

# RACE RESULT

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## CONTACT TRACING WITH BIB NUMBERS

*The Covid-19 Safety Concept of the  
SWITZERLAND MARATHON light*



RACE RESULT  
/ SWISS

SWITZERLAND  
MARATHON  
LIGHT // 21.1 km  
10 km  
4 km

# The Challenge

Since 2014 the SWITZERLAND MARATHON light has always taken place on the first weekend in September. In the Swiss running scene, it is considered one of the fastest and most beautiful half marathons. The flat route leads runners around Lake Sarnen amidst an impressive Alpine backdrop. On their way, the runners are supported by music bands. Around 2,600 participants took part in 2019, competing in different distances (21km, 10km, 4km, children's run). The event is being organized by former European marathon champion Viktor Röthlin.



## Corona Situation

Events with more than 1,000 people were prohibited in Switzerland in 2020 until the end of September, which included the event day of the SWITZERLAND MARATHON light. According to regulations, events with more than 300 participants would be possible, if participants would be divided into start waves of max. 300 people. The general hygiene regulations such as mask requirement and 1.5 m distance also applied.

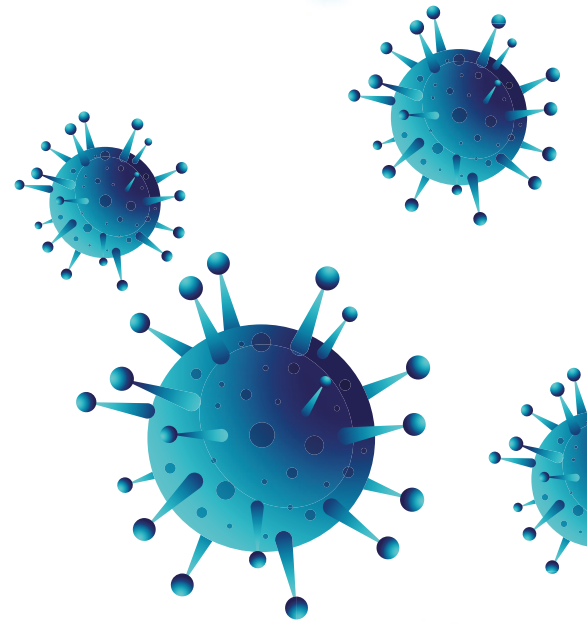
Events had to develop their own health and safety plan, which had to explain how contact tracing would be implemented and guaranteed. This included not only runners and staff, but also spectators in crowded areas.



## Cancel or Go on?

The organizer was faced with the question of whether the event could take place under pandemic conditions. It quickly became clear that the event would not be able to run in the usual way. All big race celebrations in the party tent with entertainment program, the race expo and spectator areas would need to be omitted. So if the event would take place, it could only be a marathon "light", limited to being purely a sporting event.

Still, a challenge remained. Even with social distancing being enforced and the field of runners being spread out over a longer period of time, there would still inevitably be larger gatherings of people in the start and finish areas. The traceability of contacts had to be made possible here. Without a solution to this aspect, any safety concept would be invalid.



# The Solution

## Contact Tracing with the Bib Number

The *race result swiss gmbh* has been supporting the event with online registration, bibs, timing and result lists since 2016. The close exchange between organizer Viktor Röthlin and the timekeeper made it possible to use the TAVI system from the German manufacturer RACE RESULT. This could record which participants

were at the same time at certain places in the start and finish area. In the event of a possible corona infection of a participant, staff member or spectator, all persons who came in contact would be able to be identified and informed quickly.

## TAVI (Transponder Assisted Visitor Information)

is based on three components:

### UHF Transponder

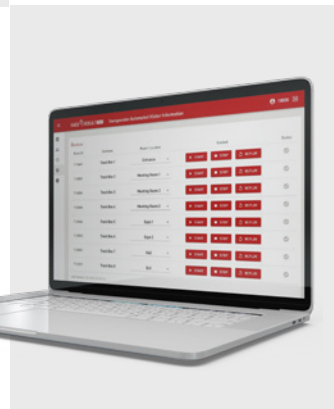
The feather-light, 1.5mm thick chips can be stuck on badges or tickets. Each participant or employee receives their own personal transponder. This is inexpensive and works contactless via radio technology. Since these transponders are already attached to the start numbers for timing purposes, there is no need for any additional effort by the participants.

### Track Box Passive

The compact device is set up at certain points. It uses radio technology to record all transponders within a range of up to ten meters. The identification data is provided with a time stamp and transmitted to a secure server via the cellular network. The Track Box is activated with just one push of a button and then works autonomously via an integrated battery (10-18 hours running time) or mains power.

### TAVI Online Platform

All data from the track boxes are collected and evaluated here. On request, the system calculates which transponders have been in the same area for how long. In this way, possible contact persons of an infected person are subsequently filtered out. The platform also enables numerous other evaluations, for example live monitoring of visitor capacities in certain rooms / areas.



# Planning and Implementation

It quickly became clear to the organizer of the SWITZERLAND MARATHON light: This system could be the key deciding factor in the proposed safety protocol for the event. TAVI enables contact tracing and the simultaneous monitoring of the event site. If there are too many people in one area (e.g. locker rooms) at the same time, the system will indicate this.

The correct and well-planned set-up of the Track Boxes is particularly important at TAVI. The detection areas of the boxes should not overlap. To guarantee accurate and reliable data, the boxes need to be installed at strategic locations where all participants have to pass through. The boxes must be aligned in a way that bibs can be detected on the participant's chest. The boxes need a direct line of sight to the transponder.

## Further aspects of the protection concept

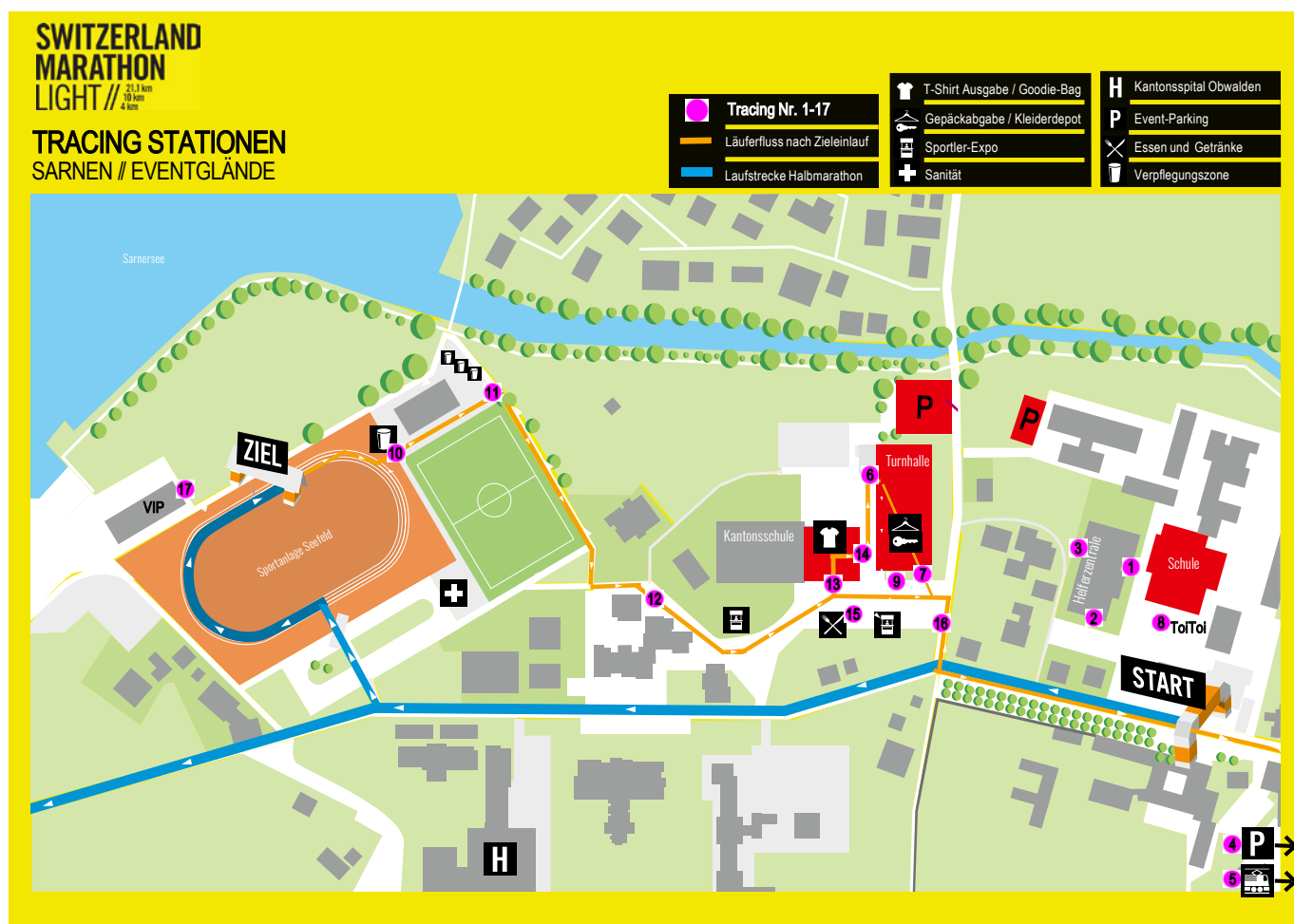
- No on-site registration
- Every participant must wear his or her bib number when entering the site
- Start in blocks of 200 with sufficient spacing
- Mask requirement before and at the start. The masks can be removed and disposed of after 300m
- Urgent request to all spectators to avoid the start and finish area
- No shower facilities on site
- No award ceremony
- Participants leave the site quickly after passing the finish line
- All staff and volunteers wear face masks and receive their own TAVI transponder



# Track Boxes

The positioning of the boxes was planned with the help of a site map. It is important to note that each area to be recorded must have exactly one entrance and one separate exit.

Here a track box is positioned in such a way that the participant inevitably has to walk through the detection area. Based on the detections of "entrance" and "exit", the TAVI software calculates the length of stay and contacts for each transponder, and also supports live counts of visitor numbers per sector.

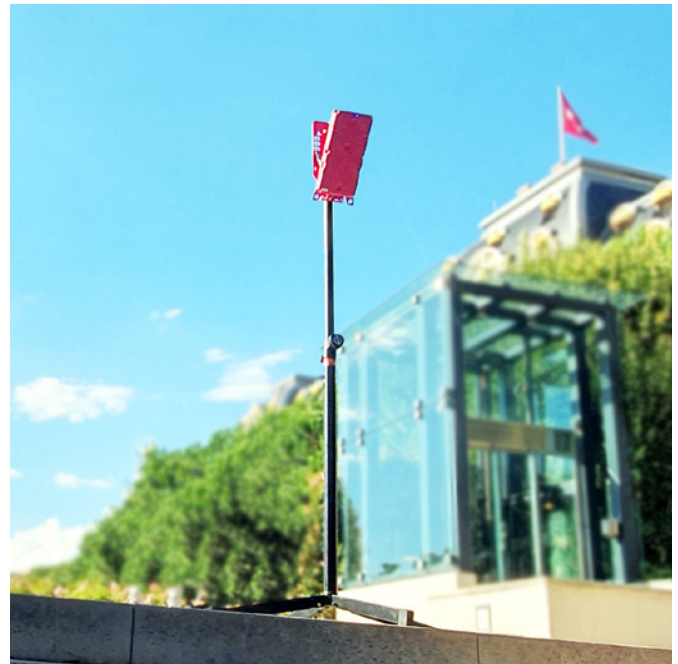


Site plan start and finish area with positioning of the Track Boxes (purple)



It takes around a minute to set up each box. The Track Box can be attached to metal surfaces with the integrated magnets, hung on a tripod or simply fastened with cable ties. Track Boxes can also stand on the floor, but this is not recommended with the TAVI application.

The preconfigured Track Box is switched on at the push of a button. It then automatically connects to GPS, cellular network and data server.



Track Boxes in red, purple ovals mark the approximate detection area



Using the example of this setup, the functionality of TAVI can be explained particularly well. The areas of "Refreshment", "T-Shirt distribution", "Locker Rooms", and "Race Expo" are equipped with Track Boxes at each entrance and exit. When an athlete enters or leaves one of these areas, this is recognized by TAVI and stored.

For each participant it can be seen whether they went to the T-shirt issue after crossing the finish line, or whether they walked directly over the race expo towards the exit. How long was the (infected) athlete inside the T-shirt distribution or locker rooms? Who was he there with at the same time, and for how long? Which staff or volunteers may have had contact with him?

# Transponder

The participants received all their documents in advance by mail. Therefore, registration at short notice was not possible. The start number with the transponder stuck on the back was used for both timekeeping on the run and for contact tracing.

A VIP area was set up at the event site. Personalized tickets for this were issued in advance and limited to 80 people. Like the runners, the guests wore a bib number. A track box was installed at the entrance to the VIP area.



# Online Platform

The operator (in this case, race result swiss gmbh) can configure the event via [tavi.raceresult.com](http://tavi.raceresult.com). Rooms / areas are created here and track boxes are assigned to them. A maximum number of people can be set for each area. The operator monitors the capacities in the individual areas live via the dashboard. The movement profiles of individual transponders can be traced and all of its contacts can be listed, sorted by room or duration of contact.

DeviceID	BoxName	Room / Location	Control	Status
T-20461	Track Box 1	Entrance	▶ START ■ STOP ↺ REPLAY	✓
T-20007	Track Box 2	Exit	▶ START ■ STOP ↺ REPLAY	✓
T-20034	Track Box 3	Hall	▶ START ■ STOP ↺ REPLAY	✓
T-20045	Track Box 4	Meeting Room 1	▶ START ■ STOP ↺ REPLAY	✓
T-20046	Track Box 5	Meeting Room 2	▶ START ■ STOP ↺ REPLAY	✓
T-20023	Track Box 6	Cafeteria	▶ START ■ STOP ↺ REPLAY	✓
T-20047	Track Box 7	Expo1	▶ START ■ STOP ↺ REPLAY	✓
T-21017	Track Box 8	Expo 2	▶ START ■ STOP ↺ REPLAY	✓

Last Update: 5.8.2020, 15:12:14



## ***TAVI and data protection***

The transponders transmit an anonymous code to the track boxes and the online platform. The system-side data processing is thus completely anonymous. It is the responsibility of the organizer to assign personal data to these codes, to be able to act in the event of an infection.

In a sports competition, the assignment of transponders to participants is also done in the context of timing.

Only in this way can everyone get their personal times and ranks can be created. It is up to the organizer to handle the data responsibly. During registration, the participants should be informed about the processing of their movement profiles for the purpose of Covid-19 tracing.



## ***TAVI with Decoder & Ground Antenna***

The TAVI solution also works with any conventional passive system from RACE RESULT. A decoder with a foldable ground antenna delivers the same data and can be integrated into the TAVI online platform just as easily as a Track Box Passive. This allows timekeepers and clubs to use existing hardware.

In the specific case, the finish line timing system was used in the TAVI platform to identify who entered the finish line area.



# Result

## Safety Concept

The safety concept had to be submitted to the health department of the department of Obwalden. They then approved the event.

Swiss Athletics President Christoph Seiler is also Vice President of the SWITZERLAND MARATHON light. He will also incorporate the experience with contact tracing with other organizers.

Various running organizers contacted the organizers of the SWITZERLAND MARATHON light after the successful implementation and wanted to have the concept sent to them.

The safety concept was implemented smoothly. The runners all adhered to the requirements in an exemplary manner.



## TAVI on Site

Timekeeper Hanno Maier had developed the tracing concept in advance together with the organizer and supervised it on site:

*„From my point of view, everything went perfectly. In our TAVI software, we were able to determine the number of people in the individual rooms at any time and could thus intervene and limit access. The total number of participants at the event location was also interesting for the organizer. An added bonus information for the organizer was the tracking data we collected about how many participants arrived by train or car. This is important when planning the parking space capacity.“*



## Participants

Online registration for the 2020 edition had already started in December 2019. From the beginning of June, smaller sporting events were possible again in Switzerland, and the number of registrations has risen sharply since then. The 1000 starting places for the half marathon and 450 for the 10km run were quickly booked out.

## Organizer

For the organizers around running legend Viktor Röthlin it was clear in advance that the run would not yield any financial profit in the new format. On the contrary, the event ends with a financial loss of around CHF 80,000. He decided to hold the event in 2020 anyways because he wanted runners to have a chance to finally compete again. Because life has to go on with Covid-19. In his opinion, contact tracing has proven itself:



*"Thanks to our own contact tracing, we were able to ensure that, in the worst case, we could significantly reduce the number of people who would have to be quarantined. And this is exactly what will be an important aspect of events in the future. Currently, people are thinking a lot more about whether to attend an event that is subsequently threatened with quarantine. Your own contact tracing at the event site is therefore certainly a strong argument for attending an event.*

*It was also important to me that I was able to record all of the volunteer helpers. Because they put their heart and soul into action for my event year after year. And the majority of them come from the area of Obwalden. Before the event, the number of cases in Obwalden was very low per 100,000 residents.*

*That's why it was of course very important for me as the organizer that these numbers didn't skyrocket because of my event. Thanks to the contact tracing, I would have been able to specifically inform the helpers and thus contain further distribution of the virus.*

*Fortunately, we have not been contacted by an infected person after our event. Nobody had to be informed. However, the contact tracing enabled us to make exciting analyses afterwards. This enabled us to compare the number of people arriving by car and public transport. In addition, how many people actually used the lockers rooms. This helps us to develop our event further.*

*I would like to say a big thank you to RACE RESULT and Hanno Maier. The entire planning and implementation of our own contact tracing was unbureaucratic and uncomplicated. And I am grateful to have such a partner!"*



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