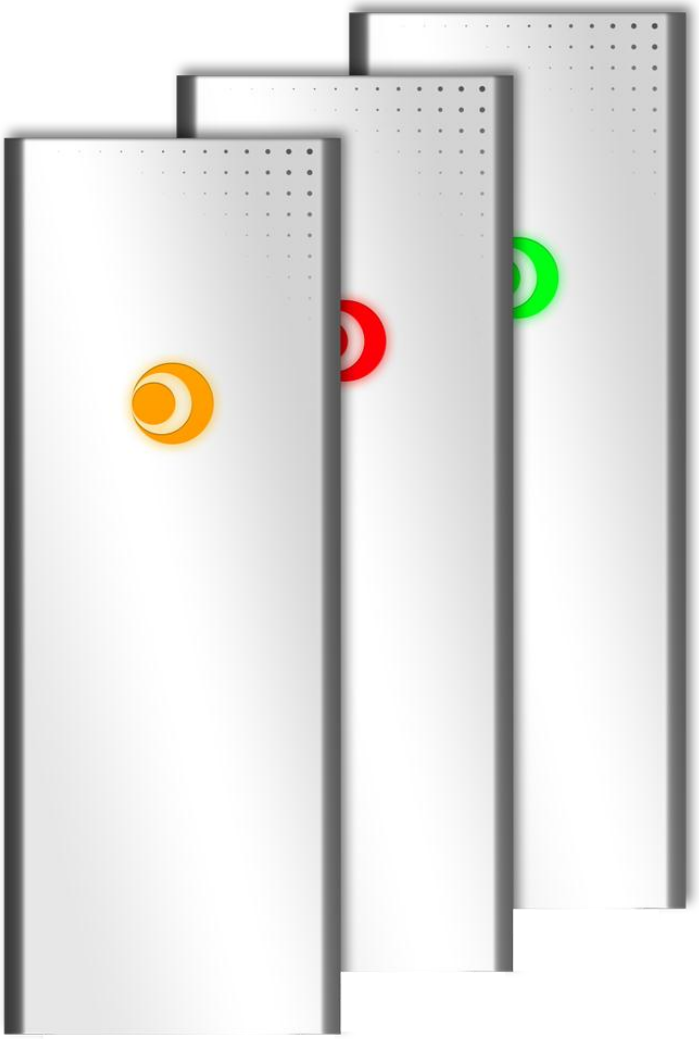
Identification of People
Hands-free System
STid GAT UHF Reader



IMPLEMENTATION GUIDE

Introduction

The GAT hands-free reader can identify people moving.

The purpose of this document is to describe the approach to use for a people identification project using UHF technology and GAT reader, to get optimal results according to the variants, configuration and installation constraints.

General standards of UHF technology

Operating standard

GAT uses «passive» UHF (Ultra-High Frequency) technology: the chip does not require a battery to operate; its power is supplied by the reader.
The radiofrequencies used for this technology are in the band 860-960 MHz, depending on country regulations.

This passive UHF technology can therefore be used to read data from an electronic tag with no integrated power supply within a range of several meters.

Uses and limitations, environmental effects, useful information

Various laws of physics apply to this technology and can influence performances. The major factors to keep in mind are next:

- The materials on or behind the tag will influence global performance (range and speed). A tag should be matched to its environment to give the best results.
    - The same tag will operate very differently on metal or behind glass (windscreen).
    - **At this frequency there is a phenomenon of wave absorption in the presence of liquid conductive elements (ex: water).**
      The human body will prevent the detection of a tag if the body is between the reader and the tag itself or if the tag is located too close to the body or if the tag is in the hand.

- The waves are partially reflected on surfaces: the waves emitted by the reader can bounce on obstacles and be deflected. The presence of obstacles in the RF field may influence the results.

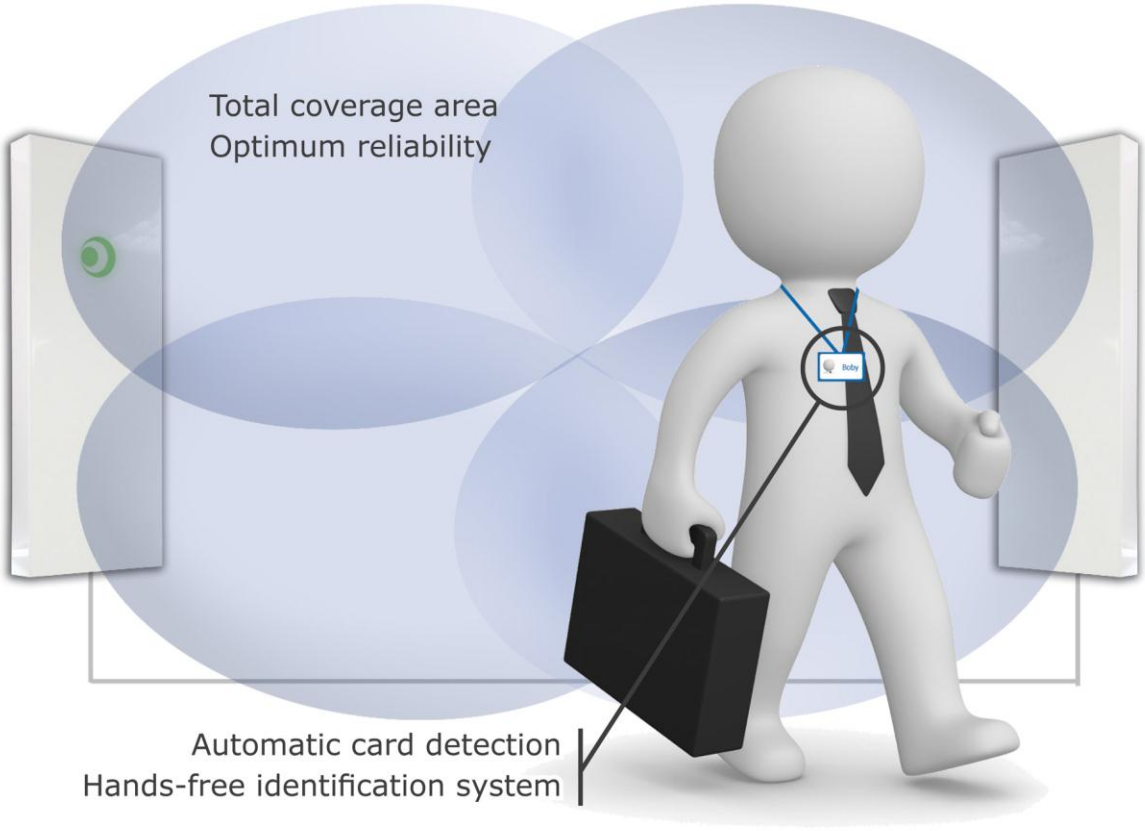
- UHF technology can be directive: an antenna has its specific radiation pattern which can be more or less directive, like the area of a spot light. The location of antennas will therefore be planned on the basis of the targeted reading zone, depending on their characteristics.

- A UHF tag may have a specific orientation, related to the polarisation of its antenna. A “linear” tag will be orientation-sensitive and will not read as well horizontally as it does vertically or vice versa.

Optimum

Given the constraints described above, it is important to identify the conditions that will give the best possible system performance. This means ensuring the optimum antenna and tag positions.

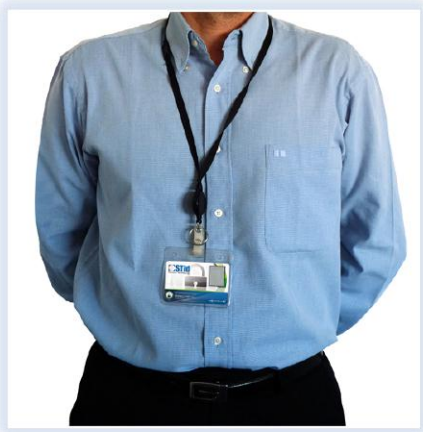
Performance will depend on the position of the tag relative to the antenna. Maximum range and optimised detection will be achieved under the conditions of tag presentation following the next recommendations.



Tag position

Objective: the way of wearing the tag influences the performance of detection so it must be positioned in order to optimize the quality / performance of detection.

ISO Card around the neck



It is recommended to wear the tag around the neck, visibly and free.

DO NOT :

- **paste the tag near the body**
- **put your hand over the tag**
- **wear the tag under a jacket or in a pocket**

We recommend use of rigid badge holders that allow moving away the card from the body (Ref. STid: PB-001, PINCE-001).

Semi-passive tag wristband or necklace

These identifiers, called “semi-passive”, are made with a battery which powers the chip when the tag is in the field of the antenna.

These identifiers have a sensing range smaller than the ISO cards but the assistance of the battery allows greater freedom of positioning (for example in a bag).

New projects

When installing a site with GAT system, various steps need to be followed.

Site analysis

Gather the basic information required to define the configuration:

- Site map,
- Direction of traffic,
- Dimensions.

Project definition

Identification zones: define the areas in which people are to be identified

- Locations,
- Dimensions.

Materials choices

Information on the project and conditions gathered in the earlier stages of analysis will influence the initial equipment choices: number of antenna, tag type etc.
Site requirements and constraints will determine the technical choices. This analysis will provide a good overview of the feasibility of the desired configuration and will help to identify any adaptations or adjustments that may be required

Testing

From the start, we recommend defining the tests required for validating the configuration (Single or Dual) with customer- if validation is required.

Important notes

- In use, the GAT emits a front field but also some back field, when the GAT is installed against a wall identifiers located in the room behind the wall can be potentially detected.
  To solve this problem we recommend creating insulation of the wall (ex. metal paint on the wall).

- Important: if a significant numbers of people pass along the antennas very close to each other, someone could mask another.

- The person identification is a voluntary action.

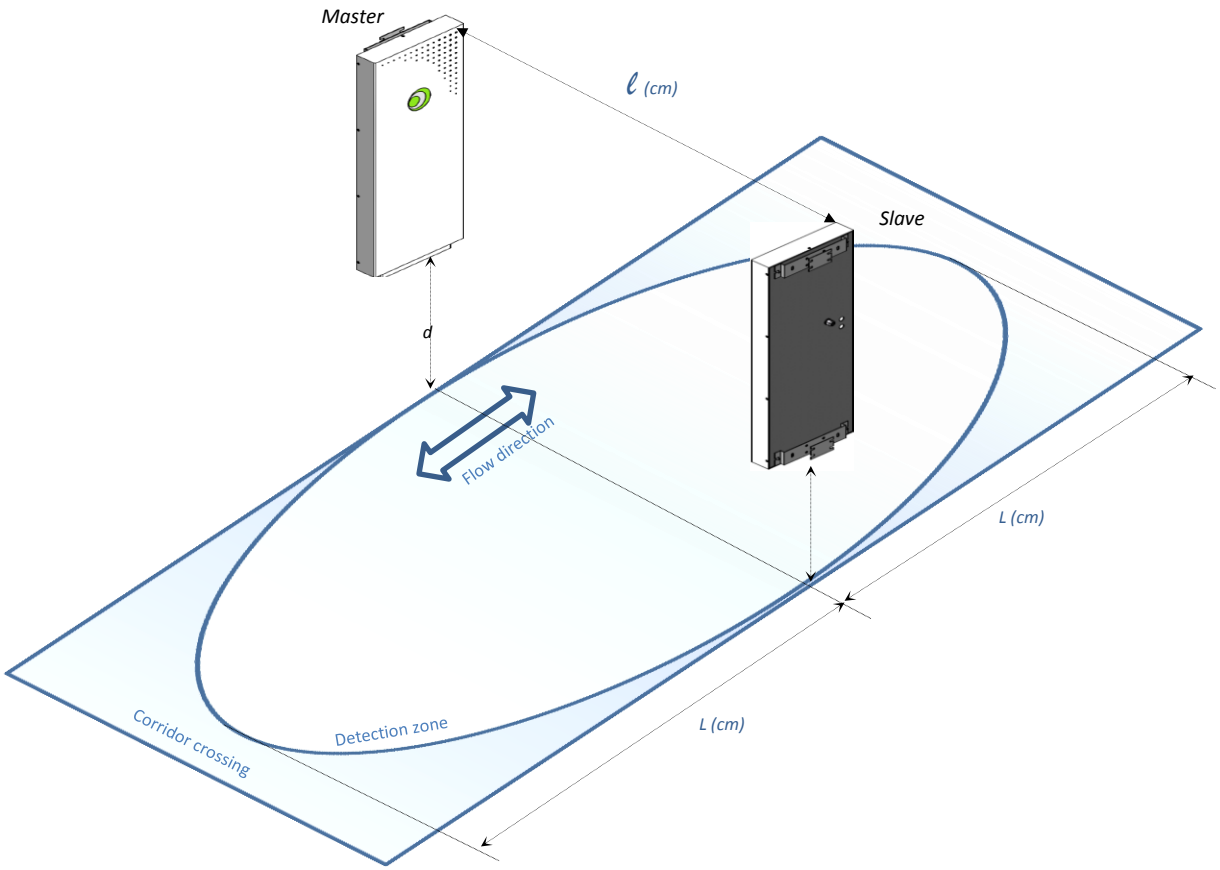
- GAT detects the tag present in a larger or smaller detection area depending on the configuration and the selected tag. You must consider this point especially if you do not want to read tags outside the area you has defined.

GAT Dual (gate)

Optimal positioning for a two directions flow

The two antennas must be installed parallel and spaced up to four meters. In the case of reduced performances, reduce the distance between the antennas.

The bottom of each antenna must be positioned at a distance between 60 and 80 cm from the floor.



Size of the detection area according to the tags used (1)

		ISO Card UHF GEN2 Ref. STid CCTW360	ISO Hybrid Card UHF GEN2 + Mifare 1K Ref. STid CCTWR70	Wristband (Battery Assisted)	Necklace (Battery Assisted)
ℓ (cm)		L (cm)			
ETSI	200	400	320	110	180
	400	340	330	120	220
FCC	200	320	220	180	120
	400	300	280	150	180

Moving in the detection area

No specific caution is necessary to pass through GAT.

If a significant numbers of people pass along the antennas very close to each other, someone could mask another.

In the same passage an identifier can be read several times. You manage this point by configuring your interface and your application(2).

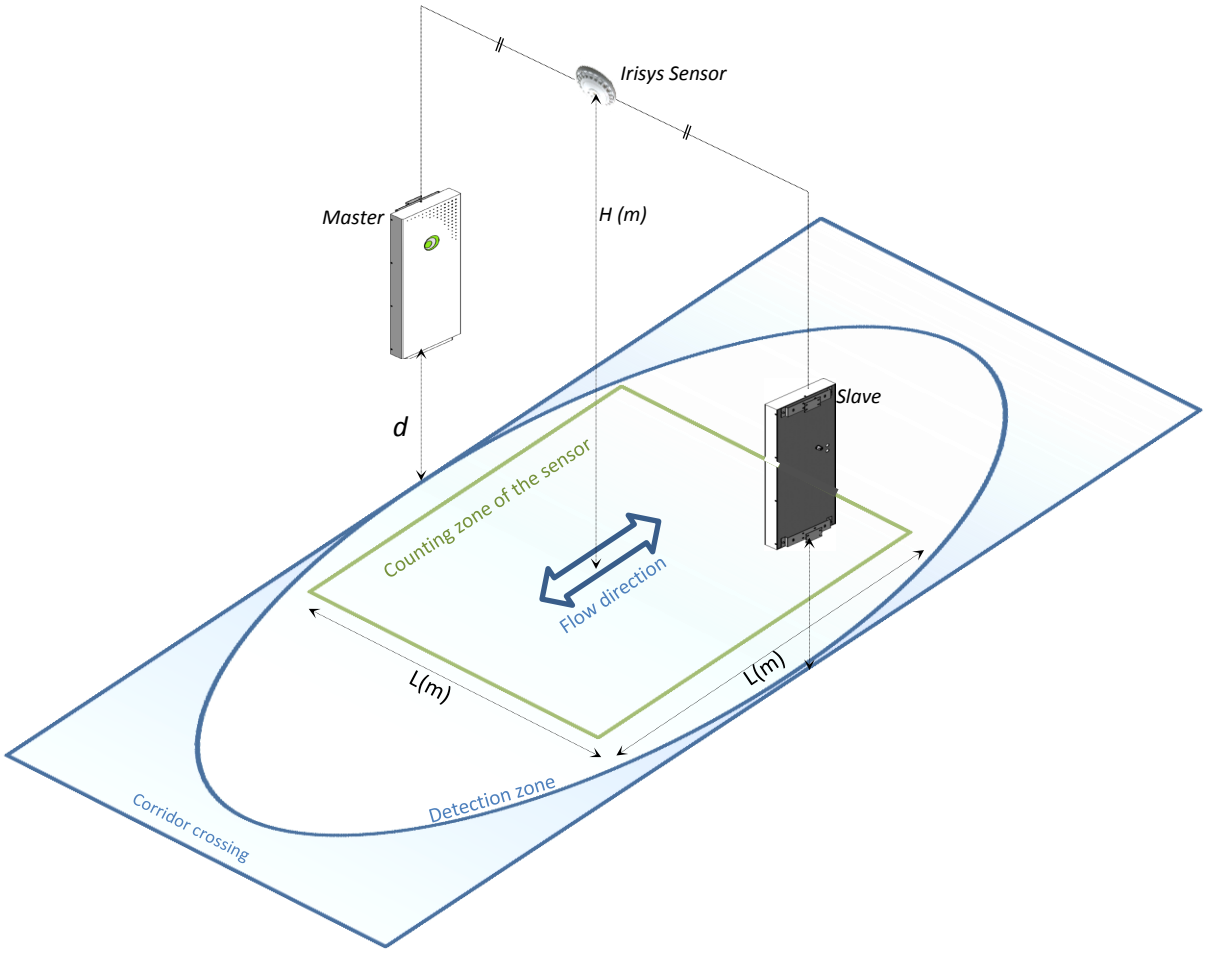
(1): Detection distances depend on the installation environment of the reader. External perturbations can cause variations in reading distance.
(2): Enable filtering on interface board (cf. FAQ). In your application set up a function to manage multiple reading of the same tag.

GAT Dual with sensor

Optimal positioning for a two directions flow

In this configuration, the position of the sensor will influence the positioning of the GAT. The two antennas must be installed in parallel, centered relative to the sensor. The distance between the two antennas depends on the height sensor installation.

The bottom of each antenna must be positioned at a distance between 60 and 80 cm from the floor.



IRISYS 2100 Sensor

Special precautions should be taken when you install your sensor adjacent to a door.

Refer to the sensor documentation for installation configuration.

The sensor detection volume depends on its installation height. It is recommended to install between 2.50m and 3.20m (outside this values, the detection volume can be reduced or detection can be altered).

Antenna positioning / sensor height

During installation you must be sure that all persons counted by the sensor are also detected by the GAT and vice versa.

The detection area of the GAT is larger than the counting area of the sensor. So it is the counting area of the sensor that will determine the GAT configuration.

For this, we recommended to respect the following values:

Mounting Height H (m)	Counting area L (m) x L(m)	Distance between the two antennas Gat (m)
2.5	**2.3 x 2.3**	**2.3**
3.0	**2.8 x 2.8**	**2.8**
3.5	**3.2 x 3.2**	**3.2**

Make sure that people are obliged to pass between the two antennas, especially if the corridor is physically larger than the gate.

Moving in the detection area

No specific caution is necessary to pass through GAT.
If a significant numbers of people pass along the antennas very close to each other, someone could mask another.
In the same passage an identifier can be read several times. You manage this point by configuring your interface and your application(2).

Recommended Tags

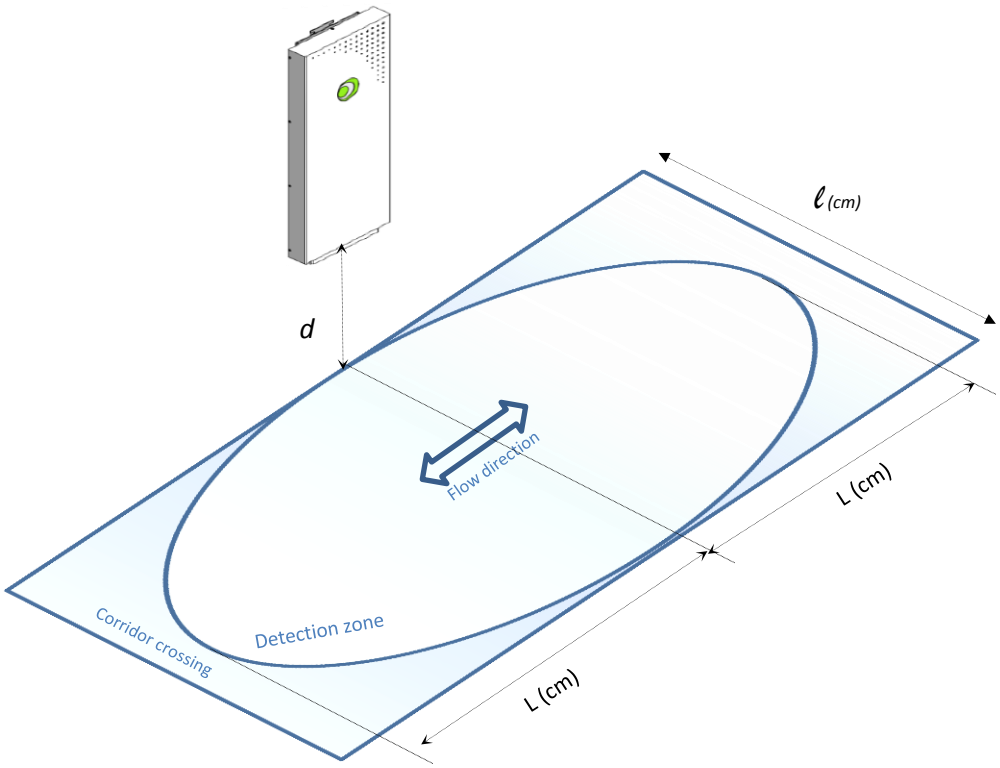
In this configuration we recommend you use the following tags:

- ✓ Card ISO UHF GEN2, Ref. STid CCTW360
- ✓ Card ISO Hybrid UHF GEN2 + Mifare 1K, Ref. STid CCTWR70
- ✓ Wristband BAP
- ✓ Necklace BAP

GAT Single side position

Optimal positioning for a two directions flow

The antenna should be installed parallel to the flow direction.
The bottom of antenna must be positioned at a distance between 60 and 80 cm from the floor.



Size of the detection area according to the tags used (1)

	ISO Card UHF GEN2 Ref. STid CCTW360	ISO Hybrid Card UHF GEN2 + Mifare 1K Ref. STid CCTWR70	Wristband (Battery Assisted)	Necklace (Battery Assisted)
	L (m)			
ℓ = 200 cm ETSI	180	160	90	150
ℓ = 200 cm FCC	200	170	250	250

Moving in the detection area

No specific caution is necessary to pass through GAT.
If a significant numbers of people pass along the antennas very close to each other, someone could mask another.
In the same passage an identifier can be read several times. You manage this point by configuring your interface and your application(2).

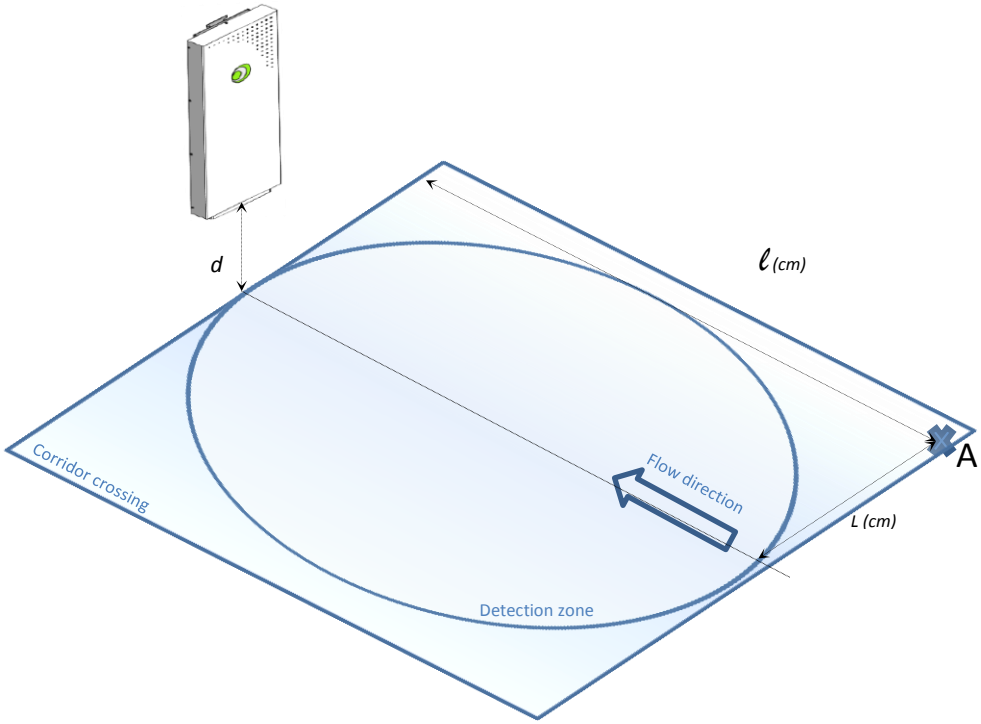
For the use of wristband BAP there is a limitation: the wristband should be worn on the wrist so that is directly in front of the GAT.

(1): Detection distances depend on the installation environment of the reader. External perturbations can cause variations in reading distance.
(2): Enable filtering on interface board (cf. FAQ). In your application set up a function to manage multiple reading of the same tag.

GAT Single face position

Optimal positioning for a single direction flow

The antenna should be installed perpendicular to the flow direction.
The bottom of antenna must be positioned at a distance between 60 and 80 cm from the floor



Size of the detection area according to the tags used (1)

L and ℓ are the coordinates of point A, limit point of detection area.

		Badge ISO UHF GEN2 Ref. STid CCTW360	Badge ISO Hybrid UHF GEN2 + Mifare 1K Ref. STid CCTWR70	Bracelet (Battery Assisted)	Necklace (Battery Assisted)
	L (cm)	ℓ (cm)			
ETSI	0 (in the axis of GAT)	600	600	400	500
	200	-	360	360	-
	250	300	-	-	-
	300	-	-	-	380
FCC	0 (in the axis of GAT)	600	600	600	580
	200	-	360	360	-
	250	300	-	-	-
	300	-	-	-	380

Moving in the detection area

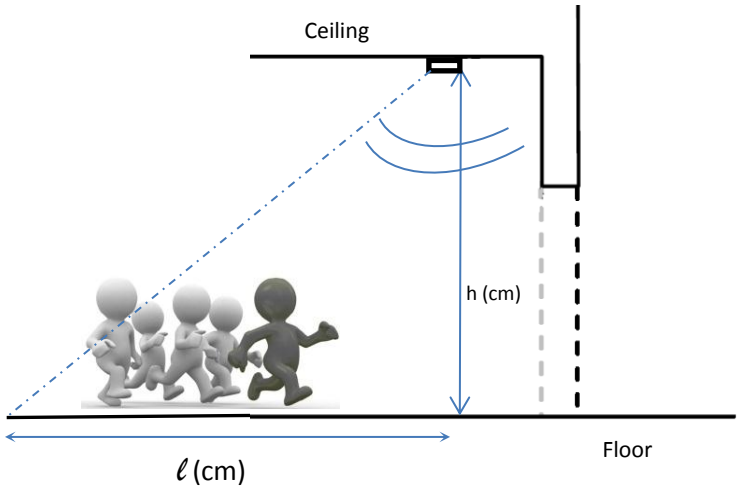
No specific caution is necessary to pass through GAT.
If a significant numbers of people pass along the antennas very close to each other, someone could mask another.
In the same passage an identifier can be read several times. You manage this point by configuring your interface and your application(2).

(1): Detection distances depend on the installation environment of the reader. External perturbations can cause variations in reading distance
(2): Enable filtering on interface board (cf. FAQ). In your application set up a function to manage multiple reading of the same tag.

GAT Single ceiling position

Optimal positioning for a single direction flow

The antenna should be installed on the ceiling, above the desired detection area.



Size of the detection area according to the tags used for h = 250 cm (1)

	ISO Card UHF GEN2 Ref. STid CCTW360	ISO Hybrid Card UHF GEN2 + Mifare 1K Ref. STid CCTWR70	Wristband (Battery Assisted)	Necklace (Battery Assisted)
	ℓ (cm)			
ETSI	300	200	220	150
FCC	300	260	220	180

The width of detection area, in this configuration, is 3.5 meters

Moving in the detection area

No specific caution is necessary to pass through GAT.

If a significant numbers of people pass along the antennas very close to each other, someone could mask another.

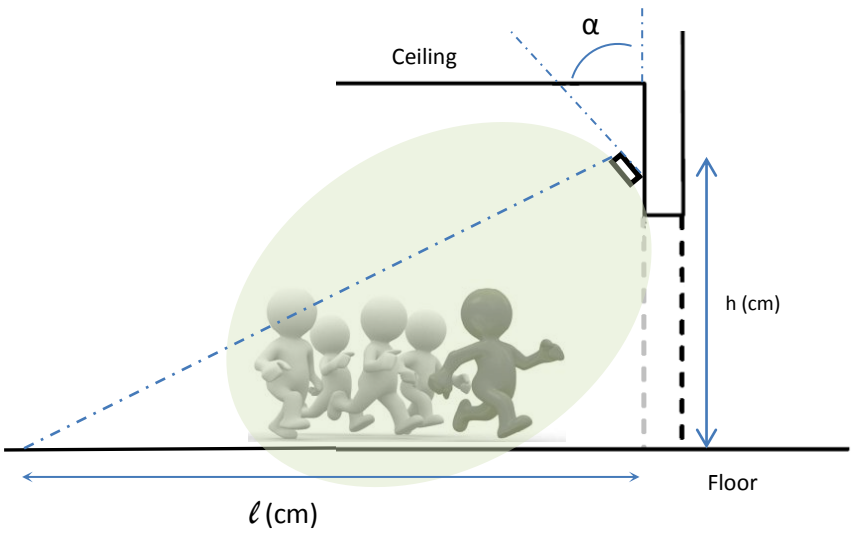
In the same passage an identifier can be read several times. You manage this point by configuring your interface and your application(2).

(1): Detection distances depend on the installation environment of the reader. External perturbations can cause variations in reading distance
(2): Enable filtering on interface board (cf. FAQ). In your application set up a function to manage multiple reading of the same tag.

GAT Single above Door position

Optimal positioning for a single direction flow

The antenna should be installed above the door and facing the desired detection zone. Installation height will depend on the inclination of the GAT.



Size of the detection area according to the tags used for h = 250 cm (1)

	ISO Card UHF GEN2 Ref. STid CCTW360	ISO Hybrid Card UHF GEN2 + Mifare 1K Ref. STid CCTWR70	Wristband (Battery Assisted)	Necklace (Battery Assisted)
α	ℓ (cm)			
45°	500	340	500	240
20°	500	350	500	500

The width of detection area, in this configuration, is 3.5 meters

Moving in the detection area

No specific caution is necessary to pass through GAT.

If a significant numbers of people pass along the antennas very close to each other, someone could mask another.

In the same passage an identifier can be read several times. You manage this point by configuring your interface and your application(2).

(1): Detection distances depend on the installation environment of the reader. External perturbations can cause variations in reading distance.
(2): Enable filtering on interface board (cf. FAQ). In your application set up a function to manage multiple reading of the same tag.

Frequently Asked Questions

Issue	Probable cause	Recommendation
My reader frequently reboots.	Current too low	Check the cable types, power supply and distance between power supply and reader.
In RS485, bad communication (noisy signals, frame errors…).	The distance between the controller and the reader is close to or more than 100 meters.	Use end of line resistor (L).
My reader does not start.	Voltage too low Incorrect wiring	- Check the voltage at interface card terminals. - Use a regulated power supply. - Check the wiring.
When I present a tag, reader emits multiple BIP, the green LED blinks and the same code is retransmitted.	Filtering is not activated (the same TAG is read continuously)	Enable filtering, on interface board, by setting the switch (N) ON.
TAG is not read (no BIP and default LED).	Dual configuration: slave is not or bad connected.	Check if both slave cables are correctly connected on master.
	Mono configuration: antennas are bad connected.	Check antennas wiring.
The data frame is not the one expected.	Incorrect configuration	Check reader configuration (specified in the order or made with Ultrys software).
	Incorrect communication protocol	Place the switch *SW1* (M) on the good position (4 : OFF, 3 : RS485, 2 : RS232 et 1 : TTL).
	Incorrect wiring	Check wiring on interface card (5 : L+/TD/Data/D0 6 : L-/RD/CLOCK/D1).
4 meters Dual configuration: Incorrect detection.	Detection distances depend on the installation environment of the reader. External perturbations can cause variations in reading distance	Reduce distance between antennas.
The detection is also outside the desired detection area.	Power of reader is to high	Reduce power (using Ultrys).
	Detection area is not adjustable.	Activate the RF field on event (ex: ground loop, cell…): use lane IN1 on interface card and put switch (J5) on OFF.
Sensor Irisys does not operate	Incorrect wiring	Check sensor wiring on interface card (+V, GND, Line1, Line2).
	Incorrect setting of the sensor.	Check its parameters (Airlock connections mode).
Tags in the next room are also detected	Gat emits a back field.	Use a plating solution like metal paint…..