RACE RESULT

# TAVI

*Transponder Assisted Visitor Information*

## *Contact tracing and visitor flow measurement for schools and universities*

This white paper introduces the TAVI solution. TAVI enables the effective implementation of contact tracing, capacity recording, and visitor flow measurements. By using UHF transponder technology, it anonymously records students, staff, and visitors all around campus buildings, classrooms, student dorms, recreational facilities, or at special events.

This data can be evaluated in a targeted manner: For effective Covid-19 contact tracing, to measure the flow of people with density, visiting times, path, and length of stay, or for attendance verification.

With just a few simple steps, the operator at the academic institution can install small boxes at key locations and distribute disposable transponders to all students, staff, and visitors. TAVI now works autonomously.

# Goals & Benefits

The safety and well-being of students and staff are decisive factors in the successful re-opening of schools and universities during the Covid-19 virus recovery phases. It is important for academic institutions to contact trace and be able to track and analyze flow of everyone on campus to be able to implement health-related safety concepts.

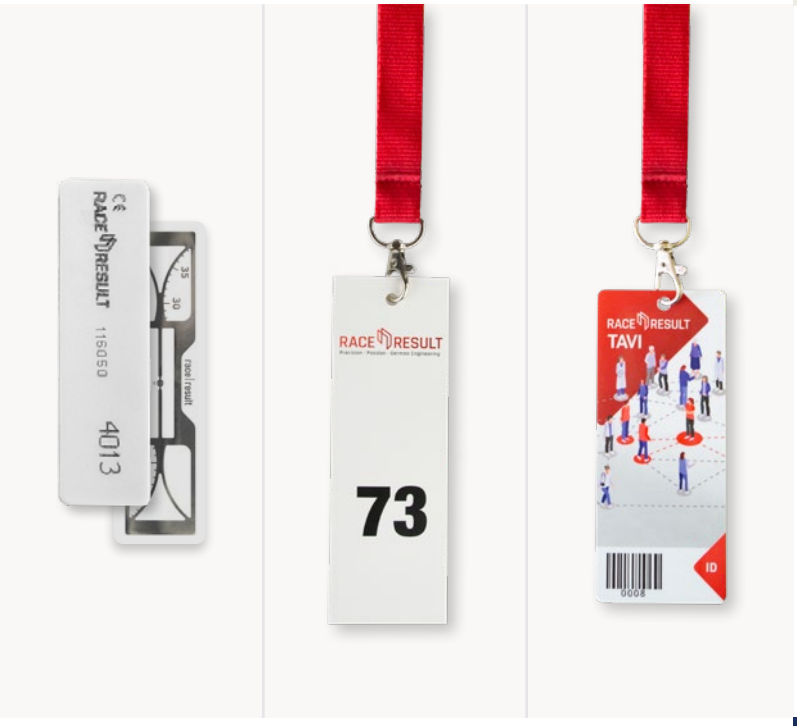
TAVI enables a wide variety of fields of application:

- Count students, staff and other visitors anonymously in different areas (building entrances, classrooms, staff rooms, dorms, athletic centers, cafeterias, etc.)
- Create heatmaps for important areas
- Track visitor routes
- Optimize safety and planningplanning
- Automatic admission stop with a specified maximum number of visitors (e.g. visual traffic light solution)
- Contact tracing: Recognize simultaneous presence of visitors in predefined areas / rooms
- At larger events integrated tracing could potentially loosen security and fire restrictions and allow an increased number of visitors
- Targeted evaluation of the data if necessary
- Collect and analyze marketing-relevant data

# The TAVI Solution

## Track Box Passive

- Installed at critical points
- Registers which transponders are within range at what time
- Sends the data to a secure server via the cellular network




## Transponder

- Distributed to students, staff and visitors
- Can be worn as a sticker or lanyard
- Sends an anonymous code via radio technology that is received by the Track Box

## Server

- Saves the collected data of the track boxes with date and time
- Calculates on demand which transponders "met" near the Track Boxes during a specified time period

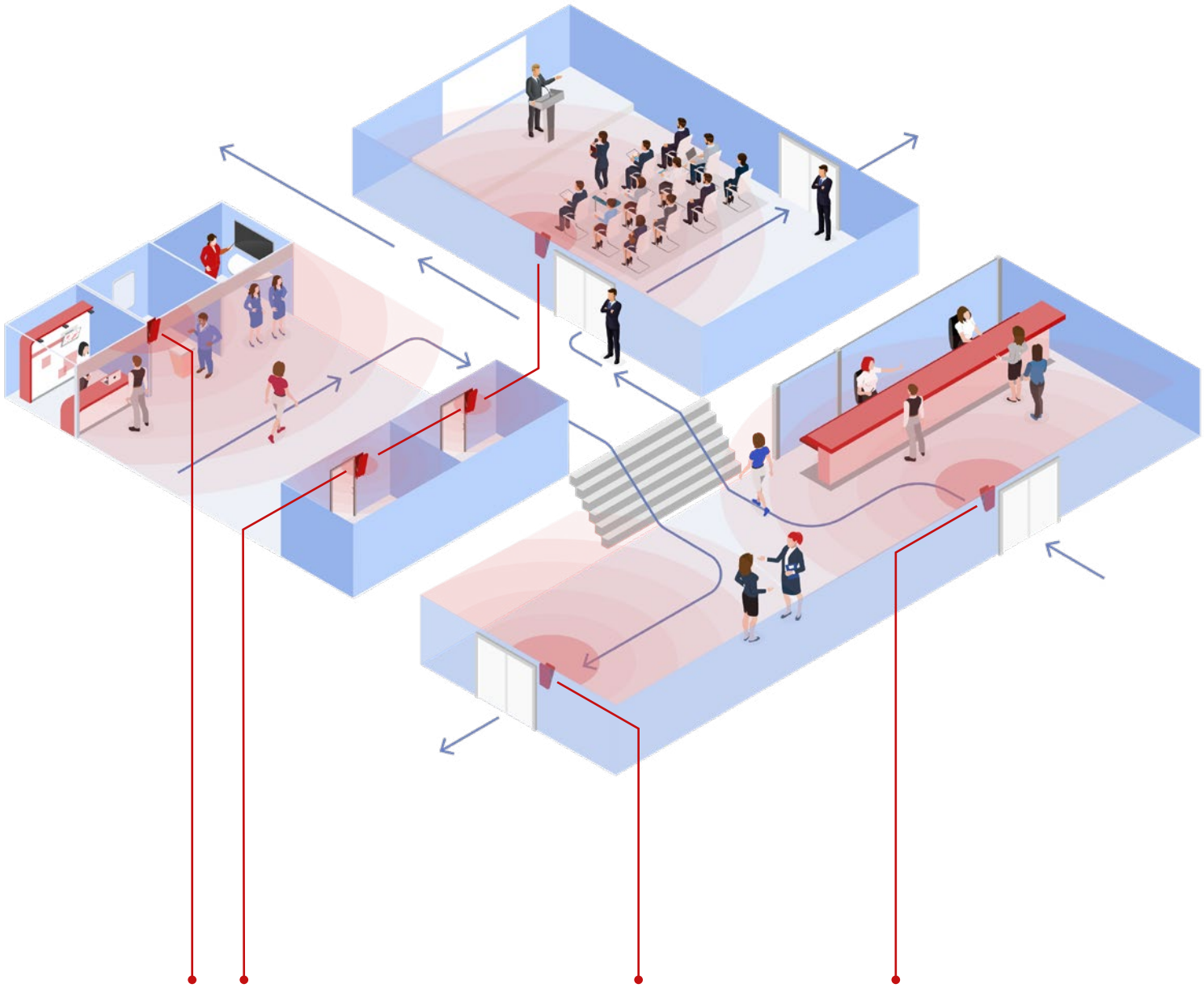
# Advantages of the TAVI Solution

Operators, students and visitors must be able to use a tracing system without technical effort and without operating errors.

TAVI is based on UHF technology. It works without user intervention. Anyone who carries the feather-light transponder with them has already done everything right.

- Low-priced and contactless passive transponders (from less than 1€)
- Can be used in lanyards or attached to other student/ staff ID cards or badges that each person visibly carries with them (transponders also work under suitable protective equipment / clothing)
- Transponder distribution to visitors during entry / ticket handover
- Centrally controlled solution without relying on smartphone apps
- Independent of GPS reception and battery life
- Fast, uncomplicated, wireless installation (you can do it yourself)
- No WiFi necessary, only GSM connection (SIM cards included)
- Low maintenance
- Possible detection accuracy >99.8%
- Fully anonymous data collection in real time
- No transfer of personal data to third parties (if assignment is desired, the information remains with the TAVI operator)
- Secure access to data via web applications
- Data safely stored on servers in Germany


# Setup Example



The Track Boxes are positioned at key locations such as lecture halls, staff rooms, cafeterias, or highly frequented areas. Hotspots can be identified and a simple student count and alert system can be implemented. Transponder flows can be recorded and possible contact persons can be traced afterwards.

Transponders are detected up to ten meters away, if there is a direct line of sight. Walls, doors, etc. form a natural barrier for the UHF signal.

Entrances and exits as well as passageways are ideal for recording everyone passing by. The more locations are equipped with a Track Box, the more precisely movements and whereabouts can be traced.

# *Installation and Maintenance*

The **Track Boxes** are shipped pre-configured. They contain a SIM card and a power adapter. Installation is easy with hooks or the integrated magents. The Track Box can run continuously, it is powered via internal battery or mains power. The box is switched on at the push of a button and automatically connects to the data server. TAVI is extremely flexible. Boxes can be added, removed or repositioned at any time without any special effort.


The **transponders** come in bulk on rolls and are 1.5 mm thick stickers with a strong adhesive. They were developed for use at sporting events, so are designed to be particularly robust.

Transponders can be easily attached to student and staff ID cards or visitor badges.

They can also be delivered inside a PVC badge with customized print layout and worn on a lanyard.

All **data** can be made available in various ways. The TAVI software enables the visualization of contact tracing, visitor numbers and much more. Evaluation options can be adapted to the wishes of the customer. It is also possible to forward the data directly to the operator's interfaces.

The data processing remains completely anonymous as long as no assignment of transponder ID to visitor is made.

## What is the difference between tracking and tracing?

Tracking and tracing are often used in the same context, but they differ significantly. While tracked user data can be followed in real time, for example through the use of GPS, contact tracing aims at a subsequent assignment of contacts.

For data protection reasons, the tracing method is therefore often preferred.

Tracking: Tracking is often used in connection with online marketing and movement data for location services. Live tracking of movement data is often rejected by laws or consumer protection.

Tracing: The process is mainly used in logistics. It describes the investigation of individual supply or production chains. Data is permanently recorded anonymously. If necessary, it is subsequently evaluated by the operator and, if necessary, de-pseudonymized.

## Tracing and Data Protection

The tracking of employees, patients and visitors is a surveillance measure that is seen as controversial for a number of reasons. This is why we made data reduction and GDPR compliance one of the key design goals from the very start. We only save the unique, and initially anonymous, Transponder-ID as part of the data.

It is the responsibility of each controller to use the Transponder-ID as a pseudonym, which can be used for an assignment to individuals at a later date, if, for example, there has been contact with a risk of infection. As the Transponder-ID is a simple alpha-numeric code, it can be easily stored in existing systems such as staff management logs or even a manually written visitor list.

Secure storage of personal information, access restrictions for de-pseudonymization of data and other necessary measures are thus easier and faster to implement. Hereby the balancing of legitimate interests for the introduction of tracing is significantly simplified and the solution can be implemented sooner without the need to meet complicated prerequisites.

20/09

**Headquarters Germany**

**race result AG**
Joseph-von-Fraunhofer-Straße 11
76327 Pfinztal
Germany

Phone +49 (721) 961 409 01
info@raceresult.com
www.raceresult.com

**Office ASEAN**

**RACE RESULT ASEAN**
Unit 8-1, The Breezeway, Desa Parkcity,
52200, Kuala Lumpur
Malasia
Phone +60 17 307 1597
tabraham-dowers@raceresult.com
www.raceresult.com

**RACE RESULT Australia**

Event Timing Pty Ltd
Aaron Clarke
Unit 28, 337 Bay Road
Cheltenham VIC 3192
Australia
Phone +61 3 9553 5800
Mail info@raceresult.com.au
Web www.raceresult.com.au

**RACE RESULT France**

Gérald Chalamet
9 Bis Chemin du Vieux Chêne
38240 Meylan
France
Phone +33 650 132 678
Mail chalamet@raceresult.fr
Web www.raceresult.fr

**RACE RESULT UK**

Sports Timing Systems Ltd
Andrew Lovatt
Unit 9 Lymedale Enterprise Court
Dalewood Road,
Lymedale Business Park
Newcastle, Staffordshire
United Kingdom
ST5 9QH
Phone +44 (0) 1782 756 386
Mail info@raceresult.co.uk
Web www.raceresult.co.uk

**RACE RESULT Slovakia**

Videocom Štancel s.r.o.
Jaroslav Štancel
Hlavné námestie 37
06001 Kežmarok
Slovakia
Phone +421 (0) 903 906 066
Mail info@raceresult.sk
Web www.raceresult.sk

**RACE RESULT USA**

Mark Bockmann
2450 Central Avenue, Suite A
Boulder CO 80301
USA
Phone 303-390-1235
Mail info.usa@raceresult.com
Web www.raceresult.com

**RACE RESULT Denmark**

Ib Stokkebye
Vestergade 37 D 1 TV
7100 Vejle
Denmark
Phone +45 255 21 317
Mail ib.stokkebye@raceresult.com
Web www.raceresult.com

**race result swiss gmbh**
Hanno Maier
Hardstrasse 40
8570 Weinfelden
Swiss
Phone +41 (0)79 420 74 19
Mail hanno.maier@raceresult.ch
Web www.raceresult.ch