



I N P H Y S I C S W E T R U S T



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## 4activeSystems

4activeSystems is one of the world's leading companies for active vehicle safety, focusing on advanced dummy objects and test systems for the evaluation and development of AEB/AES-systems and autonomous driving vehicles.

Since 2006, we have been delivering innovative solutions and products that have become global standards.

Our high-quality products „Made in Austria“ combined with excellent support make us a reliable partner for vehicle manufacturers, test labs and automotive suppliers worldwide.

Our team consists of highly qualified, passionate employees with excellent know how in physics, electronics, mechatronics and material science.



I N P H Y S I C S W E T R U S T

## 4activeMC

### The official Euro NCAP PTW target for 2022 test scenarios

- ✓ corresponding to category L3 as applied by UNECE
- ✓ realistic properties in size, shape and rotational features
- ✓ complies with ISO 19206-5 WD, Euro NCAP, ...



### Allows testing under rough conditions

- ✓ extreme lightweight and soft structure to prevent damage on VUT
- ✓ robust and modular system – easy and fast change of spare parts
- ✓ realistic response for Radar-, Lidar, Camera and IR-Systems

### Available options

- ✓ different models (scooter, ...)
- ✓ different optical appearance and colours
- ✓ synchronized movement features





Performance

mono/ stereo camera system, Lidar sensors	✓
360° - Radar characteristic	✓
micro-Doppler spread	✓
near infrared / far infrared★	✓
crash speed lateral / longitudinal	up to 60 km/h / up to 50 + 20 km/h
operation speed	80 km/h

★ optional

Dimensions motorbike

seat height	820 mm
wheel base	1420 mm
total width	750 mm
wheel diameter	17"
weight	< 11 kg

Dimensions biker

height (body)	1800 mm ± 20
width (shoulder)	500 mm ± 20
depth (torso)	235 mm ± 20
weight	< 4 kg

Key features

- ✓ compatible with 4activeFB-small, 4activeSB
- ✓ extreme lightweight and soft structure
- ✓ robust and modular system
- ✓ synchronized movement features



I N P H Y S I C S W E T R U S T

## 4activeFB-small

**The only global solution fulfilling all Euro NCAP VRU specifications**

- ✓ height and ground clearance for pedestrian targets (EPT)
- ✓ wheels of bicyclist target (EBT) have permanent contact to ground
- ✓ RCS levels according to international standards/test protocols



**Fully synchronized operation with all relevant driving robots**

- ✓ real time position data from/to robot - import/export drive files
- ✓ corrects LAT/LONG waypoint errors of driving robots (VUT)
- ✓ full synchro mode - synchronization of 5 independent platforms



**Allows testing under rough conditions**

- ✓ traversable by heavy vehicles - trucks (40 tons)
- ✓ waterproof with IP67 protection
- ✓ precise performance at high speeds (up to 72 km/h)



# 4activeFB-small

## Performance

speed levels	30/50/72 km/h
acceleration longitudinal	± 6 m/s²★
acceleration lateral	± 3 m/s²
turning radius	0.5 m
ground clearance	0-7 mm
maximum payload	30 kg
battery charging time	~ 1h★★
battery operating time	EPT > 6h / EBT > 3h / PTW >1 h(@50 km/h)★★★
positioning system	dual antenna dGNSS-IMU
dGNSS-RTK	L1/L2 GPS/GLONASS/BEIDOU
protection class	IP67
operation temperature range	-10° to 40° C (-20° to 55° C)★★★★

★ depends on speed   ★★ at 20°C   ★★★ depending on acceleration   ★★★★★ additional test equipment available

## Dimensions

length	2200 mm
width	1400 mm
weight	55 kg
transport dimensions	1490 x 950 x 90 mm

## Key features

- ✓ fast and easy battery swap system
- ✓ easy and efficient testing under worst conditions
- ✓ stealth technology - very low radar cross section
- ✓ traversable with full loaded 40 tons trucks





I N P H Y S I C S W E T R U S T

## 4activeAN

### The most realistic animal targets worldwide

- ✓ available as Roe Deer, White Tail Deer, Moose, Wild Boar,...
- ✓ compatible with 4activeFB, 4activeSB, other robotic platforms
- ✓ as an outcome of long-term research projects

### Allows testing under rough conditions

- ✓ extreme lightweight and soft structure to prevent damage on VUT
- ✓ robust and modular system – easy and fast change of spare parts
- ✓ realistic response for Radar-, Lidar, Camera and IR-Systems

### Available options

- ✓ heated animal target – 4activeHT (AN)
- ✓ additional synchronized articulation (legs)
- ✓ radar-invisible stand for static tests



Performance

mono/stereo camera system, Lidar sensors	✓
360° - Radar characteristic	✓
micro-Doppler spread	optional
near infrared (far infrared★)	✓ (★optional)
ultra-sonic	✓
crash speed	up to 50 km/h★★
operation speed	up to 60 km/h★★

★★depending on animal type

Dimensions

Roe Deer	960x1085x170 mm
White Tail Deer	1490x1210x270 mm
Wild Boar	1580x1020x560 mm
Moose	2490x1930x690 mm

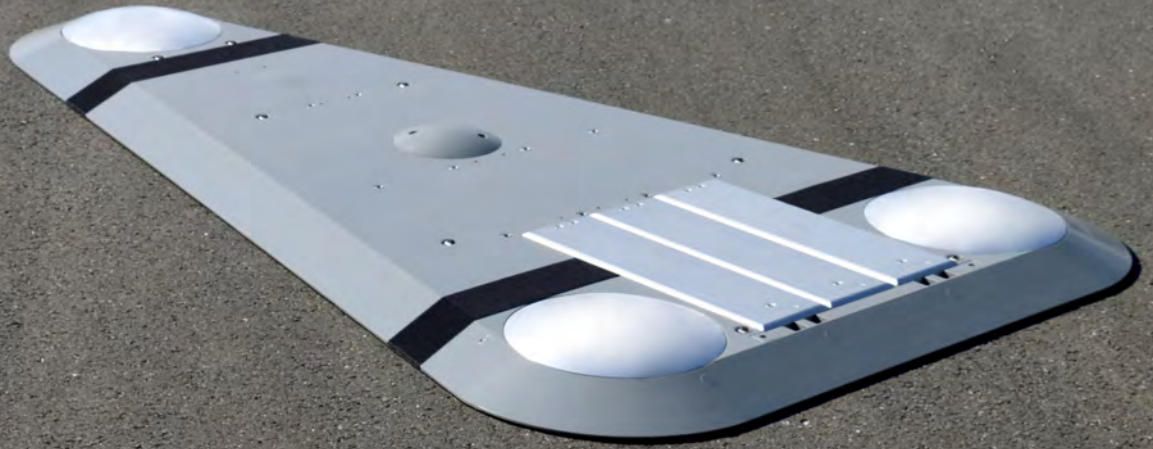
Weight

Roe Deer	4,5 kg
White Tail Deer	7,5 kg
Wild Boar	14 kg
Moose	35 kg

Key features

- ✓ extreme lightweight and soft structure
- ✓ robust and modular system
- ✓ many different animal types available
- ✓ realistic response for Radar-, Lidar, Camera, IR-Systems





I N P H Y S I C S W E T R U S T

## 4activeFB-large

**The best global solution fulfilling all Euro NCAP C2C specifications**

- ✓ to perform AEB/AES – CCRx and LSS scenarios
- ✓ compatible with different vehicle targets (GVT, EVT,...)
- ✓ very low RCS levels according to international standards/test protocols



**Fully synchronized operation with all relevant driving robots**

- ✓ real time position data from/to robot - import/export drive files
- ✓ corrects LAT/LONG waypoint errors of driving robots (VUT)
- ✓ full synchro mode - synchronization of 5 independent platforms



**Allows testing under rough conditions**

- ✓ traversable by heavy vehicles - trucks (40 tons)
- ✓ waterproof with IP67 protection
- ✓ precise performance at high speeds (up to 80 km/h)



# 4activeFB-large

## Performance

speed levels	50/80/100 km/h
acceleration longitudinal	$\pm 6 \text{ m/s}^2$ ★
acceleration lateral	$\pm 3 \text{ m/s}^2$
turning radius	7 m
ground clearance	0-15 mm
maximum payload	150 kg
battery charging time	~ 1 h ★★
battery operating time	4a GVT > 4h (@50 km/h) ★★★
positioning system	dual antenna dGNSS-IMU
dGNSS-RTK	L1/L2 GPS/GLONASS/BEIDOU
protection class	IP67
operation temperature range	-10° to 40° C (-20° to 55° C) ★★★★★

★depends on speed   ★★at 20°C   ★★★depending on acceleration   ★★★★★additional test equipment available

## Dimensions

length	2400 mm
width	1400 mm
weight	155 kg

## Key features

- ✓ fast and easy battery swap system
- ✓ easy and efficient testing under worst conditions
- ✓ stealth technology - very low radar cross section
- ✓ traversable with full loaded 40 tons trucks
- ✓ Euro NCAP scenarios: AEB-CCRs/CCRm/CCRb, CCFtap, ELK, LSS



I N P H Y S I C S W E T R U S T

## 4activeC2

### Conform to the Euro NCAP target 2020 specification

- ✓ easy and fast reassembly within 2 minutes by 2 people
- ✓ compatible with 4activeFB-large and other robotic platforms
- ✓ complies with ISO 19206-3 WD, Euro NCAP, ...

### Allows testing under rough conditions

- ✓ extreme lightweight and soft structure to prevent damage on VUT
- ✓ robust and modular system – easy and fast change of spare parts
- ✓ realistic response for Radar-, Lidar, Camera and IR-Systems

### Available options

- ✓ different car categories, different optical appearance and colours
- ✓ active lighting features (brake, blinking, ...)
- ✓ synchronized movement features



Performance

mono/stereo camera system, Lidar sensors	✓
360° - Radar characteristic	✓
micro-Doppler spread	✓
near infrared / far infrared★	✓
ultra-sonic	✓
crash speed lateral / longitudinal	up to 60 km/h / up to 72 km/h★★
operation speed	up to 80 km/h

★optional   ★★at ELK oncoming with 10% overlap

Dimensions

overall length	4060 mm
overall height	1430 mm
overall width	1800 mm
tire diameter	600 mm
wheelbase	2560 mm
weight	< 60 kg

Euro NCAP scenarios

AEB-CCRs / -CCRm / -CCRb	✓
CCFtap, ELK, LSS	✓

Key features

- ✓ easy and fast reassembly in 2 min by 2 people
- ✓ extreme lightweight and soft structure
- ✓ robust and modular system
- ✓ different options available





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## 4activeSB

### The official Euro NCAP propulsion system

- ✓ to perform all AEB/AES-VRU test scenarios
- ✓ platform speed up to 20 km/h - correction of velocity via GPS
- ✓ complies with ISO 19237, ISO 22078, Euro NCAP, JNCAP, CNCAP, ...

### Full synchro mode with all relevant driving robots and dGNSS-systems

- ✓ real time position data from/to robot - import/export drive files
- ✓ corrects LAT/LONG waypoint errors of driving robots (VUT)
- ✓ full synchro mode for a very accurate collision point

### Easy transport and quick set up

- ✓ fast installation in about 30 min
- ✓ battery powered system - operating time up to 8 h
- ✓ active unlocking system to release the target before impact



## Performance

vehicle speed	100 km/h
platform speed	20 km/h
acceleration	3.5 m/s <sup>2</sup>
system length crossing	35 m
system length longitudinal	50 m
power supply	110-230 VAC / 50-60Hz

## Dimensions

weight driving unit	85 kg
weight deflection unit	60 kg
weight platform	12 kg
hight platform	25 mm

## Euro NCAP scenarios

CPFA	✓
CPNA / CPNC / CBNA	✓
CPLA / CBLA	✓
CPTA / CPRA	✓

## Key features

- ✓ fully compatible with all relevant robots/dGNSS-systems
- ✓ easy and fast assembly/disassembly
- ✓ easy operation via WLAN (laptop, control panel)
- ✓ automatic triggering of dummy articulations



I N P H Y S I C S W E T R U S T

## 4activePA

### The official Euro NCAP pedestrian target (EPTa, EPTc)

- ✓ available as 50% adult male and 7-year-old child
- ✓ replicates human properties in size, shape and articulation
- ✓ complies with ISO 19206-2, Euro NCAP, CNCAP, JNCAP, ...

### Allows testing under rough conditions

- ✓ extreme lightweight and soft structure to prevent damage on VUT
- ✓ robust and modular system – easy and fast change of spare parts
- ✓ realistic response for Radar-, Lidar, Camera and IR-Systems

### Available options

- ✓ static pedestrian target – 4activePS
- ✓ heated pedestrian target – 4activeHT (PS, PA)
- ✓ additional synchronized articulation (arms, head, ...)



## Performance

mono/stereo camera system, Lidar sensors	✓
360° - Radar characteristic	✓
micro-Doppler spread	✓
near infrared / far infrared★	✓
ultra-sonic	✓
crash speed	up to 60 km/h
operation speed	up to 10 km/h

★ optional

## Dimensions adult

body height	1800 mm
shoulder width	500 mm
torso angle	85 °
weight	< 4 kg★★ / 7,5 kg ★★★

★★ 4activePS    ★★★ 4activePA

## Dimensions child

body height	1154 mm
shoulder width	298 mm
torso angle	78 °
weight	< 2 kg★★ / 4 kg ★★★

★★ 4activePS    ★★★ 4activePA

## Key features

- ✓ compatible with 4activeSB, 4activeFB-small
- ✓ absolute waterproof - testing under rainy conditions
- ✓ extreme lightweight
- ✓ soft structure to prevent damage on VUT





I N P H Y S I C S W E T R U S T

## 4activeBS

### The official Euro NCAP bicyclist target (EBT)

- ✓ standard average european utility bike – average male
- ✓ realistic properties in size, shape and rotating wheels
- ✓ complies with ISO 19206-4, Euro NCAP, UN-ECE, ...

### Allows testing under rough conditions

- ✓ extreme lightweight and soft structure to prevent damage on VUT
- ✓ robust and modular system – easy and fast change of spare parts
- ✓ realistic response for Radar-, Lidar, Camera and IR-Systems

### Available options

- ✓ bike for 7-year-old child
- ✓ different frame colours
- ✓ synchronized articulation (pedalling, arm signs, ...)



Performance

mono/stereo camera system, Lidar sensors	✓
360° - Radar characteristic	✓
micro-Doppler spread	✓
near infrared / far infrared★	✓
ultra-sonic	✓
crash speed lateral / longitudinal	up to 60 km/h / up to 45 km/h
operation speed	up to 35 km/h

★ optional

Dimensions bike

handlebar height	1200 mm
diameter wheels	700 mm
wheel base	1230 mm
weight	6 kg

Dimensions bicyclist

body height	1800 mm
shoulder width	500 mm
torso angle	10°
weight	< 4 kg

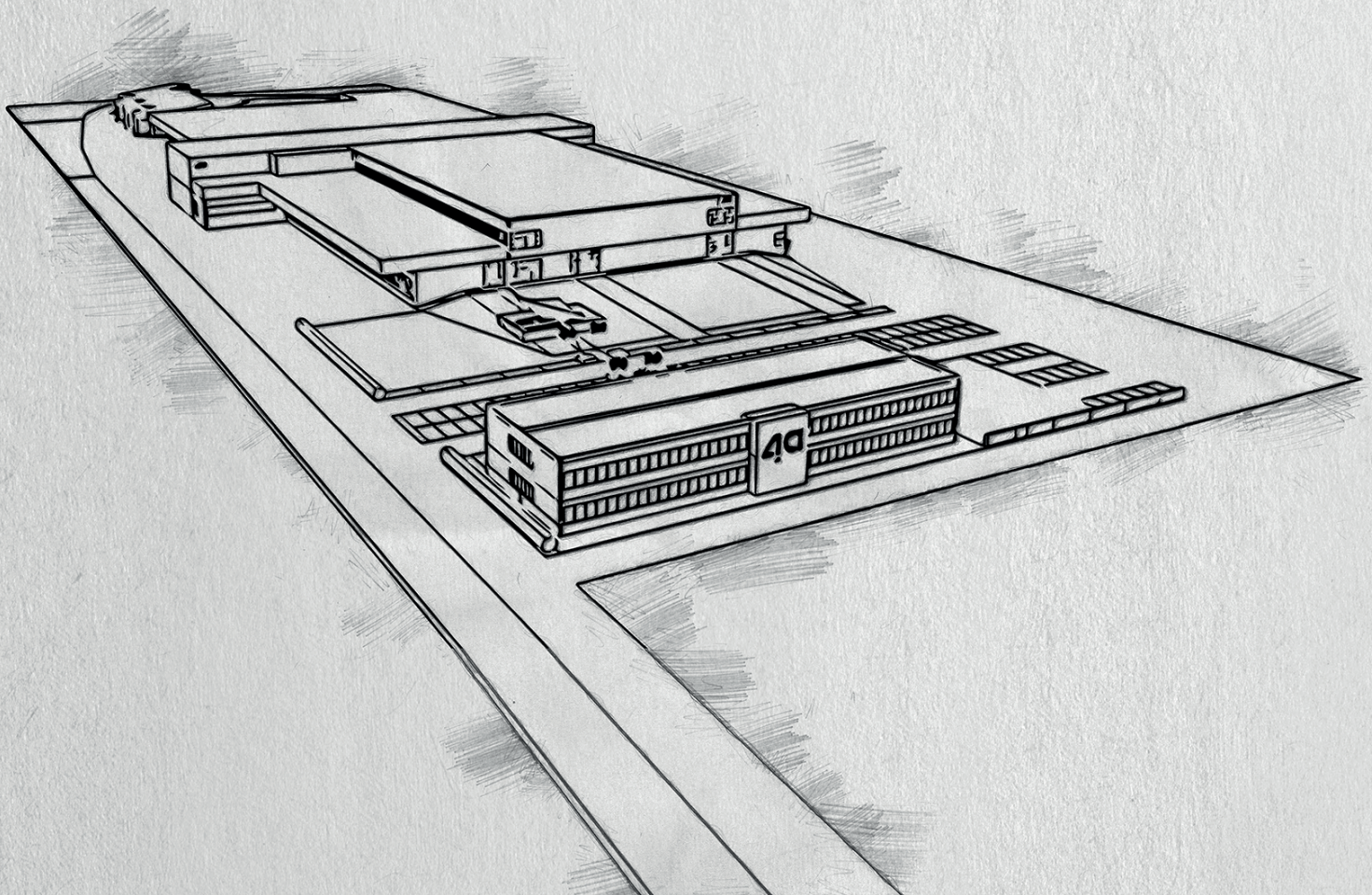
Key features

- ✓ compatible with 4activeSB, 4activeFB-small
- ✓ rotating wheels - permanent contact to ground
- ✓ foldable bike - easy transportation and storage
- ✓ extreme lightweight and soft structure



[www.4activesystems.at](http://www.4activesystems.at)

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