

## **MACHINES FOR THINKING AND BODIES TO PRESERVE. EXHIBITION PROPOSAL FOR THE VENICE NATIONAL ARCHAEOLOGICAL MUSEUM**

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### **Abstract**

The essay describes the first results of a biennial research project that focuses on the survey, digitization and restitution of the statues preserved at the Venice National Archaeological Museum.

The focus is particularly on Roman copies of Greek originals that have undergone extensive restorations since the second half of the sixteenth century, in order to document their transformations in multimedia installations that guide the visitor in understanding and reading the works, with the aim of integrating them in a temporary exhibition and in the new museum set-up scheduled for 2022.

### **Keywords**

Digital Exhibit, Statues, Restoration, Structure from Motion, 3D Animation

### **1. Introduction**

Among the effects of the Covid-19, widespread on a global scale, the containment strategies triggered by the sanitary emergency led to the complete closure of several cultural sectors, or an intermittent access to them for just a limited number of persons. Now more than ever, the access to knowledge confronts us with the double nature required by the *presence* or *distance* from which we can enjoy them.

Museums are at the center of a wide debate that precisely regards the meanings of the term *openness*, meant in its broadest sense and ascribable to institutional places, to be considered both as anthropic spaces of the direct experience and in their re-enactments mediated by digital devices.

In the spring of 2020, the visitor's impossibility to physically interact with the artworks has led to a rapid development of communication projects implemented on websites, to increase the online archival resources, to disseminate information in social networks, to propose numerous virtual visits in order to promote the right to knowledge (Balboni Brizza, 2006).

In his letter to former premier Giuseppe Conte, Salvatore Settis described museums as *irreplaceable sources of cultural nourishment*,

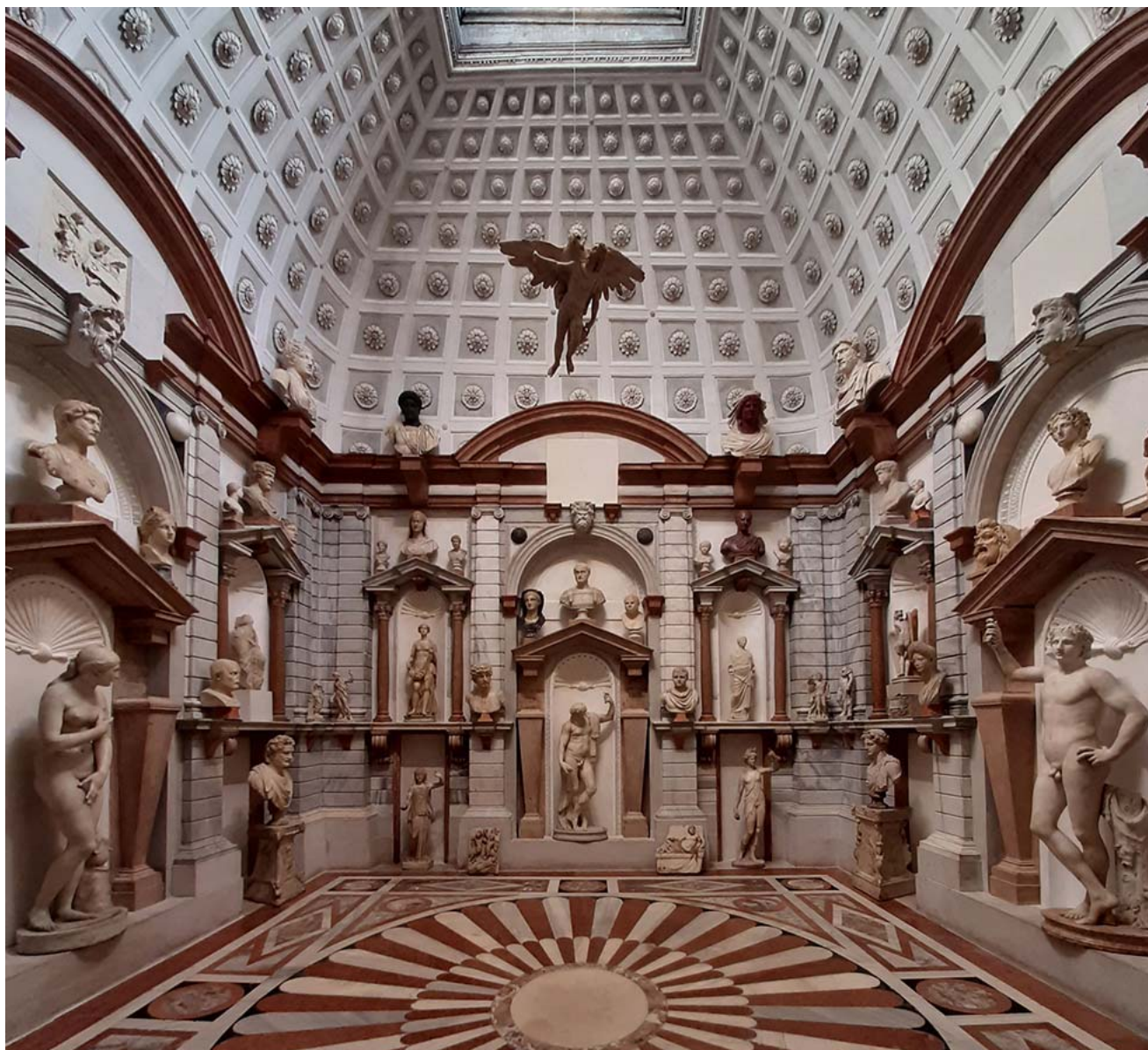
arguing that it is precisely in times of crisis that the need for culture, beauty and the revival of memory become determining factors.

The following essay starts from his call and the definition of the museum as a «machine for thinking, the sign and symbol of a society that does not merely survive itself but frequents the past to create the new» (Settis, 2020).

A past to be rediscovered, on which the designer Judith Schalansky also recently questioned, reflecting on the value of what can be forgotten or even buried in oblivion, as far as «the art of oblivion is something impossible, because all signs, even when they refer to something absent, make things present. [From this perspective, our museums cannot be reduced to mere] administrative cemeteries» (Schalansky, 2020), in which the preserved assets are set aside or, in the absence of space and plausible justification, placed in storerooms, but appropriately valorized because it is «the past that represents an authentic possibility space» (Schalansky, 2020).

It is precisely in this privileged dimension that digital technologies become necessary, to support new communication projects and enhance artistic and cultural heritage.

Despite the restrictions imposed by the pandemic, the close collaboration between the



**Fig. 1:** Tribuna of Palazzo Grimani, new exhibition set-up: *Domus Grimani 1594-2019*. The collection of classical sculptures reassembled in its original setting after four centuries. Museum of Palazzo Grimani May 7<sup>th</sup>, 2019 – May 30<sup>th</sup>, 2021. Photo by Gabriella Liva, Venice 2020. Direzione Regionale Musei Veneto, by concession of MIBACT

Università Iuav di Venezia and the Polo Museale del Veneto made it possible to develop a two-year research project focused on the in-depth study of the ancient statuary in the Venice National Archaeological Museum<sup>1</sup>.

The involvement of multiple stakeholders, in pursuit of the objective of protecting and promoting the available heritage, has guided the choice to focus on storytelling forms increasingly interrelated with digital technologies.

<sup>1</sup> *The Statuary of National Archaeological Museum of Venice. Digitization, graphic restitution, and display project.* Scientific directors: Massimiliano Ciammaichella and Monica Centanni; funded researcher: Gabriella Liva. Call 2019 and

The synergic collaboration between the competent authorities, experts and scholars involved in the project, allowed the experimentation of exhibition projects oriented to an enrichment of the information that can be experienced in the direct and indirect observation of the works exhibited in the museum.

The display of the collections, collected over the centuries, is based on a sense of identity based on a continuity with the past, providing – in

Call 2020, attribution research funds by DCP - Department of Architecture and Arts of Università Iuav di Venezia, and Polo Museale del Veneto. The project started in December 2019.

accordance with the Code for Cultural Assets (President of the Republic - Italy 2004) and ICOM Ethics Code<sup>2</sup> (ICOM 2004) – activities to promote the knowledge of the artistic and cultural heritage, ensuring the best conditions for the public use and enjoyment of the heritage itself, which has a fundamental educational role to play.

## 2. The Venice National Archaeological Museum

The current museum overlooks St Mark's square and preserves valuable Greek and Roman statues belonging to several generations of the Grimani family, whose spontaneous donation to the city, in the late sixteenth century, determined the institution of the Public Statuary, once oriented towards the *Piazzetta*.

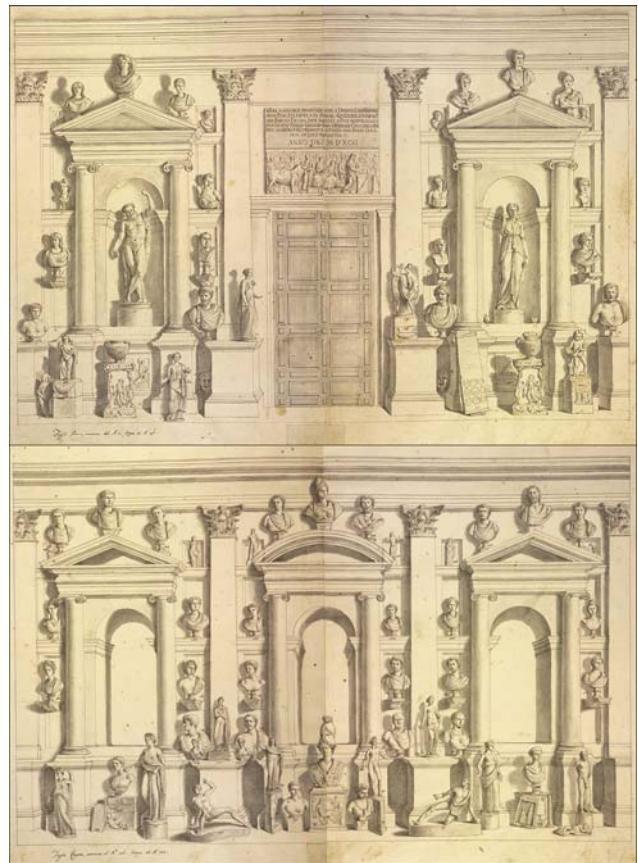
Domenico Grimani, cardinal since 1493 and man of great culture, loved to surround himself with works of art including statues. Following a violent illness in 1523 he decided to donate his entire private collection to the Venetian Republic, which kept only part of his bequest in the *Sala delle Teste* of Palazzo Ducale. But this exhibition space maintained its function until 1586, when it became the *Chiesuola della Signoria*, so the collection was returned to his nephew Giovanni Grimani, Patriarch of Aquileia, himself a well-known and esteemed collector of ancient works.

Inside the family palace, located in Ruga Giuffa near Campo Santa Maria Formosa, he set up a consistent series of statues in the cloister and in the rooms, but the most precious ones were placed in the so-called *Tribuna*, which is today restored and can be visited (Fig. 1).

In 1587 Giovanni Grimani met the Collegio dei Senatori to donate his entire collection of antiquities which was placed in the *antisala* of the Marciana Library (ASVe, 1587).

Designed by Vincenzo Scamozzi, the majestic space exhibited four walls full of busts, heads and statues arranged on the floor or distributed on brackets at different heights, as can be seen from the observation of the custodian Anton Maria Zanetti drawings (Fig. 2), contained in a small volume edited by the librarian Lorenzo Tiepolo (Tiepolo, 1736).

Just in occasion of the Public Statuary inauguration, some works that presented lacerations or removal traces were restored by the



**Fig. 2:** Anton Maria Zanetti il Giovane, *Statuario Pubblico della Serenissima*, entrance wall, Venezia, Biblioteca Nazionale Marciana, Cod. It. IV, 123 (10040).

artist Tiziano Aspetti, after the will of Giovanni Grimani himself.

Following the death of the latter, which occurred in 1593, the completion of the exhibition project was entrusted to the de supra prosecutor Federico Contarini who, in 1597, opened the Statuary to the public attracting the curiosity of many Italian and foreign visitors.

In 1797, with the fall of the Republic and the subsequent entry of the French troops, the Statuary was closed and for over a century the sculptural heritage underwent substantial movements, in part justified to protect it from the world conflict.

On 23 December 1920 Vittorio Emanuele III assigned to the Ministry of Education the first-floor rooms of the Procuratie Nuove, to set there the National Archaeological Museum of Venice which was set up by the archaeology professor Carlo Anti, between 1923 and 1926 (Ravagnan, 1997).

being first adopted in 1986, and revised in 2004, the Code has been translated into 38 languages.

<sup>2</sup> The ICOM Code of Ethics for Museums sets minimum professional standards and encourages the recognition of values shared by the international museum community. After

After circa one century, nowadays, the museum has a similar configuration to that expected in the modernist period, highlighting the deficiencies due to an obsolete management and organization of the works, whose setting is inadequate to understand their meaning and transformations, starting from the Renaissance restorations onwards. In addition, lighting is inadequate and does not enhance the quality of the valuable marbles on display.

In view of these considerations, the Polo Museale del Veneto has launched an ambitious project of rearrangement that involves not only the relocation of the goods, according to criteria of thematic subdivision, but also the increase of an informative offer supported by digital systems.

The plan is to employ a properly designed and non-invasive technology, not to overcome the works on display, but rather to enhance their contents through specific video narratives.

The tools adopted do not replace the traditional visit and the observation of the statues in situ, but they enrich the direct experience in 360° explorations that highlight the single fragments and the transformations of the restoration interventions.

The strategic integration of traditional analog supports (such as captions, cards, and educational panels) with additional digital devices, multimedia stations, video projections, apps and systems connected to the institutional website, should be welcomed as an opportunity to facilitate the reading, and understanding of the works, in a perspective of inclusiveness aimed at facilitating access to knowledge.

### 3. *The statues restoration*

In Renaissance Venice, antiquarian culture, connected to a flourishing trade of art works from past eras, sparked considerable interest among the city's most powerful families. The pleasure of possessing and exhibiting valuable objects was not only a natural response to the desire to affirm one's social and cultural status, but also a sincere appreciation and recognition of the aesthetic value of the found objects (Findlen & Trabucchi, 2004).

It should also be added the families' farsighted attitude to pass on and safeguard to posterity the material wealth accumulated by generations.

Private collecting, from which came the subsequent public fruition, had as its center the humanistic little studio, a precious meditative

place conceived for cultural activity and storing the works of art.

The conscious choice to surround oneself with antiquities, which expanded from the secluded intimacy of a room to outdoor spaces, was appropriated by precise and well-thought-out criteria of arrangement: the groupings between related subjects, in harmonious distributions, were organized to create wall textures or cultural corridors of great visual impact. «The late Mannerist and later Baroque imagery loved this crowd of characters who animated the surfaces, who enlivened the gardens, who defined the very space and paths of the rooms and galleries» (Rossi Pinelli, 1986).

To this intensive arrangement of the ancient corresponded a natural tendency to reintegrate the fragmentary works that presented deterioration, subsidence and silting up, that happened one after another in the various historical periods.

The consolidated tendency not to touch the find and to keep it as it had been found, in the fifteenth century was progressively replaced by the passion for the completion and the unitary reconstruction of a partially lost image, grounding on iconographic sources or personal imagination. In particular, the fractured statues of the Grimani family were considered unfit for display in both a private and public place. So, a peremptory decision to intervene physically was taken, to integrate the precious marbles with prosthetics and additions, providing visitors with recognizable antiquities.

The completion modalities varied from purely integrative restorations to interpretative ones in which the lack of identification of the subject, represented by the owned fragment, implied the attribution of a new identity to be given to the whole artifact (De Paoli, 2004a).

Within Tullio Lombardo's workshop, between the fifteenth and sixteenth centuries, «the antique was first and foremost a period chronologically without internal partitions, an indistinct repertoire of suggestions and models from which to draw to define a modern style» (Rossi Pinelli, 1986).

The *Philiskos' Muse*, known as *Cleopatra*, a Greek work in white Pentelic marble from the II century BC, can be traced right back to the hand of Tullio Lombardo.

Having to reinterpret the image of a headless bust, now identified with the muse named Clio, the substantial intervention of completion generated a



**Fig. 3:** *Philiskos' Muse*, inv. 53, II century BC. Photo by Massimiliano Ciammaichella, Venice 2020. Direzione Regionale Musei Veneto, by concession of the Ministero per i Beni e le Attività Culturali e per il Turismo.

formal and iconographic transformation. This interpretative choice transformed the divine dancer into the queen of Egypt, in the moment of taking the poison (Fig. 3).

Equally significant are other metamorphoses attributed to the Renaissance sculptor Tiziano Aspetti, to whom, on the opening of the Public Statuary, we owe the merit of a work defined in the terms of an «Opera fatta diligentissimamente, et ben proporzionata all'antiquo» (ASVe, 1595). For 16 years he worked at the Grimani palace with the task of taking care of the ancient marbles and to him are due many actions of completion that, despite deviating from the classical philological restoration, were accepted, and appreciated.

The intervention on the Gauls, Celtic warriors hired for mercenary plundering between the III and II century BC, is exemplary in understanding how the past becomes a pretext to express the ability of the modern sculptor and to provide a

personal interpretation of the ancient, in terms of an accentuated formal dynamism that looks with admiration at the Greek Hellenism and his contemporary figurative culture. The body of the *Fallen Gaul*, reduced to little more than a torso with head, is completed by adding the arms, the entire right leg and part of the left leg, from knee to foot (Fig. 4).

The atypical pose that altered the primigenial anthropomorphic conformation, with freer and more dynamic movements that can be traced back to Mannerist art and Italian iconographic tradition, distorted a probable frontal and compressed posture, necessary for the exposure of the young warrior on the *anathemata*<sup>3</sup>.

At the beginning of the twentieth century, the alterations and additions made in previous centuries were questioned by the archaeologist Carlo Anti who, in his purist strategy of safeguarding the original model, be it Greek or Roman, was responsible for radical operations of mutilation and removal, attributable to modernist de-restoration (Anti, 1930).

In *Artemis on the march*, a Roman work from the half of the I century BC, the Renaissance addition of an ancient head to the headless body was judged to be of poor quality and not in line with the style of the statue itself. Therefore, Anti removed the head, now in the museum's storage room, and replaced it with a plaster one (Fig. 5).

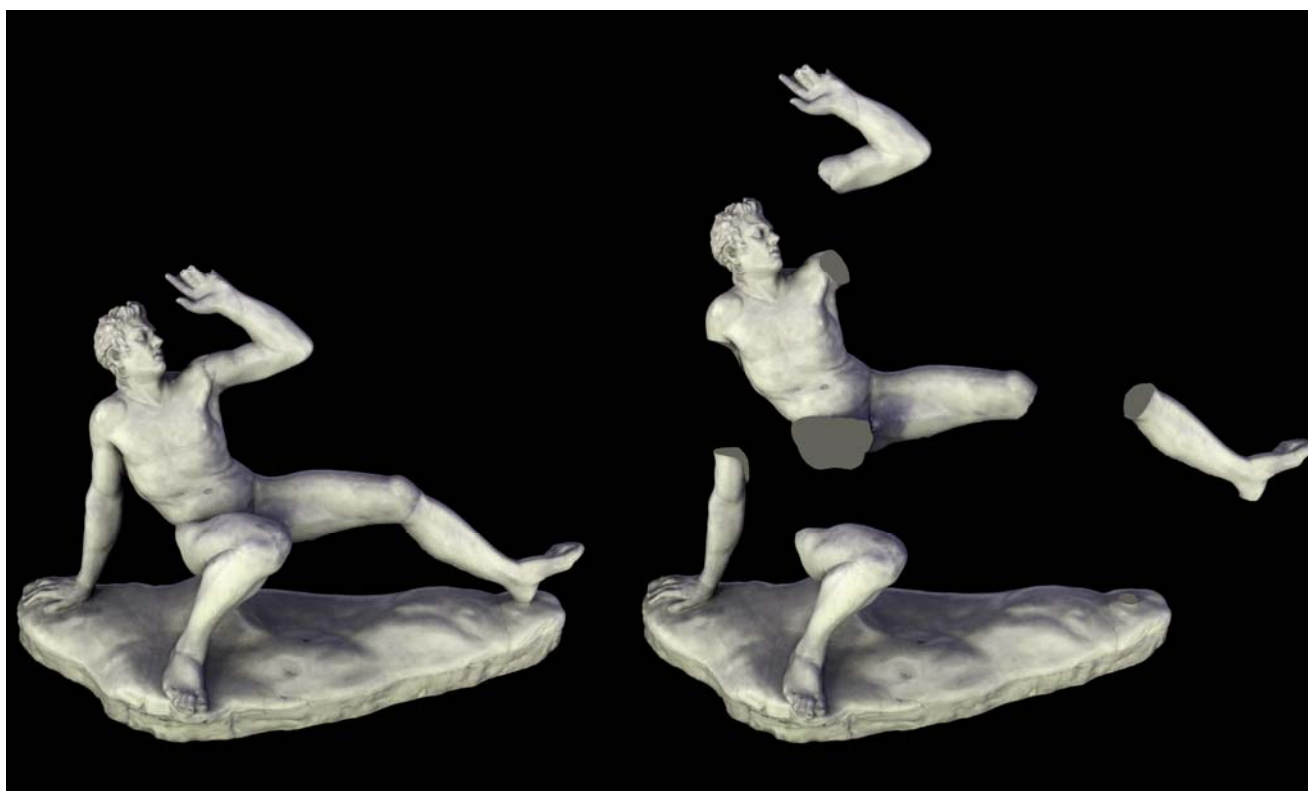
The examples here mentioned, among the most valuable artifacts belonging to the Venetian archaeological museum, are witnesses of secular stratifications and configurative alterations and deserve to be promoted and presented to the public in an updated museum fruition.

#### 4. Survey, restitution, and statuary digitalization

For the survey of the statues we employed indirect methodologies, i.e., digital photogrammetry, and software based on *computer vision* algorithms implementing *Structure from Motion*, to generate a numerical model mapped by an ultra-high-resolution texture, from a sequence of photographic images, in this case captured with a Nikon D800E full frame digital camera.

Given the anthropomorphic nature and the complexity of the geometric surfaces of the artifacts to represent, during the survey campaigns we tried to produce a very large

<sup>3</sup> Votive altar offered to the god in the form of thanksgiving or in the request to obtain a benefit.



**Fig. 4:** *Fallen Gaul*, inv. 55, original parts of the statue surveyed and reconstructed in *Agisoft Metashape Professional*, version 1.6.1, and elements decomposition. 3D modeling, and rendering by the authors, 2021.

number of images, so to ensure the best results in the recognition phase of the homologous points coordinates, present in multiple pairs of frames that determine the correspondences necessary to the *multi-stereo matching* interpolations (Stylianidis, Georgopoulos, & Remondino, 2016).

Several studies have demonstrated the effectiveness of these techniques, even comparing them with other indirect procedures, such as those offered by 3D laser scanning or optical sensors that are embedded in today's smartphones, which are effective when entire portions of the artifacts to be detected are occluded by the proximity of a wall, making it almost impossible to intervene with bulky instrumentations (Al Khalil, 2020). This is the case of the *Philiskos' Muse*, whose small size and height of 110 cm ca. conditioned the choice of surveying the back parts with the camera of an iPhone 6s<sup>4</sup>, then integrating the images with photographs taken with the full frame digital camera.

In general, for all the case studies mentioned above, the impossibility of obscuring the rooms to uniform the light diffusion with flash lamps,

determined the choice of operating with a 24 mm lens because it was more suitable to focus the marbles' shiny surfaces, such as those of the three Gauls, whose reflections were reduced to a minimum by the arrangement of black fabric panels that could be oriented in different ways.

Around the statues, 34 survey stations were traced, distributed around an ideal circumference at 1.5 meters ca. from the barycenter of the basements, and then photographs were taken from 5 different heights, to increase the amount of information in the alignment of the single photographic images, from which the spatial coordinates were deduced using multi-stereo matching software<sup>5</sup>.

In the camera calibration phase, contextual information was excluded from the calculation, isolating the survey objects by tracing easily selectable clipping masks, thanks to the use of black back panels.

The next step in the workflow is camera alignments, to identify the centers and directions of projection useful for building dense point clouds and the mesh surfaces that interpolate them.

<sup>4</sup> Focal distance: 4 mm, lens length: 35 mm, exposure time: 1/33 sec., images resolution: 4032 x 3024 pixel.

<sup>5</sup> *Agisoft Metashape Professional*, version 1.6.1 build 10009 (64 bit).



**Fig. 5:** *Artemis on the march*, inv. 59, half of the I century BC. Photo by Gabriella Liva, Venice 2020. Direzione Regionale Musei Veneto, by concession of the Ministero per i Beni e le Attività Culturali e per il Turismo

Only and exclusively for the small head, once mounted on the headless statue of *Artemis on the march*, the very small dimensions favored the use of a 50 mm focal lens.

The find was laid down on a soft support covered with black fabric and the consistent sequence of 285 photographic shots, taken at 80 centimeters ca. from the surfaces, made it possible to generate an accurate numeric model of the prototype to be compared with the geometry of the stone body that once housed it (Fig. 6).

Finally, we focused on the survey of the statue of *Ulysses* because it was the protagonist of an exhibition curated by the authors and the subject of a conservative restoration at the Museum of Cycladic Art in Athens, where it is currently displayed. Its return to Venice, however, is scheduled for the end of 2021.

The statue is 105 centimeters ca. tall and, until a few months ago, was positioned on a pedestal in the center of room VIII. The freedom of spatial movement around it made it possible to locate 25



**Fig. 6:** Small head once mounted on the headless statue of *Artemis on the march*. Survey, and reconstruction in *Agisoft Metashape Professional*, version 1.6.1. 3D modeling, and rendering by the authors, 2021.

survey stations, positioned on a circumference of 210 centimeters ca. in diameter, and to acquire a total of 222 frames from seven different heights (Fig. 7).

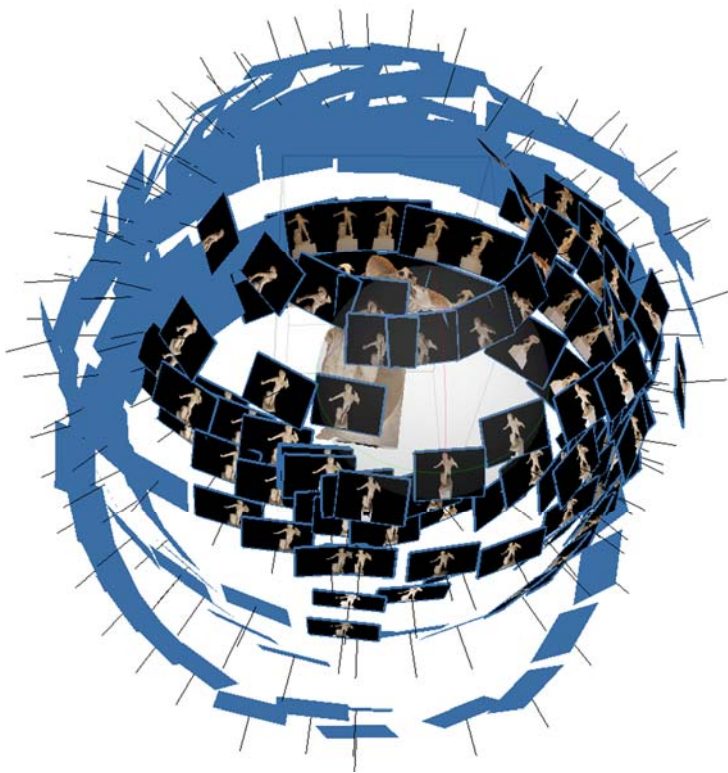
Also, for the *Ulysses* statue the application of digital photogrammetry reproduced a virtual clone, mapped by an ultra-high-definition texture.

The numerical model obtained has been elaborated in a 3D modeling software<sup>6</sup>, in order to identify the discontinuities signs due to the renaissance restoration interventions. The digital anastylosis processes, which in this case concern the separation and reconstruction especially of some fundamental anatomical portions, involved a complex work on the mesh surface.

Observing in detail the sequence of triangular faces that delimit the artefact, evident anomalies, ascribable to the numerous fractures, have been found in the dense distribution of the single geometric elements. These signs have been identified and redrawn not only on the three-

<sup>6</sup> *Cinema 4D*, version R19.

dimensional model, but also in its plane readjustment, thanks to the *unwrapping* techniques.



the left hand, the lower edge of the short chlamys, part of the left leg and some patches scattered on the body.



**Fig. 7:** *Ulysses*, inv. 98, II century AD. Photos alignment and construction of the dense point cloud, elaboration in *Agisoft Metashape Professional*, version 1.6.1. 3D modeling, and rendering by the authors, 2021.

A double control on the three-dimensional shape and on its visualization in the plane has reduced the margin of error in the operations of tracing, selection, and consequent section of portions of mesh.

The final digital decomposition has favoured a greater reading and critical analysis of the original archetype borrowed over time (Fig. 8).

## 5. *Ulysses*

The *Ulysses* statue belongs to the Domenico Grimani collection and is a Roman copy of the II century AD of a proto-Hellenistic model, perhaps attributable to the III century BC (Favaretto & Traversari, 1993). The small sculpture was exhibited in its fragments until 1586 in the *Sala delle Teste* of Palazzo Ducale and, later, on the occasion of its transfer to the Public Statuary, Patriarch Giovanni Grimani decided to entrust Tiziano Aspetti with the task of restoring it.

The completion intervention, documented by the same sculptor, included the right arm with the hilt of the sword, part of the scabbard of the latter,

The anatomical shape and the freedom of movement given to the torso with head recalls, by similarity, the restoration carried out on the *Fallen Gaul*, corroborated by the fact that Aspetti reconstructed the image not of the Achaean hero, but of a gladiator.

Critics agree that the Roman statue is a representation of Ulysses, partially covered by a short cloak wrapped around his body, with a relief clasp showing the Athena profile.

Perhaps it was part «of a group depicting the Greek warriors' expedition on the Troy acropolis to steal the sacred simulacrum of the goddess from the Athena sanctuary» (De Paoli, 2004b).

Like in the Grimani *Ulysses*, or the *Ulysses' head* belonging to the *Polyphemus Group* at the National Archaeological Museum of Sperlonga, or the statue of *Ulysses below the ram* at the Torlonia collection, the iconography identifies the Greek hero with precise physiognomic characteristics that include a bearded face, half-open lips, and a wavy hair whose curls are covered by the typical pileus, a cap worn by sailors or travelers.





**Fig. 8:** *Ulysses*, inv. 98, II century AD. Sections and *unwrapping* of mesh surface, elaboration in *Cinema 4D R19*. Digital elaboration by the authors, 2021.

As it happened for *Cleopatra*, or for the *Fallen Gaul*, the choice of the restoration preserves the doubt on the conscious will to provide the recovered fragment with a new identity.

Certainly, Renaissance inherited numerous interpretations, even contradictory, around the mythological figure of Ulysses, who raised interest and curiosity, to the point of appearing in many texts from the classical age to the Middle Ages<sup>7</sup>.

The Odysseus *polytropos*, a fortunate Homeric epithet associated with a multifaceted character, far from the aristocratic models embodied by Achilles and the protagonists of the Trojan War, is presented with an extremely versatile character, also with a negative meaning.

But his actions, as ambiguous as sublime, will make him both a subtle deceiver, far from the noble warrior virtues, and an astute and ingenious man, deeply earthly, who will be rewarded with the return to his native island after years of wandering (Calzecchi Onesti, 2020).

The protagonist of *nostos* in Ithaca, a metaphor for travel, nostalgia, and separation, becomes the hero of the *mad flight*, a feat that fades the image of the fraudulent advisor that Dante meets in the

VIII *Borgia infernale*, described in the XXVI *Canto dell'Inferno*.

The supreme poet delivers to humanism the extraordinary portrait of a solemn and curious soul, starting from Latin sources, Ovid first of all.

In the XIV *Metamorphoses* book, Laertes' and Anticlea's son exhorts his travel companions not to stop in front of uncertain navigation (Bernardini Marzolla, 2015).

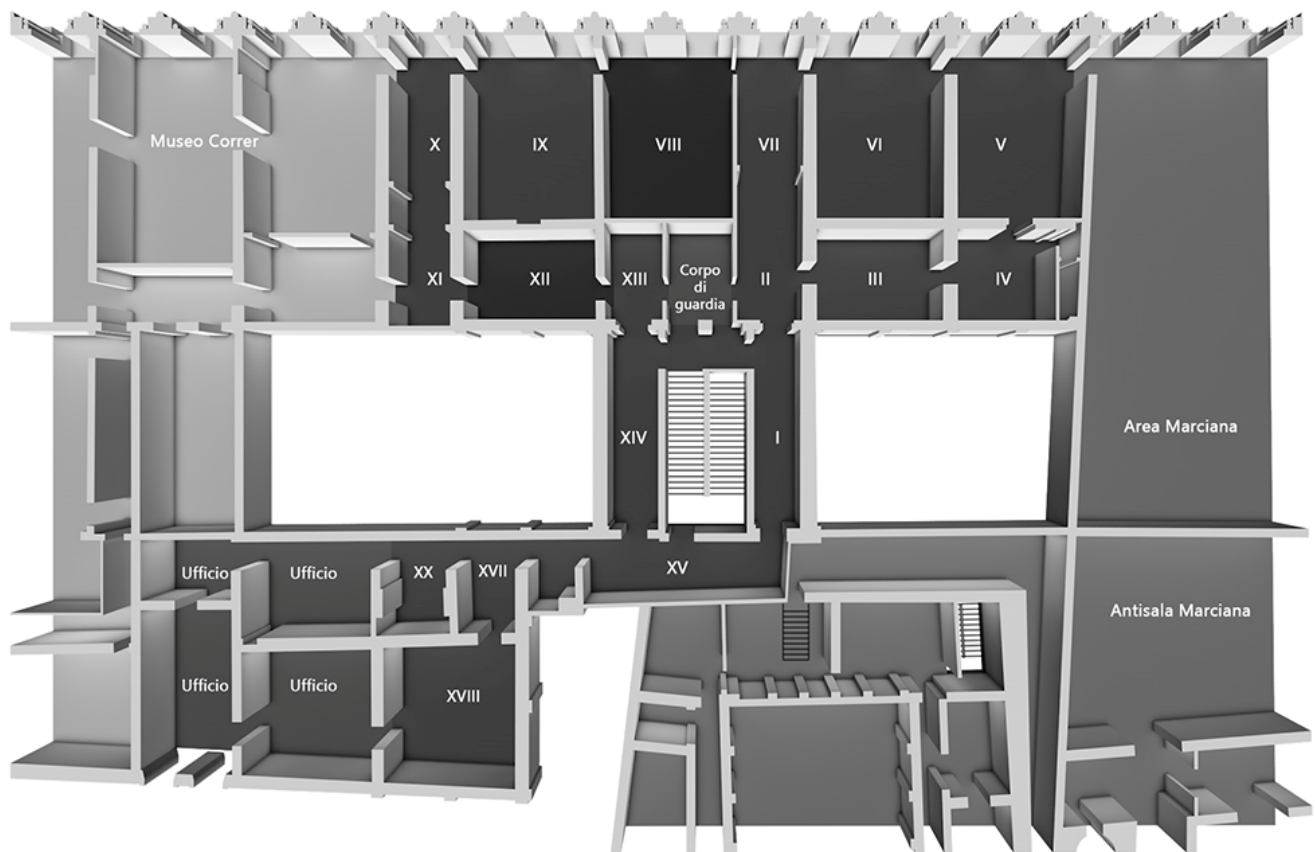
It will be precisely the unknown destination that will suggest to Dante, centuries later, a tragic ending with a Christian meaning.

The Latin Ulysses is transfigured by the medieval theological conception: the ancient model, to whom great genius is acknowledged, remains victim of his own knowledge pride. It is not the deceptions perpetrated by his cunning that condemn him, but the insatiable desire to exceed the limits imposed on human knowledge.

In his final epiphonema addressed to travel companions: «fatti non foste a viver come bruti, ma per seguir virtute e canoscenza» (Bosco & Reggio, 1990), he embodies and anticipates the modern man who dedicates his existence to an insatiable thirst of knowledge.

<sup>7</sup> The Ulysses figure appears in classical Greek and Latin literature, such as in the Sophocles and Euripides tragedies, in Virgil's *Aeneid* and in Ovid's *Metamorphoses*. Dante did not

draw directly from the Homeric poem, but referred mainly to Ovid for the interpretation of Ulysses within the *Divine Comedy*.



**Fig. 9:** Gabriella Liva, plan reconstruction of the Venice National Archaeological Museum, with the distribution of rooms. 3D modeling and rendering, 2021.

In the XVI century, Ulysses represented the Renaissance ideal influenced by the reading of Homer, Ovid, and Dante's exegesis (Picone, 1991), but Tiziano Aspetti saw in the surviving marble not Ulysses but of a gladiator advancing with suspicion.

This interpretative choice contrasts with some features of the find at its initial state, probably represented in a defensive posture: the left arm ready to cover his face, as in the kneeling nude warrior of the Torlonia collection, and the signs of a prop in the lower abdomen suggest that the weapon was not facing upwards but directed towards the body (De Paoli, 2004a).

The Grimani's *Gladiator-Ulysses* was kept until November 2020 in room VIII of the Venice National Archaeological Museum, but it is currently part of a temporary exhibition at the Museum of Cycladic Art in Athens<sup>8</sup>, which led all the actions of handling, travel, and statue restoration, as a function of the exhibition.

For this reason, the Venetian museum has given the research group of the Università Iuav di Venezia the opportunity to design an exhibition dedicated to the Ulysses valorization and, more generally, to formulate multimedia installations proposals to implement in the new museum exhibition planned for 2022.

#### 6. *Temporary installations and strategies for museum display*

The temporary transfer of the Ulysses statue made us reflect on the testimonial value of a presence evoked by its storytelling rather than leaving the visitor disappointed in confronting its absence, testified by a photographic image and an information sign, as it is unfortunately often found in several museums.

Hence the need to design an installation in room XII, which will become the place designated for temporary exhibitions dedicated to the research upon some works, as the final stage of a

<sup>8</sup> *Antiquarianism and Philhellenism: The Thanassis an Marina Martinos Collection*, curated by: Dr Fani Maria Tsigakou, Art

Historian; Professor N. Chr. Stampolidis, Director of Museum of Cycladic Art.



**Fig. 10:** Installation in room VIII dedicated to *Ulysses* statue, inv. 98, II century AD. White box and video projection by Joan Porcel. Concept, and design curated by the authors, 2021.

path constrained by the chronological circularity according to which the collections of the archaeological museum are currently distributed (Fig. 9).

Among the precious finds exhibited in room VIII and raised by wooden plinths painted white, the three Gauls positioned at the center frame an empty pedestal which the visitor is invited to approach.

A white parallelepiped, whose horizontal surface is replaced by a projection screen, activates a film made by the photographer and video maker Joan Porcel documenting the departure of the *Ulysses* statue and its arrival at the Athens Museum (Fig. 10).

Continuing the visit, we find its re-enactment in room XII, dedicated to it. Access is allowed to small groups of a maximum five people, through an opening filtered by long velvet curtains. A Dolby Surround 5.1 audio system<sup>9</sup> has been installed on the top of the walls. From different points, it broadcasts short monologues recited by four actors in circular sequences that place them in a diachronic dialogue, substantiated by the reading

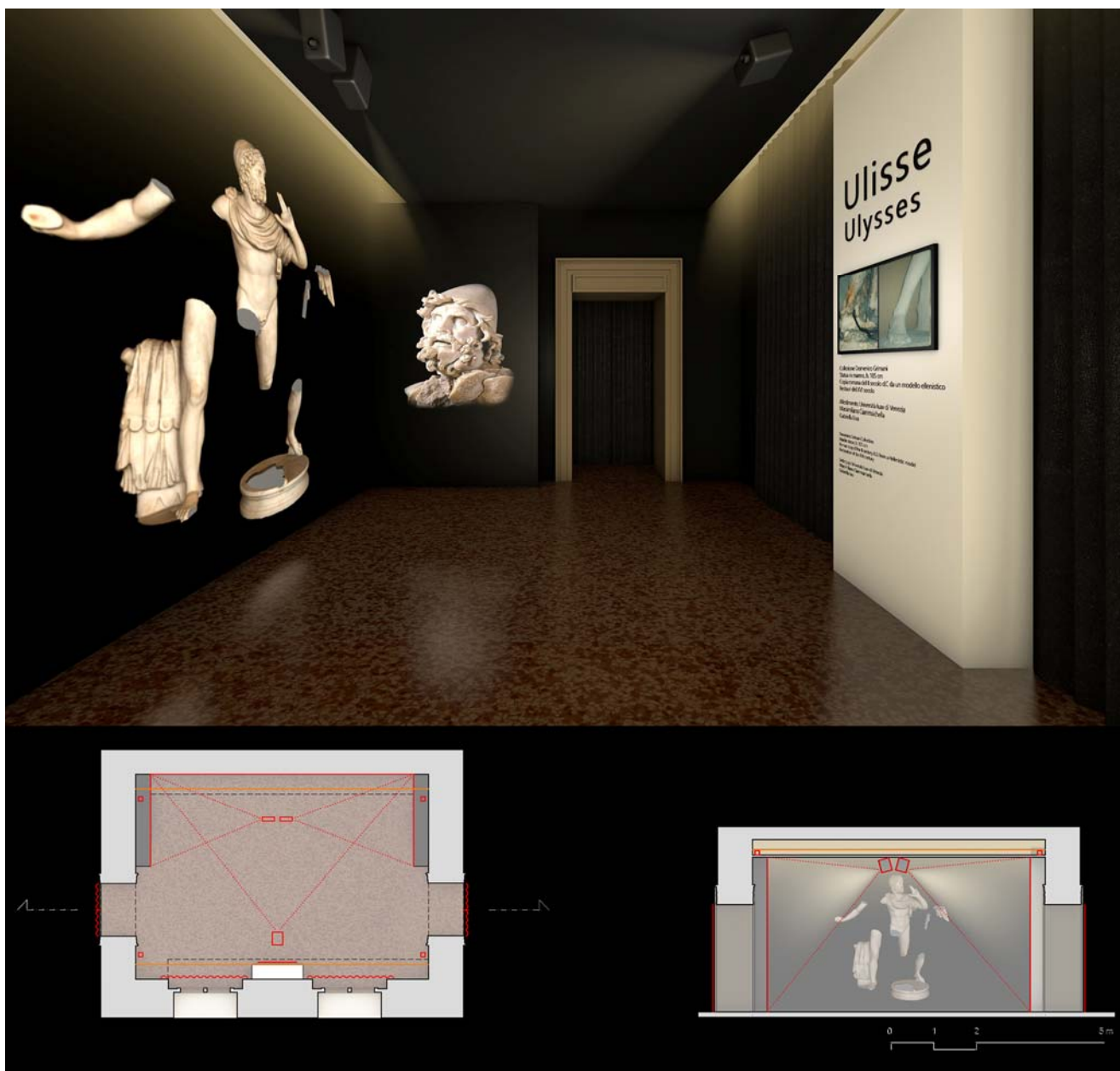
of famous literary texts centered on the *Ulysses* myth. A white totem, housed between the two darkened windows, contains a small monitor that documents on video the cleaning and restoration operations of the statue, together with graphics containing textual indications about the work and the authors of the installation.

The other walls are completely painted with *immersive black max contrast* paint, to accommodate morphing video projections of a statues' repertoire depicting the Achaean hero and exhibited in the world's most important museums.

The longest wall, however, is dedicated to the Grimani's *Ulysses*, whose 3D model, obtained from the survey campaign, is slowly rotating in a loop that disassembles its limbs to highlight the integrations occurred during the centuries-old restorations.

Although the increase of multimedia tables and multitouch screens documented in exhibitions (Mandarano, 2019), for safety reasons due to the current sanitary condition we chose to design multimedia content whose interaction involves only sight and hearing (Fig. 11).

<sup>9</sup> Logitech Z906 5.1: Dolby Surround audio speaker system, THX certified, Dolby e DTS, 1000 Watt, multi-device.



**Fig. 11:** Installation in room XII dedicated to *Ulysses* statue, inv. 98, II century AD. Concept, and design curated by the authors, 2021.

More generally, as far as the new museum exhibits is concerned, the desire to redistribute the works by thematic nuclei, and not according to the chronological order imposed by Carlo Anti in the 1920s, has highlighted the need to dedicate an entire room to an in-depth study of fragmentary Roman antiquities, object of study for the artists who portrayed them and, in some cases, intervened with completion operations at the request of collectors and patrons. Thus, a section of room VI will be dedicated to the Renaissance

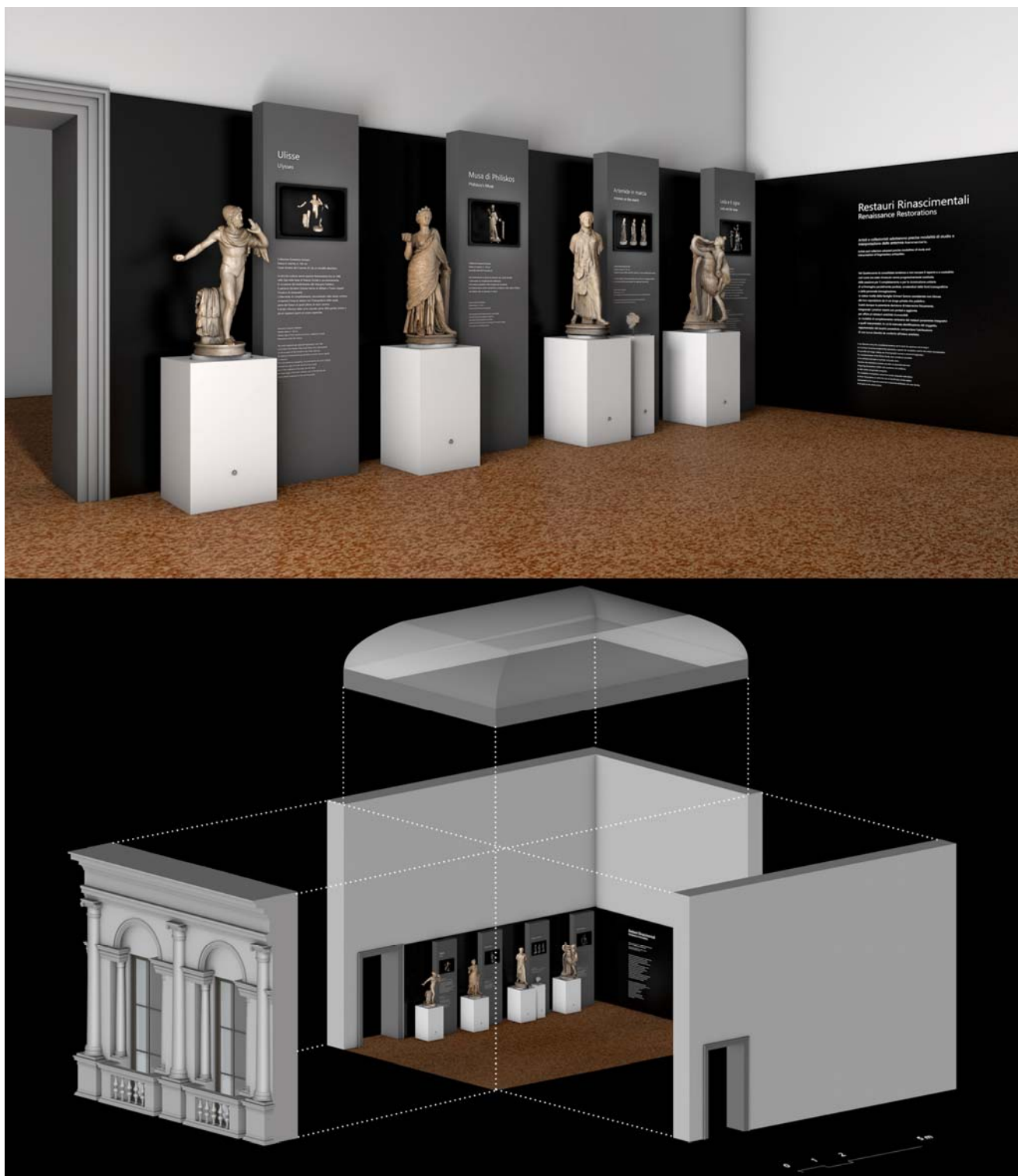
restoration of some valuable specimens already mentioned above.

Our proposal is to display the small statues along a wall, raised by motorized rotating pedestals that are activated by optical sensors, placed in the bases, whenever the visitor is at 1.3 meters ca. from them. This makes it possible to appreciate these precious objects in their entirety, grasping their details, their workmanship and to identify integration and joining signs, with the support of digital screens showing the 3D

animations of the models obtained from the surveys, in a game of disassembly and reassembly of the elements that follows the circular movements imposed by the direct and close observation of the works on display (Figs. 12-13).

### 7. Conclusions

Indirect survey methodologies, typical of digital photogrammetry with algorithms for multi-stereo matching, have proved to be valid aids for the restitution and study of statuary. In particular,



**Fig. 12:** Installation in room VI dedicated to Renaissance restorations. Concept, and design curated by the authors, 2021.

the possibility of mapping three-dimensional models with ultra-high-resolution textures has allowed to identify in detail the integration signs due to the restoration interventions, subdividing the single elements by means of cutting operations on the mesh surfaces, assisted by the *unwrapping* techniques that allow to visualize on a flat digital surface the direct correspondences between the numeric model and the image projected on it.

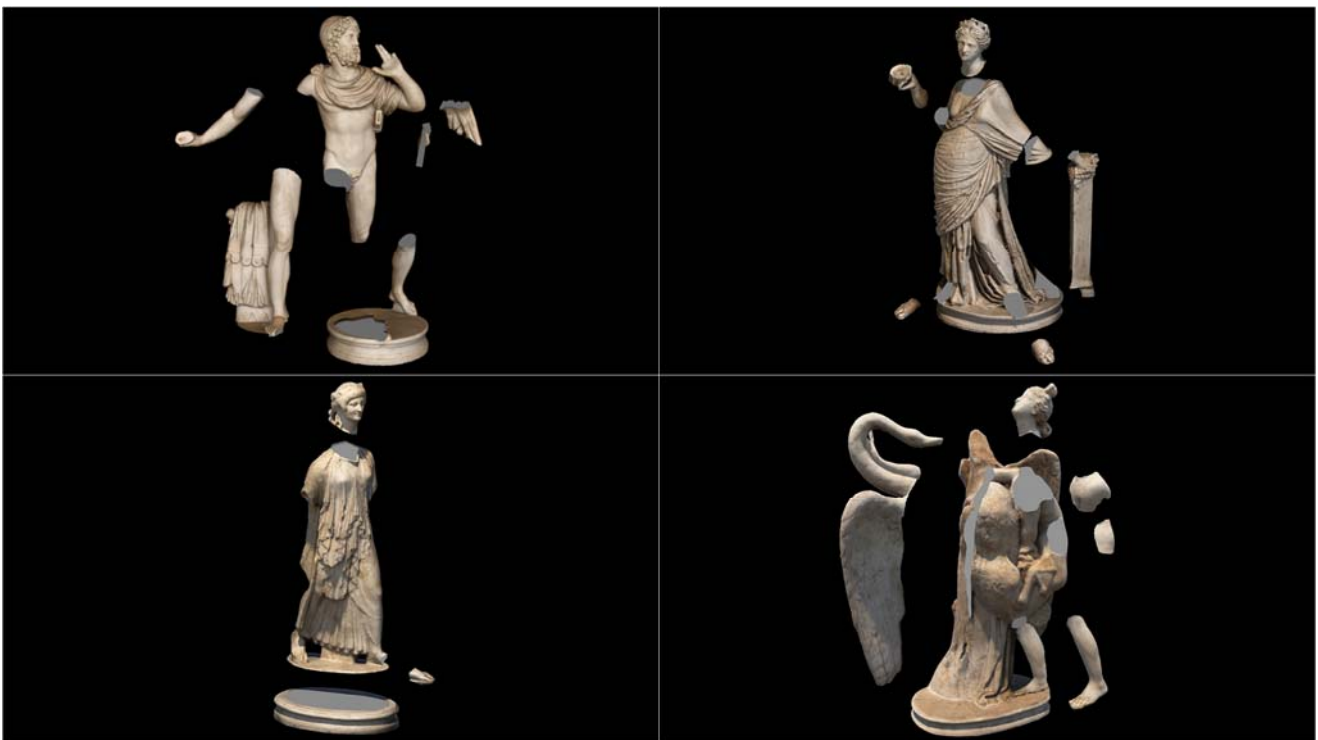
The resulting polylines have been interpolated into as many polygonal discretizations that determine the physical limits of the breaking and rejoining surfaces.

The results achieved present a clear and wide multidisciplinary character because they involve the practices of the now accredited *virtual restoration* – even though it has been initially opposed by those who did not recognize its

potential (Moschini, 2001) –, they belong to survey and representation knowledge and they are open to the cultural dissemination facilitated by video narratives that accompany the individual works.

Finally, the digital clones produced can be harbingers of other exhibition configurations, for example in a possible video mapping that virtually repositions them inside the Marciana Library *antisala* where the first Public Statuary was located, currently unadorned, or in prototypes made with 3D printers that repopulate the cloister, the rooms and the *tribuna* of Palazzo Grimani.

These are just some of the possible scenarios that consider museum spaces as places where to experiment with digital technologies; «the challenge to face is, therefore, to use objects not to consolidate visions but to give mobility to representations of the world» (Colombo, 2020).



**Fig. 13:** Video animations frames showing the elements decompositions of statues: *Ulysses* statue, inv. 98, II century AD; *Phyliskos' Muse*, inv. 53; II century BC; *Artemis on the march*, inv. 59, half of the 1 century BC; *Leda and the Swan*, inv. 30, II century BC. 3D animations by the authors, 2021.

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