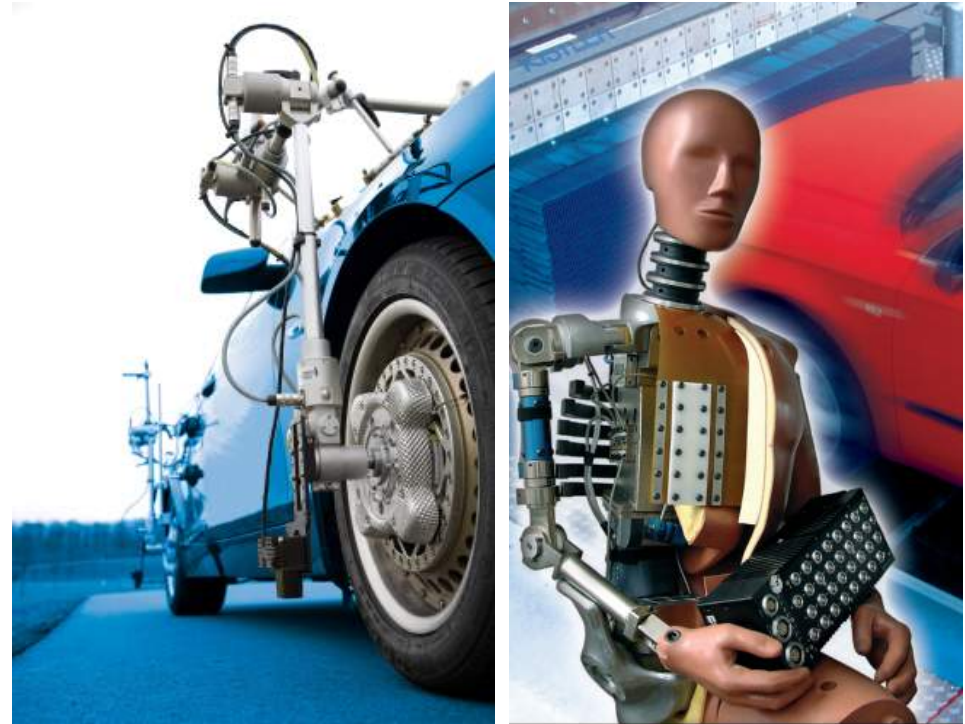


# Kistler

## Your Partner for Automotive Research & Testing



# Introduction

- International HQ in Switzerland
- 6 production centers  
(Switzerland, USA, Germany)
- 25 sales centers
- >1 000 employees
- Sensors, electronics & systems  
for
  - Acceleration
  - Force
  - Pressure
  - Torque



Winterthur • Buffalo • Detroit • Lorch • Munich • Schönaich • Stuttgart • Wetzlar

# Kistler Worldwide

# KISTLER

measure. analyze. innovate.

**Wetzlar (Ger)**  
**Kistler Automotive GmbH**  
Competence Center Wetzlar  
35 Employees

**Stuttgart (Ger)**  
**Kistler Instrumente GmbH**  
64 Employees

**Lorch (Ger)**  
**Kistler Lorch GmbH**  
95 Employees

**München (Ger)**  
**Kistler Automotive GmbH**  
Competence Center München  
23 Employees

**Detroit (USA)**  
**Kistler Instrument Corp.**  
24 Employees

**Buffalo NY (USA)**  
**Kistler Instrument Corp.**  
85 Employees

**Hong Kong (HK)**  
**Kistler China**  
50 Employees

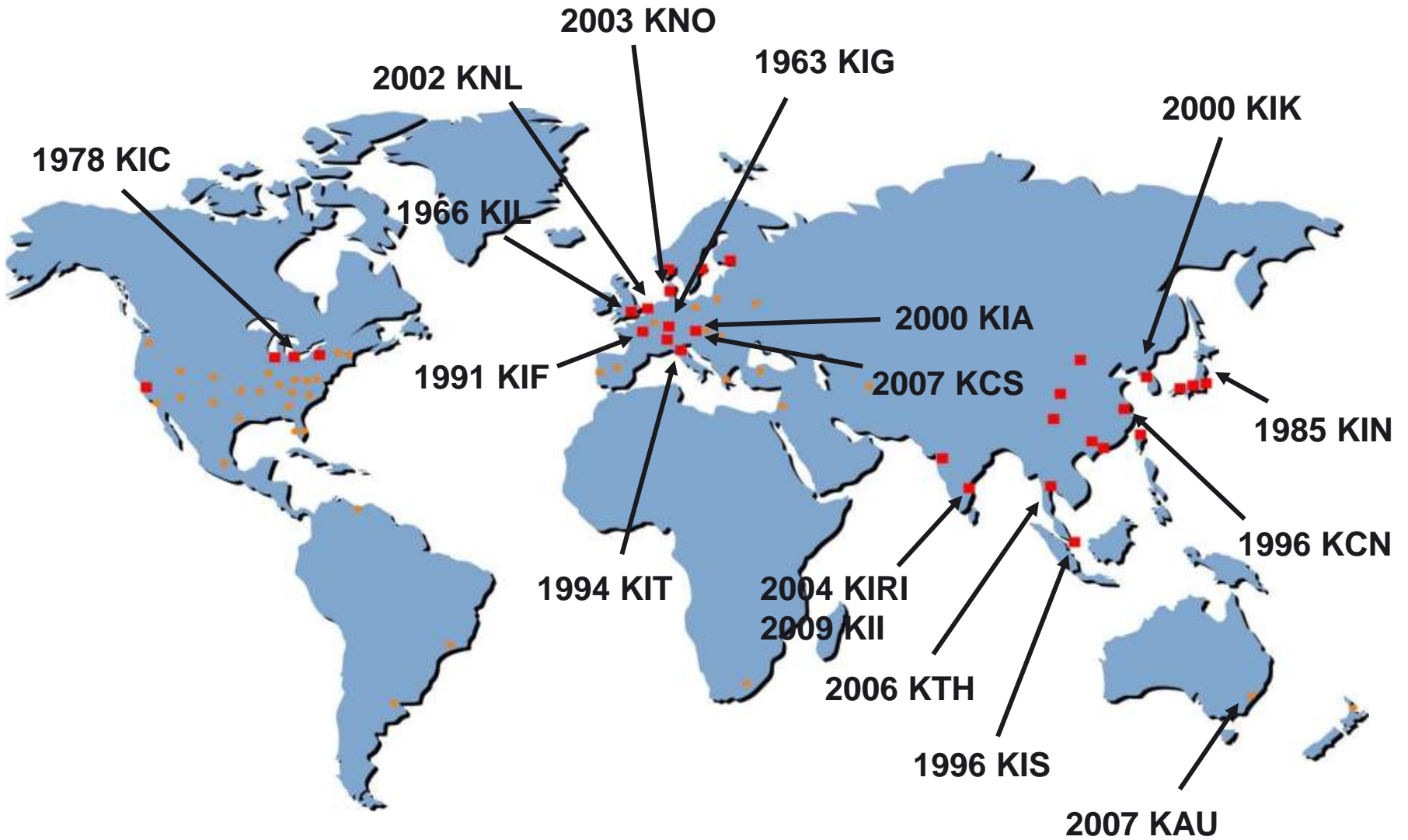
**Winterthur (CH)**  
**Kistler Instrumente AG**  
460 Employees

**Stuttgart (Ger)**  
**Kistler Automotive GmbH**  
Competence Center Schönaich  
74 Employees

 Product Center  
 Continental Head Offices

**Kistler Group Companies in 25 and  
Distributors in 30 countries**

# Kistler Sales Centers



# On Asphalt, Snow, Ice.....

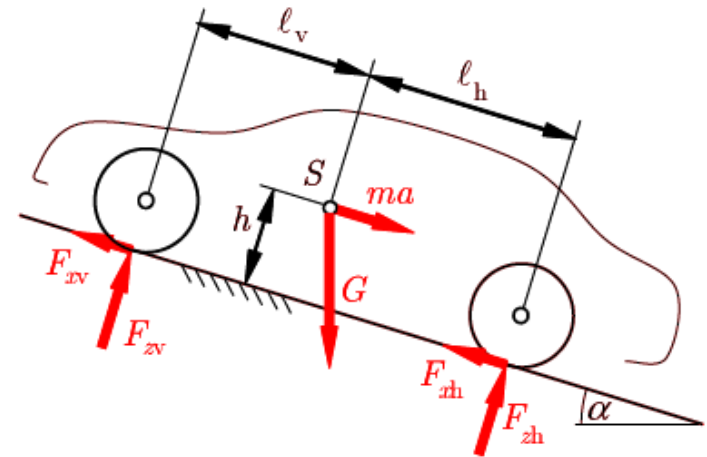
**KISTLER**  
measure. analyze. innovate.



# ..... and Wet Conditions



- Evaluation of acceleration and braking behavior
- Driving resistance: wheel, air, rolling and acceleration resistance (energy requirement)
- Engine characteristics, gear balance (engine supply)
- Transmission of drive and brake forces (driving limits)



Planar model of longitudinal dynamics



# Short Product Overview

- Optical Sensors
- Mechanical Sensors
- Fuel Measurement Sensors
- Data Acquisition
- Equipment
- Software



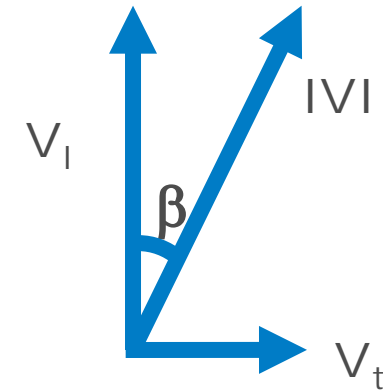
# Correvit® L-350 Aqua

Non-contact 1-axis optical sensor  
for slip-free measurement of longitudinal dynamics



# Correvit<sup>®</sup> S-350 Aqua

Non-contact 2-axis optical sensor  
for slip-free measurement of longitudinal  
and transversal dynamics

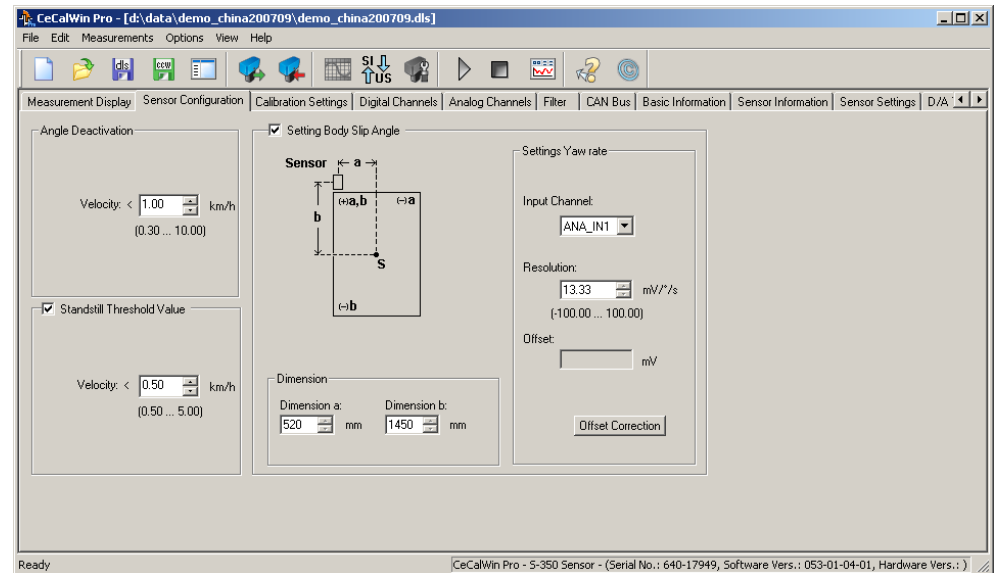


- Easier mounting
- Improved signal processing by ideal combination of the analog and digital signal conditioning (DSP-FPGA technology)
- Reduced noise of the output signal
- Improved measurement features on various surfaces in combination with environmental influences by snow, ice or water
- Improved standstill
- Performance
  - Distance measurement deviation  $<\pm 0,2 \%$  \*
  - Speed linearity  $<\pm 0,2 \%$  \*\*
  - Angle range  $\pm 40^\circ$
  - Angle resolution  $<\pm 0,1$
  - Working distance and range  $350 \pm 100$  mm

\* with calibration on test surface at a distance of 200 m minimum / \*\* with calibration on test surface,  $v > 10$  km/h

# Correvit<sup>®</sup> S-350 with Gyro

- For automatic calculation of body slip angle relative to the vehicle's center of gravity



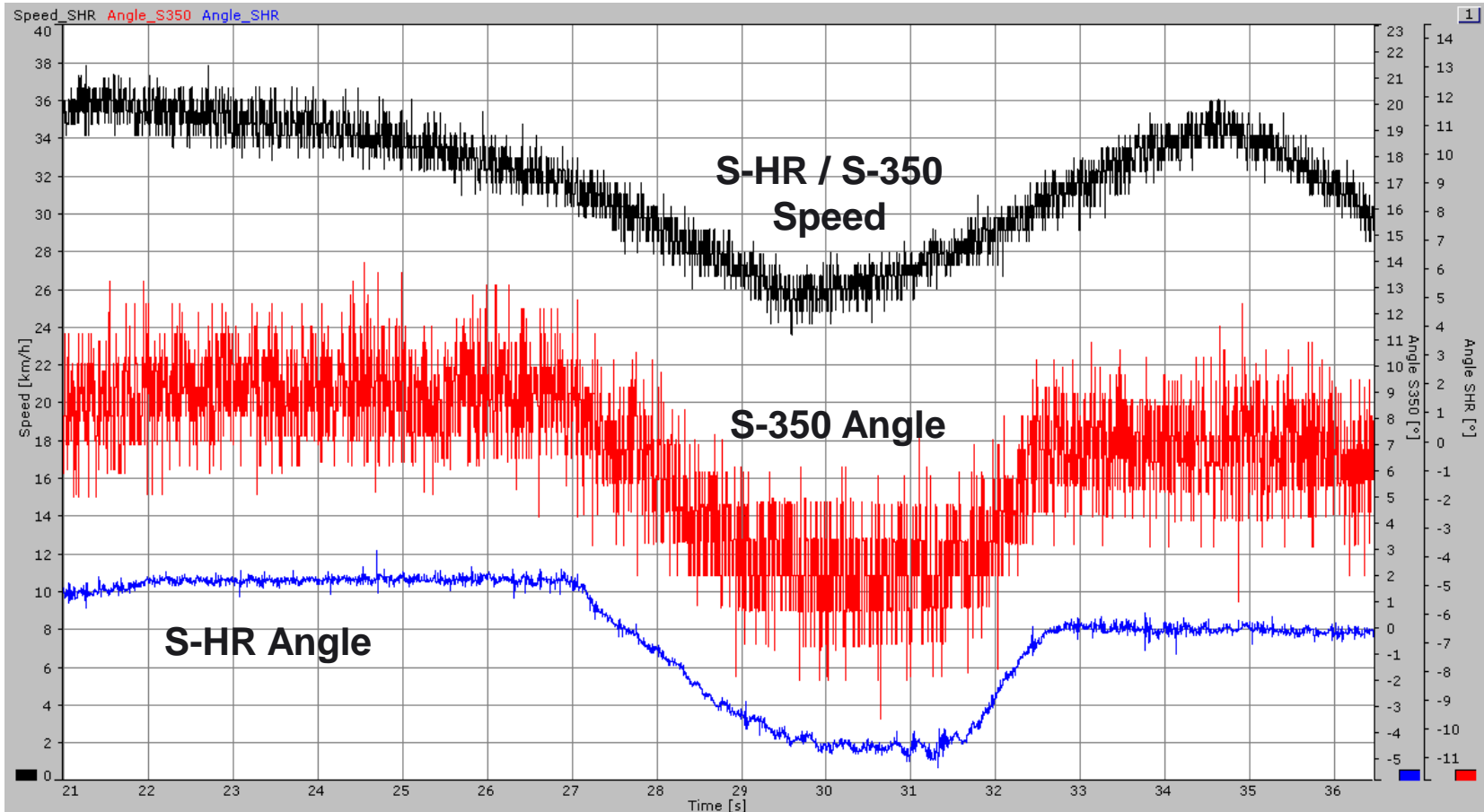
- Non-contact optical high-resolution sensor for slip-free measurement of longitudinal and transversal dynamics



- Accuracy of the unfiltered angle within the range of  $\pm 15^\circ = 0.1^\circ$
- High-resolution slip angle measurement by enhanced measuring principle
- Working range of 250  $\pm$ 50 mm from test surface
- Applicable from 0,5 km/h ... 250 km/h\*
- Extremely high measuring accuracy\*\* better than  $\pm 0.1\%$  as a result of precise optics and digital signal processing
- Performance
  - Angle measurement range  $\pm 40^\circ$
  - High-Resolution  $\pm 15^\circ$
  - Angle resolution 0,01  $^\circ$
  - Angle accuracy 0,1  $^\circ$
  - Angle resolution ( $-40 \dots -15^\circ$ ,  $+15 \dots +40^\circ$ ) 0,1  $^\circ$
  - Measurement frequency real 250 Hz

\* with calibration on test surface at a distance of 200 mm minimum / \*\* with calibration on test surface,  $v > 10$  km/h

# Comparing Angle Curve of S-HR and S-350



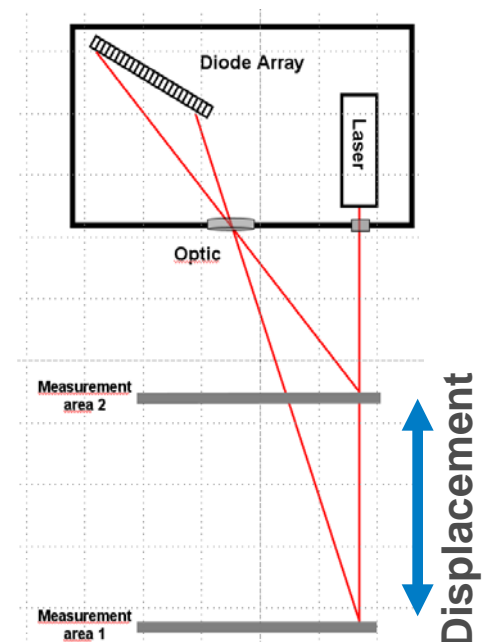
# HF Sensors

## HF 250C

## HF 500C

## HF 750C

Working range	100 mm ... 350 mm	125 mm ... 625 mm	150 mm ... 900 mm
Resolution	0.1 mm	0.2 mm	1.5 mm
Relative Accuracy	±0.5 mm	±1 mm	±1 mm
Linearity	±0.2 %	±0.2 %	±0.3 %
Max. Sampling rate *	1 kHz	1 kHz	8 kHz
Outputs	analog, RS232, CAN	analog, RS232, CAN	RS232, CAN
Light Source	Laser < 5mW **	Laser < 5mW **	Laser < 5mW **
Wavelength	660 nm (red)	660 nm (red)	660 nm (red)
Weight	155 g	155 g	155 g



# Important Physical Values to Measure

- Speed
- Acceleration in x-direction
- Acceleration in y-direction
- Yaw
- Pitch angle
- Roll angle
- Steer angle
- Steer torque
- Body-slip angle
- Distance

