CONCHA:

report of the underwater field missions on Santiago Island, Cape Verde (April 2018 to January 2019)

Lisbon, January 2020

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Report Datasheet

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Abstract

This report presents the results of the underwater archaeology works conducted between April 2018 and January 2019 by CHAM - Centre for the Humanities, the Instituto do Património Cultural (IPC) of Cape Verde (Cultural Heritage Institute) and Éveha International, under CONCHA Project and UNESCO Chair “The Ocean’s Cultural Heritage”.

An underwater assessment was made on São Francisco and *Urânia* wreck sites and on Cidade Velha anchorage site, all on the Santiago Island. The documentation of the wrecks São Francisco and *Urânia* was made through direct observation, video, photography and photogrammetry. In Cidade Velha, a survey and general characterization of the surface remains on the anchorage was carried out. Photogrammetric recording was also used in two areas with a concentration of surface materials (Area A and Area B) and in two probable shipwreck contexts. The mission also included the general inspection of the archaeological materials recovered from these sites at the Archeology Museum in Praia. Dissemination activities were also developed targeting local school’s audience.

The archaeological survey in Cidade Velha allowed to map evidences related to port activities, of different types and chronologies. A small fragment of a wooden ship was identified (Cidade Velha 1). A group of iron guns, already referenced, was also relocated (Cidade Velha 2). The analysis of São Francisco and *Urânia* wrecks revealed archaeological deposits characterized mainly by large pieces of iron, cannons, anchors or ingots.

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1. Introduction

Started in 2016, the UNESCO Chair “The Ocean’s Cultural Heritage” aims to interconnect several disciplines of the humanities, focusing on the history of the ocean and its cultural heritage, especially in the early modern period. The Chair is based on the establishment of a network of Institutions across the Atlantic, including researchers, heritage managers and students, enabling them to share experiences, materials and knowledge through the development of research, education and awareness raising activities.

Among the Chair partners are CHAM and IPC. Both have defined as a fundamental action the study and promotion of the Cape Verde underwater cultural heritage, namely through the development of the underwater archaeological inventory of that archipelago. The development of this action began in 2018 under the project CONCHA: an EC funded staff exchange project, based on CHAM (NOVA FCSH—UAc, Lisbon, Portugal) that joins around 50 researchers from 11 partner institutions from Europe, Africa and the Americas. CONCHA’s main goal is to address the different ways port cities developed around the Atlantic during the early modern period in relation to differing global, regional, and local ecological and economic environments. Speaking to different literatures on port cities in the Atlantic, material and immaterial culture, and environmental history, CONCHA aims to produce an Atlantic history of seaports in which the ocean – its ecosystems and species – is included as a dynamic player.

The first underwater archaeological mission carried out in Cape Verde in the scope of CONCHA was conducted in Santiago Island, in the anchorage site of Ribeira Grande (Cidade Velha), home to one of the first European occupations in sub-Saharan Africa, an essential port for slave trade in the Atlantic in the early modern period and a UNESCO World Heritage Site since 2009. The mission also included a survey in São Francisco wreck, dated from the second half of the 17 century, the oldest wreck known that has been subject of works in the archipelago (Smith, 2002; D´Oliveira, 2005: 55-58), and in *Urânia*, wrecked in 1809 (D´Oliveira, 2005: 90-91) (Fig. 1).

Three archaeological missions have been developed. The first between 17 April and 2 May of 2018; the second between 1 August and 5 September of 2018 and the third between 26 January and 10 February of 2019. Besides the underwater surveys, the project also included the review of the documents and artefacts previously

recovered from these sites, on deposit at the Archaeology Museum in Praia. Dissemination activities were also developed, for school public, and training activities. This report presents and systematizes the results of these works.

Fig. 1 – Location of the surveyed sites.

2. Framework

Located in the Middle Atlantic, the Cape Verde archipelago is formed by ten volcanic islands about six hundred kilometres off the coast of West Africa. The archipelago was discovered by Portuguese navigators in the 15th century. Settlement started from 1460s on the largest island, Santiago. Two captaincies were founded: Alcatraz and Ribeira Grande, both in coastal areas with easy access by sea[1].

Alcatraz, the northern captaincy was located in the bay of Nossa Senhora da Luz, in the eastern part of the island, but had an ephemeral occupation[2]. The city of Ribeira Grande, the southern captaincy, was located at the south end of the island, at the mouth of a watercourse (*ribeira*). It remained the main European establishment until the 17th century, when the population and economic activities were progressively transferred to the city of Praia, also on the south coast of the island (Silva, 1998).

Ribeira Grande was the first Portuguese overseas city. Head of diocese, it had all the administrative institutions of the Portuguese Crown[3] and soon became an important slave trading post. By the end of the 16th century the city had 500 neighbours and over 5000 slaves, who lived in modest huts of perishable materials. The city also had a floating population of merchants, a large urban group in the 16th century, which began to decline only in the early years of the 17th century, when the importance of trade with Guinea diminished (Torrão and Teixeira, 2009: 4-6).

Sailing between Africa and America numerous ships touched Ribeira Grande port with European products. These products and other manufactures from the islands were then exchanged in the Guinean rivers for slaves. For example, caravels from Portugal, including Madeira, and the Canary Islands, came to Cape Verde to buy salted goat meat, then introduced into commercial circuits with Sao Tome and Brazil, and sold

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[1] Valentim Fernandes, in the 15th century refers that the Island has two captainces (Ribeira Grande e Alcatraz) and good ports; however none of them is mentioned. Brásio, António Pe., org. 1958. Monumenta Missionaria Africana. Segunda série, vol. 1, África Ocidental (1342-1499). Lisboa: Agência Geral do Ultramar, p. 742 [Consulted: URL:http://hdl.handle.net/10451/34738. Last consulted 02-01-2020].

[2] Alcatraz captaincy began to be abandoned in the early 16th century and its inhabitants moved to Ribeira Grande or Praia.

[3] See, for example, the letter from 1580, written by Father Frutuoso Ribeiro on his way to Angola. “The city of Cape Verde, even though small has the entire city government…” (free translation) Brásio, António Pe., org. 1953. *Monumenta Missionaria Africana*. *Vol. 3, África Ocidental (1570-1599).* Lisboa: Agência Geral do Ultramar, p. 187 [Consulted: URL:http://hdl.handle.net/10451/34722. Last consulted 02-01-2020].

in return flour, wine, vegetables and nuts (Torrão and Teixeira 2009: 7-8). Spanish ships serving Sevilla based merchants docked to acquire slaves for the American continent, namely Cartagena de Indias, one of the ports of entry on that continent (Torrão and Teixeira, 2009). The islands of Cape Verde also played an important role as a geographical reference in transoceanic navigation (Duncan, 1972).

The geostrategic position of the islands in the transoceanic trade routes explains the frequent loss of vessels of different nationalities in the archipelago and the importance of the underwater cultural heritage of the archipelago. The interest in these underwater remains came early, with more than a dozen initiatives in press news or publications (D'Oliveira, 2005: 138-156).

The first exploration permits took place in the early twentieth century, until about the independence of the country in 1975, a time also marked by the recovery of materials at various sites. Little information was recorded about the contexts intervened, the recoveries made and the destination of the artefacts recovered. Nevertheless, press news were very common (D´Oliveira, 2005: 137-139). The exploration of a shipwreck in Ponta do Leme Velho, Island of Sal, was also the theme of a documentary in RTP, the Portuguese national television channel (Fig. 3). A collection of Portuguese faience and other materials from the same wreck, dated from the end of the 17th century, ended at the Portuguese Centre for Underwater Activities (CPAS) in Lisbon (Gomes et al., 2014).

Since its independence, the Cape Verdean state has received proposals for research on several islands, some of them from known salvages explorers in various countries. In 1980, Robert Marx made a request. The agreement of this work would result in the sharing of half of the identified artefacts with the company Phoenician Explorations, but the exploration was never carried out. In the same year Robert Sténuit made a request to recover artefacts from two specific shipwrecks: one from the reign of Louis XIV and another from the Dutch East India Company (VOC), missions that were also unsuccessful (D'Oliveira, 2005: 139; Tavares, 2017: 68). In the following years proposals continued to emerge, most notably were those made in 1984 by World Wide First, represented by Franck Goddio and Edmound Balm, who submitted an exploration request for the *Naarden* (1623), *Conception* (1625) *Dromadaire* (1762), *Leyjmuden* (1770), *Hartwell* (1787) and *Lady Burgess* (1806) wrecks. This company intended to locate two more shipwrecks, one south from Santo Antão Island and another near Cidade Velha in Santiago Island. In return the company committed the

training of one conservation professional and two local divers, which also didn't happen (Tavares, 2017). At the same time a possible contract was negotiated with Erick Surcouf, that defined the share of the recovered artefacts, the execution expenses and the counterparts for Cape Verde government that once again included the training of one conservation professional and two divers[4].

Fig. 2 – Images from the RTP programme *Sabe o que há no fundo do mar?,* episode 9, from 1974.

[4] *Proposta contrato a celebrar entre o Governo da República de Cabo Verde e Erick Surcouf*. Consulted in the archive of the Archaeology Museum in Praia, Santiago island.

The first effective concession happens in 1993, focusing on some of the long-coveted wrecks. The South-African company Afrimar was licensed to explore *Hartwell*, *Santo André*, and *Leijmunden*, where it recovered pottery, cutlery or weapons, for example (Tavares, 2017: 91). Between 1995 and 2001, Arqueonautas World Wide, a Portuguese company based in Madeira island, is granted a license to continue this work, extended to other islands. According to the data available in IPC and on the company's website, 71 underwater sites were identified, of which 11 shipwrecks and two areas in the Cidade Velha were partially excavated.

The available data on this intervention are deposited at the Praia Museum, including dive sheets, descriptions, conservation sheets, administrative and documentation inventories. On the island of Santiago, the intervention focused mainly in the Cidade Velha anchorage and on the wrecks of São Francisco and *Urânia*, but the list of intervened sites accounts for 71 areas, classified under the AGO-nomenclature, followed by a sequential number assigned by work zone. The sites verified in 2018/19 under CONCHA correspond to AGO - 030 (*Urânia*), AGO - 063 (São Francisco wreck) and the Cidade Velha anchorage, which received several numbers, corresponding to the various areas.

Despite the almost absence of publications, the legacy of this exploration definitely marked Cape Verdean archaeology, giving rise to the Archaeology Museum, the training of conservation technicians and an awareness of the importance of the archipelago's underwater cultural heritage. Today, Cape Verde has ratified the UNESCO Convention on the Protection of the Underwater Cultural Heritage and IPC is an active partner in international safeguarding and enhancement projects, creating the conditions for the development of archaeology and management of its / our underwater heritage.

3. The archaeological work

3.1 Goals and tasks

In a phase in which we have no data about the contexts presented on the three selected sites, the mission had as main objectives to delimit the extent of the sites, characterize their formation processes and date the deposition events that occurred there. Globally it was expected to end the investigation with a mapping of the areas already explored and with the characterization of the potential of the surrounding space.

This characterization, aims to determine the questions to be developed by a systematic analysis of these sites in the research framework of navigation in the early modern period and to define a monitoring and conservation strategy. These objectives included several phases and tasks, listed below for each site.

1 – Cidade Velha Anchorage site

a) Visual survey of the anchorage area, from the anchors known by the local divers and participants in previous works;

b) General characterization of the area through the mapping and photographic recording of the most important archaeological evidence identified during the previous phase;

c) Photogrammetric record of the most important anchorage or wreck contexts identified;

d) Recovery of the most relevant materials and at risk of destruction and loss;

e) Inventory and documentation of the recovered materials, including finds from earlier phases on deposit at the Archaeology Museum;

f) Analysis of the documentation related with previous works, in deposit at the Archaeology Museum.

2 – São Francisco wreck

a) Visual survey of the area with archaeological wreck remains;

b) Photogrammetric record of the remains;

c) Recovery of the most relevant materials and at risk of destruction;

d) Inventory and documentation of the recovered materials, including finds from earlier phases on deposit at the Archaeology Museum;

e) Analysis of the documentation related with previous works, in deposit at the Archaeology Museum.

3 – *Urânia*

a) Visual survey of the area with archaeological wreck remains;

b) Photogrammetric record of the remains;

c) Recovery of the most relevant materials and at risk of destruction and loss;

d) Inventory and documentation of the recovered materials, including from earlier phases on deposit at the Archaeology Museum

e) Analysis of the documentation related with previous works, in deposit at the Archaeology Museum.

3.2 Team and logistics

The diving team included seven archaeologists, six from CHAM and one from EVEHA, and the monitoring of IPC technicians, permanently from the conservation technician José Lima.

Site relocation and April dives were also guided by Emanuel Charles de Oliveira and Alexandre Semedo (Table 1). Besides these participants the several missions counted with the support of elements from the Maritime Police and the Coast Guard that crewed the several vessels mobilized.

José Bettencourt	Archaeologist	CHAM	Responsible for intervention, GIS, photography and documentation systematization
Patrícia Carvalho	Archaeologist	CHAM	Field work and field data processing

Inês Coelho	Archaeologist	CHAM	Field work and field data processing
Tiago Silva	Archaeologist	CHAM	Field work and field data processing
Gonçalo Lopes	Archaeologist	CHAM	Field work and field data processing
Cristóvão Fonseca	Archaeologist	CHAM	Field work and field data processing
Christelle Chouzenoux	Archaeologist	EVEHA	Field work and field data processing
Dúnia Pereira	Archaeologist	IPC	Field work monitoring
Jaylson Monteiro	Archaeologist	IPC	Field work monitoring
José Lima	Conservation technician	IPC	Field work monitoring
Emanuel Charles de Oliveira	Diver	-	Field work during April mission – relocation and georeferencing of the archaeological sites
Alexandre Semedo	Sailor	-	Monitoring of diving works

Table 1 – Participants in the works.

The logistic base of the field works was at the Archaeology Museum, where the diving equipment and archaeological record material was stored. Tanks rental and refills were hired with Divecenter Santiago, Tarrafal, and Atlanticus Diving, Praia.

Diving operations were supported by several vessels provided by Cape Verde Maritime Police and Coast Guard, including the marine patrol vessel *Djeu*, in the field works in São Francisco wreck (Fig. 4). Noteworthy was the good articulation and environment generated, essential to the success of the mission (Fig. 5). The remaining record equipment used in field works, namely in photogrammetric mapping is described in Table 2 (are not include the personal diving and nautical equipment's).

Fig. 3 – Patrol vessel *Djeu* during April 2018 mission, on São Francisco wreck site.

Type	**Brand**	**Model**	**Main technical features**
Record	Canon	Canon EOS 7D	Camera, reflex and digital video, with Tokina lens of 10-17 mm
Record	Aquatica	A7D	Underwater housing for Canon EOS 7D, equipped with 2 Ikelite flashes
Record	Nikon	D300	Digital reflex camera withTokina lens of 12 mm
Record	Sealux	CD300	Underwater housing for Nikon D300 equipped with 2 Ikelite flashes
Record	Garmin	GPSMap 78	Portable GPS with underwater housing and antenna
Record	Canon	G12	Digital Camera
Record	Ikelite	-	Underwater housing for digital Camera Canon G11
Record	Ikelite	160 movie	2 underwater flash for cameras and video lightning

Table 2 - Equipment used in field works made available by CHAM.

Fig. 4 – Team involved in field works in Cidade Velha Anchorage in April 2018.

3.3 Methodology and description of the works developed

Analysis of the archives and archaeological materials on Praia Archaeology Museum

The assessment of the underwater archaeology archive in Cape Verde was limited to the data and artefacts related to the sites surveyed in the scope of CONCHA, currently in Praia Archaeology Museum, Santiago Island.

The archive concerning underwater archaeology corresponds to several files with administrative documentation and copies of the conservation sheets of the recovered artefacts by Arqueonautas S.A. company.

These artefacts received an alphanumeric code concerning the island, the surveyed area and a sequential number. Among others, the codes AGO-025, AGO-048, AGO-050, AGO-051, AGO-052 and AGO-054 correspond to finds from different areas in the anchorage site that are particularly interesting; the code AGO-030 to materials from *Urânia* and the code AGO-063 to artefacts from São Francisco wreck. Some of the catalogue numbers correspond to groups with more than one artefact.

It was also viewed the documentation (paper) recently delivered by Arqueonautas S.A. to the IPC, that included dive sheets, maps or inventories of the finds from the various contexts, as well as historical data on shipwrecks. A digital copy was made.

Some artefacts from the selected sites are on display at the Archaeology Museum, but most of the finds are in the storage area at the same museum. As part of the collection was sold, no systematic inventory of these materials was made. However, a sample of the different groups was cataloged and recorded by photography, drawing and photogrammetry. The results of this study are presented in the respective subchapter of chapter 4 of this report.

Visual survey of Cidade Velha Anchorage site and global mapping of the remains

The survey was carried out in several missions, between April and August 2018 and February 2019, and allowed to characterize the area in front of the city, where most of the remains are concentrated, either according to the data from previous phases, either according to the results of our work. It was also carried out a transect to the west, to Ponta Grande da Cidade, where the remains of a wreck were relocated. This area was also surveyed by Arqueonautas S.A., under the code AGO - 038.

Fig. 5 –Location of transects made in 2018 e 2019.

The work carried out was essentially non-intrusive, adopting the same methodology that we have used in other Atlantic sites (Bettencourt, 2017). Divers location and finds were recorded in geographical coordinates (WGS 84, decimal

degrees). The GPS was carried on the surface on a board and synchronized with the camera (Fig. 6). Transects were then downloaded in gpx format and introduced into the GIS project, where the photos were georeferenced and, therefore, also the position of the underwater finds.

A selective recovery of artefacts was made and included a large earthenware bassin, an olive jar and an African pot. These artefacts are currently deposited in the Archaeology Museum in Praia city under desalination. The position of these materials was made following the same methodology as described above, but also through the photogrammetric record of the areas where they were located, where anchors remain, allowing to relocate their original position with precision. The description of the methodology used in these surveys will be made below.

Fig. 6 – View of the diving survey at *Urânia* wreck site, with the board carrying the GPS.

Photogrammetric record in Cidade Velha (CV1, CV2, Area A and Area B)

In addition to georeferenced photos and finds, in Cidade Velha four areas were recorded by photogrammetry: two wreck sites (CV1 and CV2) and part of two anchorage areas (Area A and Area B), located in Fig. 7. The photogrammetric surveys consisted of photos taken with a Canon EOS 7D digital camera, with a 10-17mm Tokina lens, with the zoom off, but in autofocus at a more or less constant distance. Several corridors were made at a constant speed, with overlapping photographs ranging from 60 to 80%. The CV1 model has 71 photos taken at an average elevation of 1.42 m, covering an area of 25.7 m²; CV2 has 368 photos taken at an average altitude of 2.56 m, covering an area of 334 m²; the survey of Area A corresponds to 989

photos taken at an average altitude of 2.76 m, recording an area of 873 m²; Area B has 990, taken at an average altitude of 2.76 m, corresponding to an area of approximately 1250 m^2.

These models were oriented based on 1 m^2 steel grids, leveled at the extremity of the areas to be recorded. Depths were obtained with a digital depth instrument. The control point's position was obtained in the GIS, based on a orthophoto georeferenced taking in consideration the finds positions obtained during the survey. The limits of the areas shown in Fig. 7 are approximated.

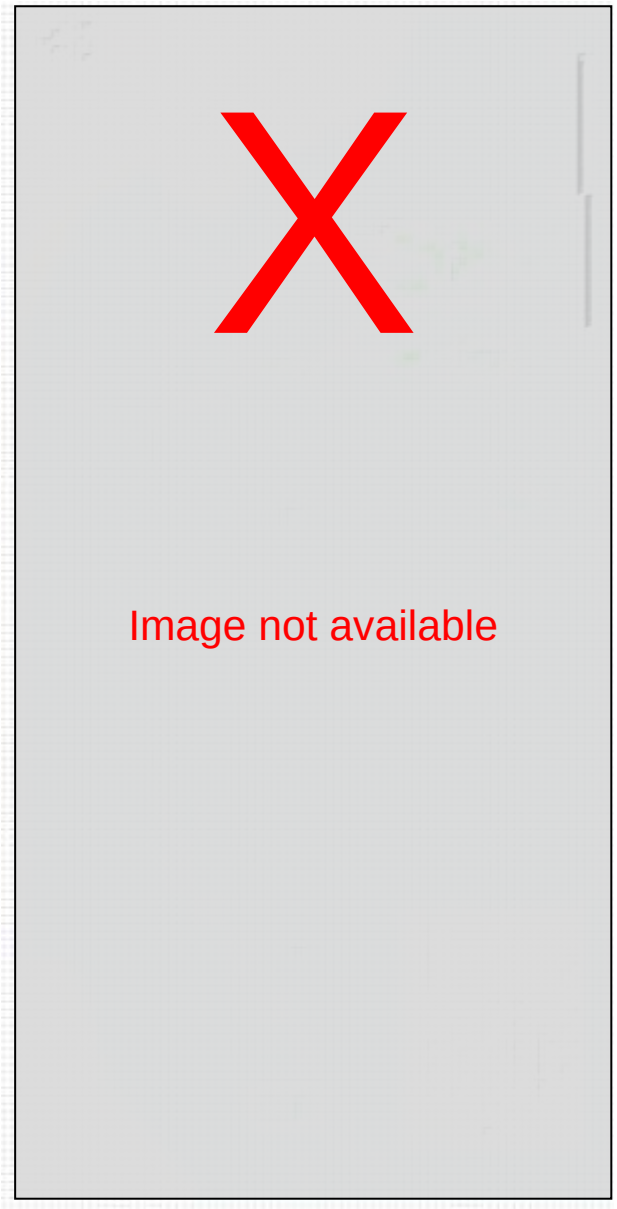

Fig. 7 – Cidade Velha – Location of the wrecks (CV1 e CV2) and areas with larger concentration of surface materials.

Mapping and photogrammetric record of São Francisco wreck

The mission on São Francisco wreck was particularly challenging. The site is located on a coast exposed to great wave energy and with difficult access, 11 miles from the port of Praia. However, it was possible to assess the archaeological remains in April 2018 because the Coast Guard made available the patrol vessel *Djeu*, which proved to be an adequate logistical base for interventions in these types of contexts. The site was then visited twice more, in August 2018 and February 2019.

The location of the remains identified in São Francisco wreck was made with a GPS, with a precision of ±6 m, carried on the surface on a board and synchronized with the camera. As on Cidade Velha, transects were then downloaded in gpx format and introduced into the GIS project, where the photos were georeferenced and, therefore, also the position of the relevant materials (anchors and canons), in geographic coordinates (WGS 84, decimal degrees).

The site was also recorded through several photogrammetric surveys. The first was made in April 2018, including the acquisition of 329 photographs, in 3 corridors. The second photogrammetric coverage was performed in August 2018, including 1,080 photos, at an average altitude of 3,87 m, covering 529 m². Finally, the third was obtained in February 2019, corresponding to 669 photographs, at an approximate distance of 2,3 above the remains, covering an area of 335 m².

The first model was not oriented, serving only as a reference for work planning. The others were oriented based on steel grids with 1 m^2, levelled at the extremity of the areas to be recorded, for which depths were obtained with the digital depth gauge.

The depth of those models, to the Hydrographic zero, was calculated by correcting the value obtained with the digital depth gauge applying the rule of twelfths over the tide predictions of the Praia buoy, from the Buoy Network of the Hydrographic Institute (http://www.hidrografico.pt/). The orientation was carried out by correcting the magnetic north reading obtained with a compass, taking into account the declination value for the island of Santiago calculated in March 2019 (-9.4º). The control point's position was obtained in the GIS. The absolute precision of the coordinates obtained on the model should be ± 6 m. The relative accuracy is the same as the 3D model, centimetre.

Mapping and photogrammetric record of *Urânia* wreck

The position and photogrammetric record of the remains identified at *Urânia* wreck site followed the same procedures adopted in the other areas surveyed and described above. A georeferenced transect was made with a GPS, carried on the surface on a board and synchronized with the camera, that allowed to record the position of the canons and areas with large concretions.

The site was then recorded by photogrammetry, in August 2018, including 1742 photos, with a Canon EOS 7D and a Canon PowerShot G12, at an altitude of 2,8 m that covered an area of 639 m². The model was oriented through steel grids with 1 m^2, levelled at the extremity of the areas to be recorded, for which depths were obtained with the digital depth gauge. The control point's position was obtained in the GIS.

Photography and Video

In addition, photographs obtaining for photogrammetric processing, the remains were recorded in digital photography, in raw and / or jpg format, and video.

As we have seen, the photographs obtained during the survey were georeferenced by synchronizing the time of the photo with the time of the GPS, which allowed to extract and introduce its approximate position in the project's GIS, with a ± 6m accuracy, without any correction.

The original documentation is deposited at CHAM. A copy of the most important data is included with the report delivered to the IPC.

The GIS

Information management was carried out in a GIS project that includes, in this phase, several layers in vector format - the transects correspond to lines, the artefacts to points, the intervention areas to polygons.

These data allow the analysis of the sites and planning of future works. They will also be migrated to the Cape Verde Government's GIS project, allowing the implementation of monitoring plans. To do it, contacts have been established with Esri, responsible for managing Cape Verde Government's GIS project, during the mission carried out in February 2019.

Outreach and dissemination activities

Actions were also taken to outreach and raise awareness among the school public, which included a short presentation on the importance of archaeology and heritage, followed by practical activities and a guided tour of the exhibition at the Museum of Archaeology (Fig. 8).

An introductory workshop on underwater archaeology was also held, with the participation of technicians from various Cape Verdean Institutions, including the Maritime Police and the Coast Guard, and elements of diving centres.

Fig. 8 – Part of the outreach and raising awareness activities developed for the schools in the Museum of Archaeology in Praia.

The dissemination of the works was also ensured through social networks, with the publication of news on the IPC, CONCHA and UNESCO Chair “The Ocean’s Cultural Heritage” Facebook pages. The work was also covered by the written press and Cape Verde and Portuguese television.

4. Results

4.1 Cidade Velha

Ribeira Grande de Santiago (Cidade Velha) developed along a valley oriented north / south framed by steep slopes, which end in a basalt plateau. The main core of the city was implanted in the low zone, until the level of the 20 m, starting from the beach and around the short river course, that penetrated along the valley. (Fig. 9) This center would expand to the east, next to the sea, up to the height of 30 m, where the Cathedral was implanted. The steep of the slopes limited human occupation, standing out above this altimetry only the fortress of São Filipe, at the height of 90 m, on the east side[5].

The beach has also occupied a relevant place in port operations, being the only space on the city limits that allowed boarding and landing of small vessels, currently mainly coastal fishing boats. The anchorage was in front of the beach, to the South, being documented in diverse cartography, sometimes a little to the East, in front of Ponta da Sé or Ponta Lombéga (Barcellos, 1892: 31), where it was the fort of São Veríssimo, today in ruins (Fig. 10).

The location and operation of the Ribeira Grande anchorage are also found in the *Roteiro do Archipelago de Cabo Verde*, by Christiano de Senna Barcellos, from 1892. Wide, although very exposed to the winds from southwest to southeast, in the months of July to November, the port of Cidade Velha was then only frequented by coastal ships. The presence of irregular bottoms, with “ratos de pedra” (rock outcrops), required special attention in anchoring. The ships were to point to Ponta Lombéga with the ruins of the São Francisco convent, where they would find good bottoms, with between 6 and 15 fathoms deep (c.10.5 m to 26.5 m) (Barcellos, 1892: 31).

[5] Pires, F. de Jesus Monteiro do Reis, *Da Cidade da Ribeira Grande à Cidade Velha em Cabo Verde Análise Histórico-Formal do Espaço Urbano séculos XVI-XVIII*, 2004, Mindelo, quoted by Pavliuc, Tatiana, 2013, *Reflexo da cidade velha: arquitectura, património e turismo: o caso Cidade Velha em Cabo Verde,* Universidade da Beira Interior.

Fig. 9 – Cidade Velha beach, entrance to the port of Ribeira Grande de Santiago.

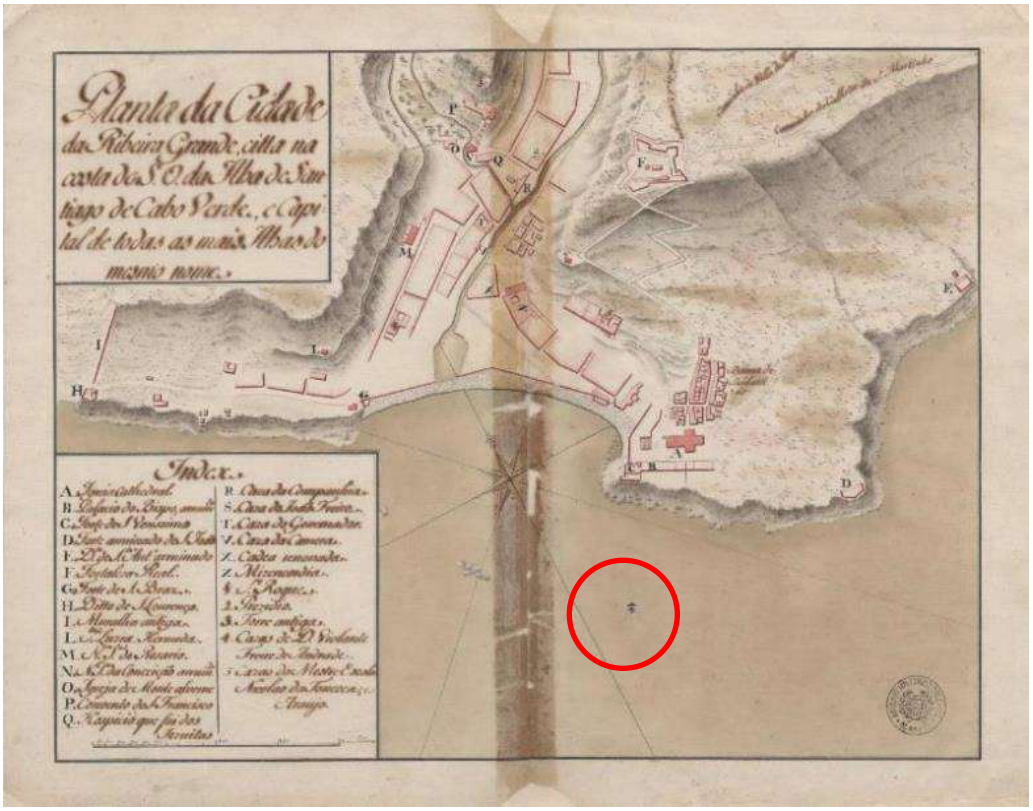

Fig. 10 – Location of Cidade Velha anchorage in *Planta da Cidade da Ribeira Grande* [..] from 1778[6].

[6] Planta da Cidade da Ribeira Grande… S.O. da Ilha de Santiago de Cabo Verde…[engenheiro António Carlos Andrea].-Escala de 2000 palmos.-[Cabo Verde] : [s.n.], [ca. 1778].-1 planta :

The survey carried out in 2018 and 2019 made it possible to confirm its scientific potential, which had been intensively explored previously, namely by the company Arqueonautas Worldwide, S.A., as we have seen above.

The area corresponds to a bottom of sand and gravel, from the beach until the depth of 25 m, between two rocky platforms. The depth in this area evolves rapidly, reaching 25 m just 400 m from the beach. The sandy area, with good anchoring conditions, reaches approximately 80 m in width, ending abruptly to the east and west on the rocky platforms constituted by volcanic drains, thus limiting and making operating conditions more difficult. The precautions mentioned in the description by Christiano de Senna Barcellos are evident; the accumulation of material of anthropic origin, namely ballast dumped by ships in transit, is also likely to cause changes in the depth of that space as well (Barcellos, 1892: 31).

In fact, the evidence recorded in front of Ribeira Grande appears mainly from 17 m deep.

The archaeological finds include iron anchors, of different dimensions, types and chronologies, deposited in the sandy bottom, but also on the rocky platforms that limit it, where they are sometimes embedded.

In the sandy area we can find surface materials, including the remains of a ship (Cidade Velha 1) and ceramics of various types. The ceramics are scattered, mostly in areas with more heterogeneous sediments, with the presence of gravel, blocks or even rocky outcrops, but with greater density in two areas (Area 1 and Area 2), partially recorded by photogrammetry (Fig 7, Fig. 11 and Fig.12).

The wooden ship Cidade Velha 1 (CV1) corresponds to three curved pieces that come together in a linear timber, also with structural functions, and that support the remains of planks and several iron supports (Fig. 13). This structure, with a north / northwest orientation, is 3.5 m long and 2.5 m wide.

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papel, color, ms. ; 34,6 x 43,6 cm. Anexo a AHU-CU-CABO VERDE, cx. 37, doc. 48-A, 9 e cx. 36. doc. 31 e 17, de 1778, Outubro, 6PT/AHU/CARTM/024/00123.

Fig. 11 – General distribution of the finds recorded by GPS in 2018 and 2019.

Fig. 12 – Cidade Velha 1 (CV1) ship from south.

The position of the planks and the shape and distribution of the fittings suggest it may correspond to the remains of part of a stern panel (*painel de popa*), interpreted as illustrated in Fig.14, though the width appears to be very small. Extrapolating the maximum width preserved between the centre of sternpost (*cadaste*) and the limit of the fashion piece (*pé manco*), of 1.58 m, the width of the panel can be estimated at a value close to 3.4 m.

The curved timbers, in this case fashion pieces (*pé manco*) and filling transoms (*porcas*), measure between 24 and 27 cm wide (it was not possible to measure the thickness). The center piece, possibly the sternpost (*cadaste*), would be 21 cm wide, preserving for a maximum height of 2.9 m, showing the remains of a rabbet (*alefriz*) on the face where the planks fit. The sternpost (*cadaste*) would be 23 cm wide.

Only small fragments of the planking appear. Its section is difficult to measure, but the thickness would be between 4 and 6 cm.

This structure was built with iron fittings and wooden treenails, with about 3 cm diameter. Several rudder fittings on the structure axis were also observed, the maximum measured 59,8 cm long and 9,4 width. The best preserved fittings were upon a timber, only partially visible, that might correspond to fragments of the rudder.

During the superficial cleaning work, several fragments of red pottery, namely of sugar moulds, were recorded, but for now they can't be related to the hull.

Fig. 13 – Orthophoto of CV1 ship.

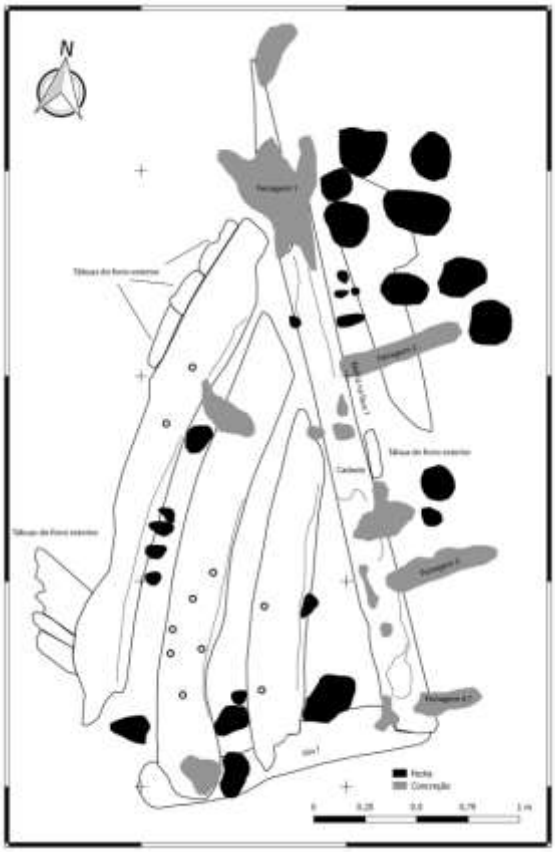

Fig. 14 – Preliminary map of CV1.

Area 1 develops from CV1 to the south and west and has a larger density of surface material than the periphery. Nine iron anchors have been documented, three in the sand, and the others in the transition to the rocky bottom, including a group of four anchors overlapped (Fig. 16). Throughout Area 1 there are also numerous ceramics, especially between the blocks on the mixed seabed to the north (Fig. 15) or embedded beneath the outcrops that limit the sedimentary basin. Several productions have been recorded, but the rims and walls of olive jars and other productions clearly from Iberian origin (Fig. 17): common shapes in red ceramic, sugar moulds, plain white ware and glazed ceramics.

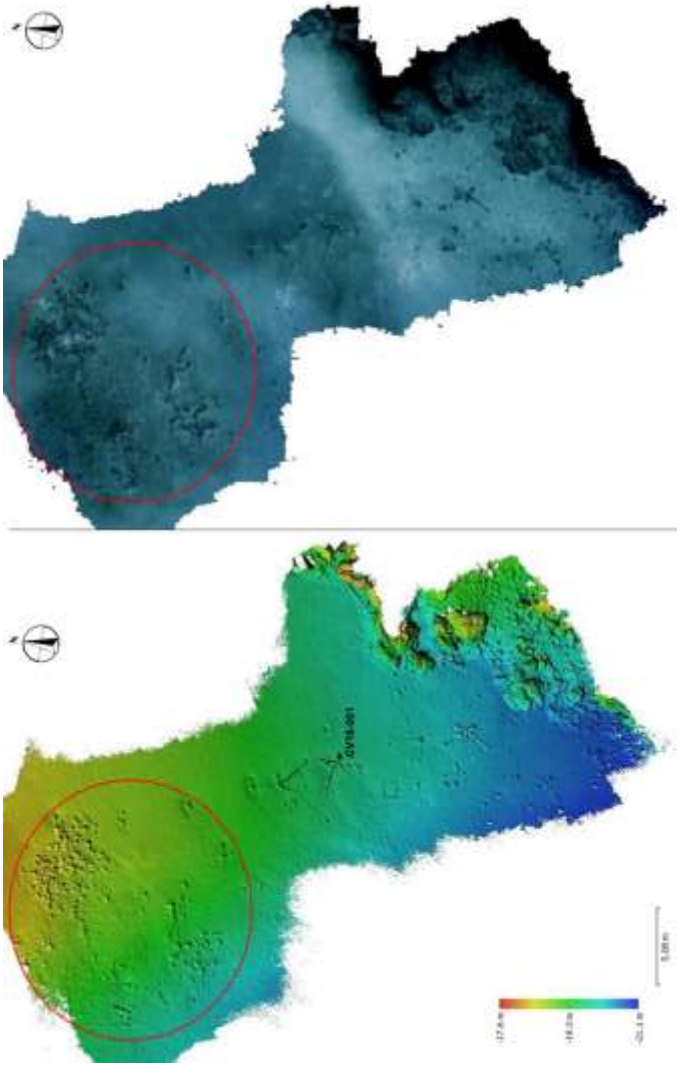

Fig. 15 –Orthophoto of and DEM of part of Area 1. Accumulations of blocks, where most of the archaeological material was recorded are highlighted in red. However, it was possible to observe archaeological material scattered though all the area (approximate depths, not rectified).

Fig. 16 – Group of iron anchors in the Anchorage site of Cidade Velha, in the transition between sandy and rocky bottoms (Area 1).

Fig. 17 – Finds in Area 1: a) and b) olive jar rims; c) sugar moulds; d) plain white plate (scale: 30 cm).

In this area a basin (alguidar) in red earthenware was recovered (CV18-001) during the survey in April 2018. It was near the crown of one of the anchors in the

sedimentary basin (Fig.15 and Fig. 18). This piece, very deformed, measures: 43 cm of maximum rim diameter, 11 cm of maximum height and 27 cm on the base (Fig. 19).

Fig. 18 – Basin CV18-001 *in situ*, before recovery.

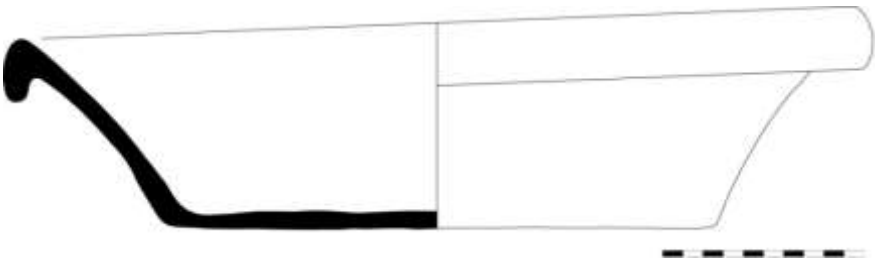

Fig. 19 – Basin (alguidar) CV18-001 (scale: 10 cm).

The relationship between CV1, evidence of a shipwreck, and the materials in Area 1 is not certain at this stage. However, the location of this hull and the presence of several iron piles in the surveyed area, possibly related to the reference grid used by divers from the company Arqueonautas Worldwide, SA, suggests that Area 1 and CV1 corresponds to the codes AGO-051 and AGO-052 used during that company intervention. In fact, the available documentation indicates the presence of a wooden vessel in the AGO-051 zone (Fig. 20). The use of axes and a grid is also mentioned in the diving record sheets referring to the work in those two areas. This grid might be associated to the datum axes and cables detected during our work (Fig. 21 and Fig. 22).

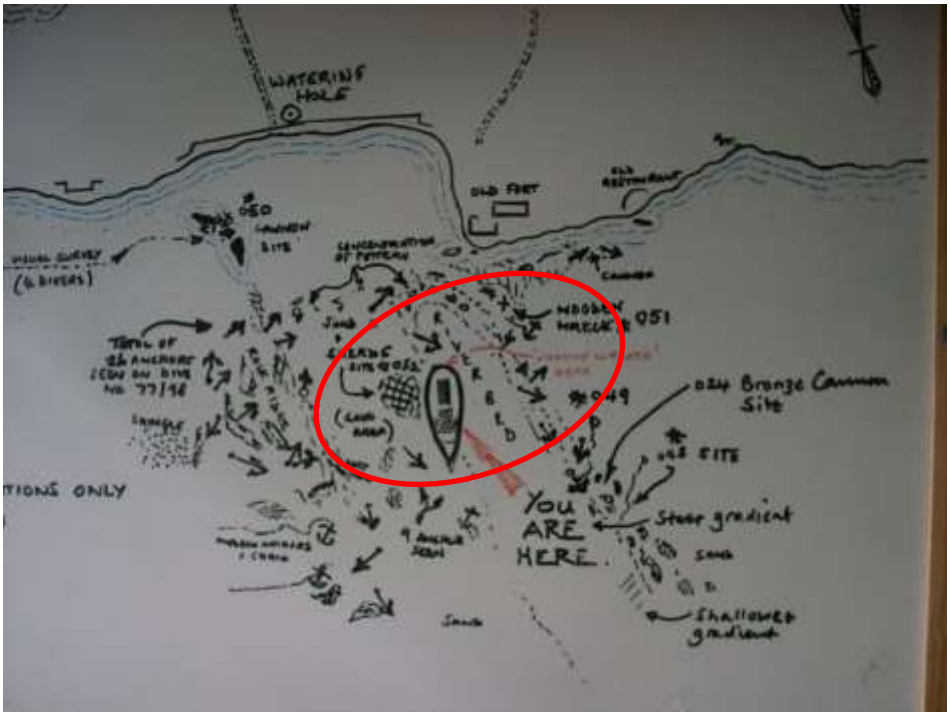

Fig. 20 – Draft of the surveyed sites by the company Arqueonautas Worldwide, S.A. in the anchorage of Cidade Velha (available at http://aww.pt/archaeology/cape-verde/), where the areas AGO-051 and AGO-052 stand out in red.

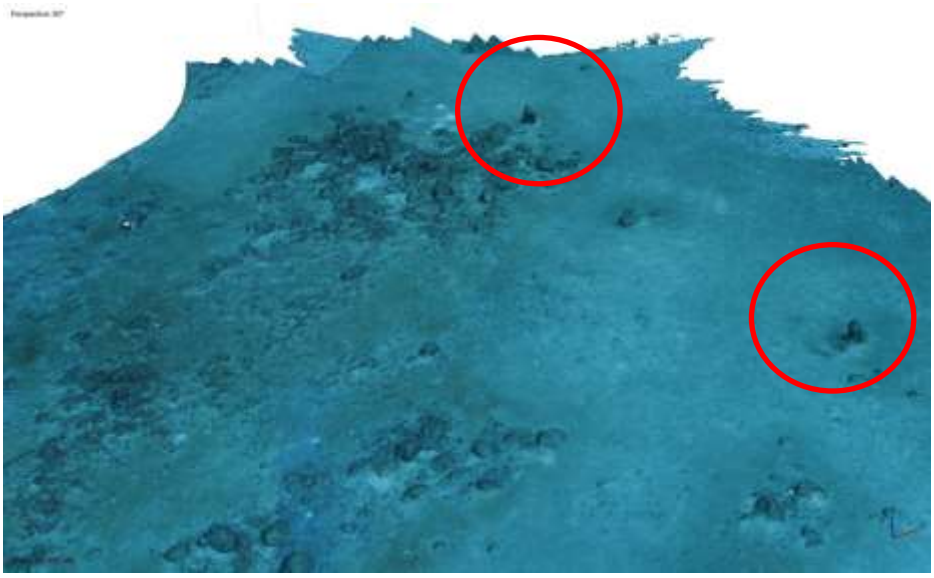

Fig. 21 – Model with the iron piles possibly used by divers from the company Arqueonautas Worldwide, SA.

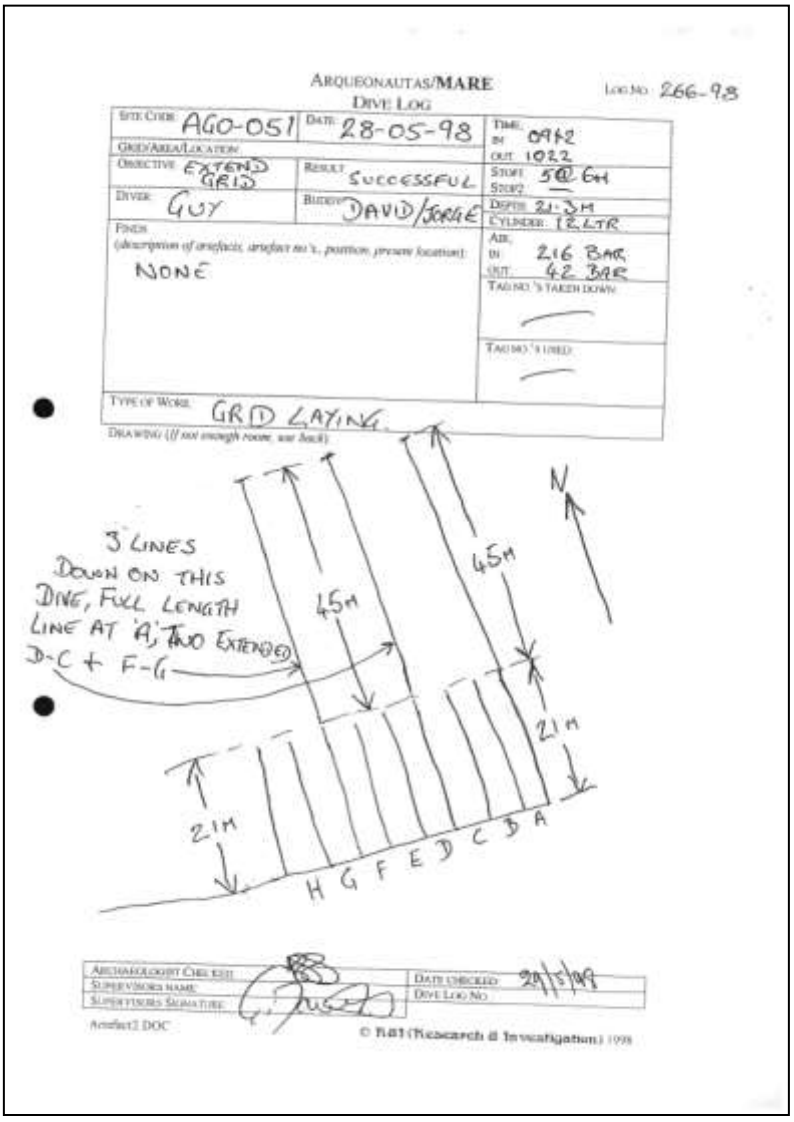

Fig. 22 – Dive sheet from Area AGO-051 (Archaeology Museum/ IPC Archive).

This hypothesis allows a different approach to the materials at the Praia Archaeology Museum recovered from these areas (AGO-051, AGO-052 and, eventually, other peripheral areas such as AGO-O49 or AGO-054), clearly evidence of port operations and possibly remains of one or more shipwrecks. This collection is in fact vast and heterogeneous, with different origins, but with a chronology that mainly covers the 16th and 17th centuries. However, a greater presence of peninsular productions is evident, highlighting the same typologies documented during our work – olive jars, some complete, sugar moulds, plain white ceramic, or red pottery without decorations and glazed ceramics, both with several fabrics.

The olive jars recovered in these areas show different types, mainly Andalusian manufacture (Fig. 23). AGO-052/98 / PT / 583 is clearly included in type A (elongated oval), in the Middle Style of John Goggin's typology (ca. 1580-1780), with the rim more related to the productions from the second half of the 17th century, according to George Avery proposal (1997: 120). The first, AGO-052/98, corresponds also to an elongated oval shape, but to an older production, from mid-16th century, latter recognized and incorporated in the typology of Goggin (Avery, 1993: 95-96 e 120). The other olive jars are from B type, globular, from Middle Style, being AGO-054/98/PT/1019 probably more recent, from the second half of the 17th or 18th century, considering the shape of the shoulders.

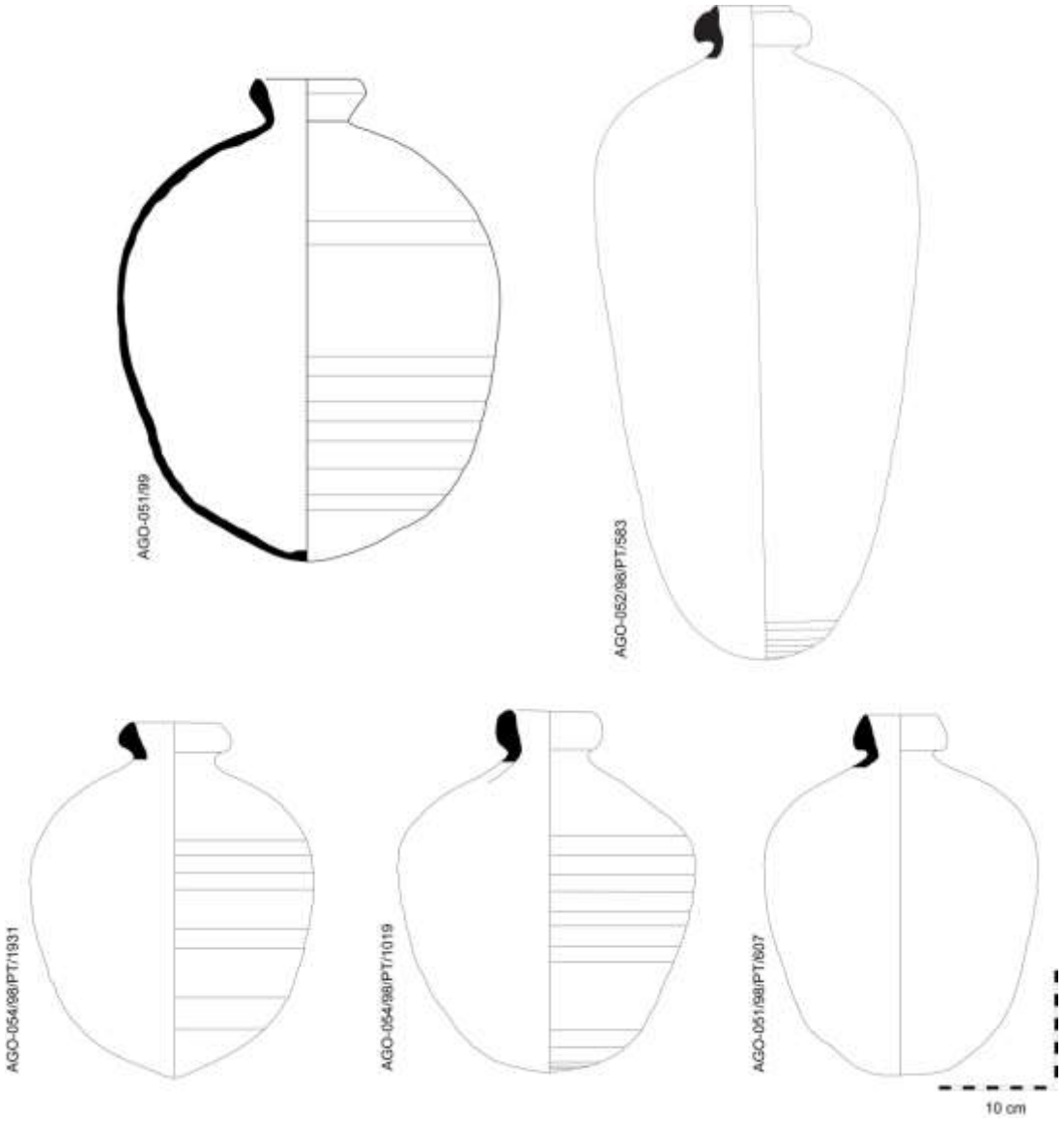

Fig. 23 – Olive jars, with Andalusian productions, recovered in AGO-051, AGO-052 e AGO-54.

Among the various fragments of sugar moulds, some in red ceramic, possibly from Portugal, there is a complete piece with pastes similar to those used in the manufacture of olive jars from Andalusian origin (Fig. 24). This is a known type among the productions of that area, which manufactured sugar moulds to supply local refineries and American mills between the beginning of the 16th century and 1574 (Amores Carredano and Chisvert Jiménez, 1993: 278).

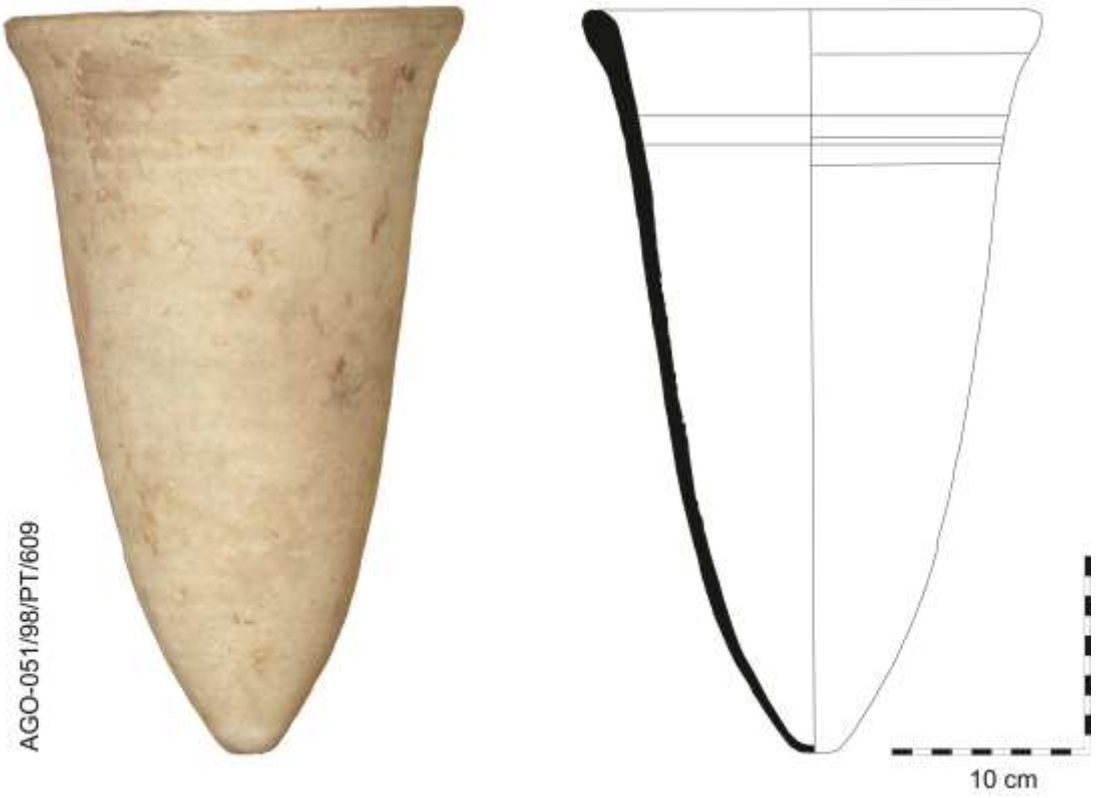

Fig. 24 – Sugar mould, possible production from Andalusia.

The plain white ceramic was produced with pates from dark yellow and light grey, homogeneous, with a layer of thick white glaze, though many fragments show significant changes from post depositional processes, sometimes with colours between grey and black. This production has been identified as Andalusian, mainly from Seville, between 16th and 17th centuries (Deagan, 1987:55-57). In Cidade Velha it is represented by plates (AGO-050/98/PT/845; AGO-051/99/PT/15359; AGO-051/99/PT/693; AGO-051/99/PT/15191) and bowls (AGO-051/99/PT/15367; AGO-051/98/PT/608) (Fig. 25 and Fig. 26).

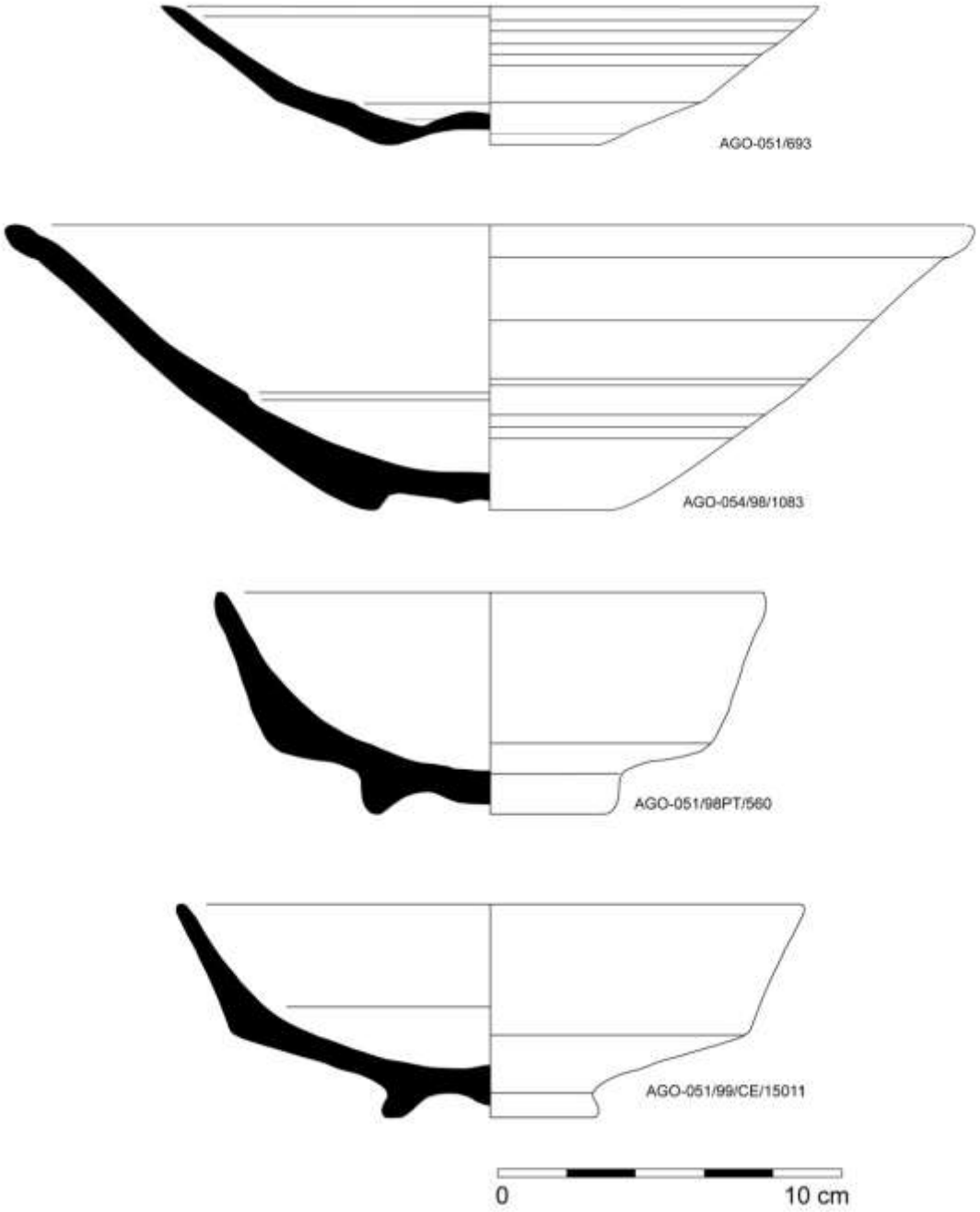

Fig. 25 – Plain white plates and bowls.

With some morphological diversity, with more or less thick walls, the plates show the most common shape of this type, with a conical cone and undifferentiated profile in the base, but the presence of omphalus in some pieces (AGO-051/99 / PT / 15359, for example) may indicate the presence of 16th century pieces (Deagan, 1987: 56). One of the fragments presents an incised mark on the interior wall, on the rim. These marks have been associated to proprietary marks or with the inventory and

counting of productions, due to the large number of pieces with the X mark, which also appears in olive jars (Marken, 1994: 147-148 Deagan, 1987: 56).

Bowls also appear (AGO-051/99 / PT / 15367; AGO-051/98 / PT / 608) in the same production, open and carinated, with an omphalos base, sometimes suggesting a foot-rim.

The vast diachrony of this production does not allow an accurate typological classification, but the research carried out on the ceramics from Spanish shipwrecks indicates that there are some characteristics with chronological significance. For example, unlike what happens with bowls from the 16th century, those from the 17th century have on ring base and show very irregular profiles (Marken, 1994: 174).

Fig. 26 – Plain white glazed plate from Andalusian fabric recovered in AGO - 051.

Other Andalusian productions also appear, in less quantity, including a bowl with blue on white decoration (AGO-054/98/PT/1024) (Fig. 27), or pottery with green glaze. Among the collection are also present other types of red pottery without decoration: bowls and pots for example, Portuguese faience, clay tobacco pipes, some porcelains or Italian mayolicas.

Fig. 27 – Bowl AGO-054/98/PT/1024.

Area 2 also has a high density of materials, mainly towards south of the rock outcrops that limit at west the main zone. It's an area with bathymetries around 21-22m but that deepens fast towards south. The bottoms are of sand, with gravel, blocs and some outcrops (Fig. 28). In this area four iron anchors were found and several surface materials, ceramics and bones (Fig. 29). This includes two ceramics located very close – an olive jar (CV19-001) and an African tradition pot (CV19-002), the first complete and the second without part of the rim (Fig. 30, Fig. 31 e Fig. 32). Both were recovered and are now in the Archaeology Museum in Praia. We also underline the presence of several ship timbers of one or more ships.

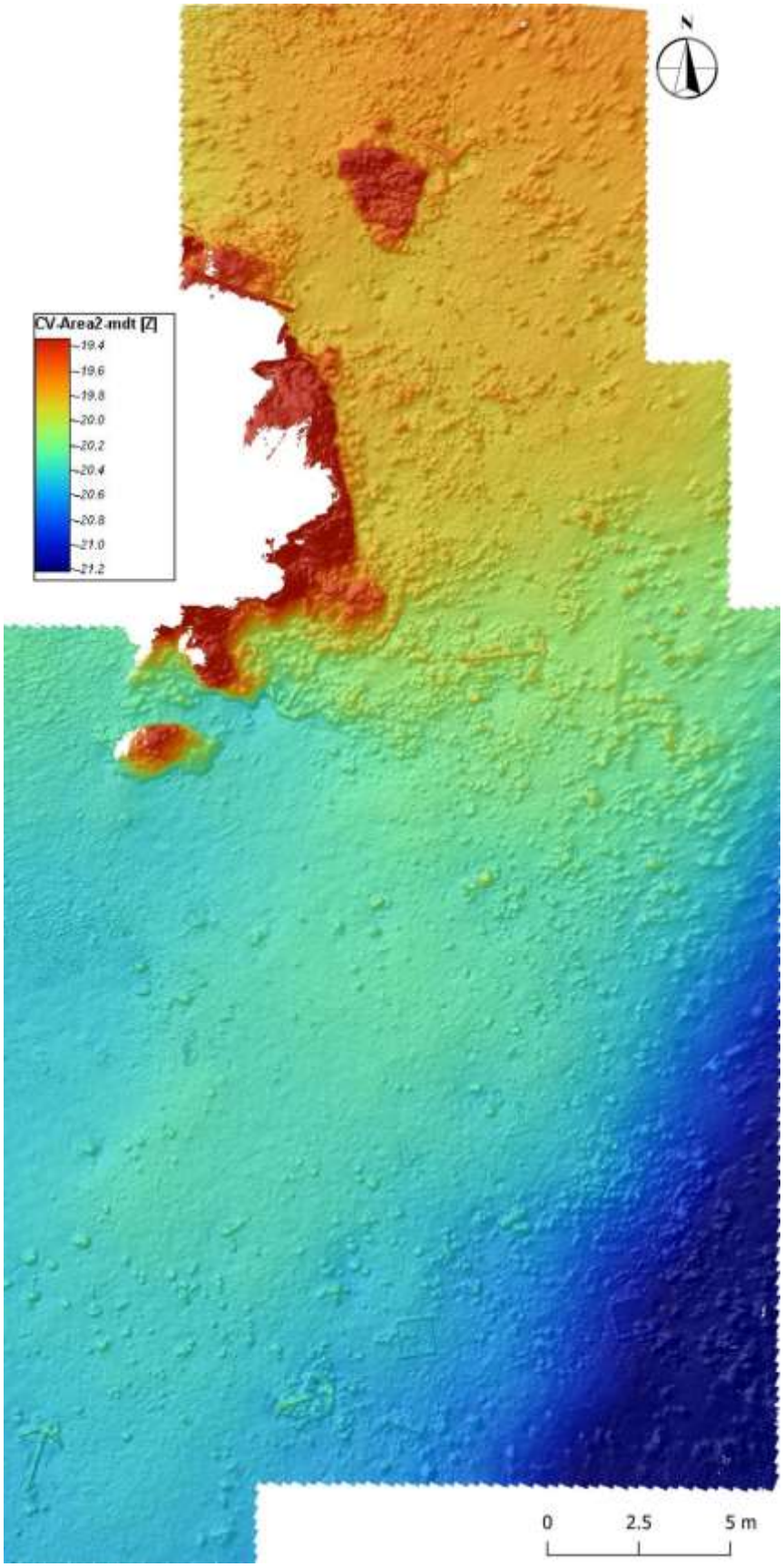

Fig. 28 – DEM of Area 2.

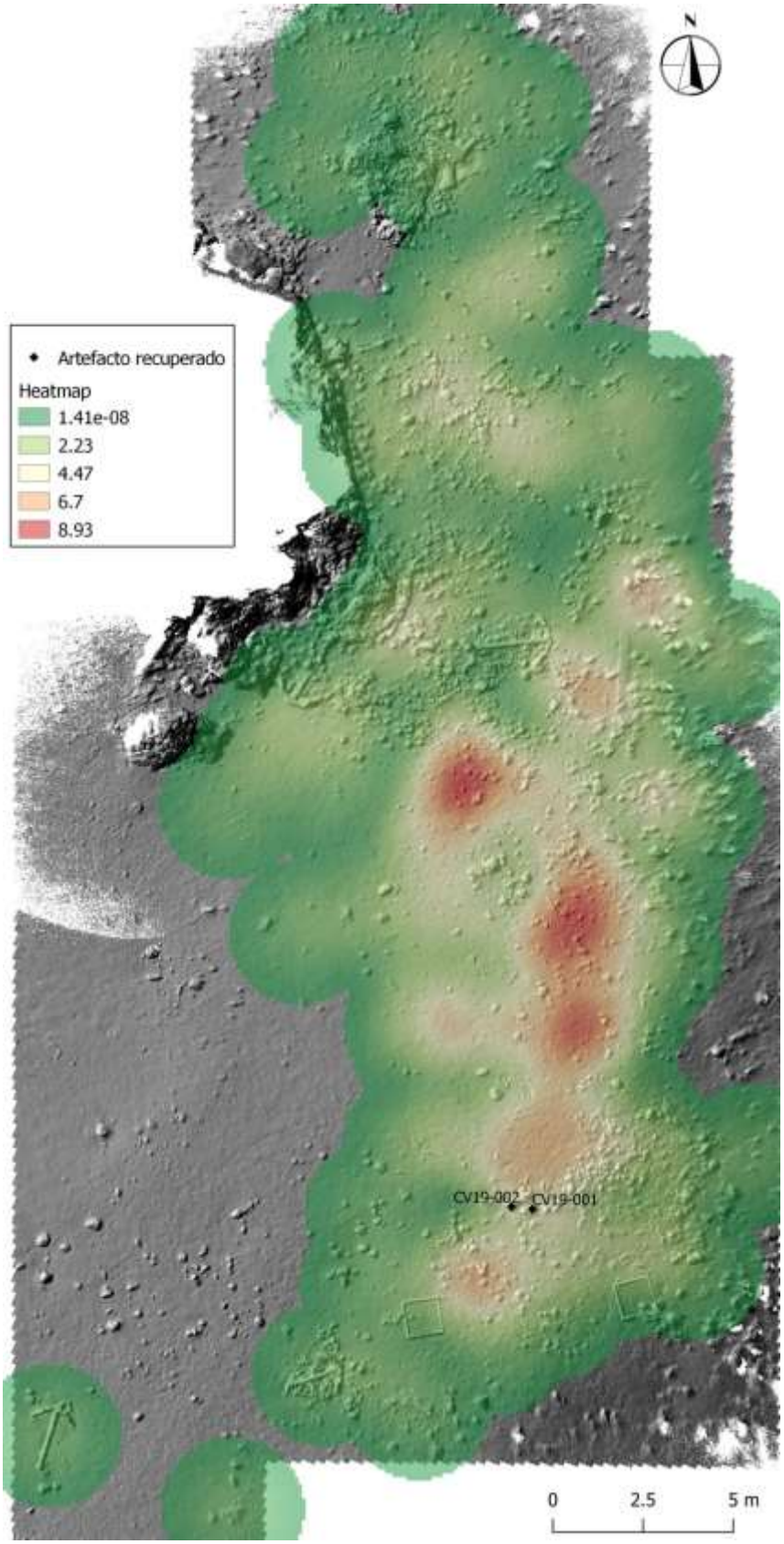

Fig. 29 – Area 2 - heatmap with the distribution of the surface materials identified in the photogrametric survey. The map also shows the location of the two pieces recovered in January 2019.

Fig. 30 – Olive jar CV19-001 and pot CV19-002 *in situ* (scale: 30 cm).

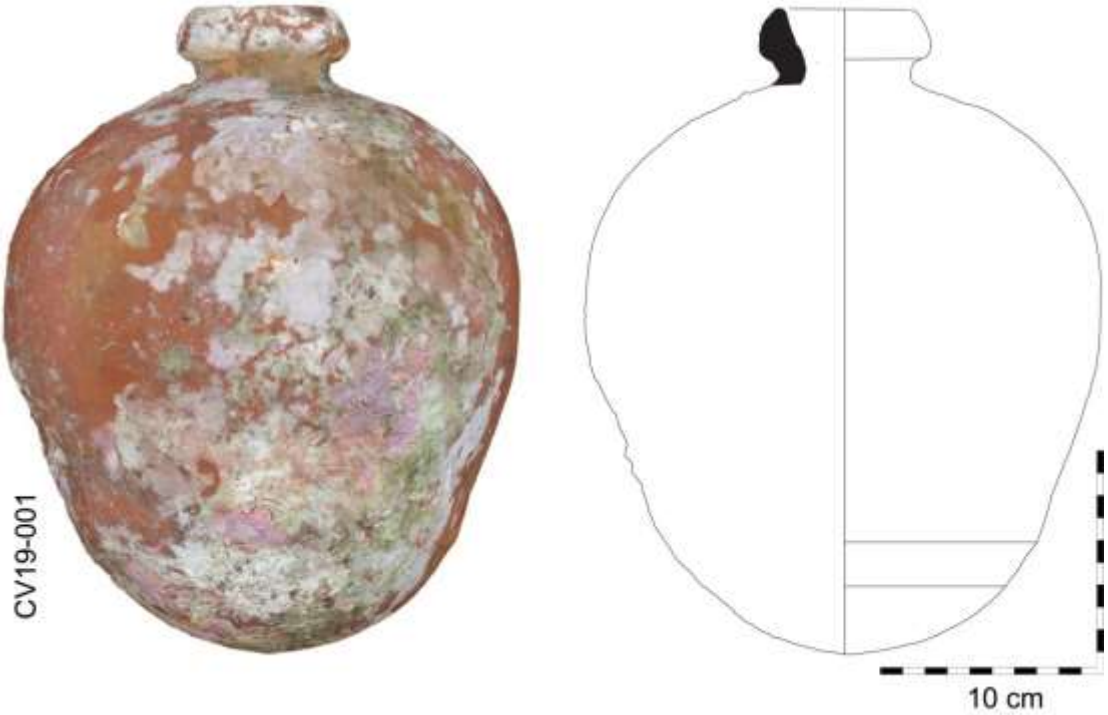

Fig. 31 – Olive jar recovered in Area 2.

Fig. 32 – African tradition pot recovered in Area 2.

The work also allowed to locate two groups of cannons. In the first, located next to the islets in front of Cidade Velha, three iron cannons are identified (Fig. 33). Its origin is difficult to determine, although the archive of the company Arqueonautas S.A. mentions the recovery of several artefacts in that area (AGO-050), namely of lead shots that might correspond to possible evidences of a shipwreck.

Fig. 33 – Iron cannons identified next to the islets in front of Cidade Velha.

The second group (Cidade Velha 2) clearly corresponds to a shipwreck context, southwest from Ponta Grande. The mapping of this site by photogrammetry allowed to record 13 iron cannons in a depression with north-south orientation, with approximately 11 m wide (Fig. 34). The cannons appear along 29 m, in three different groups - one, at south, with two pieces, another, central, with 10 cannons (Fig. 35) and another, at north, with an isolated piece. This area is shallow, less than 4 m deep, with a rocky bottom, outcrops and blocks, unfavourable to the conservation of archaeological deposits (Fig. 34).

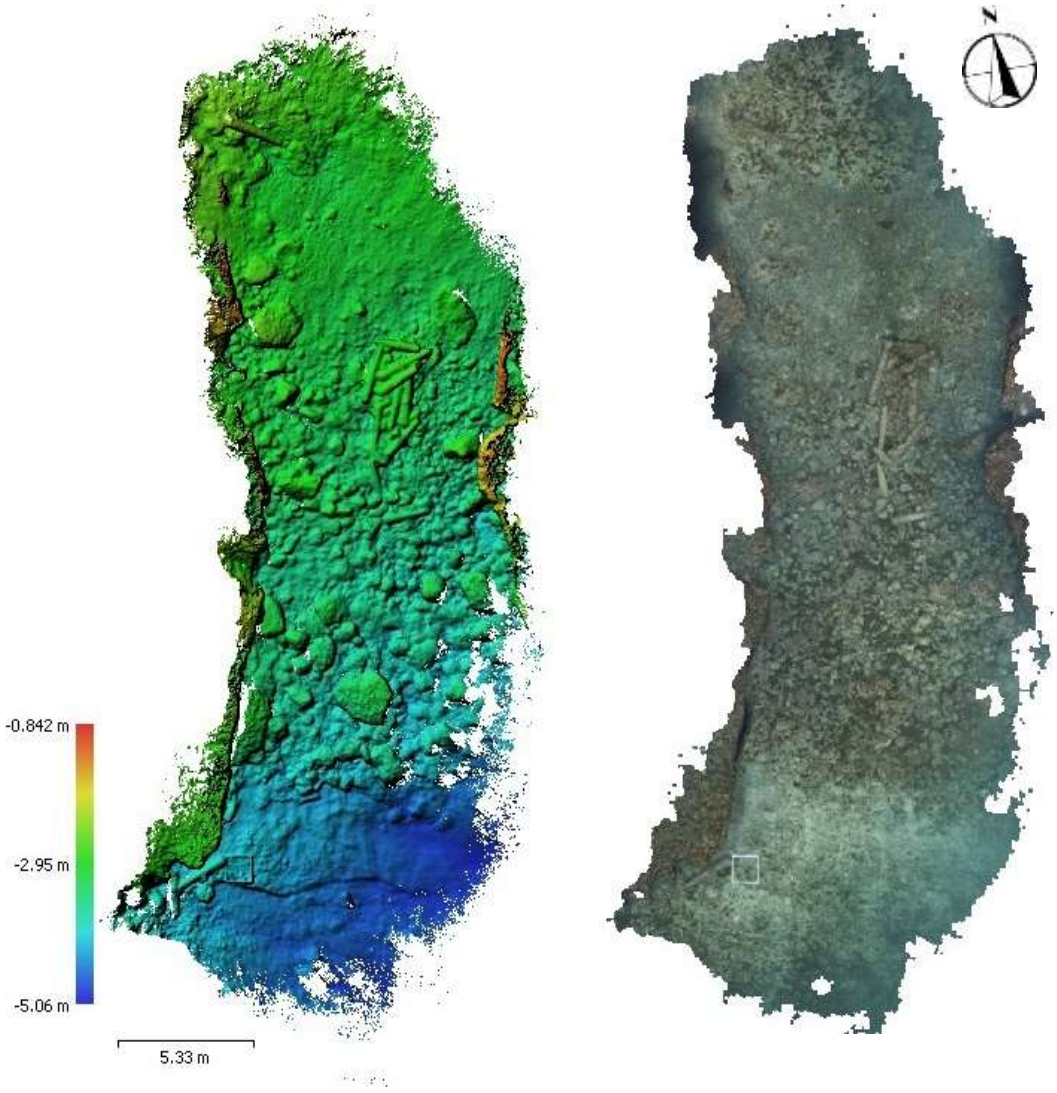

Fig. 34 – DEM and orthophoto of Cidade Velha 2 (CV2).

The cannons are difficult to measure because they are very eroded due to corrosion and abrasion processes. The length of the gun, on the photogrammetric survey, show values between 1.76 and 2.3 m. No other materials were visible on the

site in February 2019, but during the intervention of the company Arqueonautas Worldwide, S.A., some copper alloy and ceramic sherds were recovered (area AGO-038). This material has not yet been studied, but the typology and decoration of a faience plate (AGO-038/96/36) points to a chronology somewhere between the end of the 17th century and the first decades of the 18th.

Fig. 35 – The main group of iron cannons in Cidade Velha 2 (CV2).

4.2 São Francisco Shipwreck

The São Francisco shipwreck is located in Passa Pau, east of Moia Moia, 11 miles from the port of Praia, on a rocky coast, exposed and difficult to access, which conditions the development of archaeological surveys (Fig. 36). Despite the difficulties, the survey in Passa Pau was justified by the historical and symbolic importance of this wreck.

Extremely explored by the company Arqueonautas S.A., the AGO-063 site, excavated in 1999 and 2000, is the oldest to date in Cape Verde. From this site, a rare

astrolabe was recovered, originating one of the few publications on the intervention of that company in the archipelago (Smith, 2002). The San Francisco astrolabe, currently at The Mariners' Museum and Park, in the United States, is a silver-plated piece that was manufactured by Nicolao Rvffo in 1645, *terminus post quem* for the context, which also includes a diverse collection of materials, metallic and ceramic, globally dated from the second half of the 17th century.

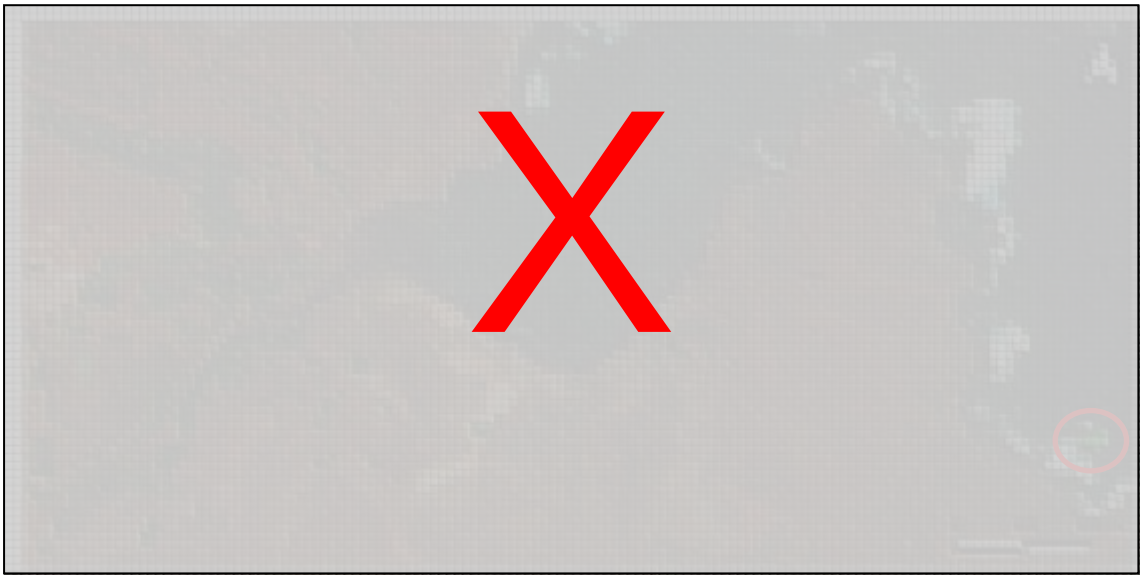

Fig. 36 – Location of São Francisco wreck.

The work carried out in April and August 2018 and February 2019, during just three days, allowed to verify that the contexts of this wreck extend until the coast line. They are found on a very irregular bottom, which varies between rocky outcrops, that emerge on the surface in some areas, until forming canyons perpendicular to the coast. These canyons have different depths that vary between 3 meters to the west and 9 m to the east, in the deepest areas, in relation to the top of the outcrops (Figs. 37 to 39).

The remains are concentrated over approximately 30 m, especially in one of these canyons, with east-west orientation, but the dispersion of the materials extends to peripheral depressions, namely to underwater caves in the outcrops that limit it.

The bottom of the canyon varies between small sandy cover, gravel or outcrops. These layers are mobile having been verified a decrease in the sedimentary layer between the mission of April 2018 and February 2019.

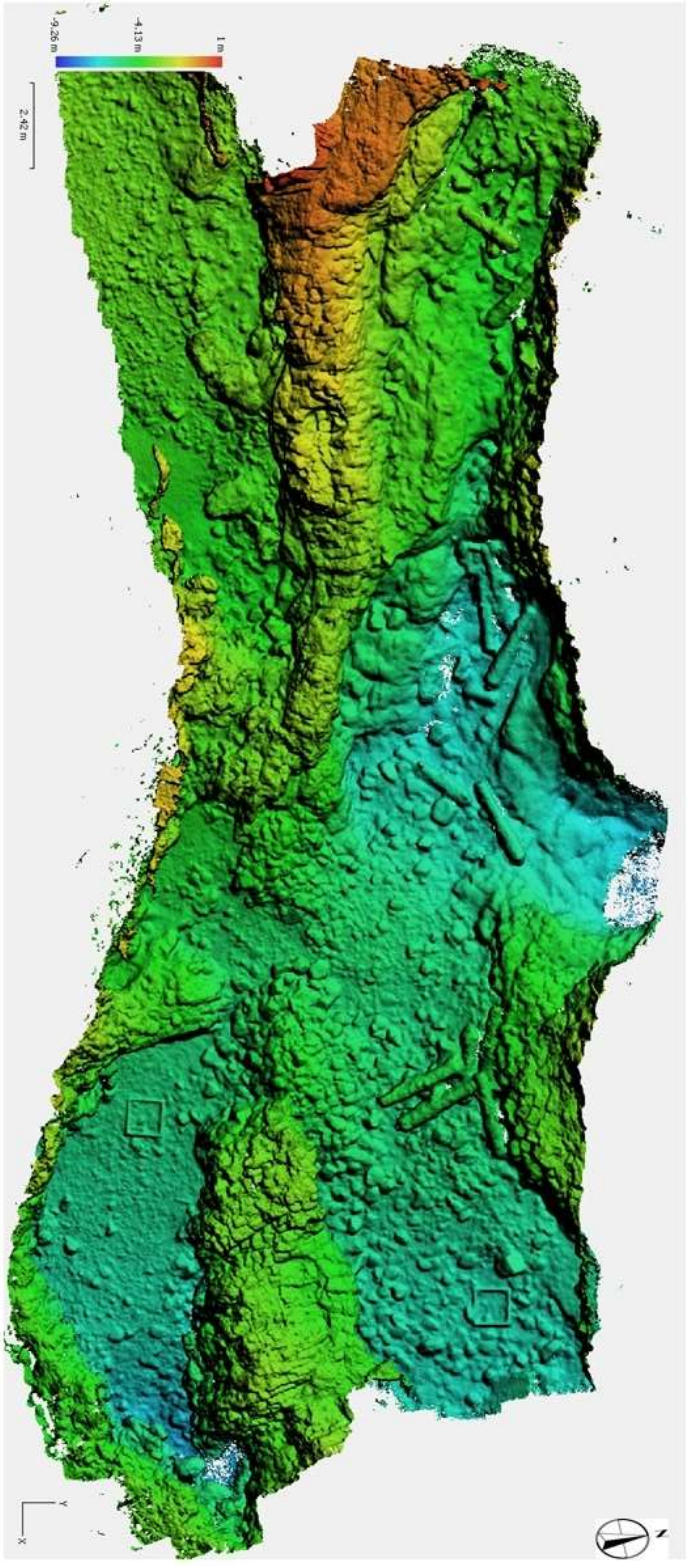

Fig. 37 – DEM of São Francisco shipwreck site (version 2, from August 2018).

Fig. 38 –São Francisco shipwreck site – orthophoto of the submarine canyons with the highest concentration of iron cannons and anchors, having marked the location of the two ceramic artefacts recovered in February 2019 (version 3, February 2019).

Fig. 39 – Overview of São Francisco shipwreck - a secondary canyon can be observed and also the irregular topography of the underwater site.

The predominant materials correspond to 17 iron cannons and three anchors in the same material, divided in three groups –the first, to the east, consists of five cannons partially overlapping (Fig. 40); the second, in the center of the site, includes eight cannons, two of which slightly spaced to the north enter through a cave[7], and an anchor (Fig. 41); the third, to the west, with four cannons and the remains of, at least, two very fragmented anchors (Fig. 42).

The cannons are very eroded, which difficult their analysis. They correspond to at least at two distinct groups: the largest pieces had a length of the gun between 2,35 and 2,40 m (the nine measures obtained on the photogrammetric survey and vary between 2,31 and 2,42m), the smaller measured between 1,89 and 1,91 m. This may correspond to two different calibres. The anchors are very fragmented, which doesn't allow a systematic analysis.

[7] The plans produced by the company Arqueonautas Worldwide, S.A., in the IPC archive, show the existence of another fragmented cannon in this area (CAPE VERDE. Db, Vol. 1. AGO-003 to ANT-015). They also present some artefacts in a different position from the one registered by us, such as an anchor drawn in the central core. It is likely that some parts were remobilized during the operation of that company or due to natural processes.

Fig. 40 – Iron canons in the east group.

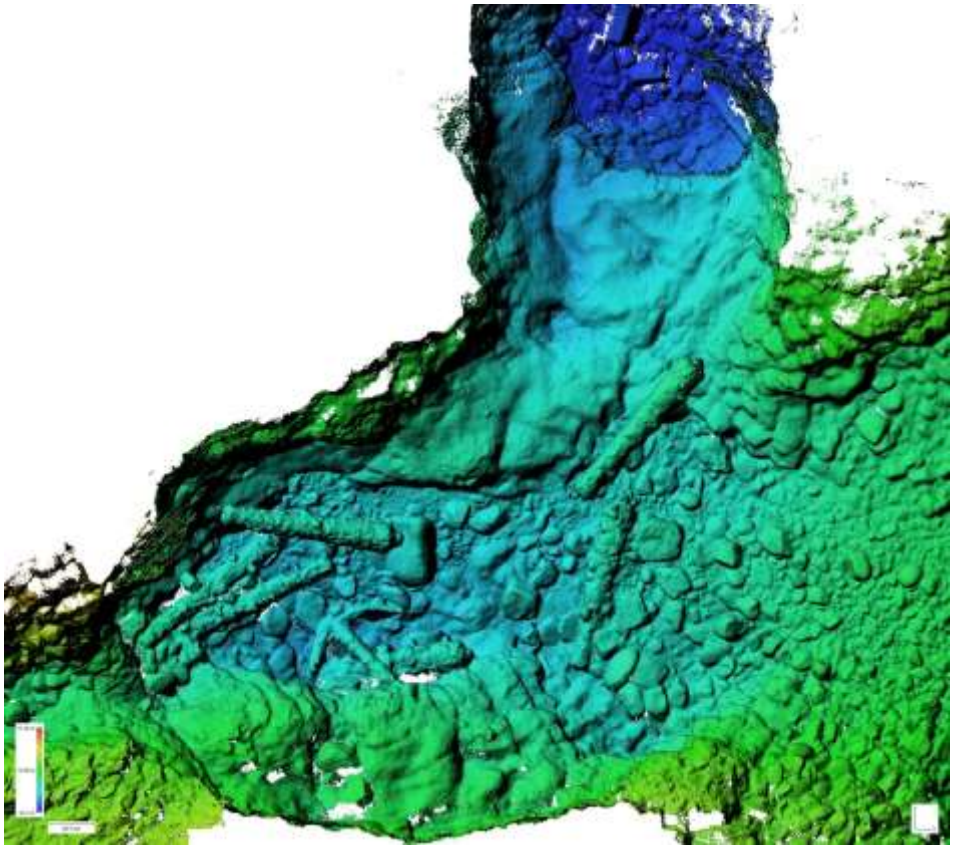

Fig. 41 – Group 2, in the center of the site, with 8 cannons and one anchor (detail of version 3 of DEM, from February 2019).

Fig. 42 – The palm of one of the anchors, found on vertical, supported on the outcrops.

Besides these iron pieces, several surface materials were observed, mainly in February, when the remains were more exposed. At least one stone carved block appeared under two cannons in the west, suggesting that it was being transported aboard the ship (Fig. 43).

However, the largest group of artefacts consists of earthenware ceramic sherds, mainly olive jars bodies and some rims. The ceramics were found among blocks, next to the iron pieces, but were also scattered in another smaller canyon, located southeast, where two rims were recovered in February 2019. These rims are currently on the Archaeology Museum in Praia (Fig. 38 e Fig. 32). Both rims presented very extensive marine encrustations, showing that they were exposed for a long period. Artefact SF19-001 corresponds to the rim of one olive jar 10,3 cm in diameter; the mouth is 5,8 cm in diameter. Fragment SF19-002 corresponds to the rim of a large pot (*talha*), that would measure approximately 28,3 cm in diameter and presented a mouth with 25,5 in diameter.

Fig. 43 – View from east to west from the west area, where can be observed a stone block under two iron cannons (photo-February 2019)

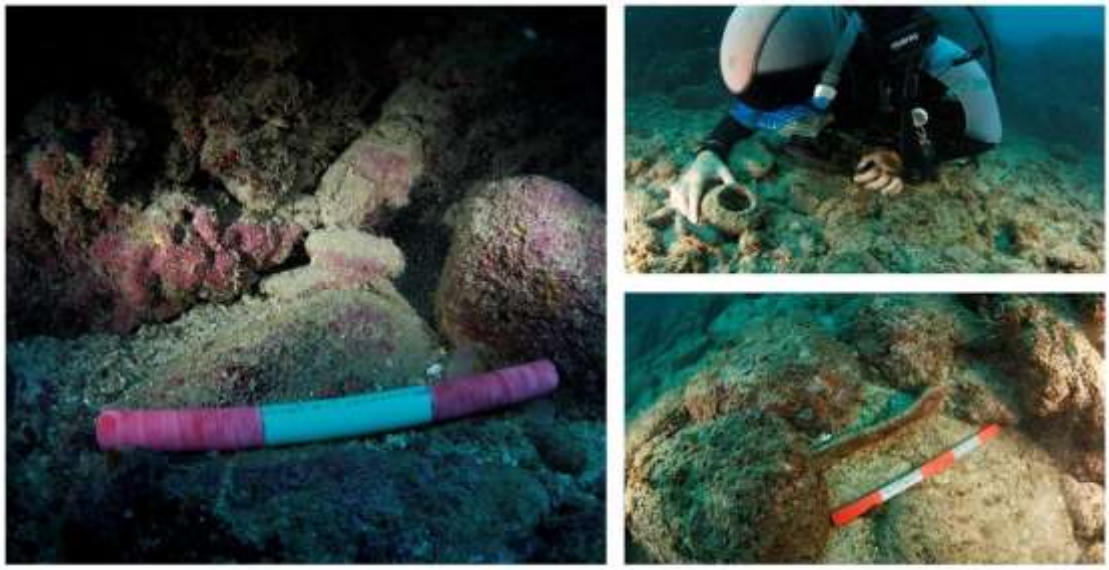

Fig. 44 –In *situ* materials.

Fig. 45 – Rims SF19-001 and SF19-002, recovered in February 2019 (scale: 10 cm).

These materials are similar to the ones recovered in Passa Pau by the company Arqueonautas Worldwide, S.A., currently in the Archaeology Museum of Praia (Fig. 46). In this collection are, at least, half a hundred rims with the same morphology as SF19-001, triangular, with lip and rim demarcated externally. There are still at least two almost complete pieces of the same type, that corresponds to oval olive jars, with an approximate capacity of 0,0148 m^3, 14,8 liters (calculated based on the 3D model of olive jar AGO-063/99/PT/15382). The collection of São Francisco wreck includes also two complete oval olive jars, smaller, to which we have not had access until now (Fig. 47).

These olive jars, used for the storage and transport of cargo and provisions, present a brown color, the result of a predominant oxidizing production (some of these fragments, namely those of greater thickness, show a core darker than the surfaces). Resin was identified to waterproof the internal surface of several pieces. Fragment

AGO-063/99/PT/15623.03 has its external surface glazed. This is a well-known production attributed to Andalusia, common in shipwreck contexts, mainly Spanish (Marken, 1994, pp. 65-71; Avery, 1997, pp. 103-106; Bettencourt, 2017).

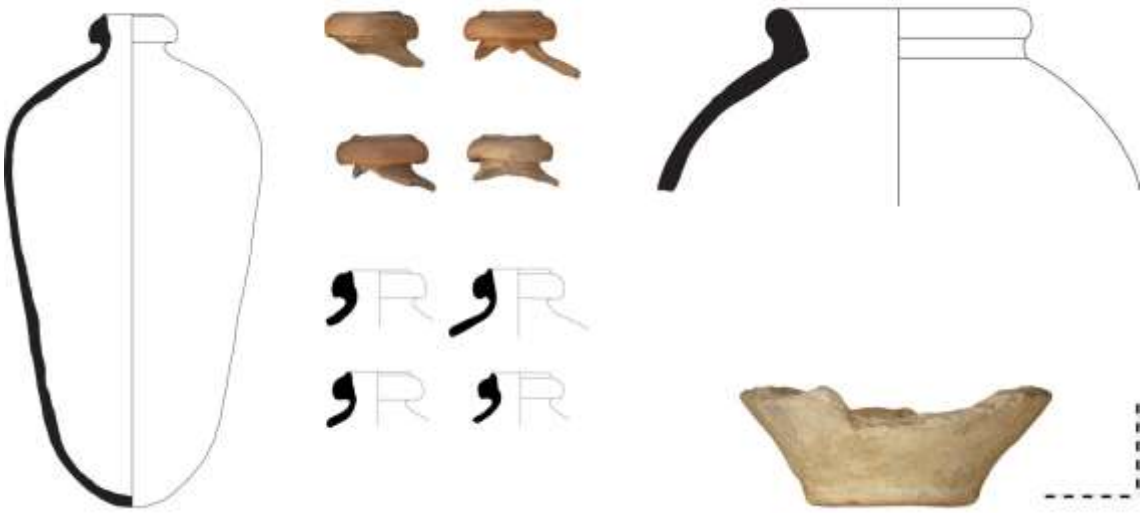

Fig. 46 – Olive jars and large pots recovered in São Francisco wreck site by the company Arqueonautas S.A. (scale : 10 cm).

Fig. 47 – Olive jar AGO-063/99/PT/15387 (photo – IPC archive).

The large pot SF19-002 has also parallels in the Museum materials, on rim AGO-063/00/PT/16059. The same typology can be attributed to the base AGO-063/99/PT/15502 from the same collection (Fig. 46). These large pots were produced with very thick coarse clay, with non-plastic elements (micas, ceramic (?) and quartz), from medium to coarse grain, particularly on surfaces, especially the exterior ones, which have no treatment. This type, *tinaja* in the Spanish documents from the early-modern period, should be used for water storage (Marken, 1994: 182), appearing in 17th century contexts, namely in *Nuestra Señora da Atocha* (1622) or in Angra D (Bettencourt, 2017). Probably it has the same production area as olive jars, in Andalusia, where they are commonly found, especially in Seville (Amores Carredano and Chisvert Jiménez, 1993: 276 and 301).

The Andalusian provenance can also be attributed to the plain white table ware found on the same context. In this group, at least two bowls stood out: (AGO-063/99/PT/15506; AGO-063/99/PT/15497) (Fig. 48) and one plate with omphalos (AGO-063/99/PT/15516) (Fig. 49). These typologies are also very common in shipwreck contexts from the 16th and 17th centuries, namely from the Spanish Armada (1588) (Marken, 1994) or Angra ships (Bettencourt, 2018).

Fig. 48 – Plain white bowl AGO-063/99/PT/15497 (scale: 10 cm) (photo –IPC archive).

Fig. 49 – Plain white plate AGO-063/99/PT/15516 (scale : 10 cm) (photo –IPC archive).

Among the ceramics found in São Francisco, several fragments of clay tobacco pipes produced in Europe (AGO-063/99/PT/15526) (Fig. 50 and Fig. 51) and at least two bowls of African tradition were found - (AGO-063/99/15518) (Fig. 52) and (AGO-063/00/16083) (Fig. 53). Without any marks and without a specialized study, it is difficult to distinguish if the pipes were produced in England or in Netherlands. However, the shape of the bowls, biconical, it's similar to the Dutch productions between c. 1610 and the last quarter of the 17th century and to the British productions between 1640 and 1680 (Atkinson and Oswald, 1969). In any case, the hypothesis of corresponding to Dutch productions is the most probable because one of the stem fragments shows a decorative pattern formed by fleurs-de-lys framed in rhombuses, common in these productions (Heredia Bercero and Miró i Alaix, 2008: 147).

Fig. 50 – Clay tobacco pipes AGO-063/99/PT/15516.

Fig. 51 – Stem decoration detail of one of the pipes AGO-063/99/PT/15516.

Fig. 52 – Pipe AGO-063/99/15518 (photo –IPC archive).

Fig. 53 – Pipe AGO-063/00/16083 (photo –IPC archive).

In addition to the ceramics, the Archaeology Museum holds a vast collection of the shipwreck of San Francisco, not systematically studied, including several metals, for example. Among the metals a large number of silver coins, most Spanish, pewter plates, lead shots and lead plates (Fig. 54), one divider, one cross and one candle holder in copper alloy, for example[8]. In this metal also stands out a group of brass basins, that were found stacked (Fig. 55). In pewter it is particularly relevant the large collection of different types of case bottles caps (Fig. 56).

Fig. 54 – Rolled lead sheet AGO-063/99/LD/15613.6.

Fig. 55 – Brass basin from the group AGO-063/00/PB/16019.

[8] Some documentation in IPC archive mentions the recovery, in 1999, of two composite guns – AGO-063/99/15380, on October 29, and AGO-063/99/15411, on November 4 (CAPE VERDE. Db, Vol. 1. AGO-003 to ANT-015). One of them is in exhibition on the Archaeology Museum. However, in field records reviewed at the moment, namely the site plans, do not record these guns.

Fig. 56 – Pewter caps for glass case bottles.

Also of note is the presence of a loop (Fig. 57) and a bolt axis (Fig. 58), probably from one or more shackles. These are similar, both in shape and dimensions, to the ones found in site of loss of the English slave ship *Henrietta Marie*, which wrecked in 1700 on Marquesas Keys, Gulf of Mexico, being considered the most indicative artefact of the ship slaving activities (Moore e Malcom, 2008: 28).

Fig. 57 – Iron loop AGO-063/99/CU/15583 (photo –IPC archive).

Fig. 58 – Iron bolt AGO-063/99/CU/15574 (photo – IPC archive).

The São Francisco collection also has parallels in the Elmina shipwreck, possibly the Dutch ship *Groeningen*, from the Dutch WIC, which sank there in 1647 when was arriving and one of its cannons exploded (Cook et al, 2016: 375). Similar materials include a cargo of brass basins, pewter caps from case bottles and lead sheet rolls. The site also has other materials associated with slave trade, namely glass beads and shackles (Pietruszka, 2011).

The iron shackle and the African elements preserved in the context give particular importance to São Francisco wreck. In addition to being the oldest known wreck in Cape Verde, this material signature puts us on the trail of the slave trade routes. The predominance of Spanish coins and Andalusian ceramics, of transport and everyday life, suggest that they correspond to a Spanish ship in route to Cape Verde, sometime in the second half of the 17th century (most likely in the third quarter), possibly to buy slaves.

The slave trade is a topic not often developed by maritime archaeology. The continuity of mapping and exhaustive study of this context is therefore a priority.

4.3 Urânia

It is the only intervention site from which the identity of the ship is well known. The frigate *Urânia* shipwrecked in Praia on February 5, 1809, when returning to Brazil after an escort to England. The history of this Portuguese Navy ship is, however, much

richer. Built in Lisbon by Torcato José Clavina, was launched on December 15th 1792 under the name *Ulisses*, maintained until 1807. With 132 feet in length (43.56 m), 34 in breadth (11.22 m) and 25 in height (8.25 m), the frigate armed 36 guns, although later documentation indicates that it had 32 or 38 in some missions. The crew had around 300 men (308 in 1795; 329 in 1798; 331 in 184; 352 in 1807), including officers, cooks and sailors. Throughout his life the ship carried out several missions in the English Channel, Algiers, Azores, England, Tangiers or Brazil, for example, having joined the fleet that escorted the Portuguese Royal Family to Brazil in November 1807 (Esparteiro, 1979: 87- 99).

The remains associated with *Urânia* are approximately 90 m south of Ilhéu da Praia (Fig. 59), occupying an area with a rocky bottom, outcrops and large blocks, and therefore with little sedimentary layers. The context is dominated by scattered iron cannons and extensive concretion, spread over 41 m, with an approximately south-north orientation, at a depth that varies between 3 m in the north and 6 m in the south. The mapping carried out in August 2018 allowed to understand this distribution (Fig. 60 and Fig. 61).

Fig. 59 –*Urânia* wreck site location.

Fig. 60 – Orthophoto of *Urânia* wreck (version 1, August 2018).

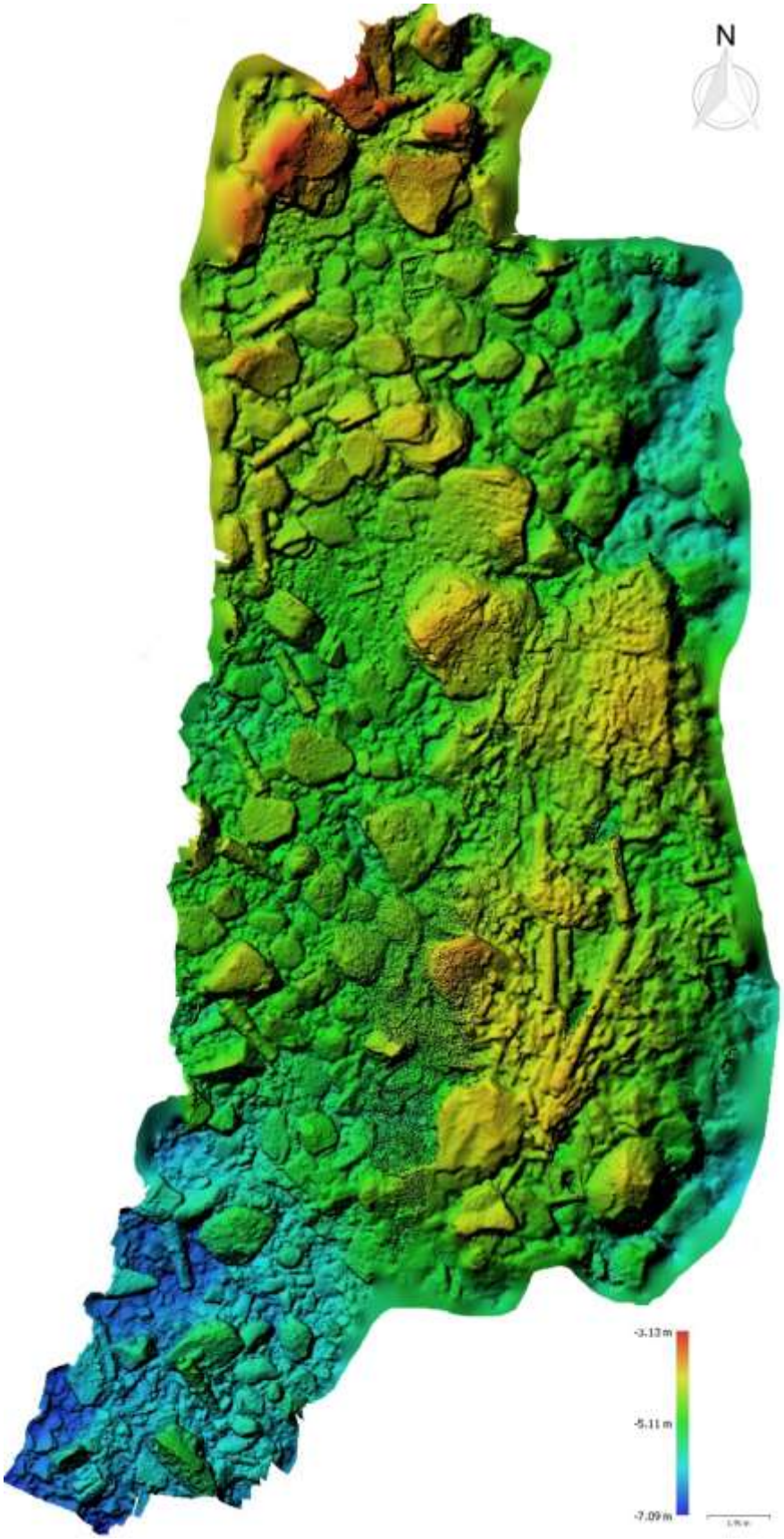

Fig. 61 – DEM of *Urânia* (version 1, August 2018).

Fig. 62 – View of the aligned guns, deposited between and over outcrops and blocks. In the foreground, the cascable of one of the cannons.

The scattered guns form an approximately south-north alignment, 41 m long, formed by ten pieces deposited with varied orientations and inclinations because they are directly on the rocky bottom (Fig. 62). The distance between cannons varies between 2.96 and 7.64 m (center to center measurement obtained on the photogrammetric survey, from south to north - 4.38 m - 7.05 m - 5.04 m - 2.97 m - 2.96 m - 4.37 m - 3.17 m - 4.05 m - 7.64 m). The shape and a length of the gun of this group is very homogeneous, varying between 2.07 and 2.20 m (measurements obtained above concretion), which suggests that they correspond to pieces of the same calibre.

The central axis of the concretion area is approximately 10 m east of the cannon alignment, developing substantially from its southern end over 18.4 m and presenting the same orientation (Fig. 63). This concretion, which corresponds to a continuous mass that rises in relation to the bottom to the west in approximately 2 m, joins several materials.

In the south half, seven iron guns are concentrated, arranged in one or two rows, with an orientation close to that of the tumulus (Fig. 64). These have different characteristics from the previous ones, with a length of the gun that vary between 2.16 and 2.62 m (approximate measures, measures obtain over the concretions).

Surrounding them are bars and other objects made of the same metal. Stands out a concretion of 2.36 m long (West-East) and 1.48 m wide (North-South), which partially covers the cannons further north, where can be identified spheres, possibly iron projectiles. It is difficult to characterize the iron bars, most of them are joint in the large concretion, but the bars located in the extreme south, isolated, have lengths between 1.03 and 1.06 m and widths around 17 cm (Fig. 65).

The northern half of the *tumulus* corresponds to a continuous mass, where alignments seem to indicate that it was an area where iron bars were mostly arranged in the bottom of the hull.

This distribution suggests that the *tumulus* corresponds to the position of the bottom of the hull, corresponding to the ballast deposited in the hold of the ship, consisting of iron cannons and bars and a storage area to the cannon balls in the same metal.

The alignment of guns must, therefore, correspond to the final deposition of the artillery originally in one side of the ship's gun deck. The others should have been recovered after the wreck, as well as the anchors and other equipment's. It was not possible to determine the position of the bow through the archaeological data.

Fig. 63 –General view of the end of the *tumulus*, from north to south.

Fig. 64 – View of the iron cannons preserved in the *tumulus*.

Fig. 65 – Iron bars deposited in the south end of the *tumulus*.

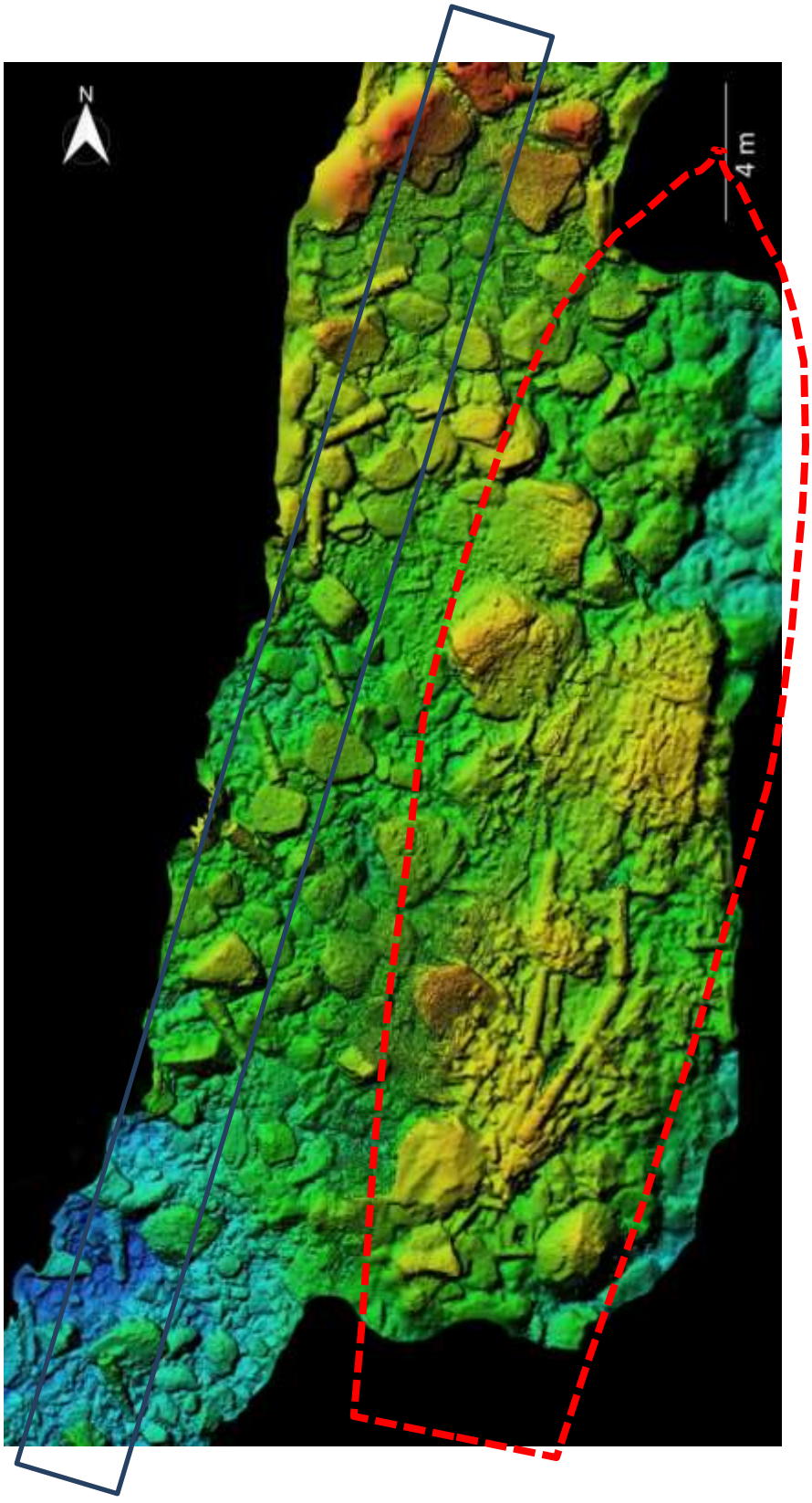

Fig. 66 – In red the possible position of the ship after standing (approximatte scale of the ship; location of the bow merely indicative); in blue the deposition aligment of the cannons of one side of the ships gun deck.

The small finds on the site are scarce. Only a few fragments of iron nails and of copper alloy plates having been observed. However, the Archaeology Museum in Praia keeps a small collection recovered by Arqueonautas Worldwide, S.A., consisting mainly of metallic objects. Among these are one of the ship's gudgeon rudder in copper alloy (AGO-030/96/37) and several fragments of nails and coaks (*chumaceiras*) in the same metal. Also noteworthy is the presence of a button with the weapons of the Portuguese Navy (AGO-030/98/1784), of a mortar (AGO-030/98/1778), either in copper alloy, or of a plate (AGO- 030/96/168) and a jug (AGO-030/98/229), in pewter. Some fragments of ceramics and glass were also recovered.

5. Final remarks

The work carried out to date confirms the high potential of Cape Verdean underwater cultural heritage (UCH). The survey in Cidade Velha revealed the existence of extensive surface deposits, including at least the remains of a wooden ship and concentrations of ceramics that can be linked to shipwreck contexts. The mapping of the São Francisco and *Urânia* shipwrecks allows for new interpretations. Together they document various phases of navigation in the Atlantic in the early and modern eras. Ribeira Grande de Santiago anchorage and the remains of the São Francisco shipwreck are particularly significant, because they are related with the slave trade.

The São Francisco shipwreck may actually be related to the Spanish involvement on the that activity, which in the 16th and 17th century's connected Cape Verde and America. An example of this trade is given by the journey of Francesco Carletti at the end of the 16th century. In his work "My Voyage Around the World", this Florentine merchant recounts the voyage he made between Seville, Cape Verde and Cartagena, present day Colombia, in 1594. Francesco Carletti left Sanlucar de Barrameda, Andalusia, on 8 January 1594 in an 85-ton ship, having arrived at the island of Santiago after 19 days of sailing, where she anchored in front of Ribeira Grande. In the small town, which housed a mostly mestizo population and a large number of merchants, caravels from Portugal, Madeira and the Canaries were found, buying salted goat meat, selling flours, wines, vegetables and nuts in exchange. But his merchandise was different. With the arrival of slave ships, the local merchants, who kept the slaves on their properties in the interior of the island, run to the port with the Africans available, who were exchanged for cash or bills of exchange. Each slave cost him 100 ducats, almost twice as much as he had anticipated, but he managed to fill in the 75 licenses he had obtained from the Casa de Contratacion in Seville. The voyage to Cartagena lasted 30 days. The slaves, separated men, women and children, crammed and pinned, received a daily ration of cooked corn, with oil and salt, but their final destination is unknown (Torrão and Teixeira, 2009).

The available data also make it possible to begin the construction a georeferenced inventory of the Cape Verde UCH, serving as a reference for the adoption of protection and monitoring measures.

Graphic documentation (photography, video or models) also has potential that goes beyond research, allowing its presentation and dissemination in various media -

publications, panels, videos and documentaries. The mapping of *Urânia*, for example, allows the creation of an itinerary that can be visited and may give rise to the creation of an underwater archaeological park, with added tourist value.

Fig. 67 –3D reconstitution of a large pot, from pottery sherds fragments found in São Francisco wreck site.

The work was also particularly positive in the articulation between all partners and participants, including the Maritime Police and the Coast Guard, constituting a unique experience in Portuguese-speaking countries. Thus, it is important to continue this project through: increasing research on the island of Santiago; extending the work to other islands, adopting the same strategy of non-intrusive assessment of sites already known; promoting access to low sensitivity sites; and the development of specialized training activities in a research environment, ensuring the transfer of knowledge and collaboration, namely with other projects.

Lisbon, January 13, 2020,

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(archaeologist, responsible for the archaeological works)

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