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Architectures along James I itinerary in the Valencian Province

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Persistent forms in Valencia Cathedral. © Sandro Parrinello

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FAST SURVEY TECHNIQUES FOR THE DOCUMENTATION OF THE CASTLE OF BENISSANÓ

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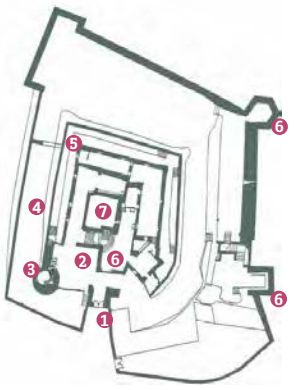
Side page, Fig.01
Benissanó Castle
View of the 15th-century castle of Benissanó, a fortified noble residence set between the Turia plain and the inland hills of Valencia.

The Benissanó Castle is located at the end of the narrow street that runs through the town's historic centre. Getting there is a journey, although short, through the intimate landscape of the Valencian countryside. Leaving the outskirts of Valencia and heading toward the hills, the town is a small urban nucleus perfectly defined in contrast to the surrounding agricultural land. The houses are low and colorful, and the streets are almost deserted due to the heat. The historic center is an example of a typical settlement, where historical layers blend with the quiet atmosphere of a rural village that retains the charm of its medieval origins. It features a simple yet functional urban layout inherited from past centuries. On the edge of the village stands the castle, the symbolic and architectural heart of the town, not only a defensive element but also a landmark that tells the historical significance through its walls and towers. The narrow streets are lined with buildings reflecting the traditional architecture of the Valencian province. The simple facades of mid-20th-century buildings alternate with ceramic decorations and the presence of churches and chapels, places that testify to the deep religiosity of the local community. One of the main attractions is the parish church, with its understated elegance and a bell tower that stands as another distinctive feature in the village's landscape.

The castle, which shares its name with the city, was originally developed during the Islamic presence in the region. The current configuration of the complex, resulting from successive transformations over the centuries, dates back to the 15th century and stands on the remains of an ancient *alquería* called Benixanut, a period in which it took on a noble residential configuration[1]. Benissanó has no direct connection to James I of Aragon, who granted this *alquería-castillo* to Íñiguez de Díaz Castelló[2], while the surrounding lands were distributed among several knights. By the 14th century, Benissanó had already become an independent estate and lordship, distinct from Lliria, and unresolved disputes

Fig. 02
Castle ground level
1. Main Access; 2. Place of Arms; 3. Poterna Tower; 4. Moat; 5. Patrol walkway; 6. Vestibule; 7. Homenaje Tower



[1] Cf. Rubial (1998), *Castillos de Valencia.*

[2] In the land grants made during the time of the Reconquista, documented in the Llibre del Repartiment, it is recorded that in November Íñiguez de Díaz Castelló received a tower and several buildings under the name of *Benizano*: *"P. Enneguez de Diacastello: turrim cum edificiis suis que vocatur Benizano et XIII jo. terre ibidem et domos contiguas domibus Dominici de Lombierre et quasdam domos pro stabulo contiguas muro ville et I ortum contiguum balneo. Kalendas novembris [...]"*. Coleccion de documentos inéditos del Archivo General de la Corona de Aragon, tomo XI, Repartimientos de los Reinos de Mallorca, Valencia y Cerdeña, Publicada de real orden por su cronista D. Próspero de Bofarull y Mascaró, Barcelona, 1856, p.447.
These lands would soon gain significant importance in the area, especially after the flight of the Arabs who were attempting to escape from the Christians. However, it was not until January 18, 1261, that James I confirmed Íñiguez de Díaz Castelló as the lord of the Benizano estate. From that moment on, Benissanó, which then consisted of a tower, surrounding buildings, a public bath, and a wall enclosing the village, would have its own jurisdiction; cf. Campos González, Herrero García, Alonso García, (1998), *El castillo de Benisanó.*

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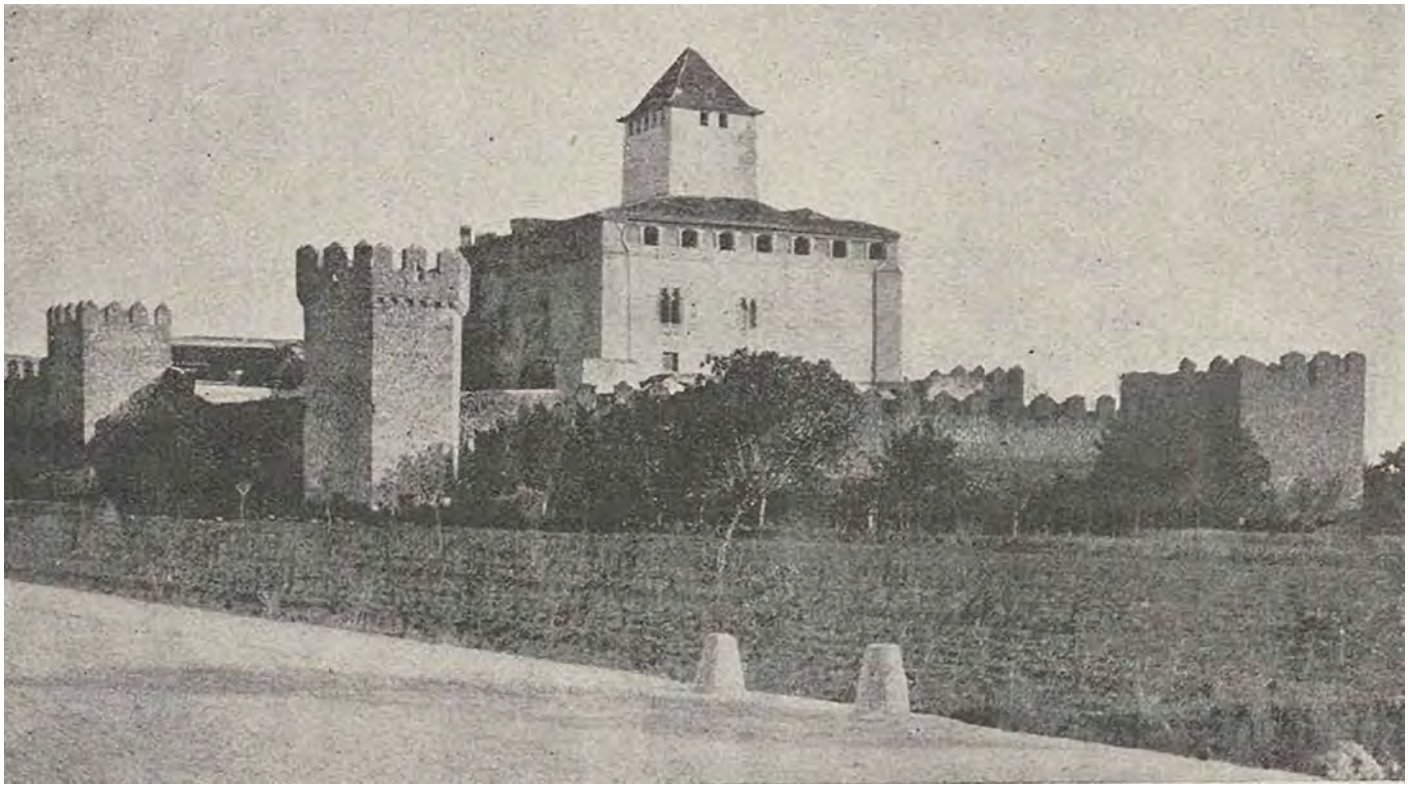


Fig. 03
A glimpse from a Century Past
Evocative early 20th-c. view of Benissanó Castle, still standing proud amid open fields (from *Geografía general del Reino de Valencia*, Sarthou Carreres, vol. III, t.II, p.552).

Fig. 04
Noble residence
Early 20th-c. view of the inner Palace (from *Geografía general del Reino de Valencia*, Sarthou Carreres, vol. III, t.II, p.553).

over irrigation water culminated in an attack by the inhabitants of Lliria in 1408, during which the settlement was set on fire. It is therefore in the second half of the 15th century that Mossen Luis Villarrasa de Cavanilles, heir to this and other wealthier properties, built the Benissanó castle on the ruins of a previous fortification from the Islamic period of *Al-Andalus*. Its peak development occurred in the 15th and 16th centuries, thanks to the contributions of the Cavanilles-Villarrasa family, which shaped the current appearance of the building[3].

The structure is protected by two concentric walls, with the outer ring—connected to the city walls—being lower in height than the inner one. Today, only the castle and three of the city gates that once provided access to the walls remain.

From a typological perspective, the castle belongs to the category of palace-castles, combining the distinctive features of fortresses with those of medieval noble residences. Its architectural layout is based on a rectangular plan, with four internal levels, culminating in a crenelated terrace, which remains a prominent feature of the current structure. The most distinctive element of the castle is undoubtedly the central body, built upon the remains of a medieval Muslim tower, which serves as the keep of the fortress. The tower has a square base measuring 7.5 meters per side and was gradually transformed between the 15th and 18th centuries, with crenelations added during the last restoration in the past century. All the rooms are arranged around this tower.

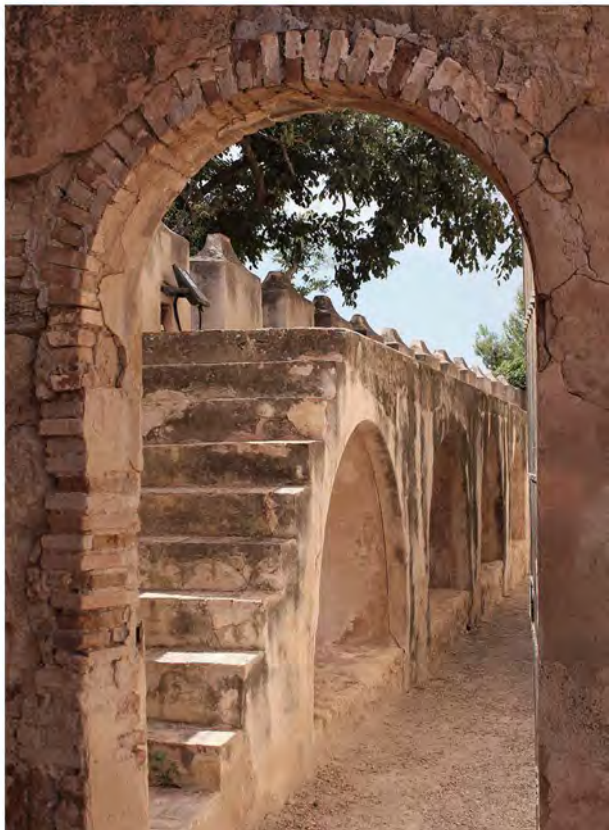
[3] Cf. Sarthou Carreres, (1910-1915), *Geografía general del Reino de Valencia*, vol. III, t. II, *Provincia de Valencia;* Campos González, Herrero García, Alonso García, (1998), *El castillo de Benisanó, cit.*

Fig. 05
The Castle today
Aerial view of the current state of the castle. Notable differences can be observed, particularly in the main tower's roofing system.

The complex exhibits a heterogeneous mix of styles, evident in the composition of its openings: Mudéjar with pointed arches, Gothic with delicate tracery, and Renaissance with round arches.
The castle has two entrances: one through a small passage connecting the stables to the vestibule, and another through a door in the parade ground, directly in front of the well, leading straight to the vestibule. Only a few original elements remain in the castle, with notable features including some coffered ceilings, sections of the flooring, and a Medieval Islamic passageway that is accessible from one of the rooms. The castle's current appearance, while evocative, obscures the charm of its former palace. By the early 20th century, the castle had already undergone significant modifications. In the section dedicated to the Castle of Benissanó in the *Geografía general del Reino de Valencia*, Carlos Carreres states: "*Deplorable transformations have disfigured the palace's original character. The disappearance of the bridge, the partial filling of the moat, the division and expansion of the halls, the overwhelming application of plaster and lime on the walls and ceilings (except for those spared due to their height), the perforation of coffered ceilings to build modern staircases, etc., have ultimately given the appearance of a farmhouse to what was once a noble residence*" [4].
The defensive wall forms an irregular polygon shaped by the rocky hill, while towers and gates follow a more regular layout, with entrances on each open side and corner towers at the ends of the curtain walls.

Side page, Figs.06, 07
The Features of the Castle
A selection of descriptive images highlighting the most significant fortified elements.

[4] Translation by the authors, the original text is provided: "*Lamentables transformaciones han desfigurado el carácter primitivo del palacio. La desaparición del puente, el rellenado de parte del foso, la división y aumento de los salones, la inundación de yeso y cal de los muros y techos (salvo los que por su altura se salvaron de ella), la perforación de artesonados para levantar modernas escaleras, etc., etc., acabaron por dar carácter de granja agrícola á lo que fué señorial mansión*". Sarthou Carreres (1900-1915), *Geografía general del Reino de Valencia*", vol. III, t. II, *Provincia de Valencia*, pp. 554.



Along the entire length of the wall, there are battlements, most of which are decorative, primarily resulting from renovations in the 20th century.

The castle originally had a moat, now disappeared, which explains the relatively low height of the outer wall. However, within the walls, there is a second line of defenses, featuring square and round towers, also crenelated, taller than the outer enclosure and attached to the palace itself. The current entrance is straightforward, but in the past, it was equipped with a drawbridge that spanned a second moat. The present gate leads to a small quadrangular courtyard, featuring the Poterna Tower and a well carved into the rock under Islamic rule. Beneath the parade ground, there are cisterns for water storage, the largest of which is covered by a large vault.

The decorative richness, combined with the complexity of its defensive morphology, led to the definition of an integrated research process, aimed at digitally reconstructing its overall image. The possibility of structuring a three-dimensional database of the site allowed for the analysis of the main defensive elements of the fortress, validating the hypotheses proposed on-site and defining an iconographic framework useful for its understanding[5].

Fig. 09
Inside the Palace
Views of some interior spaces on the ground floor, showing original structural elements and later architectural additions.

Side page, Fig.08
Inside the Castle
View of the castle's courtyard framed by the side arch of the main entrance, revealing original masonry textures and architectural details.

[5] Parrinello, Pettineo (2024), *Traditional Architectures Along the Cultural Route of James I of Aragon in the Province of Valencia*

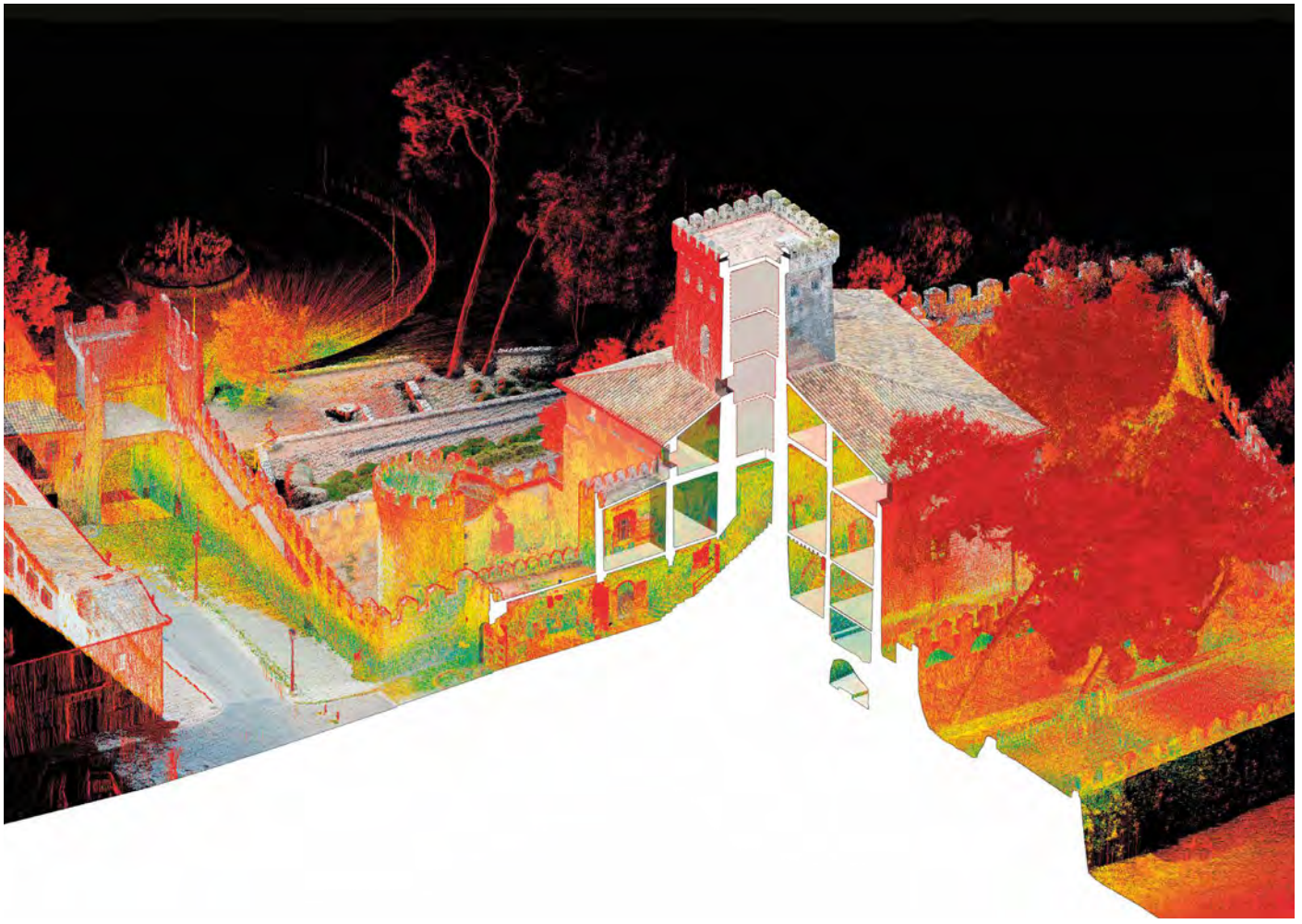


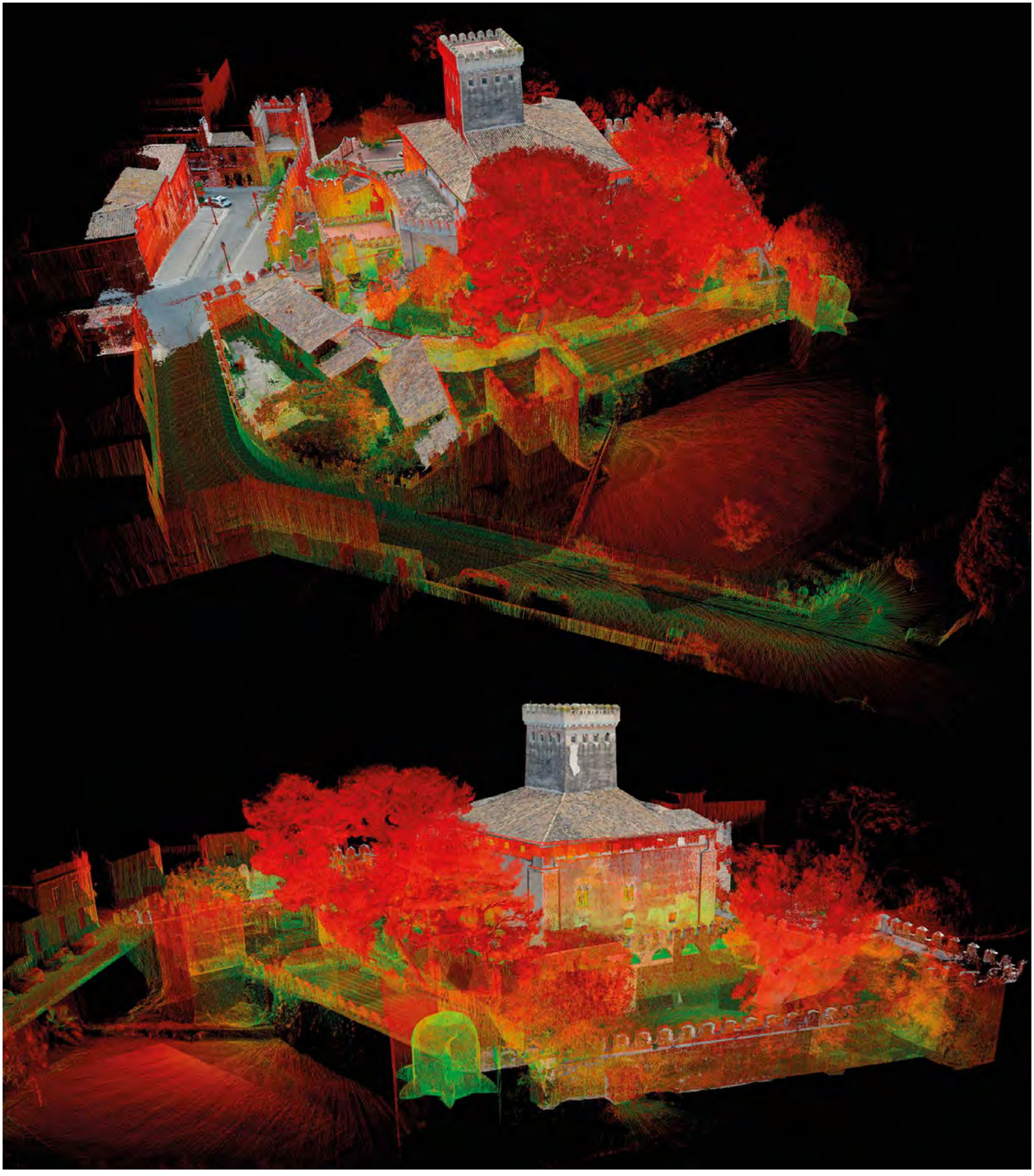
Fig. 10
Reading the Castle in Section
Axonometric cutaway view of the multi-source point cloud, illustrating the spatial complexity of the castle. (Drawing credit: Alberto Pettineo)

Side page, Fig.11
3D Database
Visualisations of the integrated 3D point cloud from UAV, and mobile mapping systems.

To achieve an adequate level of metric and colorimetric accuracy for each fortified element of the castle, a data acquisition methodology was defined, utilising SLAM-based LiDAR equipment integrated with UAV systems and DSLR cameras, leveraging image-based acquisition principles[6].

The castle was divided into macro areas to establish an organisational structure of the various environments, useful for the construction of a comprehensive digital archive. To gain an overall view of the external fortified space and relate it to the internal environments[7], a mapping of the entire complex was carried out using mobile LiDAR. The connection between the inner and the external spaces was ensured through the creation of linking pathways. Additionally, a mapping of the surfaces was integrated using image-based acquisition techniques, through: (i) UAV systems at a territorial scale to provide an overview of the surrounding area and capture the roofs, which were unreachable from the ground; (ii) DSLR cameras for detailed mapping of the main internal and external facades.

[6] Picchio, La Placa, Galasso, Dell'Amico, Fu, Porcheddu, Ricciarini (2025), *Metodologie integrate di rilievo per la documentazione di spazi urbani, da luoghi marginali a modelli dinamici di reuso*, pp. 244-255.
[7] The interior space was only partially captured due to the inability to access the upper rooms of the central tower, as they were closed to the public. However, this did not limit the overall understanding of the fortified space.



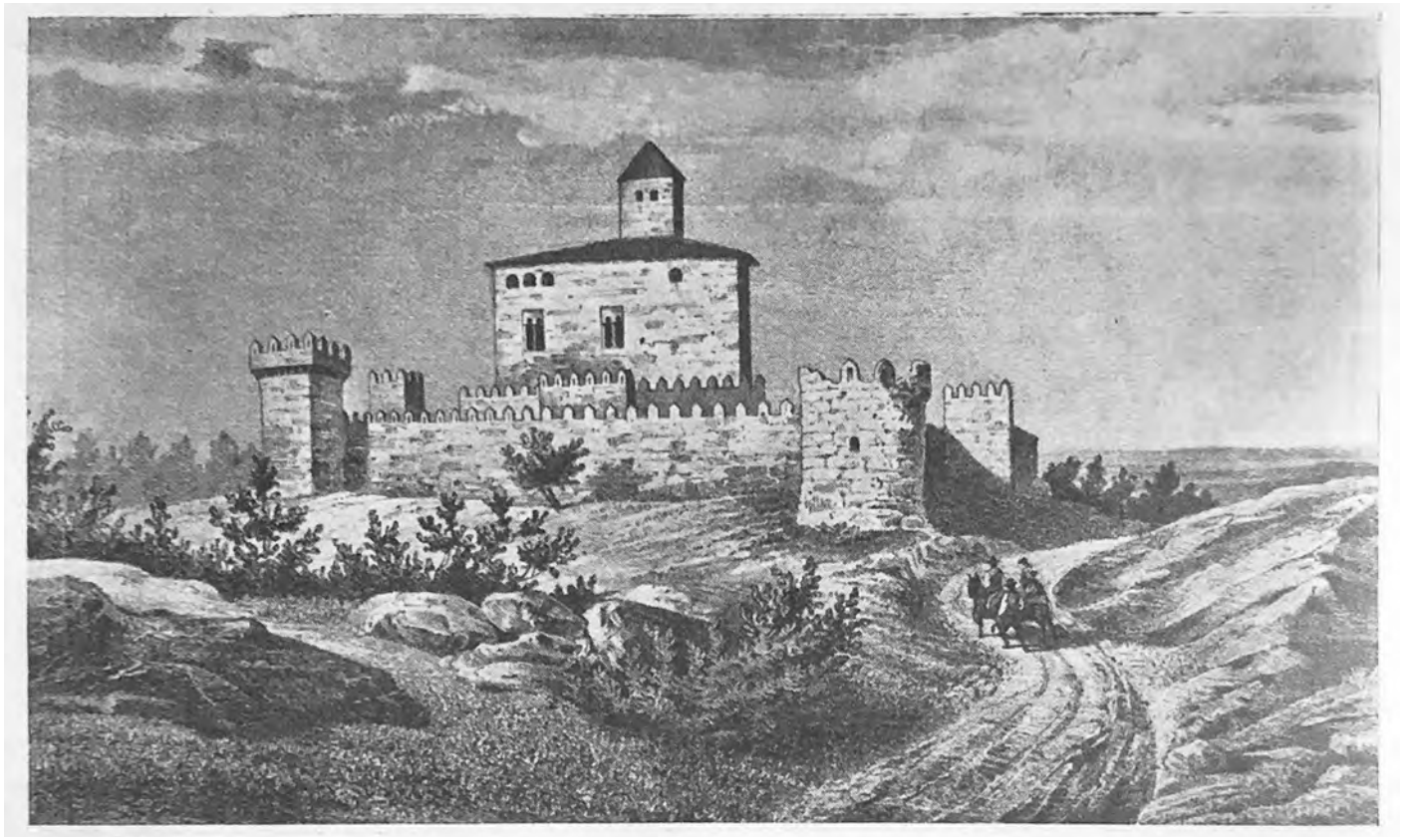


Fig. 12
A Romantic vision of Benissanó
View of Castle in an engraving by Isidoro Salcedo y Echevarría, from *Castillos y Tradiciones Feudales de la Península Ibérica*, José Bisso, 1870.

The breakdown into macro areas enableb the efficent use of the acquisition equipment and facilitated the creation of a comprehensive surface mapping, capable of describing the state of preservation and the structure of each area. The 3D database obtained from the developed methodology allows for the analysis of the complex from a different perspective, facilitating the understanding of the relationships between the various environments and between the construction elements. The accuracy of the metric data was ensured by mapping through LiDAR[8], proving effective for the mapping of the fortified complex. This aids in the analysis of the descriptive elements for the preservation of the Castle's image and the development of virtual systems for enhancing the complex within the Cultural Route. The management of data from the survey campaign and the organisation of information to create tools for digital access and understanding of the site are part of the activities outlined in the project[9].

The structuring of a data discretisation system, to reduce and manage the complexity of not only the morphological context but also the real-world context, produces a model-structure from which guidelines can be drawn to generate a cataloging and archiving system for the data and elements comprising the structure. Through the creation of a digital archive, it has been possible to preserve the current image of the castle along with its complex relationships with the surrounding landscape and the other sites of the Route.

[8] The average deviation of the photogrammetric data is 1-2 cm compared to the Mobile data in the integrated database.
[9] Picchio, Meseguer, Gonzalez, Valldecabres, Pettineo, Dell'Amico., Fu, Galasso (2024), *Repositorio 3D para la puesta en valor de la ruta cultural de Jaime I en Valencia*, pp. 299-309.

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