Galleryzone proposal

Niklas Roy, 25.8.2006

Infrared transmitter
(sends "go" signal)

RFID tag
(sets car into "wait for go" condition)

Trafficlight
(for visual output only)

Light barrier
(car enters zone recognition)

Light barrier
(car exits zone recognition)

track →

track →

track →

Zone controller

Gallerydrive Zonesystem proposal - Galleryzone general setup

One main safety feature of any Gallerydrive will be "Galleryzone", the Gallerydrive zone system. This system will prevent car crashes, even if Gallerydrive cars run out of battery during the ride, if a car in front stops due to another unexpected reason, or if the Gallerydrive system stalls due to an unexpected reason.
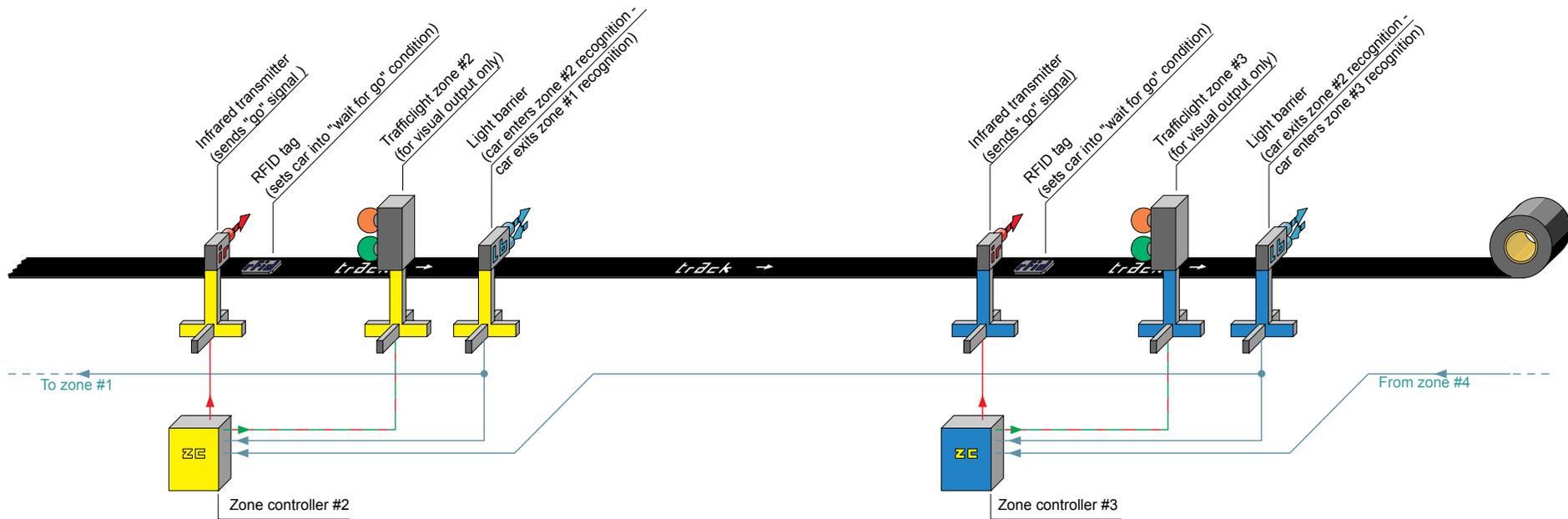
Each Gallerydrive must have as many zones, as cars are in the ride. And it must have three additional special zones: The "enter"-zone, where visitors enter the car, the "exit"-zone, where visitors exit the car and a "queuing"-zone, where cars are queuing, if the frequency of visitors, which want to ride, is less than the maximum frequency of visitors which could take a ride technically. These three special zones will be described later.

Cars can just enter a normal zone, if the zone is empty. There are lightbarriers (or another device with the same function) installed at the beginning and at the end of each zone, which are connected to a zone controller. This controller recognizes, whether a zone is empty or occupied.

The information, whether a zone is occupied or not, is displayed by a trafficlight at the beginning of each zone. The trafficlight is only for visual feedback. It has no influence on a Gallerydrive car. There is a infrared transmitter and a RFID-tag installed at the beginning of each zone, which stop the car and let it go. The infrared transmitter is connected to the zone controller.

If a car arrives at the beginning of each zone, a RFID-tag on the floor will set the car into a "wait for go" condition. The car will activate its infrared input, now. If it receives a "go" signal via infrared, it will drive on. If it doesn't receive this "go" signal, it will stop and wait, until it receives a "go" signal. Then it will go on with driving.

The distance between infrared transmitter and the first lightbarrier has to be at least the length of one car plus the way for stopping the car. Otherwise, it would be possible, that a car breaks the zones first lightbarrier, even if the zone is occupied.

Infrared transmitter
(sends "go" signal)

RFID tag
(sets car into "wait for go" condition)

Trafficlight zone #2
(for visual output only)

Light barrier
(car enters zone #2 recognition -
car exits zone #1 recognition)

Infrared transmitter
(sends "go" signal)

RFID tag
(sets car into "wait for go" condition)

Trafficlight zone #3
(for visual output only)

Light barrier
(car exits zone #2 recognition -
car enters zone #3 recognition)

To zone #1

From zone #4

Zone controller #2

Zone controller #3

Gallerydrive Zonesystem proposal - Zone setup in a looped Gallerydrive parcours

In a looped Gallerydrive track, each zone can be connected to its previous and to its next zone. This will save the cost for one lightbarrier per zone.

For the following example, imagine three cars in a row, each in its own zone. The first car is called car 'a', the second car 'b' and the third and last one is car 'c'.

With this interconnection, it is impossible, that let's say car 'b' leaves its current zone, as long as the next zone is occupied by car 'a'. So, car 'b' keeps on occupying its own zone, and it is impossible, that another car 'c', following car 'b', can enter the zone of car 'b'. So each car has to stay in its own zone, until the first car 'a' leaves its zone. Then, car 'b' can drive into the zone of car 'a'. It empties its zone, and car 'c' can follow, and so on...

To avoid "traffic jams" and waiting cars during the ride, the time it takes to drive through a zone should decrease with any next zone. If there are for example three cars in a ride and the Gallerydrive has three zones (plus the three special zones for "enter", "queue" and "exit"), the drive through zone #1 could take 1 minute, the duration of driving through zone #2 could take 40 seconds, and the drive through zone #3 could take 20 seconds.
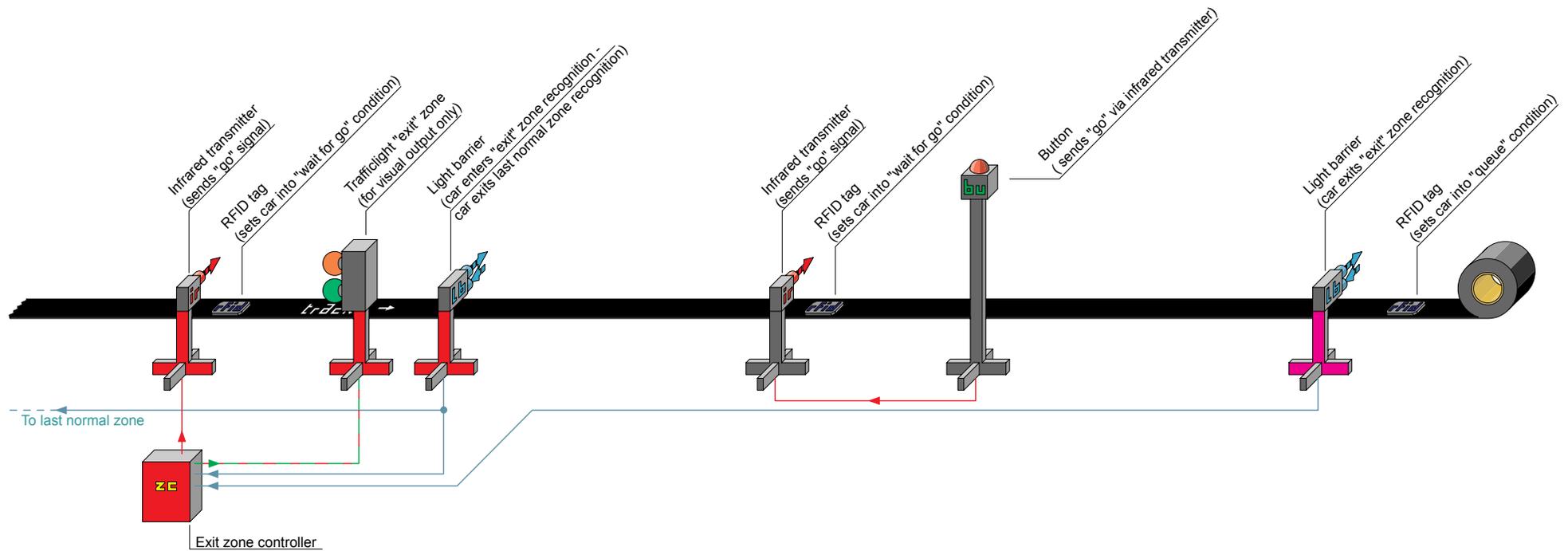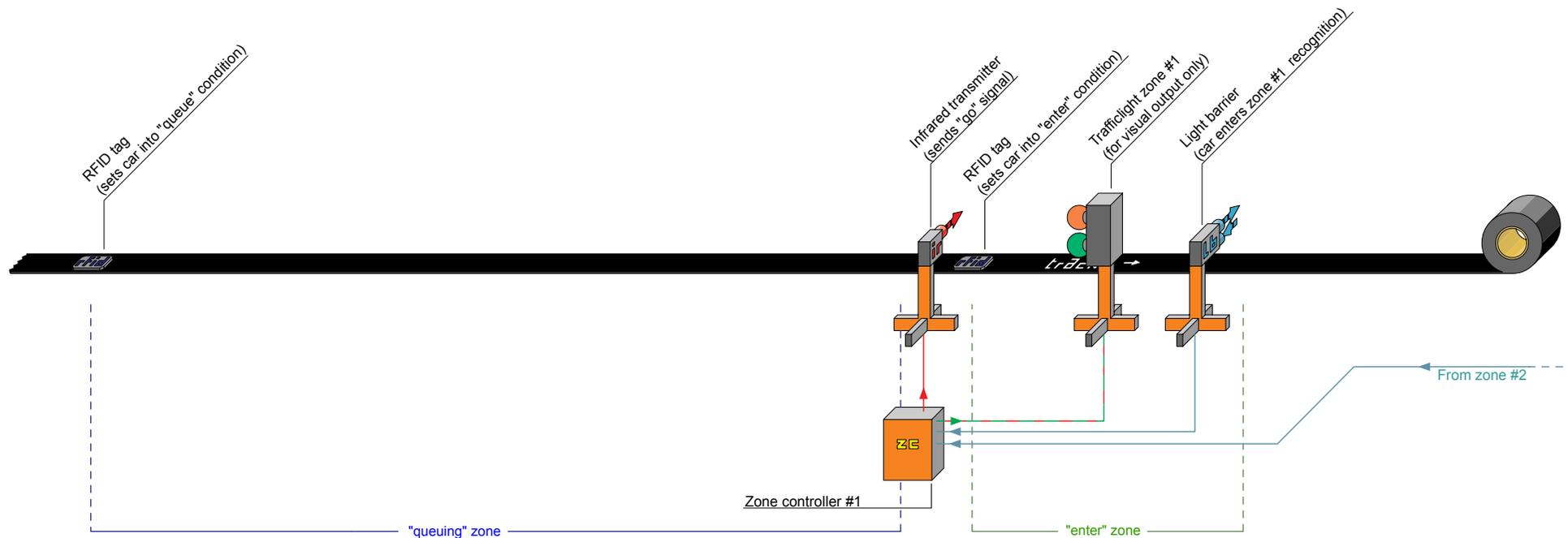
Gallerydrive Zonesystem proposal - Special zones: The "exit" zone

As I mentioned already, there are three special zones: the "exit", the "queue" and the "enter" zone. This illustration describes the "exit" zone, where visitors, which have taken a ride, are leaving the car.

The procedure is as follows:

- The car will enter the "exit" zone as it enters any normal zone.

- It will stop at the RFID, that sets the car into a "wait for go" condition.

- A friendly service staff member will help the visitor to get out of the car.

- If the visitor has left the car, the friendly service staff member will wish the visitor a pleasant day and push the button, which is connected to the infrared transmitter.

- The infrared transmitter sends a "go" signal and the car will go on driving. It will pass the second lightbarrier, so it empties the "exit" zone. And it will pass a RFID, which sets the car into a "queue" condition (see next page).

Gallerydrive Zonesystem proposal - Special zones: The "queuing" zone and the "enter" zone

A queuing zone is necessary, if there are less visitors than the ride can put through technically. In this zone, the cars will queue, until the "enter" zone is empty. The length of the queuing zone is defined by the sum of the length of all cars, plus the distance that the cars keep during queuing (approx. 1m) plus additional 25% of the sum, for safety.

The procedure is as follows:

- The car will enter the "queuing" zone as described on the page before. There is no RFID which sends a "wait for go" condition needed at the beginning of this zone, because cars can always enter the queuing zone.

- A RFID-tag sets the car into a "queuing" condition. This means, the car will drive slow, until its internal distance measurement system detects another car in front, which is closer than 1m. This will stop the car. If the car in front drives on, the distance measurement device will detect no obstacle within that 1m

range and the car will go on driving slowly until the distance to the car in front is below 1m ...

- At the end of the queuing zone, a RFID tag overwrites the "queue" condition in the first car and replaces it by a "enter" condition. This means, the car will stop, and on its screen, it will display the question "Are you ready for a Gallerydrive?". Because the "enter" zone is also the waiting area in front of zone #1, the car will wait for a "go" signal of zone controller #1 **and** it will wait for a visitor, sitting in the car, who has to answer the question on the display by pushing a button under the display. If both happens, the car will drive into zone #1.

- The next car in the queue will enter the "enter" zone automatically, because it is still in the "queue" condition and there is no obstacle anymore in the 1m range in front of it.