

# Beacon Südtirol - Alto Adige

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## D4.2

# Beacon Network Installed Beacons

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# 1 - Introduction

In the WP 4 “Beacon Network” the Beacon project team in cooperation with Konverto has:

- created a beacon network over the whole South Tyrol;
- developed the software tools needed to properly manage and use the beacon network.

## 1.1 - Project overview

This document describes the activities of the 4th Work Package of the project "Beacon Südtirol - Alto Adige". The aim of the work package is to build a physical network of 3.500 Beacons and to distribute these Beacons over the territory of South Tyrol. Furthermore, within the 4th Work Package the software tools which allow the use and the administration of the network will be developed .

The 4th work package includes the following activities:

- the identification of the point of interest for the beacons;
- the installation of 3.500 beacons distributed over the whole South Tyrol;
- the development of Open Source libraries (iOS and Android) that can be used by stakeholders which will use the installed beacons in their apps;
- the development of an Open Source web tool to manage and maintain the beacon network;
- the development of an Open Source Android app to manage and maintain the beacon network;
- the creation of a plan for the maintenance and the future development of the beacon network.

## 1.2 - Project history

The Beacon Südtirol - Alto Adige project started officially on 1st May 2018. The 8th of June 2018 NOI Techpark organized a Kick Off event in order to present the project and get in contact with the stakeholder interested in the beacon network. NOI Techpark, through a public call for a point of interest, started the collection of Point of Interest to be equipped with beacons. Every institution and/or company interested in beacons had the possibility to manifest their interest by writing an email at the following email address [info@beacon.bz.it](mailto:info@beacon.bz.it) and sending the information about their point of interest.

The 30th of October 2018 in a public tender KONVERTO was awarded for the creation and the maintenance of the Beacon Network and the development of

the software tools needed for the use and the maintenance of the network. The public tender was divided in the following two parts:

1. the development of the software components;
2. installation and maintenance of the beacon network.

The 12th of December 2018 NOI Techpark organized a kickoff meeting with KONVERTO in order to:

- plan the development of the software tools;
- plan the installation of the beacon network.

In order to plan the installation of the beacons, the first call for points of interest was closed at the end of January 2019. All the requests collected after this date were inserted in a waiting list.

Originally, the whole project should have been completed within 30th of June 2019. Considering some unexpected problems (the complete list of problems will be mentioned and described in detail in the lesson learned section of the WP4 final report) emerged during the implementation of the project, NOI Techpark, Autonomous Province of Bolzano, KONVERTO and ERDF fund agreed a project extension until the 31st of January 2020.

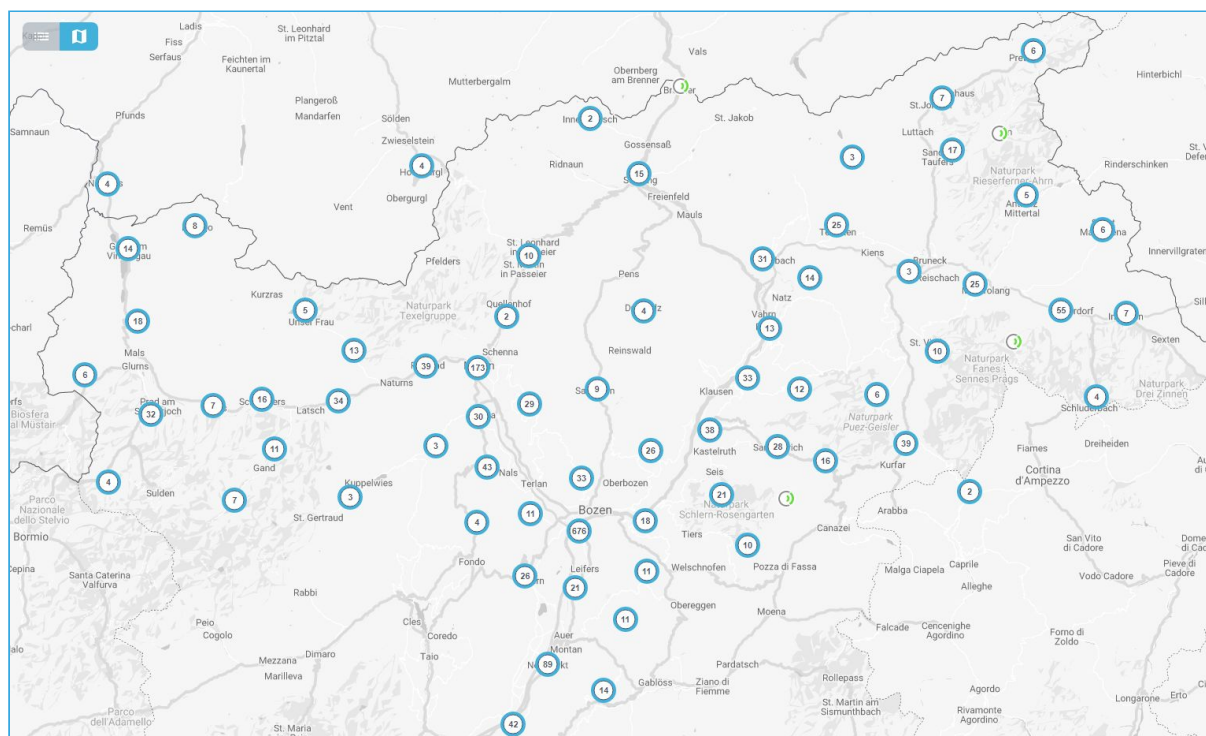
The creation of the software packages was completed in March 2019 in accordance with the original project plan and, after a testing period, was officially handed over by the project owner (NOI Techpark) on 21st of May 2019.

The present project was officially accepted and completed by the project owner (NOI techpark and Autonomous Province of Bolzano) on 29th of January 2020. The installed Beacon network was taken over into regular operation by the Autonomous Province of Bolzano and will be maintained in the next five years.

## 2 - The Beacon Network

As mentioned in the Introduction chapter, the main goal of the 4th Work Package of the Beacon Südtirol - Alto Adige project is to create a network of 3.500 beacons over the whole South Tyrol.

As can be seen in Figure 1 the Beacon Network installed within this work package is well distributed over the whole South Tyrol.



*Figure 1: the south tyrolean Beacon Network.*

### 2.1 - The installation process

The identification of the stakeholder interested in beacons began at the kick off meeting where a call for Point of Interest has been presented. The first call of Point of Interest was closed at the end of January 2019. The following institutions/ companies answered to the first call by sending their point of interest via email:

- 67 tourism associations of South Tyrol (under the direction of IDM);
- the „Landesverband der Handwerker“ (LVH-APA);
- the „Handels- und Dienstleistungsverband Südtirol“ (HDS);
- Dolomiti Superski;
- the Messe Bozen - Fiera di Bolzano;
- the Blueslemon project ( LP 14 project of Gruppo FOS and MAV Tech);
- Systems;
- Athesia;

- the medical center of Bolzano;
- the NOI Techpark.

In Table 1 are shown the number of the beacons requested by each institution or company that answered to the first call of Point of Interest.

Institution / Company	Number of Beacons
<b>Tourism Associations (IDM Südtirol)</b>	1.472
<b>LVH-APA</b>	150
<b>HDS</b>	550
<b>Dolomiti Superski</b>	100
<b>Messe Bozen - Fiera di Bolzano</b>	150
<b>Blueslemon Project</b>	100
<b>Systems</b>	10
<b>Athesia</b>	65
<b>Medical center of Bolzano</b>	350
<b>NOI Techpark</b>	816
<b>Total</b>	<b>3.763</b>

*Table 1: result of the first call for Point of Interest.*

After the first call for Point of Interest, in order to plan and share the installation methodology, dedicated meetings with the single institutions and companies have been organized.

Moreover, to test the installation procedure for the Tourism Organizations in February 2019 pilot installation sessions has been organized with the Merano, Prissian and Castelfeder Tourism Organizations. The cooperation with these pilot communities was very successful and the installation of the beacons in these locations was completed on time. The aim of these pilot installations was to gain practical experience and to test the different installation methods of the beacons on different surfaces. Furthermore, the aim was to test the optimal processes and communication channels for the planning of further installations.

Once the pilot installation has been concluded the roll out process has been finalized and shared with all the companies and institutions involved.

The installation of the beacons (roll out) in the other zones of the tourism associations started with end of April 2019, discussions were held with the other organizations or companies. With individual organizations (e.g. Gruppo FOS and Systems) this proved to be very easy and the beacons could be installed or

handed over in a timely manner. With other organizations the process was more effort demanding. NOI Techpark and KONVERTO were strongly in contact with the most critical organizations and companies.

Setting of an ultimatum (due to the approaching end of the project) led to a final decision of these stakeholders. Some of them (e.g. HDS, Athesia, Dolomiti Superski) decided not to participate directly in the project and be only observers. Others decided to take over the beacons assigned to them and apply them themselves (e.g. LVH-APA, the medical center of Bolzano).

In order to collect other stakeholder interested in beacons a second call for Point of Interest was opened during the summer 2019 and the following organizations and institutions answered to it:

- Bletterbach Schlucht;
- Eurac Research;
- Centro Trevi;
- Oberalp;
- Castel Mareccio;
- Belka.

In Table 2 are shown the number of the beacons requested by each institution or company who answered to the second call of Point of Interest.

Institution / Company	Number of Beacons
<b>Bletterbach Schlucht</b>	300
<b>Eurac Research</b>	40
<b>Castel Mareccio</b>	20
<b>Oberalp</b>	100
<b>Centro Trevi</b>	65
<b>Belka</b>	10
<b>Total</b>	<b>535</b>

*Table 2: result of the second call for Point of Interest.*

The second call for Point of Interest allowed the beacons left over by the companies and organization that, considering the effort to install the beacons, decided to not become directly part of the Beacon Südtirol - Alto Adige Project.

The rollout of the beacons over the whole South Tyrol, despite some difficulties that will be described in a dedicated section, has been concluded the 29th of January 2020.

In Figure 2 are reported some pictures of how the beacons are installed in different contexts like for example indoor installation, in cultural places, in naturparks and near the streets.



*Figure 2: some examples of installations.*

## 2.2 - The installation result

As a result of the 4th Work Package a Beacon Network distributed over the whole South Tyrol has been created. As can be seen in Figure 1 the network covers the whole region. The beacon has been installed in 67 different Tourism Organizations which involved more than 100 municipalities.



In Table 3 are summarized the number of beacons that have been installed and/or handed over divided per organization or company.

Institution / Company	Beacons handed over	Installed Beacons
<b>Tourism Associations (IDM Südtirol)</b>		1292
<b>LVH-APA</b>	100	
<b>Eurac Research</b>	40	
<b>KONVERTO</b>	1	
<b>Castel Mareccio</b>		13
<b>Belka</b>	10	
<b>Messe Bozen - Fiera di Bolzano</b>	81	69
<b>Blueslemon Project</b>	100	
<b>Systems</b>	10	
<b>Centro Trevi</b>	65	
<b>Medical center of Bolzano</b>	350	
<b>NOI Techpark</b>	703	666
<b>Total</b>	<b>1460</b>	<b>2040</b>

*Table 3: result of the first call for Point of Interest.*

The single beacons can be queried live via the administration Webfrontend developed within the project and available at the following link:

[admin.beacon.bz.it](http://admin.beacon.bz.it)

Moreover the distribution of the beacon can be queried also on the project website at the following link:

[maps.beacon.bz.it](http://maps.beacon.bz.it).

Finally the app developer can query the information about the beacon by using the iOS and Android SDK provided by the project or use the dedicated swagger API:

[api.beacon.bz.it](http://api.beacon.bz.it).

## 2.3 - The maintenance during the project

In the period from the installation of the first beacons in April 2019 until the end of the Beacon Südtirol - Alto Adige Project, there have been no significant disturbances of the network. Only once a beacon had to be replaced due to

malfunction. Occasionally, malfunctions occurred during installation, but these were usually resolved by removing and reinserting the batteries or by changing the battery.

During the Christmas season, a system failure occurred in the Merano area during the deployment of a Gamification APP. The reason was primarily a bug of the SDK that will be described in the Lesson Learned section, a misconfiguration of the API and the database accesses, too low performance of the backend and an incorrect implementation of the SDK in the APP. All these problems have been solved thanks to a great cooperation between NOI Techpark, KONVERTO and the app developer of the Merano Christmas Crime.

## 3 - Problems, solutions and lesson learned

This chapter collects the main problems, the solution and the lesson learned of the activities of the 4th Work Package of the Beacon Südtirol - Alto Adige project.

In any case the project was a success and there were only some small issues that, thanks to the great cooperation of NOI Techpark and KOVERTO could be solved without any negative effect on the project.

### 3.1 - Problems and solutions

This section is dedicated to the problems and the difficulties bumped up during the implementation of the software tools and the installation of the beacons. Moreover, for each problem or difficulty, it will be also described the solution identified by the project team. A good cooperation between NOI Techpark and KONVERTO allowed us to successfully resolve all problems and difficulties.

#### 3.1.1 - Installation coordination with stakeholders

The coordination of the installations (agreeing the POIs, making appointments for the installation, meetings with associations, getting the authorizations and access to the places) in some cases was a difficult challenge. In particular during the installation we found the following problems:

- since in some cases the contact provided by the organizations or the companies was not the one responsible for the locations, were difficult to get appointments with the supervisor of the locations where the beacons were installed;
- some organizations or companies renounced to their beacon during the installation phase;
- In some municipalities any beacon was planned on private location and we didn't get the authorization by the owner.

In order to deal with this issues, the project team implemented the following countermeasures:

- wrote a how to document with a list of task that the company/organization asking for beacons has to fulfill in order to be able to define a date to install the beacons;
- several meetings with the most critical companies and organizations were organized in order to help them to clarify their doubts and to coordinate the pianification work;

- A second call for Point of Interest has been organized in order to collect other locations to associate to the beacons taken over by some organizations and companies.

## 3.2 - Lessons learned

Learning from the experience done in this project, the project team was able to identify some optimizations and tricks that could be adopted in future projects in order to further optimize the resources and the activities.

During the coordination with the stakeholders interested in getting the beacons it appears clear that the collection of the information and the coordination of the installation activities was quite effort demanding also on their side. Considering that, in future projects similar to Beacon Südtirol - Alto Adige, the suggestion is to assign a little budget to this stakeholder for the coordination of the installation activities and eventually also their own members.

Moreover, as said in the previous paragraph, during the project it was difficult to get in touch with all the stakeholders that used the beacons and help them with their issues. In order to improve this aspects, for future projects, the following countermeasures should be taken into consideration:

- foresee a bigger budget for pilot applications;
- foresee a budget for the support of organizations and companies who are willing to integrate the implemented technology in their services/products;
- a customer care structure should be foreseen starting from the beginning of the project.