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ABSTRACT

On 24th April 1917 the imperial German submarine *U-35*, after crossing the Straits of Gibraltar, positioned itself near Cape St Vincent, in the Algarve, Portugal. A few hundred metres from the Portuguese coast, the *U-35* sank four merchant ships that day: three steamers and a sailboat. Nearly 100 years after this episode from World War I, three of these vessels are now silent testimonies for divers that visit them every year. They are silent, not because they do not have a name correlated with the ships sunk on that fateful day, but because their history and story, which were published ten years ago in a diving magazine, have only now attracted the attention of academics and are not being brought into the wider world of the diving and non-diving public. It is imperative that their history and our studies frame divers' views during their deepwater exploration of these wrecks. Soon to be covered and contextualised by the UNESCO Convention on the Protection of the Underwater Cultural Heritage, which Portugal has ratified, they should then be a matter of public awareness about the value and meaning of cultural heritage, primarily for *in-situ* preservation, as a form of appreciation and knowledge, and *in situ* recorded and studied as multidisciplinary cultural, historical and archaeological information. They should also be promoted *in situ* for general public access, disseminated to the general public through educational measures and monitored for interference. In other words, they should be given back to the community as cultural heritage, which means giving them a public and social collective character and bringing them to fruition, in its full cultural dimension, i.e., more than objects, they are witnesses of a historical era and culture, with touristic and economic potential. The CINAV-PT Navy Research Centre/Portuguese Navy, together with the municipality of Vila do Bispo, the Portuguese Minister of Defence, and SUBNAUTA are developing a historical and archaeological project with the purpose to study the wrecks and to fulfil the entire spirit of the Convention, which also means to motivate and encourage other projects – national and inter-

U-35 OPERATIONS OFF THE SAGRES COAST, ALGARVE, PORTUGAL

FIRST WORLD WAR HERITAGE AND MEMORIES FROM THE SEA

INTRODUCTION

U-35, an imperial U 29-class U-boat (Fig. 1), under the command of Lothar Von Arnauld de La Perière (1886–1941), left the Adriatic base of Cattaro, presently Montenegro, on 31 of March 1917. It crossed the Straits of Gibraltar on 12 April bound for the busy shipping route between Britain and the Mediterranean, which was vital to the English and French operations. On 24 April, *U-35* halted several ships and sank four of them off the southwest coast of Portugal.

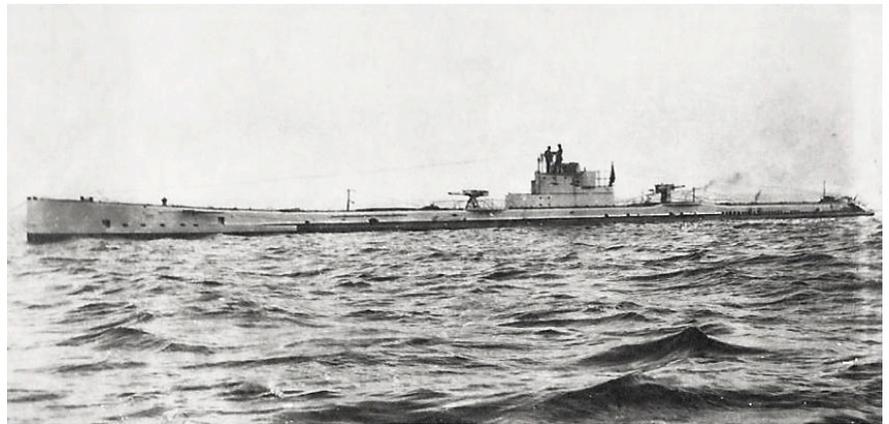


Figure 1 – *U-35*: photograph from the family album of Richard Berger, a crew member, courtesy of his grandnephew Allan Hunt, an American citizen.

At 08:50 am, the 1,055-ton *SS Nordsöen*, a Danish merchant ship under British charter bound for Genoa from Bergen with a cargo of herring, was sunk, followed at 09:15 by the 1,667-ton *SS Torvøre*, a Norwegian steamer bound for Naples from Swansea with a cargo of locomotive coal bricks.

The explosions were heard at the nearby city of Lagos and the Portuguese armed tugboat *Galgo* was sent to Sagres to investigate. Detecting the German submarine, it immediately attacked *U-35*. *Galgo* was a private tugboat¹ commissioned by the Portuguese Navy to defend an extensive part of the south coast of the country from Lagos to Cape St. Vincent. This was a huge area to cover for the small 25-meter-long, 75-ton steam tugboat, built in 1887 by Ross & Duncan of Glasgow. Armed with a single 37-mm Hotchkiss, *Galgo* was no match for the 105-mm guns of *U-35*, so the exchange of gunfire that took place had no consequences for either. That day and the day after, the Portuguese tugboat limited itself to rescuing the crews from the sunken steamers, delivering them to Lagos.

At 10:40 am, the 3,715-ton *SS Wilhelm Krag*, a British-chartered Norwegian merchant ship, was sunk in front of Praia da Luz while sailing in ballast from Genoa to Barry. Meanwhile, the *SS Nordsöen* needed

¹ Owned by João António Júdice Fialho.

national, through reciprocal contribution – and to focus on a multicultural and multinational humanistic approach, beyond the merely academic one.

KEYWORDS

First World War, *U-35*, Lothar Von Arnauld de La Perière, submarine warfare, underwater archaeology, submerged cultural heritage

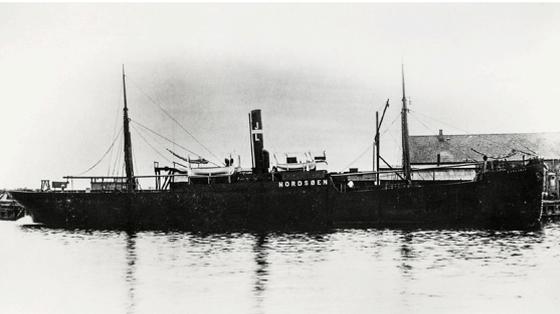


Figure 2 – *SS Nordsöen*. Courtesy of the M/S Maritime Museum of Denmark.

an extra explosive charge after running aground on the coast following the morning attack. In the afternoon, at 04:10 pm, the 265-ton Italian sailing ship *Bieneimé Prof. Luigi*, sailing from Genoa to Fowey with a cargo of china clay, was halted, inspected and sunk.

All four ships sunk were recorded in *Lloyd's War Losses* but not erased from *Lloyd's Register of Ships*, to avoid war propaganda.

U-35 returned to its home base and passed back through the Straits of Gibraltar that same evening, sinking no more ships on the way back to Cattaro, where it arrived on 6 May with only 24 gun shells and no torpedoes left.

All these four ships were sunk without a torpedo being fired, but only by using demolition charges set by the submarine's crew, or by gun-fire, after water, food, fuel and supplies were taken from them.

The mission lasted 36 days and covered a distance of 5,551 nautical miles. Nine torpedoes and 541,105-mm calibre shells were fired and 29 demolition charges used. Twenty-three ships, totalling 67,989 tons, were sunk – 16 enemy vessels (12 British and 4 Italian) and 7 neutral vessels (3 Greek, 2 Norwegian, 1 American and 1 Danish) – with 44 lives lost.

U-35's mission was not exceptional in the general context of the First World War and did not bring any particular new aspect to the macro history already well documented and extensively written on submarine warfare. But it is exceptional from the perspective of Portuguese history and very relevant to the local history and economy, and a very good example of a multinational and multicultural historic and cultural event.

However, there is also another relevant aspect to this episode, because *U-35* had a cameraman on board who recorded the entire mission on film, in particular the second attack using demolition charges on the *SS Nordsöen* (Fig. 2) and the coast of Sagres in 1917, which is very different from today. Apparently, La Perière liked to film his missions as the next *U-boat* he commanded, *U-139*, also had a cameraman on board who recorded the fight and sinking of the Portuguese Navy mine-hunter *Augusto Castilho*.

In 2017, the wrecks of these ships will come under the protection of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage, which Portugal ratified in 2006. Apart from an article published in an already extinct Portuguese diving magazine, more than 10 years ago, where the relationship between three wrecks and the First World War *U-35* episode was suggested for the first time, no research or scientific study has ever been conducted, historically or archaeologically. To put it simply, we do not know, scientifically, if these wrecks indeed correspond to the ships sunk by *U-35* in 1917. Neither do we know their actual condition and state of preservation, the real impact of diving tourism, the prime threats they face, or the impact and the role of the wrecks on the environment. Also unknown to us are the location of the remains of the Italian sailing ship, what happened to the crew

of the sunken ship after being brought ashore in Lagos and the local footprint of the event.

The CINAV planned a four-year project that started in May 2014 with an EMEPC² ROV operation aimed at locating the sailing ship at a depth of more than 650 metres. This first operation was undertaken on board the Portuguese Navy hydrographic ship NRP *Gago Coutinho*. This was followed by a field mission, in September 2014, related to the three steamers, centred on SS *Torvore*.

These actions, which were conducted up until October 2014, were only possible through the goodwill of the EMEPC, the support of the municipality of Vila do Bispo which was formalized with the signing of a long-term protocol, and a collaboration agreement with the SUBNAUTA diving centre.

After only one week of fieldwork, the Project had already obtained two important results:

- a) the definitive identification of the SS *Nordsöen* wreck location;
- b) the complete archaeography of the wreck correlated as the SS *Torvore*, enabling the correlation wreck-to-ship and the study of its steam technology, and the opportunity to contribute to the Stroke Project (Russo 2012).

What will be briefly discussed here are the objectives, methodologies, cultural heritage aims, fruition model for the wrecks and the first results of the project.

THE PROJECT OBJECTIVES

The CINAV *U-35* Project objectives can be divided into two different categories: historical and archaeological.

At the historical level, the project intends to research the full event, including the makeup of the *U-35*'s crew on that specific mission, the sunken ship's crew and what happened to it after being brought ashore by the tugboat *Galgo* at Lagos and the footprint of the event at the local level. All of these aspects will be looked at from a multinational and multicultural heritage perspective.

At the archaeological level, the project intends to collect material evidence that will allow the wrecks to be positively or negatively correlated with the sunken ships, the steam technology of the wrecks to be studied and, consequently, to make a contribution to the Stroke Project, and, finally, the sailing ship to be located at a depth of more than 650 metres.

To achieve these aims, together with a geophysics survey, a different archaeographic methodology is being developed and tested to record the wrecks. All of them are at a depth below 30 metres and have a significant verticality, a fact that makes the traditional trilateration method unfeasible.

² *Estrutura de Missão para a Extensão da Plataforma Continental – Task Group for the Extension of the Continental Shelf.*

It is hoped that the project results will contribute to the local history and cultural heritage, as part of the local historical identity; contribute to the development of the local economy and cultural tourism through the diving industry; and strengthen cultural tourism related to “wrecks with history”, from a human interest perspective, well beyond mere iron and steel objects. Ultimately, we aim to make these wrecks and their cultural heritage, with their strong multinational and multicultural dimension, a significant part of the local identity, to make the divers who visit the wrecks ambassadors and co-owners of this important underwater cultural heritage, and to make them aware of the need to participate in the *in-situ* monitoring and conservation efforts and fruition, implementing the ethos of “*Take and leave nothing but pictures and bubbles*”.

THE METHODOLOGY

To research the event and the wreck’s history, at the local, national and international level, a classical approach will be used: in-depth study of primary sources, including wartime documentation, newspapers, the film taken on board *U-35*, as well as secondary sources. Great attention will be given to tracking down people related to the event.

Archaeologically, a team of closed-circuit technical divers was assembled, as two of the three steamers sunk are at a depth below 30 metres. In order to perform all of the tasks planned at that depth, long bottom times are imperative and, as a result, long decompression periods needed.

The team members are not just divers. They are divers with skills critical to the project’s data processing, software operation and methodology development and testing.

In the absence of extensive and recent archaeological projects on contemporary wrecks, especially at that depth, the baseline/offset survey method was adapted. This adaptation was conducted and tested on the alleged *SS Torvore* wreck, during the first week of September, and involved more than 3,500 minutes of diving.

The almost 80-metre-long wreck was divided into three components: stern, engine-room and bow sections. The stern and bow sections were recorded by using a baseline marked every metre with tags through the ship’s central axis. The engine-room was recorded by surveying the engine and boiler. The wreck’s profile meant that the baseline could not be linear in Z so the depth of every single tag had to be recorded.

To record and calibrate all depths, the Lowest Astronomical Tide method was followed, which allowed us to take depths and measurements on different days, at different times of the day and at different gauges. The PO (calibrating point) was defined as the centre of the low-pressure cylinder at the engine, the highest point of the wreck and a very robust one.

From the baseline tags, we measured direct distances, both to starboard and port, to the most significant edge of the wreck and, at each edge

point, to the respective bottom point. With this, we acquired the wreck's plan and profile.

We followed this methodology because, as mentioned above, the two wrecks are at a depth below 30 metres and have significant verticality, and we believe that the traditional trilateration method is unfeasible. The geophysics survey will allow us to verify the effectiveness of this archaeographic methodology.

With the data collected by the archaeographic survey and the analysis of the engine-room machinery and cargo, it is hoped to be able to make a positive or negative correlation between the wreck and one of the ships sunk in 1917.

This methodology was developed, tested and used in the case of the merchant steamer *SS Dago*, sunk off Peniche in 1942 (Russo 2014).

With the measurements made on the wreck's engine, it is also hoped to add some precious data to the Stroke Project mentioned above.

Regarding the location of the Danish steamer *SS Nordsöen*, the objective was to clarify the contradictory information that existed, placing the wreck in different locations depending on the source, person or diving guide. We were able to confirm the ship's resting place by comparing the geomorphology of the coast from the footage filmed by the *U-35* in 1917 with that of today (Fig. 3).



Figure 3 – Geomorphology comparison by team member Tiago Dores

In order to locate the Italian sailing ship *Bieneimé Prof. Luigi*, we joined an EMEPC mission on board the Portuguese Navy hydrographical ship *NRP Gago Coutinho* and used its deep ROV – *Luso* – on three different targets previously identified using a multi-beam survey. This search was done in the proximity of the coordinates from the *U-35*'s War Diary, at a depth of more than 650 metres. It was the first time that a ROV had been used in a Portuguese archaeology project. During this ROV dive, a wooden structure was located (Fig. 4) at one of the investigated targets, but it is not possible to say whether the structure is somehow related to the Italian sailing ship sunk by *U-35*.

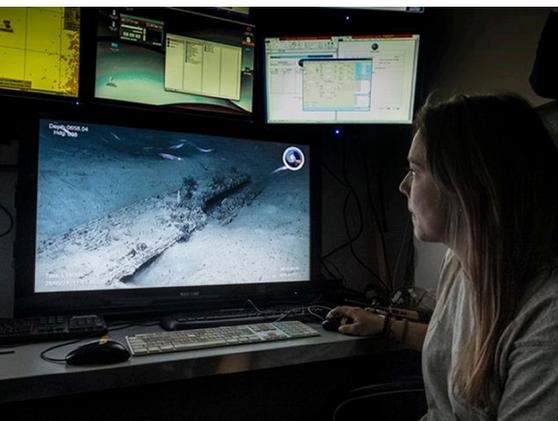


Figure 4 – A wooden structure identified during the ROV dive. Photograph by Augusto Salgado.

In this new type of approach, even the plan of the municipality of Vila do Bispo to accommodate and feed the team was very interesting and in accordance with the spirit of the project. Instead of just paying the team, the municipality contacted the hotel industry and local restau-

rants and proposed that they accommodate and feed the team, involving them directly in the project. And the response was far beyond even the municipality's expectations. The team was accommodated in two local hotels, at much reduced or even no cost, and provided with lunch and dinner at more than 14 different restaurants, each very welcoming. The range of restaurants was wide, from a fishermen's tavern, family style restaurants, or a state of the art historical inn (Pousada do Infante) to and an excellent Italian restaurant at the Martinhal Beach Resort.

We believe this approach was very significant, not only because the team was extraordinarily well accommodated and fed, but also because it was possible to introduce an historical and archaeological theme to the local economy that was taken up energetically.

This proves beyond any doubt that it is worth seeking the local community's logistical support for scientific projects. The project was very well supported and provided stimuli to the local economy, in a true symbiosis. We believe that from that moment, this project became their project as well.

The Vila do Bispo municipality also implemented an extensive media communication programme. The result was very good, with two of the three Portuguese TV channels covering the project on prime time TV news and dozens of articles in the national and local press. The field season was preceded by an article in National Geographic Magazine (Salgado and Russo 2014) on the ROV mission.

THE CULTURAL HERITAGE AIM

As mentioned, the aim is to ensure that the results of the project are fully returned to the local, national and international community. The project is not simply intended to summarize the usual academic and scientific aspects. The idea is to turn it into a long-term project which benefits both divers and non-divers.

It is not the wrecks as objects that we are studying and want to give back; it is the history of the men who built and sailed the vessels and both attacked and were attacked, while always remaining fully aware of the multinational and multicultural dimension and value of the event as cultural heritage, and its economic potential, which needs to be self-sufficient.

It is also about the families related to the crews and what these wrecks and their history mean in terms of identity, in terms of a sense of cultural belonging without frontiers, a cultural bond with Portuguese cultural heritage through these people. Locally, to increase the inhabitants' responsibility towards their cultural heritage, the aim is to encourage them to be proud of being part of a community which has this important legacy and instil the need to preserve it and be part of the measures that we all need to adopt in order to guarantee its preservation and fruition.

The definitive proof of the emerging importance of cultural diving tourism, if one were still needed, is the fact that on 6 September we dived down to the alleged Norwegian steamer *SS Vilhelm Krag* with five British divers who had travelled to Portugal specifically for that purpose. They already knew about its history and had researched it in advance.

A PROPOSED FRUITION MODEL

In Portugal, there are only two known examples of wrecks with archaeological itineraries: the *Lidador* (Monteiro 2007) and *L'Ocean* (Blot and Blot 2013), in the Azores and the Algarve, respectively. To this could be added the American Second World War B-24 airplane that crashed at Faro, in the Algarve (Guerreiro 2008), and which is under the exclusive responsibility and care of a local diving centre. We feel that the first two were “simply” put together but no real effort was made to promote or to include them in the diving industry. Only the diving company SUBNAUTA, operating from Portimão, Algarve, is taking any active measures to maintain the site of the *L'Ocean* and to publish the ship's history (Blot and Blot 2013).

With the *U-35* wrecks we would like to create a constant, long-term, living and dynamic fruition model. To achieve this, we need everyone's involvement: Government, UNESCO, academics, Portuguese Navy, municipality, diving industry and divers. We would need proper heritage-safe anchoring spots and equipment, a permanent local exhibition, a continuous linked cultural programme, professional and trained dive leaders, well-documented and informed divers that are properly briefed, a responsive and integrated hotel and catering industry, and interlinked tourism institutions. To put it simply, we would need an adequate cultural network aimed at creating a formal submerged cultural heritage as part of a broader programme of cultural heritage. All wrecks, not only these in the project, should have adequate and properly maintained cultural itineraries.

All of this is very clearly problematized in the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage and PENT – the National Strategic Plan for Tourism.

It is not uncommon to find divers who, after having dived the alleged *SS Torvore*, ask us if the wreck has an engine, and others who mention that the *Vilhem Krag* has a fantastic engine. The alleged *SS Torvore* has a huge engine, the most distinctive object on the wreck, and the alleged *SS Vilhem Krag* has no standing engine, its remains almost unrecognizable to the untrained eye. It is also common to find non-divers who would very much like to see these wrecks but have no hope of ever doing so.

For all of these people, we need a public-oriented communication strategy and plan that is suitable and very well executed. It must not be ephemeral but permanent and updated, in which virtual archaeology is a real asset, applied with respect for scientific rigour as stated for example in the *Seville Principals on the Virtual Archaeology* (n.d.), or



Figure 5 – An aspect of the survey of the wreck of the *SS Nordsöen*. Photograph by Augusto Salgado.

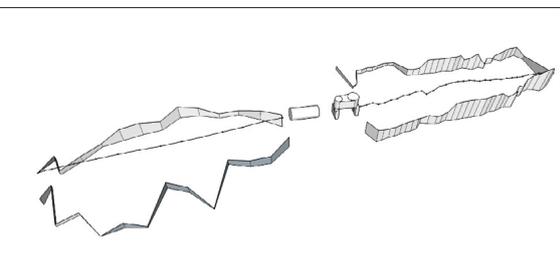


Figure 6 – Three-dimensional outline of the alleged *SS Torvöe* wreck (software operation by team member Paulo Carmo)



Figure 7 – The *SS Dago*:1:100 scale model by Jorge Russo.

the *London Charter for the Computer-based Visualisation of Cultural Heritage* (2009).

We should not forget education. The project and results must be taken to schools, where the language must be adapted. We should make presentations adapted for children, youth and university students, not forgetting the elderly, and also fishermen, those with a unique relationship to the sea and, by association, wrecks. We should not forget that there are fishermen who have knowledge of the location of what they call *peguilhos*, obstacles to their fishing nets on the seabed, very often ship wrecks.

FIRST RESULTS OF THE FIELD WORK

After only one week of field work, there are, we believe, already some interesting first results. These are of course all preliminary, as the data collected is still being analysed and discussed, and the final report is far from completion. However, being able to clarify the location of the remains of the *SS Nordsöen* was very important, not only from a historical and archaeological point of view, but especially for the local economy. Now, the diving industry is able to provide the many divers looking for cultural heritage in the Algarve with an accurate history of that specific wreck, with no error or doubts. When asked about the *SS Nordsöen*, they can take divers to the exact and correct diving spot (Fig. 5). And local diving guides can now be amended.

The more than one thousand measurements taken from the alleged *SS Torvöe* were transformed into a first draft of the wreck's three-dimensional model that allowed us to see its full and first accurate main outer dimensions (Fig. 6). What we are looking for in this first model is just to comprehend the outline and the shape of the wreck; no details about the structure are yet available. A detailed 3-D model is planned using virtual archaeology, something never attempted in Portugal before, even less so for a contemporary wreck of this size and at this depth. The aim is also to build a real 1:100 scale model, like the one produced for the *SS Dago* (Fig.7).

From the data already collected, we believe that the possible correlation wreck-to-ship for the *SS Torvöe* is very strong, since the engine, boiler, cargo and overall length all match so far. Nevertheless, the research is in progress, so we need to be cautious.

CONCLUSION

In conclusion, we believe that this First World War episode and the three related wrecks are a rare and extraordinary opportunity to fully implement a submerged cultural heritage project, and a multicultural and multinational cultural programme, fulfilling the entire content of the UNESCO Convention on the Protection of the Submerged Cultural Heritage. With it we aim to implement a fruition and conservation project and to develop the local economy, tourism and culture, not forgetting

the international dimension and potential of the project and programme. The project has a large historical and archaeological potential that can contribute to a better understanding of submarine warfare during the conflict, multinational trading and routing, the local impact of the First World War on Portugal and on the Portuguese Navy defence system, and its naval capability and constraints.

From the archaeological point of view, the project can be very important as a methodology providing the grounds for dating contemporary steam ships and steam technology, field steam machinery research and correlation wreck-to-ship methodologies. It is hoped that the project and programme can truly contribute to turn the history of *U-35* and the ships sunk into First World War heritage and memories from the sea.

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