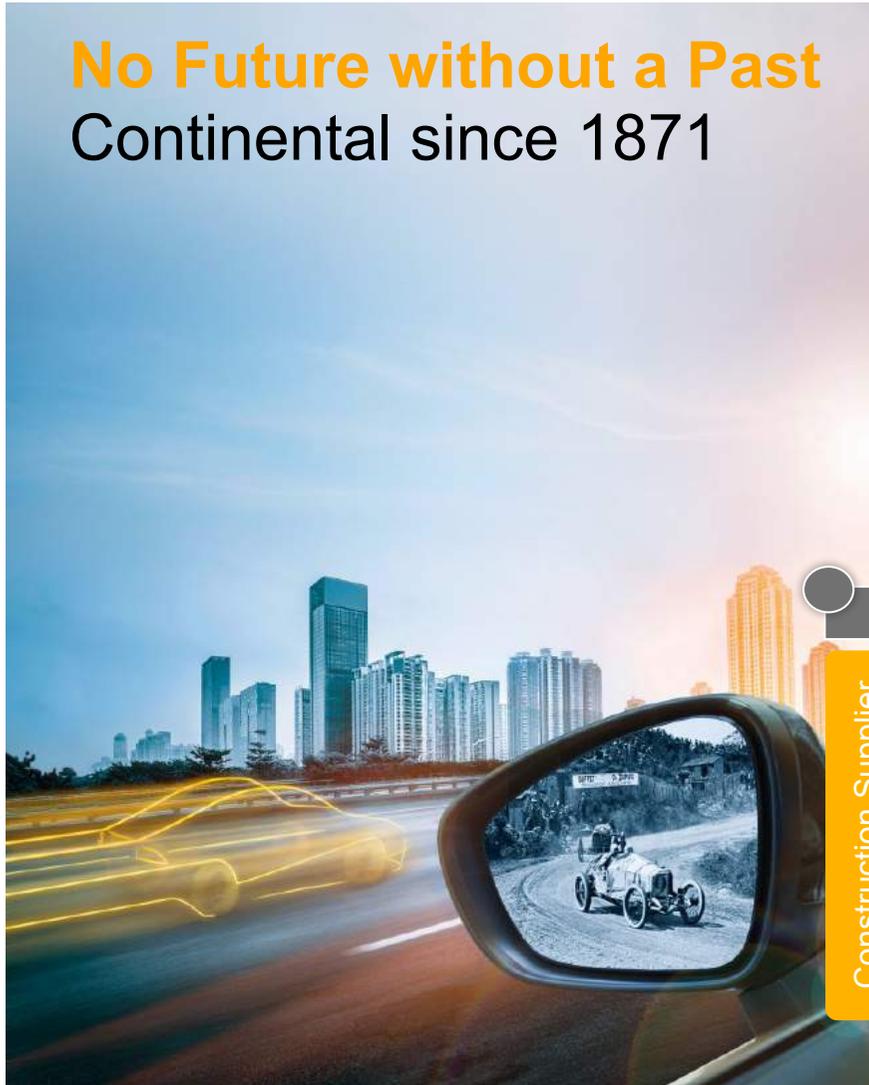


Hydraulic hose lines

70's

Rubber tracks

1991





The Automotive Systems division is established to intensify the systems business with the automotive industry.



Continental acquires Siemens VDO Automotive AG and advances to among the top five suppliers in the automotive industry worldwide, at the same time boosting its market position in Europe, North America and Asia.



Start of extensive automated-driving tests in the U.S. state of Nevada.

A highly automated Continental test vehicle has covered 15,000 miles on public roads without any accidents.

For the first time, the company employs more than

235,000

employees all over the world. Annual sales amount to €44 billion.

1995

2007

2012

2017

Continental Corporation

Overview of 2018



€44.4 billion
Sales



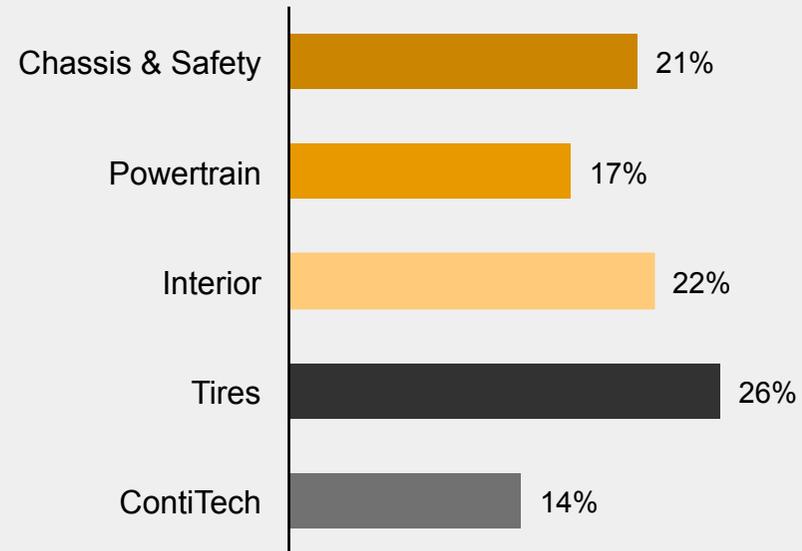
243.226
Employees



544 sites*
in 60 countries

* Since 1871 with headquarters
in Hanover, Germany

Sales by division in %



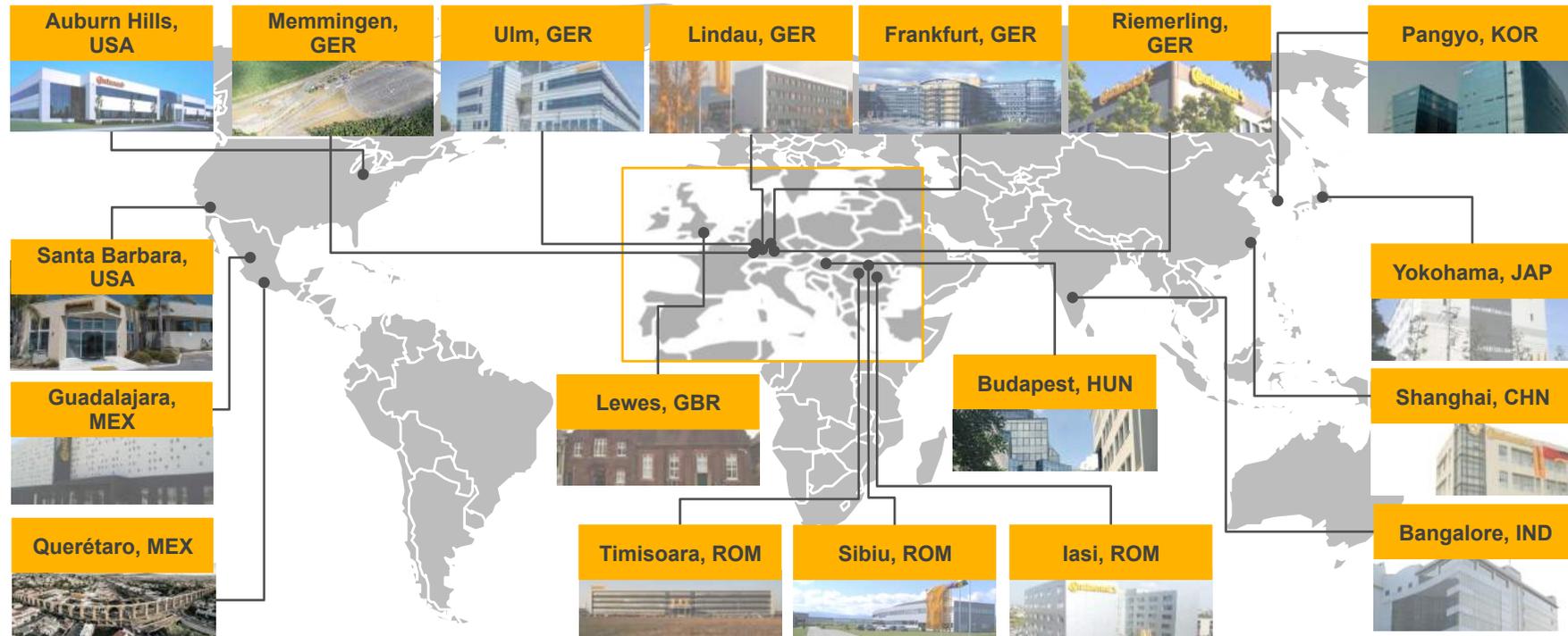
Status: Dec. 31, 2018

Advanced Driver Assistance Systems



BU ADAS Engineering Footprint

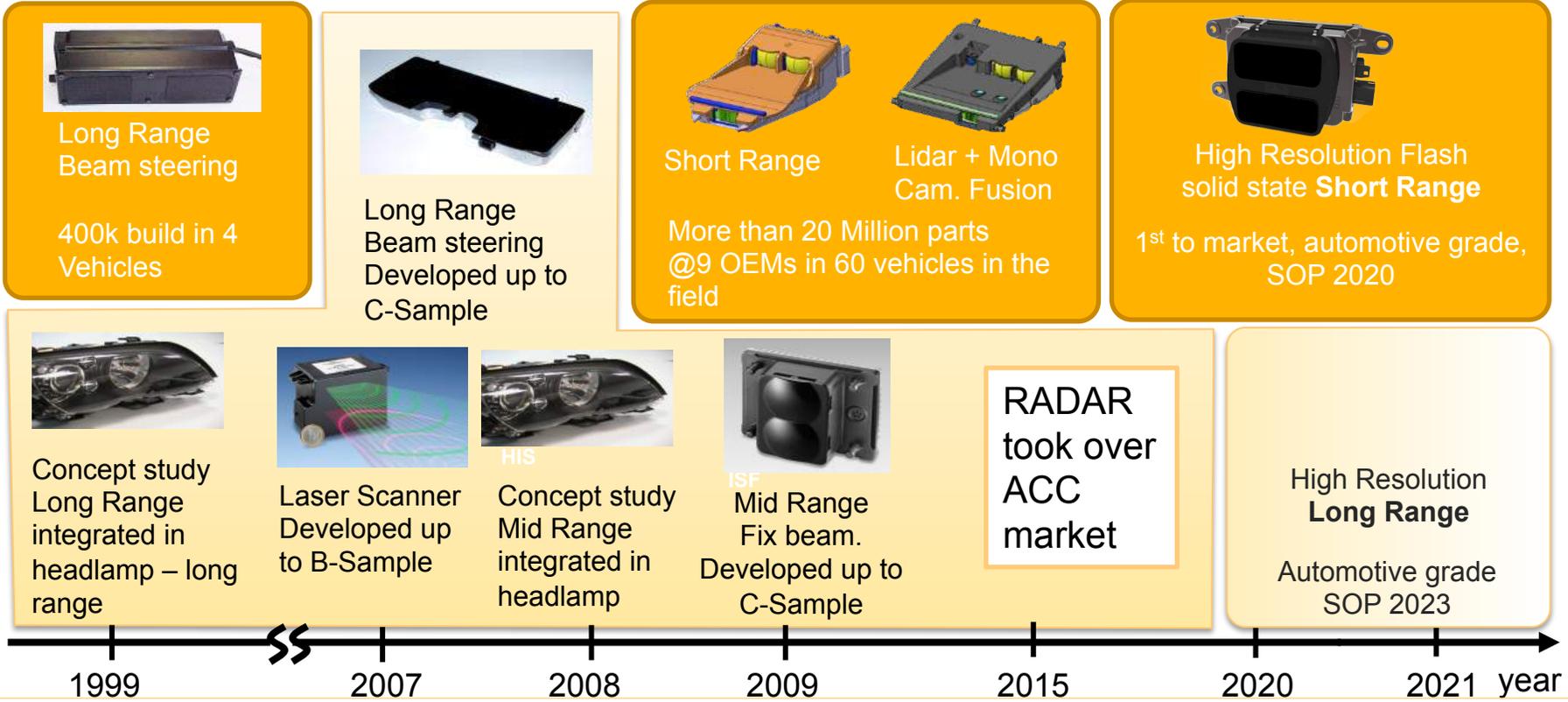
Good market awareness through local presence



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Continental LiDAR product history



Short Range LiDAR Sensor

FEATURES

- › Crash type classification is provided
- › Enhance supplemental restraint systems
- › Autonomous braking, pre charge or advanced brake assist are supported for low speed
- › Brake intervention requests are provided
- › Robust design
- › High reliability
- › Low cost

FUNCTIONS

- › Emergency Brake Assist (EBA)



Multi Function Camera with LiDAR

FEATURES

- › Compact One Box Design with a fusion of the camera and laser sensor technology
- › Color CMOS imager, 840x630 pixels and 905nm Lidar

FUNCTIONS

- › EBA up to 80kph (Fusion of Camera & Lidar)
- › Object recognition, e.g. for the Forward Collision Warning (FCW)
- › Lane Departure Warning (LDW)
- › Intelligent Headlamp Control (IHC)
- › Traffic Sign Assist (TSA)
- › Pedestrian Detection (classification)



High-Resolution 3D Flash LiDAR

DESCRIPTION

- › The innovative High-Resolution 3D Flash LIDAR is a future-proof solution that is combined with other ADAS sensors to achieve highly and fully automated driving functions.

BENEFITS & FEATURES

- › Solid-State Design
- › Contiguous Pixels – No data gaps
- › High-Vertical & Horizontal Resolution
- › Co-registered Range & Intensity
- › 30 Hz Operation
- › Low Intensity Return (10%) Capture
- › 3D Global Shutter™
- › Single pulse laser “Full Frame Scene”
- › Degraded Visual Environments (rain, dust, smoke, sun, fog)
- › Blockage detection
- › Integrated Heater
- › Optional Washing System
- › Auto alignment
- › Continuous Sample Mode
- › ASIL B (Functional Safety)



Technical Information

- › Field of View (120° x 30°)
- › Resolution: 128 x 32 pixels
- › Dimensions: 100 x 120 x 65 mm
- › Mass: <600 g
- › Frame Rate: 30Hz
- › Exp. Temp. Range: -40° to +80°
- › Power consumption: 15W
- › Supply Voltage: 12V and 24V
- › Class 1 Eye-Safe 1064nm Laser

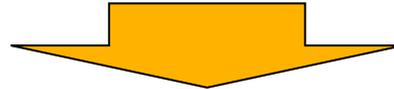
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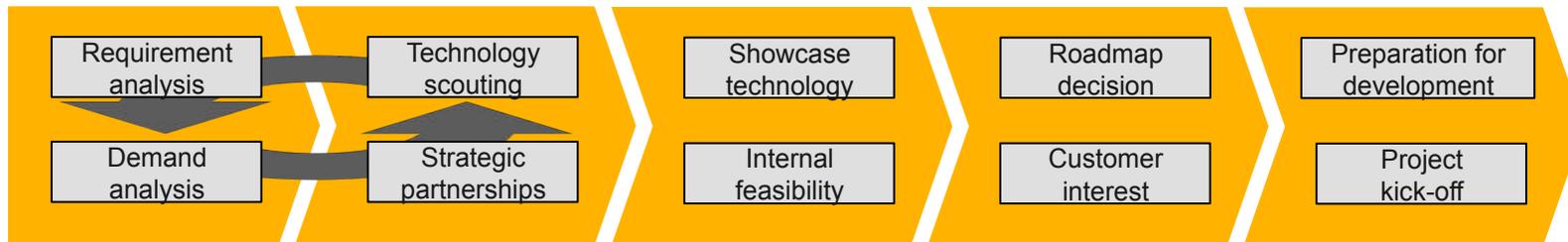
Technology development In the scope of Product Lifecycle



Product Lifecycle acc. to VDA6 is very reactive



Proactive technology development required for short product lifecycles



Demand analysis

ADAS portfolio 2014

Original 2014 slide

SurroundView
Camera



Camera
(Mono & Stereo)



Backend



Data fusion



Ultrasonic

Radar
(Short & Long
Range)

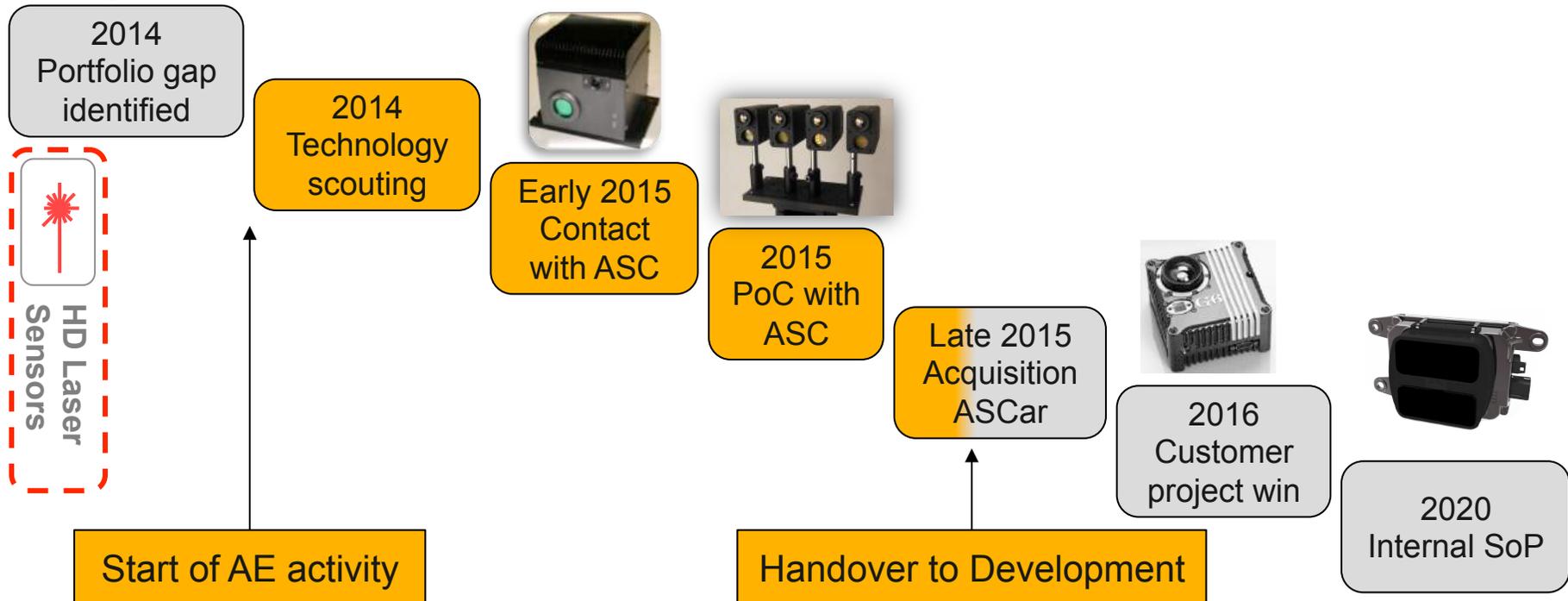


HD Laser
Sensors*

* not part of Continental product portfolio in 2014

Scouting and feasibility study

Acquisition of ASCar



Demand met ADAS portfolio today



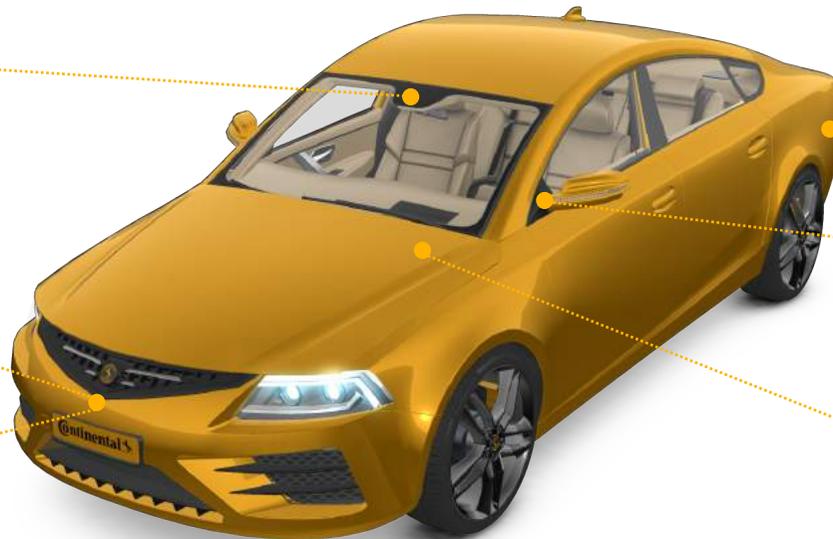
Smart Camera



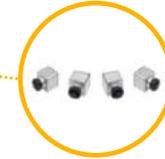
Long Range Radar



High Resolution 3D Flash Lidar



Short Range Radar



Surround View



Assisted / Automated
Driving Control Unit

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Continental and the startup ecosystem

co-pace and Corporate Venture Capital (CVC)



We power up Continental’s ambition to shape the future of mobility and beyond co-pace and CVC work extremely close together to leverage the startup ecosystem

co-pace GmbH



Incubation of startups/ concepts

- Identify and incubate outstanding product and service concepts within Continental
- Support incubation activities within organizational units of Continental
- Focus on “Continental-Entrepreneurs” and their concept, however be open for input from the startup ecosystem



Co-Operation with external startups

- Analysis of topics and scouting of external startups in strategic focus fields
- Connect startups with BUs or advanced development and run PoC projects
- Provide the framework to work fast and efficient with startups
- Conduct tech/market due diligence

Corporate Venture Capital (CVC)



Investment into startups

- Minority investments in external startups within strategic focus fields
- Financial portfolio management of existing startup investments
- Exit planning and divestment execution for each startup investment
- LP investments in selected VC funds

Note: co-pace, the startup organization of Continental, specializes in working with startups of all stages in the mobility context. This includes analysis of specific focus fields, scouting for high-potential companies/ ideas and connecting them to Continental’s operational business via PoC projects. Corporate VC focuses exclusively on potential investments in promising startups that are of strategic relevance to Continental.

Tangible example: startup co-operation and CVC

Operational business impact with Cartica AI



Algorithms for perception 

BU ADAS

USP

- Proprietary “Image2Text” software technology equips vision sensors with unprecedented object recognition and prediction capabilities
- Self-learning algorithms do not require labeled data and achieve high recognition performance despite running on low cost hardware

Value Add

- Accelerate co-development of competitive ADAS products with Continental

Continental is a minority investor in Cartica. [LINK](#)

Tangible example: startup co-operation and CVC

Operational business impact with Leia Inc.



3D Display with services **Leia Inc.**
BU ID

USP

- **Lightfield Multiview**, nano tech. creates 3D image
- **Services/Apps** platform with proprietary 3D display SDKs

Value Add

- co-pace established contact with Leia and **run PoC with ID**
- ID put Leia 3D Display on the **roadmap**
- Secured operational **exclusivity** due to **VC investment**
- Potential **single € bn. lifetime sales** starting 2022
- **Services/Apps** enabled by 3D tech, bring in additional revenue opportunities

Continental is a minority investor in Leia. The partnership goes beyond hardware and the two companies are also collaborating on content creation and developer ecosystem support. [LINK](#)

Safe and Dynamic Driving towards Vision Zero



SensePlanAct