

# Exploracity – An Innovative Platform Offering New Services for the Enhancement of Tourism and Cultural Heritage

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The “Exploracity” project is an innovative platform offering new services for the growth and the enhancement of Tourism and Cultural Heritage. Financed by the MISE, included in the National Digital Program of Italy and created by ETT S.p.A., this innovative mobile app solution makes a visit to the city an immersive and highly evocative experience. Exploracity is a software platform, assisting the discovery of the local area through the use of innovative tools, which may be proposed as a model for other cities. The city of Genoa is the first on-site experiment.

The use of geolocation tools with virtual and augmented reality makes Exploracity fast to manage. Using this app, visitors receive the first notions and historical reconstruction of the city’s cultural development. Visitors install the selected route on their mobile devices and are guided on many interactive discovery tours of real places, enriched with multimedia content together with augmented and virtual reality. All this makes a sightseeing visit an immersive and highly suggestive experience.

The Exploracity project proposes a new idea of tourist flow management, enriched with edutainment (educational entertainment).

Good visitor feedback, both Italian and foreign, encourages ETT to continue to implement cutting-edge technologies to create better engagement in the cultural heritage sector, both at the Italian and international levels. This attractive experience certainly marks a very important step in re-evaluating the role that new multimedia technologies have within the enhancement processes, improving both historical and cultural content.

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## INTRODUCTION

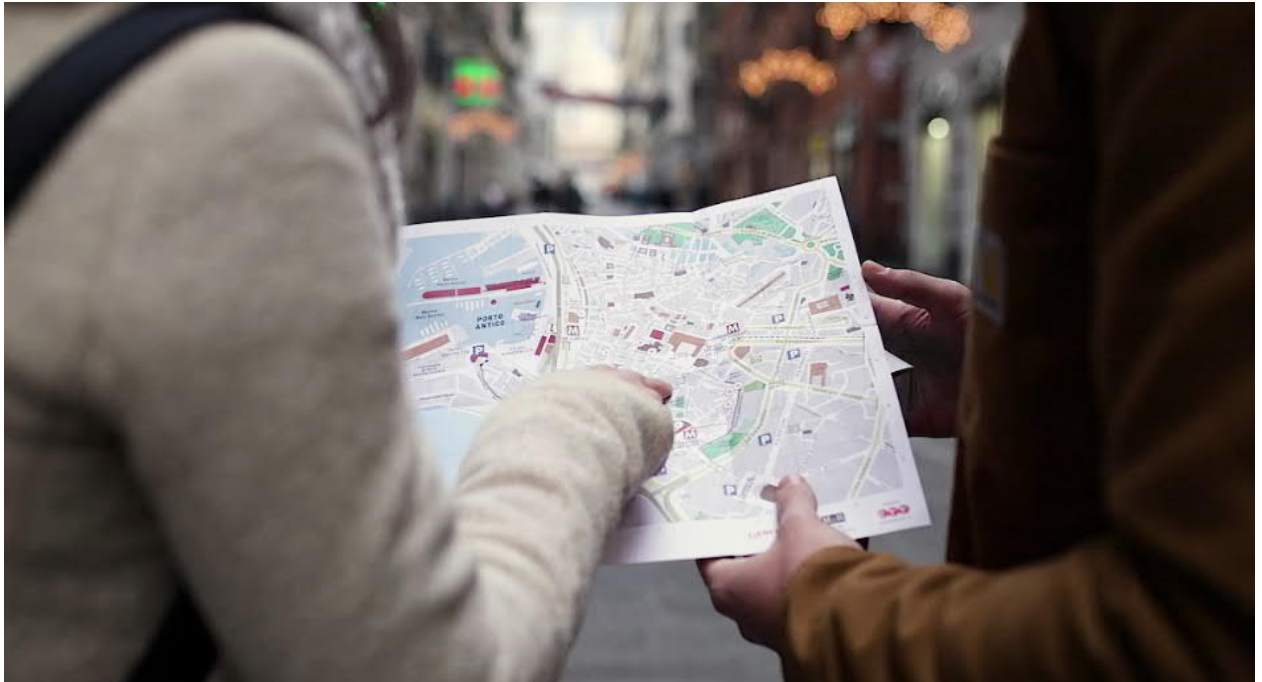
The “Exploracity” project, financed by the MISE (Ministero dello Sviluppo Economico – Ministry of Economic Development), included in the National Digital Program of Italy and created by ETT (*Electronic Technology Team*) S.p.A., is an innovative platform offering new services for the growth and the enhancement of Tourism and Cultural Heritage. Exploracity is an innovative mobile app that transforms the visit of a city into an immersive and highly evocative experience. Exploracity is a software platform, assisting the discovery of the local area through the use of innovative tools, which may be proposed as a model for other cities. The city of Genoa is the first on-site experiment (see Fig. 1).

The use of geolocation tools, mixed with virtual and augmented reality content, makes Exploracity the perfect tool with which to plan a personal tourist route. The goal of the platform is to make a visit to the city an immersive and highly suggestive experience through the use of new technologies. It offers visitors the opportunity “to live” the old city, its forts and monumental gardens, its churches and museums etc. on many different routes. Visitors can experience the city’s most unexpected and secret corners. ETT is based in Liguria, the region of which Genoa is the principal city, and was, therefore, the natural choice for this task. The historic city of Genoa is the ideal context for the development and display of new technology potential for the promotion of tourism and Cultural Heritage.

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*Fig. 1. Exploracity is a software platform assisting the discovery of the city of Genoa*



*Fig. 2. The discovery of the city through cardboard VR visors*

Discovery of the city starts at the Porto Antico “Tourist Information Office” (IAT –*Informazioni Accoglienza Turistica*). Some mini virtual cultural-route experiences are offered to visitors, with touch-screen interaction and cardboard VR (Virtual Reality) viewers (see Fig. 2). Here they receive the first notions and historical reconstruction of the city’s historical and cultural development.

The Genoa fit-out consists of:

- An information touch monitor with a photo and video gallery showing the main points of interest (POIs), as well as a games section for younger tourists
- A virtual reality station, taking visitors on a virtual flight over the city of Genoa, during which POIs may be selected and virtually explored in 360-degree vision
- A second virtual reality station, with a faithful period reconstruction offering the experience of an exciting virtual walk, balanced on a high and narrow bridge within the Porta Soprana towers
- A mobile app, enriched with multimedia content in virtual and augmented reality, guiding tourists on an interactive discovery of city monuments and making a sightseeing visit an immersive and highly suggestive experience.

This is the most complete multimedia tourist app project in Italy. For the first time, access to cultural content on the tourist scene has been considerably enhanced, showing relevant content in an immersive way thanks to augmented and virtual reality. Each itinerary, with its multimedia POIs scattered around the city, supplies videos, images and historical information on buildings, gardens, churches and museums, and gives VR and AR experiences.

## THE PROJECT: PRESENTATION AND TECHNOLOGIES

The "Exploracity" project was promoted by the city of Genoa and produced by ETT S.p.A. It is the most complete multimedia tourist app experience in Italy and offers an incredible, complete and immersive view of the city of Genoa.

Here are some of the mobile app’s main features:

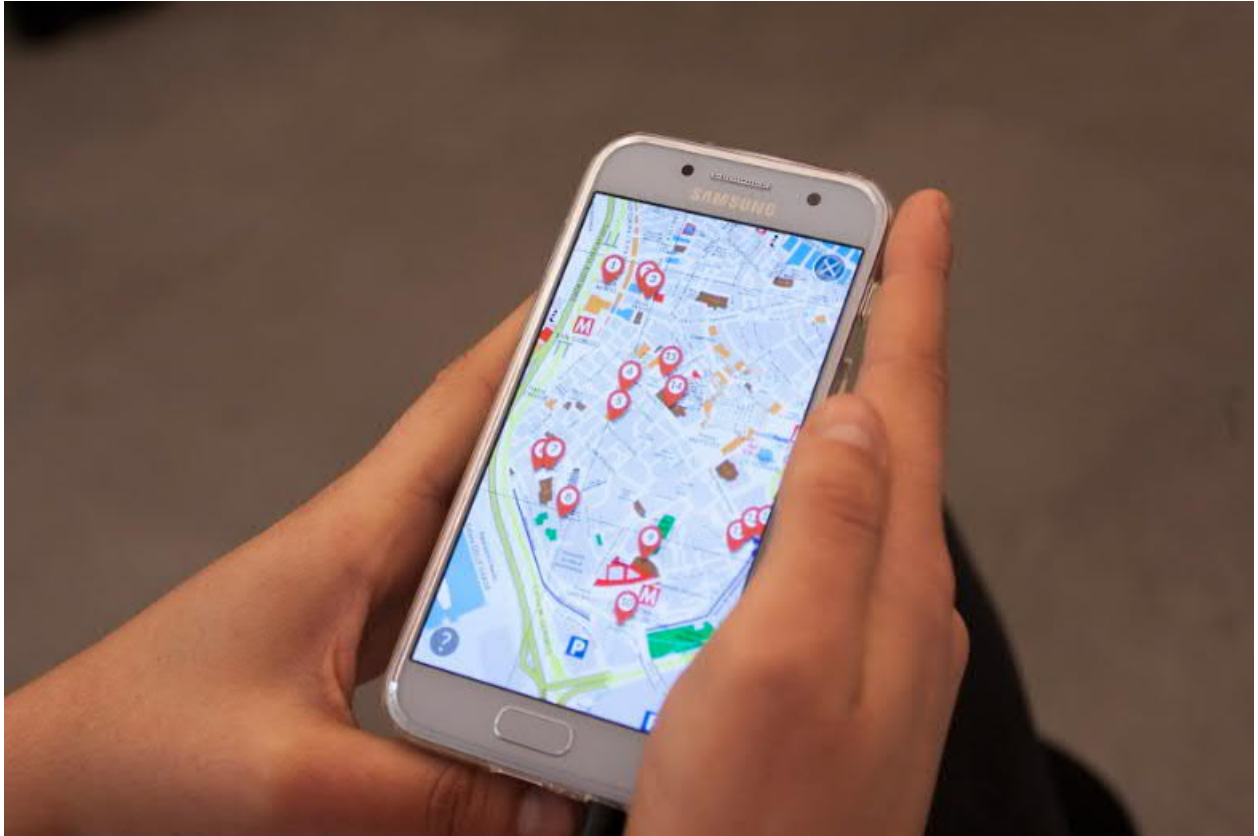
- Usable on iOS and Android devices
- Available for free download (Google Play and App Store)
- The free version contains:
  - The first three Points of Interest on the Mediaeval Genoa route
  - A Game: *Ancient Crafts*
- Tourists can buy additional premium content at the Tourist Offices (IAT):
  - The Mediaeval Genoa route map for €6, showing all 15 POIs
  - The Mediaeval Genoa route map and Cardboard VR for €10, showing all POIs and with six virtual reality features that may be used with Cardboard
- Content is unlocked by location markers near POIs
- All content, when unlocked and downloaded, remains available on personal devices and may be consulted at will.

The 15 Medieval Genoa route sites are located in the historic center of Genoa, although only the first three are free. Various routes include a combination of historical information, images, virtual reality and immersive technologies that, together, create a new way of interpreting a tourism experience (see Fig. 3).

Virtual reality content is available in six locations, including Palazzo San Giorgio and Sottoripa [Pessa 2016], Piazza Banchi, San Lorenzo [Di Fabio et al.1998] etc. The route commentary is available in four languages (Italian, English, French and Spanish) and content is activated via geolocalisation.

The *Ancient Crafts* game is free and can be downloaded from the Exploracity app. This section of the app is available in two languages (Italian and English) and content is activated at each location.

Tourists may use mobile devices to access general and historical information on site, as well as when triggering virtual reality and augmented reality content while using Cardboard.



*Fig. 3. The App points of interest (POIs) on the map*

Information is presented at every location and, when using Cardboard, tourists can immerse themselves in 360° videos or pictures and discover two different cities at the same time: today and in times past. ETT employs a special 3D tracking solution that makes use of the most advanced computer vision algorithms. The AR (Augmented Reality) function recognizes details of buildings and tracks them in real-time. VR or AR elements appear and visitors have an increasingly magical sense of being part of the scene. While using Cardboard, users can see both the real object (a building, church, monument or square) and the superimposed virtual element (augmented reality reconstruction). While listening to explanations and seeing various original monuments, churches, streets and squares, all clearly visible in their ancient magnificence, visitors can admire each secret corner of the city.

This augmented reality technology, which fully respects historic content, is a new opportunity for upgrading tourism. ETT is working in this direction by implementing these augmented and virtual reality solutions in order to let users experience a new kind of city visit. This experience leads to in-depth knowledge of the history and importance of the most important monuments of Genoa.

With this innovative project, ETT has put into place a whole range of solutions; increasing opportunities to requalify the tourism market by offering innovative solutions while respecting the historic and cultural constraints of the location.

Every Italian city is of enormous artistic and historic value and every technological touristic solution has to work on this great value. The blending of traditional methods of enjoyment with innovative digital solutions creates a new cultural tourist experience.

In the Exploracity project, the POIs blend into the city and the planned routes were designed to allow easy interaction with information and city spaces, offering an extraordinary and immersive visitor experience. Visitors experience the emotional and immersive context in the chosen areas of interest by following a logical narrative thread. Although places may be physically separated, they are constantly united through the storytelling technique.

This experience, and these solutions, mixed with virtual reality, gives participants a new kind of visit experience, leading to in-depth knowledge of history and the life of Genova and its people.

The multimedia content is designed to encourage the discovery and the direction of tourist flows around the city, thus avoiding the risk of crowding and the subsequent reduction of quality and enjoyment of the visit.

The entire project is modular and completely adaptable, making it suitable for frequent changes in tourism patterns and technology. At the same time, Exploracity offers many different routes engaging varying tourist targets: from the discovery of castles [Stagno 2005] and monumental Ligurian gardens [Cappellini 1929; Mazzino 2006] to secret routes taking in churches and little squares around the city. Every route can be chosen according to whatever appeals to the visitor.

Since multimedia support must always be able to harmonise and adapt to accurate target analysis, new potential audience types are profiled so that content may be created in line with user expectations.

The project:

- Combines technology and creativity to surprise the visitor
- Stimulates new connections, physical and/or digital, between ancient cultural content and the urban space in which it is located today
- Transforms the historic city centre into a place that goes beyond conservation, making it a lively and attractive hub for cultural tourism
- Helps new forms of visit personalisation, adjusting to the needs of each visitor
- Creates new ways of interacting between visitors and the city, with particular regard to the pre and post-visit phases
- Starts a dialogue between city and visitors
- Involves new generations through the use of familiar technologies and methods

## CONCEPT, CONTENT, AND THEORETICAL BACKGROUND

The tourism industry is currently in need of technology-based value-added integrated services, highly dynamic and offering interactivity and entertainment. Augmented and virtual realities have thus far proved to be technologies that can provide tourists and the local population with much more personalized content, as well as services tailored to their particular needs. Specifically, these tourist guides can display content-on-request as tourists travel around the city, exploring the cityscape and sites. It would be fair to say that mobile applications allow users to explore the world by adding new layers to their reality, and this makes for a new highly-dynamic interactive experience. Moreover, as these applications are, on most (if not all) occasions, accessed from mobile devices with GPS, tourists can gain additional benefits and navigate interactively, with the help of indications from the selected locations [Kounavis et al. 2012].

Besides this, AR-VR application information is delivered through the use of various multimedia formats. Such formats range from sound and image to video clips, 3D models and hyperlinks that may direct the user outside the application. This combination of AR-VR technology, the availability of various multimedia content and the careful design of the application can, all together, permit tourists to create favourite POI lists; complete with embedded multimedia files. Then, while geolocation and AR tags trigger the delivery of multimedia content, the content itself could be designed to provide further connectivity between the AR application and other sources, offering additional benefits to tourists. This suggests that mobile AR-VR applications can offer further added value to tourists by introducing the concept of connectivity and the sharing of experiences.

It is important to explore emotions, as they are central to our lives and decision-making processes. The emotion of nostalgia is common among visitors of all ages to a cultural heritage destination [Baloglu et al. 1997].

These considerations are the foundation of the Exploracity project, where the experience content and multimedia narration are elaborated at the emotional level. Emotional and balanced storytelling can help users experience the splendor of ancient Genoa, fixing it in their memory and winning their hearts.

The goal for the producers of Exploracity was to find the right way of giving new life to city cultural content, to refresh its image in the collective consciousness and to communicate its importance, so that familiarity with it would stimulate deeper knowledge. The whole tourist route proposal concentrates on experiential and emotional visitor involvement. Using this pioneering mix of technologies and new models for accessibility and visitor flow management, the visitor experience becomes a great opportunity for vivid involvement. By proposing a technically accurate and active personal experience, visitors are offered a new visit approach that narrates, in the best possible way, each historic and informative element with emotional involvement [Choi et al. 2007].

Milgram's study shows how the mixed reality experience is characterized by a combination of real and virtual environments where, if the real world occupies the left of the continuum, the virtual world is at the other end. Exploracity, with its new technology, overlaps augmented elements in the real world (augmented reality) or directly substitutes the real world with virtual vision (virtual reality) in a continuum [Milgram et al. 1994] (see Fig. 4).





*Fig. 4. Mixed Reality (MR) Continuum*

Apps for tourist tours are steadily becoming more and more common and VR options have the power to transport users to places they might never be able to visit in real life. The challenge is to combine these two options: offer a new on-site vision of reality.

This idea of a new tourism offer is the basis of the Exploracity project, proposing an immersive offer in which the tourist-observer has a new option when discovering the space around him, by creating a mixed experience environment. Real-world and virtual world objects are presented together, in the same new tourist experience [Echtner et al. 1991].

ETT has expanded the conventionally held view of the "tourist tour" by proposing the new "emotive tour" with specific "mixed experience" solutions and with different classes of hybrid content. The 3D tracking system on this project uses the most advanced computer graphics. For example, the entire AR system recognizes three-dimensional spaces around the POI view of the city and carries out real-time tracking. This recognition system elaborates a reconstruction and overlays it on the real view, giving users the illusion of being in the past and increasing the effectiveness of this immersive experience. This technology lets users see the city and its monuments as they originally were, offering the most incredible tourism experience.

The project proposes a catalogue of continually developing experiences that present a new model of Genoa's cultural features. New technologies enable virtual and augmented reality visits, with route planning and outdoor/indoor geolocation. The historic life of the city is also narrated.

Using this innovative mix of technology and new models for accessibility and visitor flow management, the visitor experience turns into a great opportunity for vivid involvement [Gunn 1988]. Thanks to the app, visitors are able to see ancient lost architectures, hear the sound and voices from the past, living an immersive experience through History.

The Exploracity app provides information on demand, thus minimizing the effect of information overload on the one hand and the negative effect of irrelevant information on the other. Information overload can occur when tourists are overwhelmed by the information transmitted regarding historical sites, museum exhibits, navigation data and so on. Apps of this type can significantly help by transmitting the city's most important facts.

## CONCLUSION

The Exploracity project offers an "edutainment" (educational entertainment) experience. Good visitor feedback, both Italian and foreign, encourages ETT to continue to implement cutting-edge technologies to create better engagement in the cultural heritage sector, both at the Italian and international levels. This attractive experience certainly marks a very important step in re-evaluating the role that new multimedia technologies have within the enhancement processes, improving both historical and cultural content.

Based on what has been achieved so far, all the virtual and augmented reality fit-outs developed in the cultural field can certainly offer rewarding aesthetic and learning experiences, otherwise difficult to obtain, but this is not enough [Goulding 1999].

The starting point for the conception and development of such projects is the awareness that the past and the present can both be conveyed simultaneously, through new media, whilst contributing to research into the cultural heritage which our country (and others) can benefit from. It is about enhancing the audience experience, thus guaranteeing both the protection and conservation of art as well as providing an engaging interpretation [Dunkley et al. 2011].

Results are user appreciation and a significant visitor number growth.

Very considerable is how the Exploracity model was used to develop some others apps: its infrastructure made possible to improve the company ability to acquire new clients such as:

- Gorizia Castle Visit App: a mobile app that supports the visitor, structure in 16 POIs with content delivered on 6 different paths intended for different targets. The app consists in AR and gaming content.
- Palazzo Besta Videoguide App: a mobile app for the visit of Palazzo Besta in Teglio, a Renaissance Palazzo hosting an important series of frescos. Visitors can use this app bringing their own device and downloading the app for Apple App Store and Google Play Store. It provides 360° VR content and uses a wayfinding mechanics through Low Energy Beacons.

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