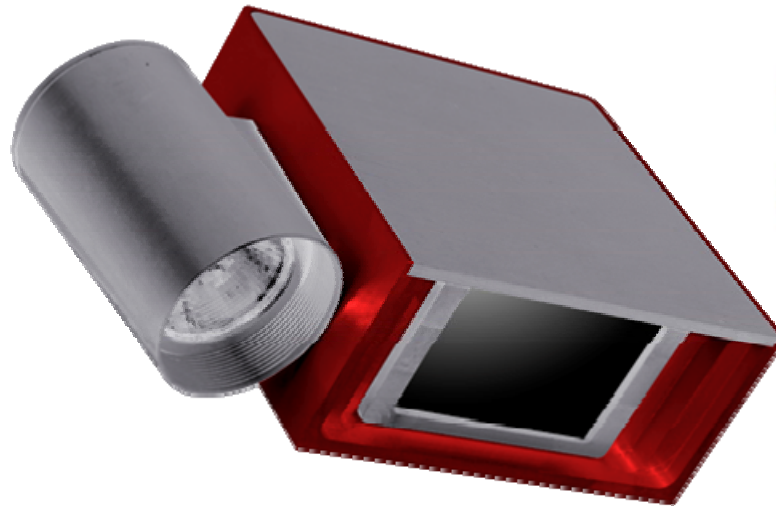


Introduction of **Luxact** optical speed sensor family



About SMG Engineering

- New developer, manufacturer and supplier of innovative measurement products & solutions
- Fundamental research in optics & sensing
- Custom development of special solutions for R&D worldwide



What is a Luxact sensor?

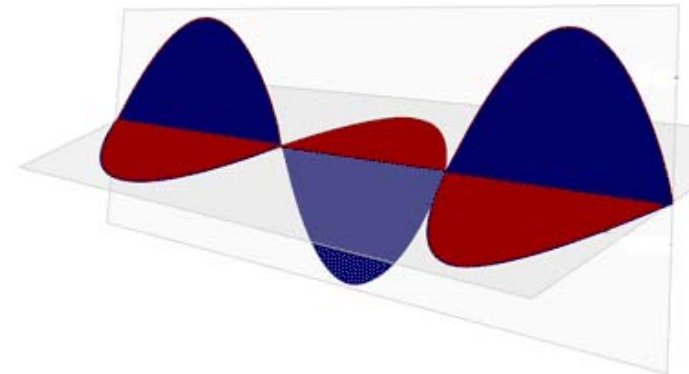
- **State-of-the-art, optical speed, distance & ride height sensor**
- **Innovative & patented optical method allows unseen reliability and flexibility of measurements**
- **A universal solution for speed measurements**
- **Luxact Family provides a growing range of sensors, customized to user & industries typical needs**
- **Pathbreaking sensor capabilities create new measurement opportunities**



Other available measuring methods considerations: Radar

Radar method:

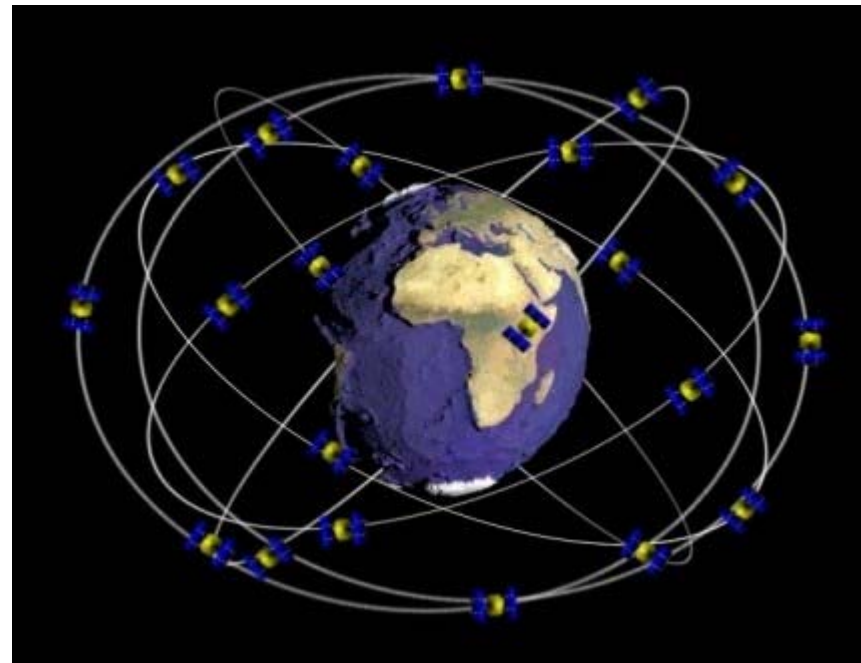
- Physically, sensitive to sudden changes of EM properties of measuring surface e.g. puddles, metals.
- Comprehensive filtration needed
- Hard to achieve high accuracy



Consideration of others available measuring methods : Satellite

Satellite (i.e.GPS based) method:

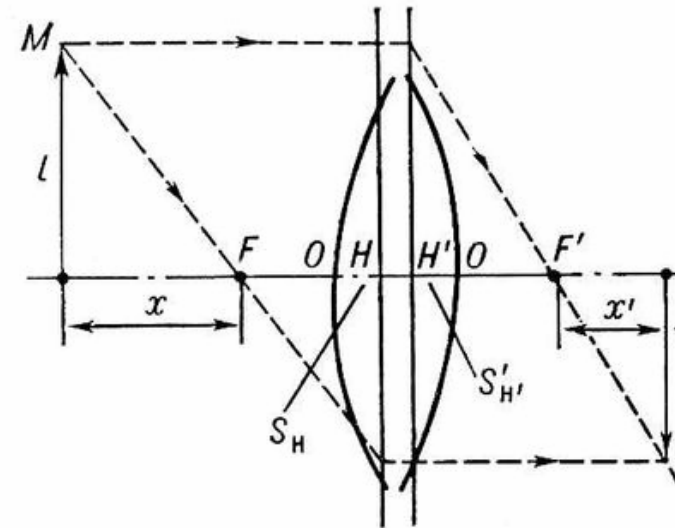
- Physically, environmental objects e.g. bridges & buildings cause failures.
- Sensitive to electromagnetic background e.g. high-voltage power line



Consideration of others available measuring methods : Optical

Other optical methods

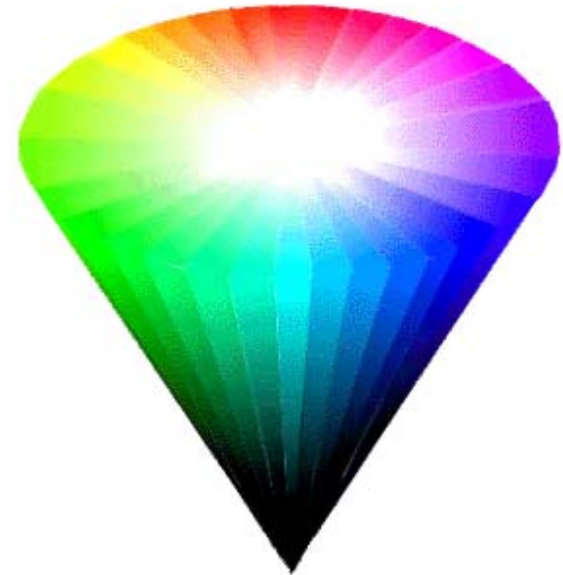
- Physically, changes of sensor-to-surface distance influence the measured speed value
- Comprehensive filtration is needed, some surfaces are



Luxact measuring method: Features

Main fundamental features of the method

- no diaphragm: a lot of light is coming inside of the sensor, producing strong signal: low reflecting surfaces and large distance to the road are available
- measured speed is independent of sensor-to-surface distance
- almost no filtering needed: small & constant delay time, instantaneous start-up, high stability
- high signal to noise ratio



Luxact measuring method: Outcome

Outcome of the method

- high accuracy
- extremely high sensor-to-surface distance possible: up to 130cm
- almost any thinkable measurement surface & conditions acceptable
- speed value irrespective to sensor-to-surface distance by the principle of the sensor operation
- always reliable & clear speed signal

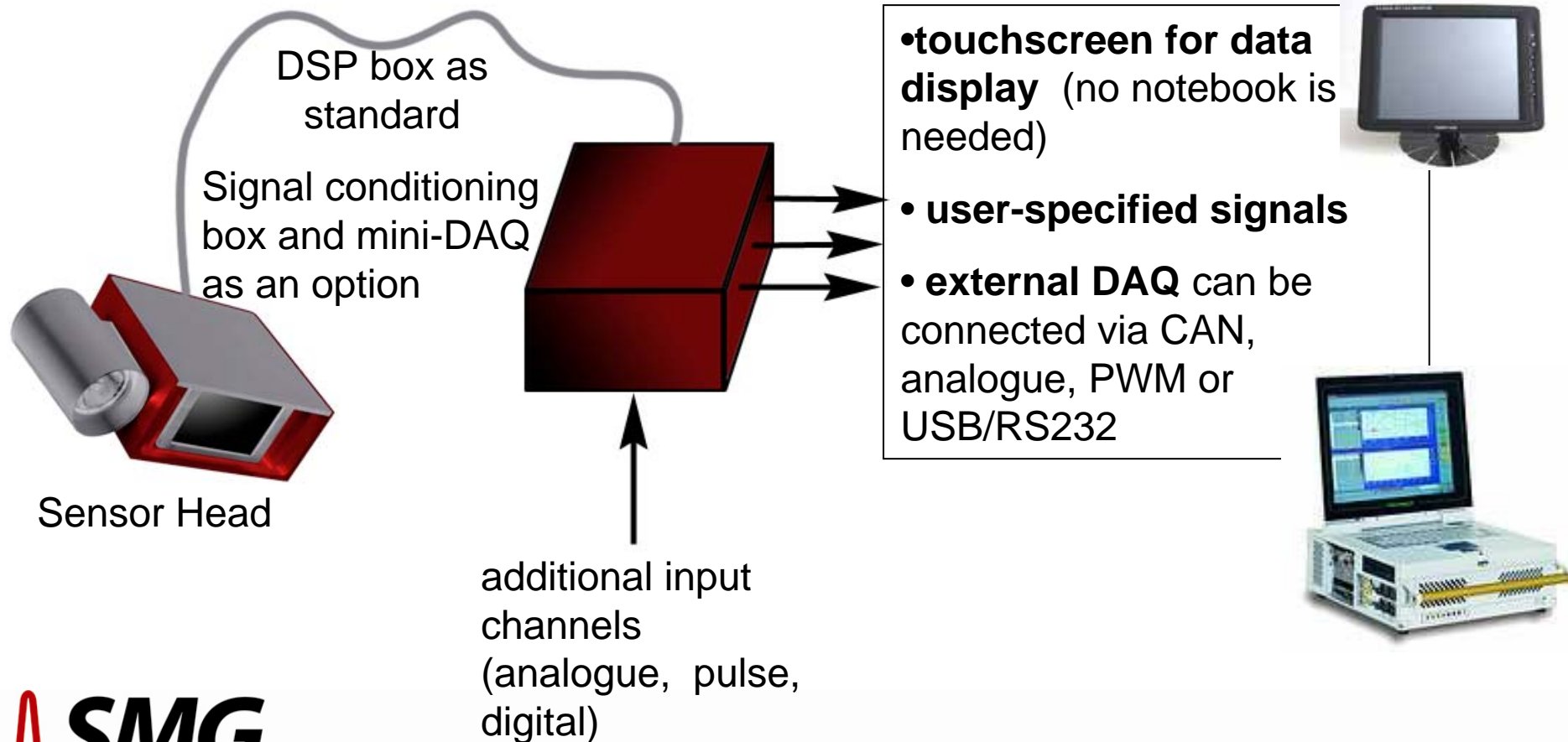


Luxact measuring method: Outcome

Typical technical data of a Luxact sensor:

Luxact 1D	
Measured values:	speed, distance, ride height, brightness of the road (surface)
Speed range:	0,5 - 250 km/h*
average speed accuracy:	<±0.2%
distance/length (s) accuracy: (independent of surface, height fluctuations, without additional calibration)	<±0,1% at s >100m
Distance resolution: **	3 mm
nominal sensor-to-surface operational range:	nominal 450mm, ± ca. 30% (320-580mm)*
Height accuracy:	± 5mm
Data output frequency:	up to 250Hz
Data Output:	Analog, CAN, PWM, USB/RS232
Special features:	<ul style="list-style-type: none">• Read out bright labels on the road surface• User-customized software

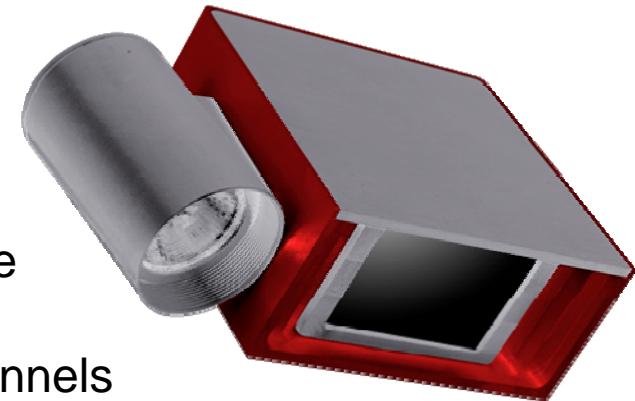
Sensor configuration: stand alone sensor or miniDAQ system



Luxact Family: Flexibility & Options

Available options and system configurations:

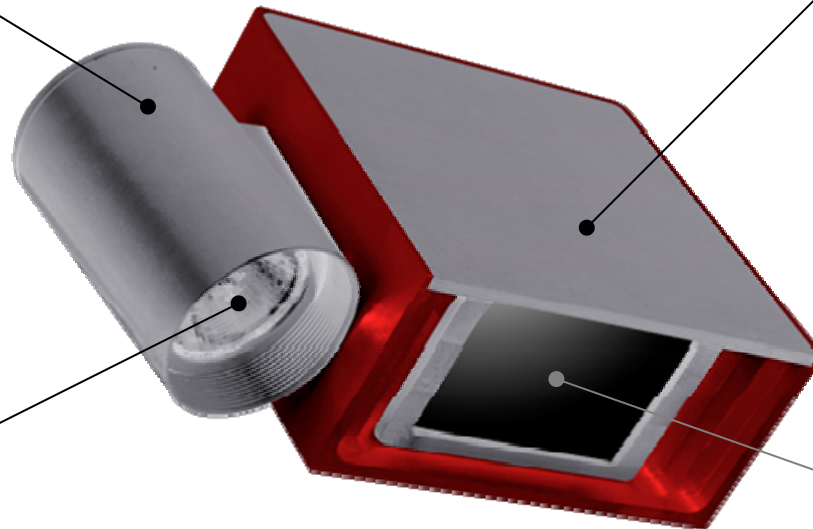
- one **or** two speed component sensors
- signal conditioning based on DSP **or** ultra compact fanless PC with a SSD for stand alone operation
- additional analogue, pulse and/or digital input channels
- magnetic sensor head fixation or suction cup
- automated read out of white labels (lines) on the road, time synchronized to speed & distance data
- automated output of distances between labels: accuracy check up
- embedded sensor software as a LabView application
- user-specific output signals



Sensor Head technical features

Light source is isolated from the main sensor head compartment: **no overheating** of sensor electronics at any temperature conditions

Special lamp spatter treatment increase light efficiency: a 20 W lamp is sufficient



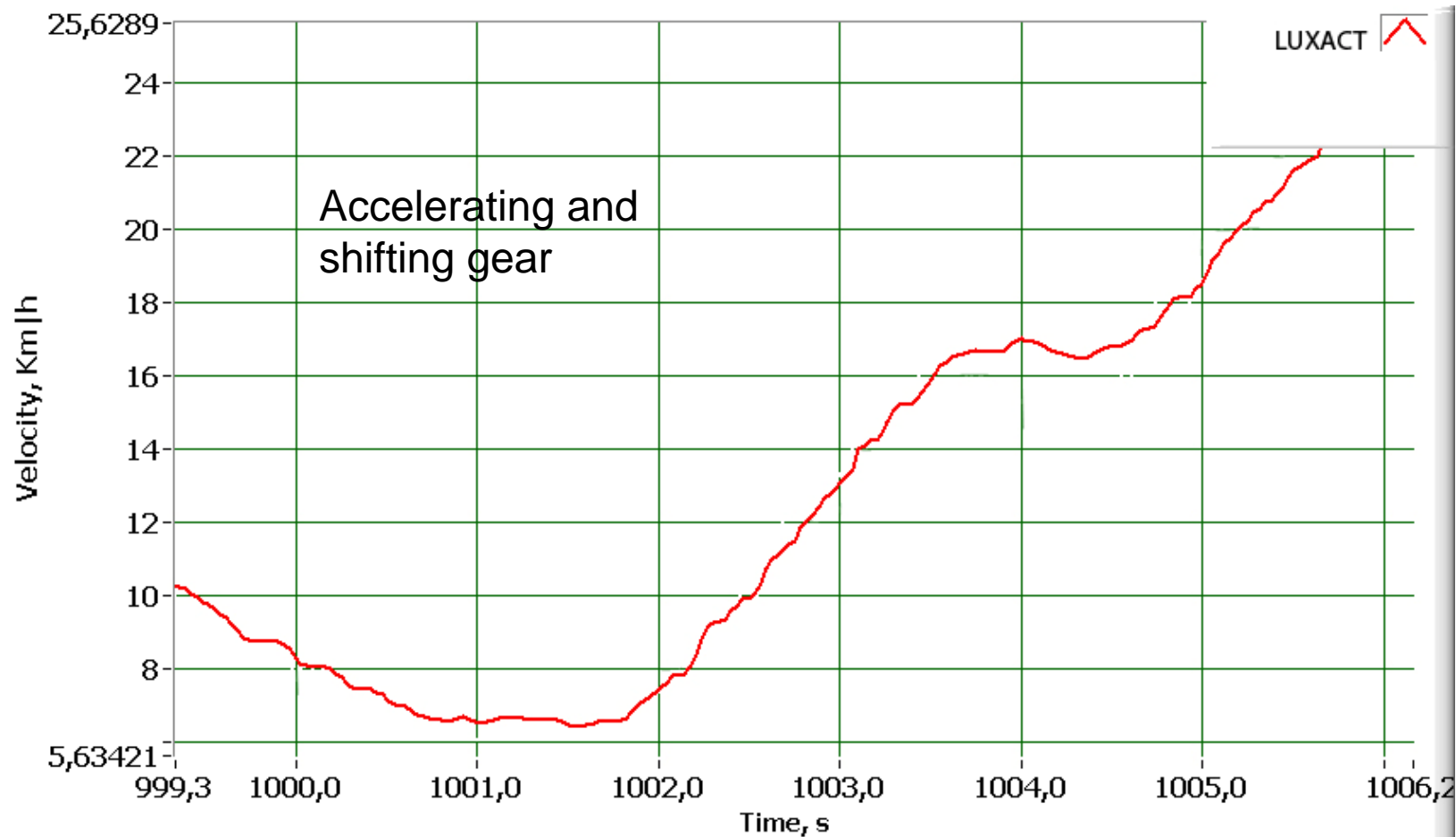
- ruggedized, IP67 aluminum housing
- compact mounting due to lightweight 0,56kg

• no moving or vibration sensitive parts inside

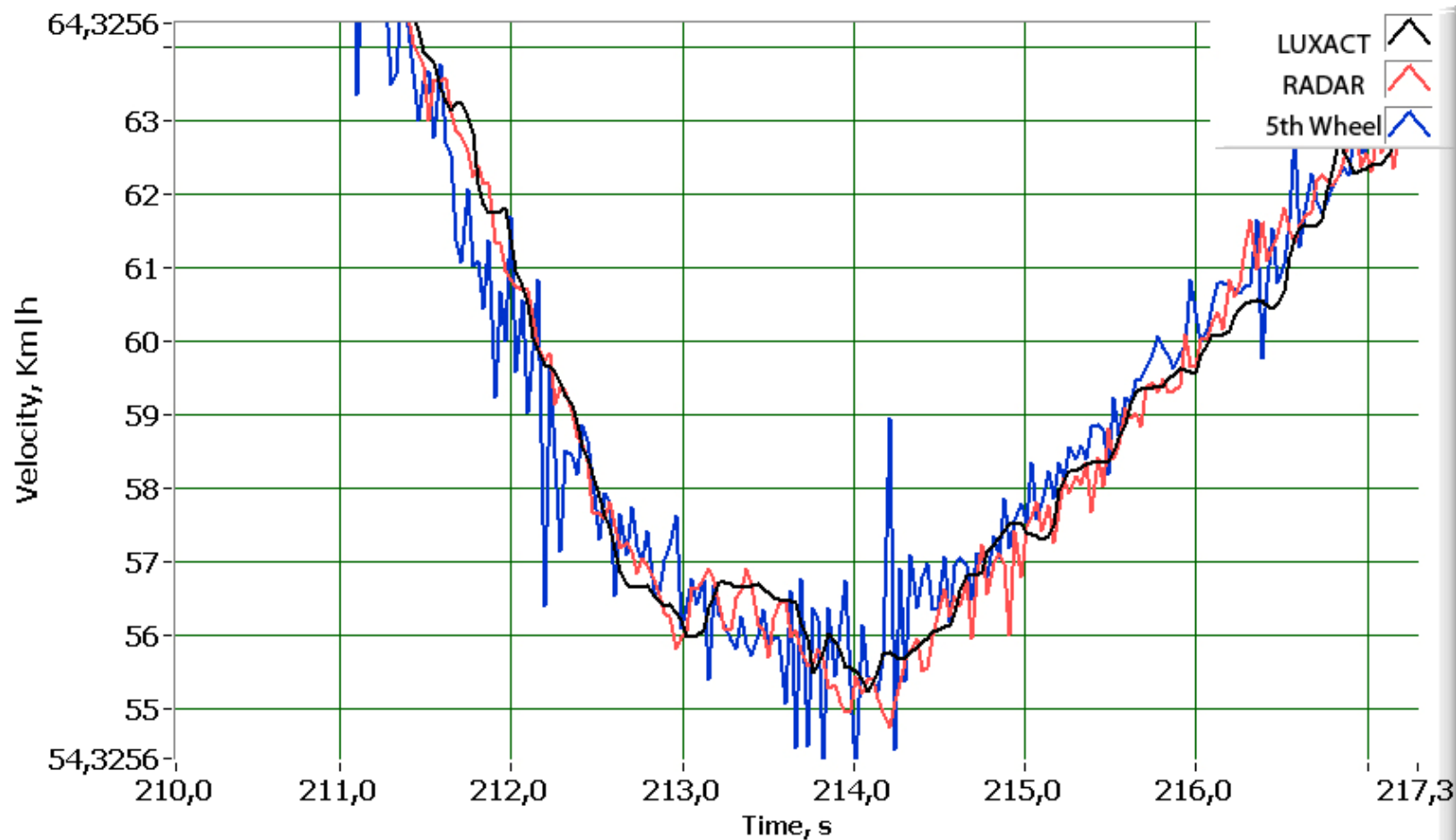
Advantages of Luxact method:

- no sunshade needed
- no splash protection needed

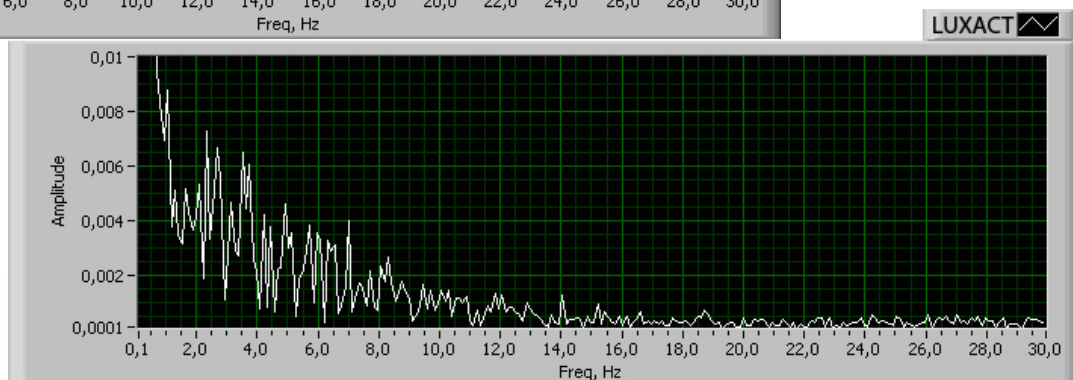
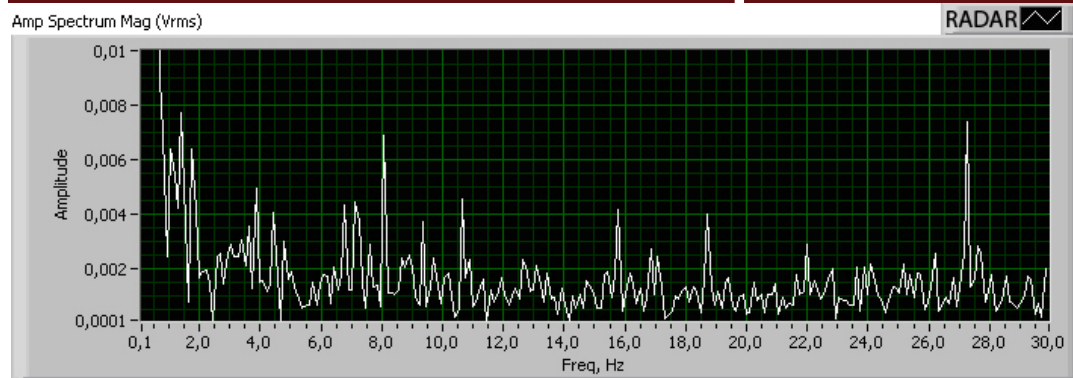
Signal quality: typical signal quality



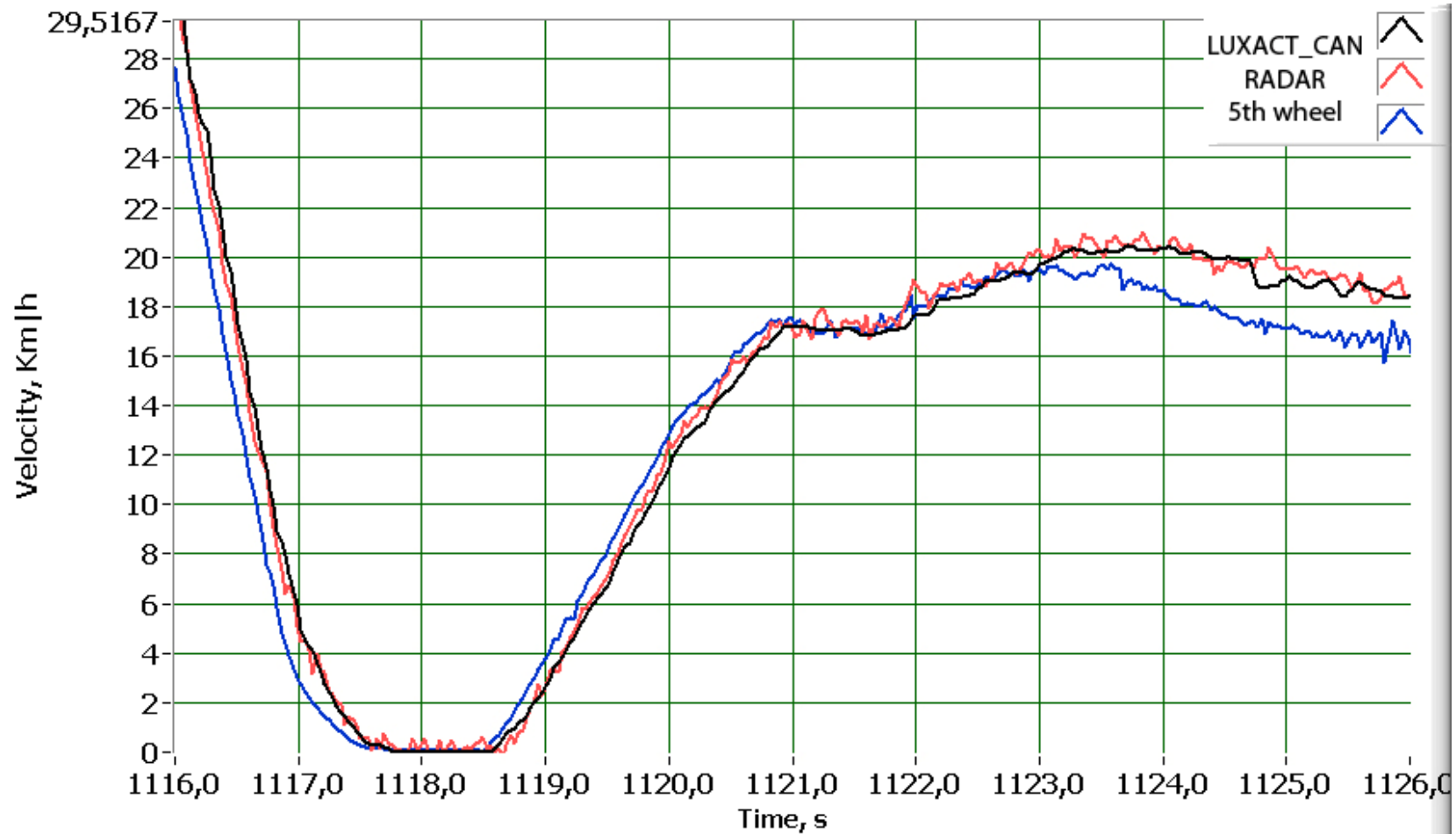
Compare: Luxact vs. Radar & 5-th wheel sensors



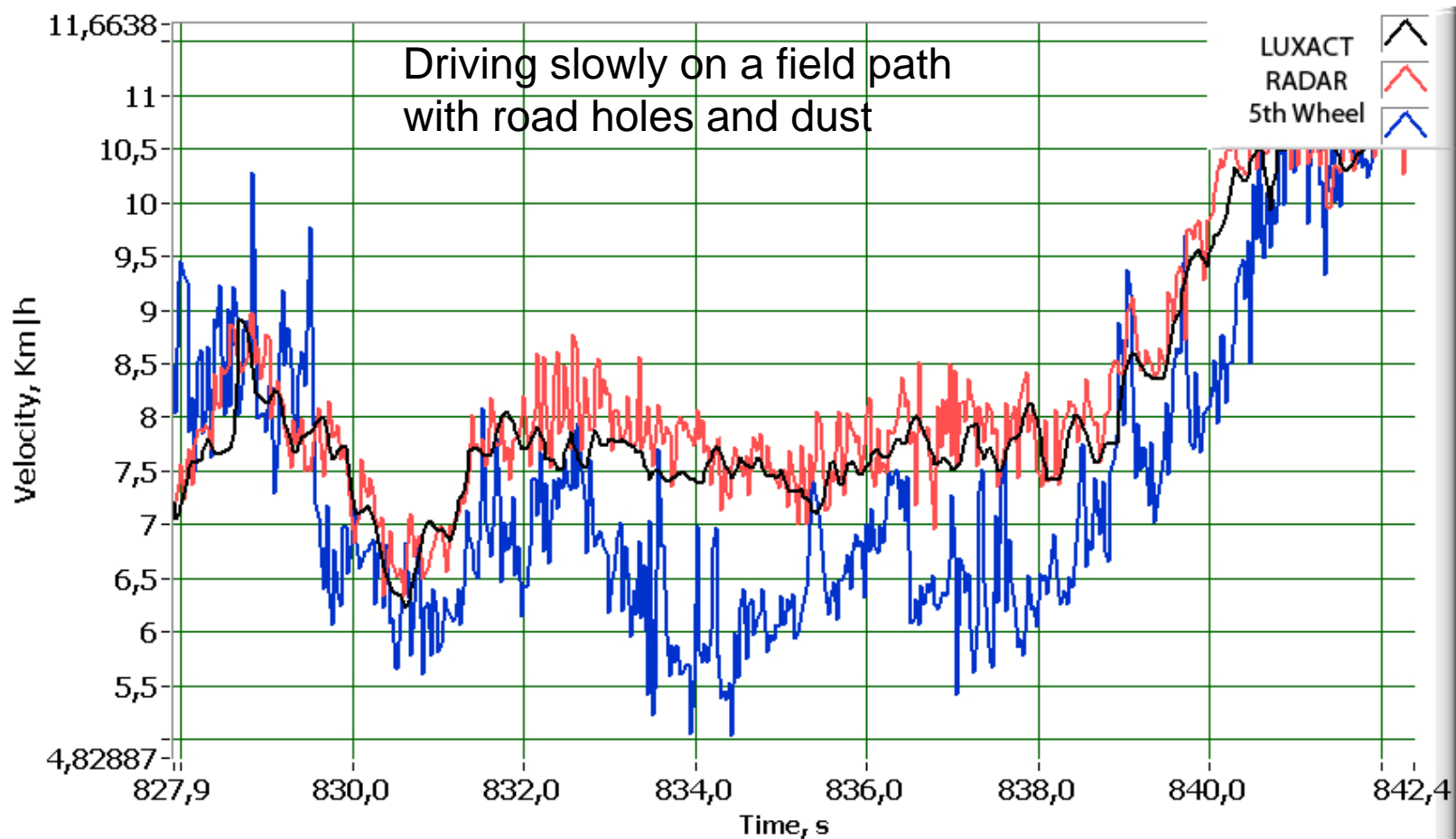
Compare: Signal noise – amplitude spectrum



Compare: Luxact vs. Radar & 5-th wheel sensors – brake test



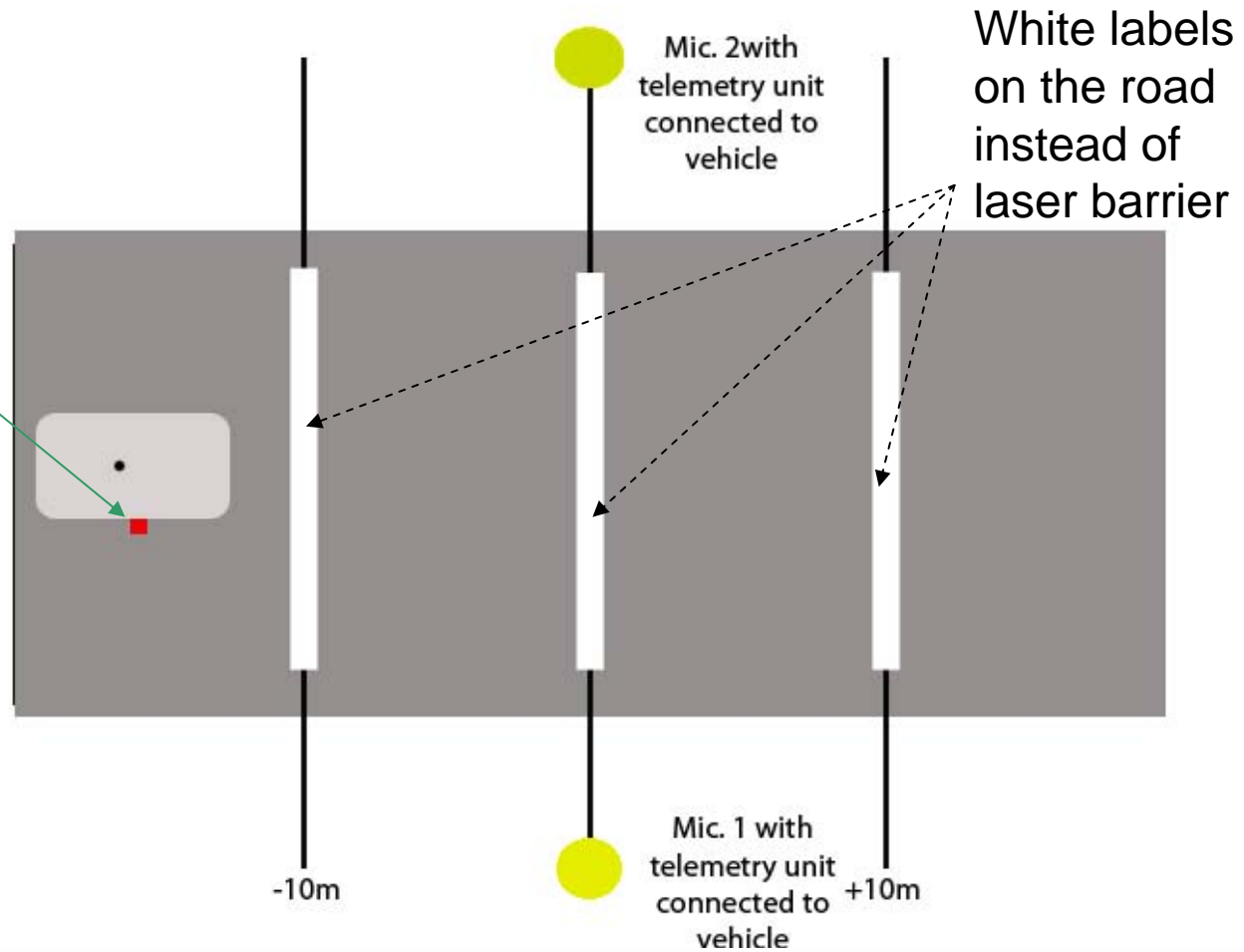
Compare: Luxact vs. Radar & 5-th wheel sensors – off road



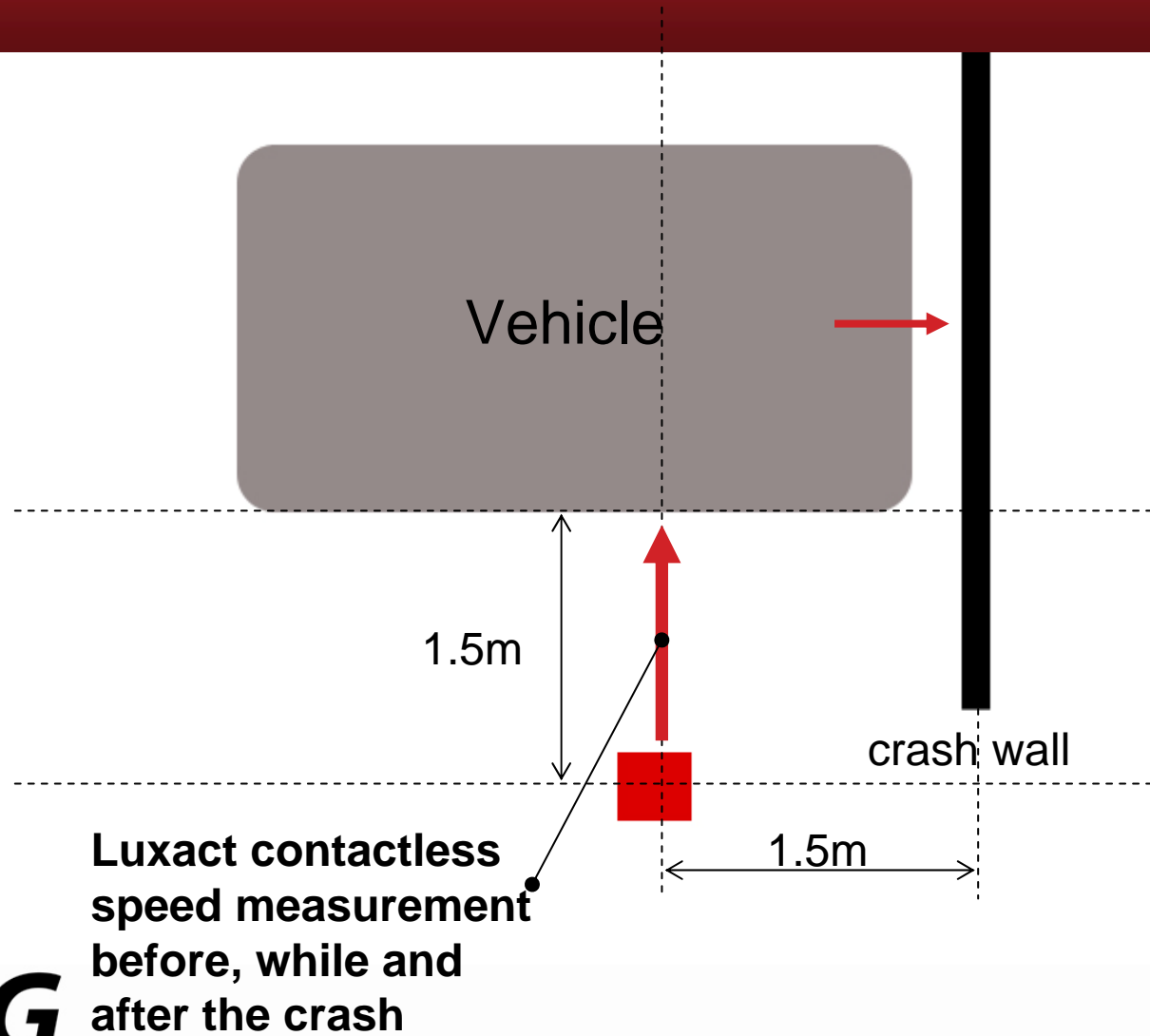
Tested sensor applications

- **brake & handling tests on wet basalt:** perfect signal quality & automated marking of braking zone drive-in if white road label applied
- **bad weather e.g. rain or snow:** hardly recognizable changes to signal even while strongest rain
- **fuel consumption:** additional input channels in sensor's signal conditionin box & easy-to-use software customized for Norms & Standarts
- **road profile measurements:** Luxact measures longitudinal distance with 1cm repeatability
- **acoustic passby:** automated marking of drive-in & drive-out of the zone if white road label applied & sound data input via telemetry. Result: Immeditely a test-passed-answer in the car
- **crash tests:** a fixed installed sensor measures vehicle speed before, while and after the crash.

Acoustic passby: no laser barriers needed



Crash test: vehicle speed



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Thank You!

Thank you for your attention.

For detailed information about Luxact
and your applications please have a look at:

www.luxact.net

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