

# THE BATTLESHIP “G. AVEROF”

## PROMOTION AND ENRICHMENT OF THE MUSEUM ARCHIVES

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**KEY WORDS:** Museum Archives, Historical Photos, Spatio-Temporal Modelling, Spatial Data Infrastructure, Mashups, Geographic Open Source Software, Geographic Catalog Servers.

### ABSTRACT:

The battleship “G. Averof” was a legendary warship of the Greek fleet during the first half of the 20th century with an active history in three wars (Balkans, World War I and II). Nowadays, “G. Averoff” is a Museum operated by the Greek Navy, and the world's only surviving heavily armored cruiser of the early 20th century. In the Department of Geography at Harokopio University of Athens – in cooperation with the Admiral in duty and the personnel at the Museum Battleship “G. Averof” – we launched in Spring 2007 a research Project with subject the promotion and enrichment of the Museum Archives. This paper presents the methodology applied and the first outcomes of the Project. Special attention has been given to the spatio-temporal dimension of the battleship history, while appropriate systems and tools offered by the current technology in web mapping and catalog services have been adopted.

### 1. INTRODUCTION

The *battleship “G. Averof”* (Figure 1) was a legendary warship of the Greek fleet during the first half of the 20th century with an active history in three wars (Balkans, World War I and II). The ship has been acquired by the Greek Navy due to the funds offered by the wealthy Greek patriot and benefactor Georgios Averof. The boat-building has been concluded in 1911 in Italy.

The main action of the battleship is focused on the Balkan Wars. The battleship, with the beginning of the First Balkan War in October of 1912, was at the head of the Aegean Fleet, under the command of Rear Admiral Paylos Kontouriotis. The battleship contributed to the liberation of Aghio Oros and the East and North Aegean islands (Thasos, Samothraki, Tenedos, Aghios Eustratios, Mitilini, Chios). The successful result of the battles of Elli and Limnos that followed offered the dominance of the Greek Navy in the Aegean Sea. During the Second Balkan War (1913) the battleship contributed to the occupancy of Kavala and Alexandroupoli.

“G. Averoff” is the world's *only* surviving heavily armored cruiser of the early 20th century. Today, is a Museum (<http://www.bsaverof.com>) operated by the Greek Navy.

In the Department of Geography at Harokopio University of Athens – in cooperation with the Admiral in duty and the personnel at the Museum Battleship “G. Averof” and the permission of the Hellenic Navy – we have launched in Spring 2007 a research project with subject: “the promotion and enrichment of the Museum Archives”. Specifically, the research project is focused on:

- the *“life” in the battleship* during the war periods (with presentation of the interior space in digital form, accompanied with photos and documents). During war periods the ship crew was 1200 persons.



Figure 1. The battleship “G.Averof”.

- the *movement of the ship in space-time* and detailed mapping of the naval engagements and other operations.
- the *development of the ship* during the last century (armaments, breakages, demodernizations).
- the *virtual visits* in the Museum (with interactive multimedia and web applications).

This paper presents the methodology applied and the first outcomes of the Project. It is worthy to mention that special attention has been given to the *spatio-temporal dimension* of the battleship history, while appropriate systems and tools offered by the current technology in *web mapping* and *catalog services* have been adopted.

The discussion is organized as follows. Section 2 presents the main Phases of the Project. Section 3 highlights the significance and originality of the methodology applied. Section 4 describes the current status of the Project by presenting the first outcomes.

Finally, Section 5 concludes the discussion by summarizing some thought as regards to our future activities.

## 2. THE METHODOLOGY

The Project consists of *four (4) main Phases*, which are expected to be concluded by the end of 2008. Namely,

### Phase 1: Recording of the Archives Content

In this Phase the content of the Museum Archives will be recorded and digitized. Specifically, the following items will be recorded:

- a) the rich and rare collection of *historical photographs* (about 1000 photographs from the first half of the 20th century). Notice that the Museum Archives preserves unique analogue copies of these photographs.
- b) the *dossiers and diaries* of the ship admirals and crew (donations to the Museum from crew descendants; also unique copies are preserved in the Archives).
- c) the *articles and other documents* from historical magazines and newspapers.
- d) the *plans of the decks and machines* as of the shipbuilding company.

### Phase 2: Analysis and Enrichment of the Content from other Sources

In this Phase the content collected in Phase 1 will be *analysed and documented*. Appropriate *metadata* will be generated and attached to the recorded items (e.g., the space-time location of a photograph).

Additionally, the content will be *enriched* from other sources, such as the Archives of the Hellenic Navy Museum, the History Museum, etc.

### Phase 3: Organization and Filing of the Digital Content

In parallel with Phases 1 and 2 the organization of the digital content using an appropriate *filing system* will be attempted. This Phase comprises the following activities:

- a) the design and implementation of a *Geographic/Multimedia Information System* to accommodate the following entities: (i) photographs, (ii) documents, (iii) engagement/ operation maps, and (iv) ship plans. The system database will follow advanced recording techniques and will comply to the international standards.
- b) the *insertion* of the content and the corresponding metadata items in the system database.
- c) the development of mechanisms to *retrieve* the content items based on various (spatio-temporal and thematic) criteria.

### Phase 4: Content Processing and Products

This Phase summarizes all efforts towards the exploitation of the recorded/analysed content and the generation of appropriate *products*.

Specifically, this Phase aims at the production of both analogue/paper and digital products (such as maps, reports and multimedia presentations) with a well documented research work and educational significance. Many of the products will be also available through the web.

## 3. SIGNIFICANCE

The significance and originality of this research project has been recognized by the Admiral in duty, the personnel of the Museum and the Hellenic Navy, who approved the methodology in Section 2.

The following list summarizes the gaining of the research work:

- The recording and digitization of the valuable and rare content available at the Museum Archives. Notice that most of the items are unique copies.
- The research and historical documentation of the content, plus its enrichment by additional items available elsewhere.
- The development of an Information System with retrieval and visualization capabilities based on thematic, spatial and temporal criteria. This System is aimed to become available at the Museum or the Web and assist the historical research and documentation.
- The generation of analogue/paper and digital products (such as maps, reports and multimedia presentations) to promote and make-known the battleship rich history.
- The education and training of a number of students and young researchers, who are being involved at all Phases of the project.

## 4. THE PROJECT OUTCOMES

As mentioned already one of the scopes of this paper is to present the first outcomes of the project. Being currently at the *middle of the project schedule* (May'07 to Dec'08) we have already developed a series of tools towards "the promotion and enrichment of the Museum Archives".

Special attention has been given to the *spatio-temporal dimension* of the battleship history, while appropriate systems and tools offered by the current technology in *web mapping* and *catalog services* have been adopted.

Specifically, the following systems and tools are already available:

1. An *image database*, which accommodates the historical photographs of the Archive.
2. A *web photograph gallery*, which serves the historical photographs on the web.
3. A *spatial database of the ship decks*, generated by the digitization of the initial analogue plans of the shipbuilding company.
4. A series of *virtual visits* in the ship decks and the Museum.
5. A series of *web mapping applications* presenting the main events of the ship history (using geographic mashups).
6. A *geographic catalog server*, which diffuses all the digital content on the web using widely accepted

standards for services and protocols (such as those proposed by ISO/TC211 and OGC).

Most of these systems and tools are already available under the Project URL: <http://averof.dynalias.net> (Figure 2). Notice that some of them require authorized access, due to restrictions (copyrights) posed by the Hellenic Navy. The following Subsections describe in more details the project outcomes, which are currently available or under development.



Figure 2. The initial web page of the Project (part of). Available at <http://averof.dynalias.net> (currently in Greek).

#### 4.1 The Historical Photographs Database

As mentioned already the Museum Archives accommodate a rich and rare collection of *historical photographs* (about 1000 in number) from the first half of the 20<sup>th</sup> century. Those photographs are in analogue form and their majority is in *unique* copies. Most of the photographs either have been taken on the ship or they depict the battleship at historical events.

Under this Project we have *scanned* all these photographs in high resolution (>600 dpi; grey scale) and *stored* them in digital files (jpeg format; low compression). Most of the photographs have been assigned appropriate captions provided by the Museum personnel and some have already been associated spatially and temporally. Our intention is to further analyze these photographs and enrich the collection with related content available in other Archives (e.g., the Hellenic Naval Museum, the History Museum).

An *image database* has been developed to store the *metadata* associated to the photographs. The *PostgreSQL/PostGIS* open source software package has been adopted for the implementation; provided that apart from the alphanumeric metadata (caption, theme, keywords, etc.), the photographs have *spatio-temporal descriptions*, i.e., the location and the date the photo has been taken.

PostgreSQL/PostGIS may efficiently support the *retrieval* of the photographs based on *thematic* and/or *spatio-temporal predicates*. Additionally, it may readily be connected to a desktop GIS or a Map Viewer in order to *visualize* the spatio-temporal distribution of the photographs on top of digital maps or geographic mashups (see Section 4.4).

#### 4.2 The Web Photograph Gallery

In order to make the photographs available on the web and mainly support the browsing on the Archives Albums, a *web*

*photograph gallery* has been generated (Figure 3). The software package used for the implementation of the gallery is the *Adobe Photoshop Elements*.

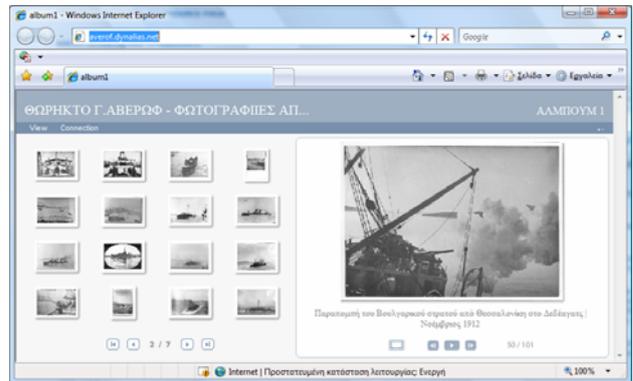


Figure 3. A snapshot from the web photograph gallery.

The gallery has followed the organization of the photographs as in the Museum Archives; and serves the photographs on the web in a *slide show* form, where the photograph captions are also visible. We plan to enrich the shows with sound (music and/or talks) in the near future.

A pilot slide show of about ten (10) photographs accompanied with the corresponding captions and musical sound has been produced in *video* format. The video has been generated in Adobe Photoshop Elements, it lasts for 1.5 minutes and presents a series of historical photographs from the launching of the battleship (Figure 4).

We plan to generate similar videos and multimedia presentations for various themes related to the history of the battleship (e.g., the naval battles of Elli and Limnos).



Figure 4. A snapshot from the slide show (video) of the battleship launching (March 12<sup>th</sup>, 1910).

#### 4.3 The Spatio-Temporal Database of the Ship History

Based on the records of the *battleship diaries*, we are currently developing a spatio-temporal database. This database will also

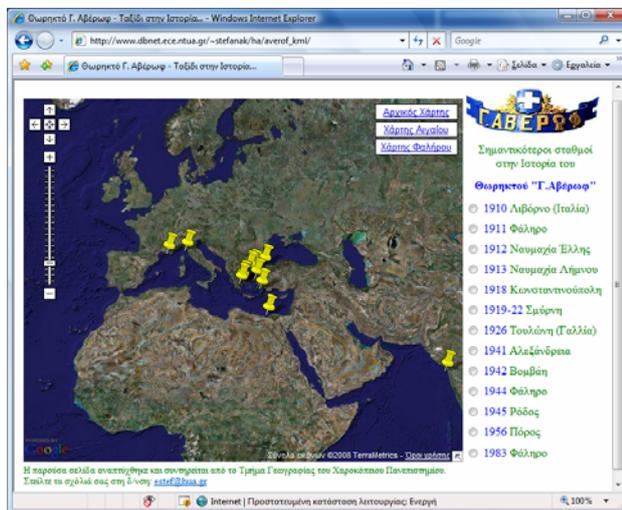
be implemented in *PostgreSQL/PostGIS* open source software package and will be capable to efficiently support the *spatio-temporal analysis of the ship history*.

PostGIS offers a rich collection of spatio-temporal operations. Additionally, it may readily be connected to a desktop GIS or a Map Viewer in order to *visualize* the ship location on top of digital maps or geographic mashups (see Section 4.4).

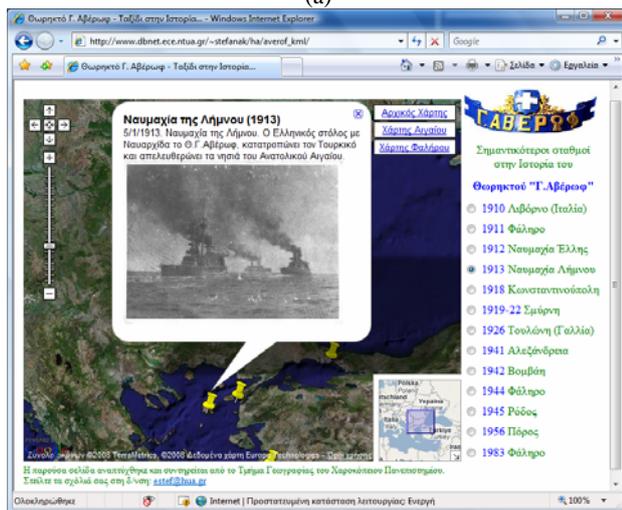
#### 4.4 The Geographic Mashups

A pilot application to present the most important events of the battleship using *mashups* has been implemented in *Google Maps API* (Figure 5). This application to highlight the powerful visualizations that may be readily obtained by combining the content of the Project databases and the geographic mashups.

This application has been implemented in Google Maps API; it consists of an interface generated in HTML and visualizes the content of a *KML* (or *KMZ*) file. The latter has been generated by a *Java script*, which takes as input the result of a *SELECT* query in the historical photographs database (Figure 6).



(a)



(b)

Figure 5. The Google Maps API Application presenting the most important events of the battleship history; (a) all the placemarks, (b) focusing on the naval battle of Limnos. Available at: [http://averof.dynalias.net/averof\\_kml](http://averof.dynalias.net/averof_kml)

#### 4.5 The Spatial Database of the Ship Decks

The Museum Archives preserve the initial paper plans of the shipbuilding company dated in the first decade of the 20<sup>th</sup> century (Figure 7). Most of them have been partially destroyed. One of the Project scope has been the digitization/ vectorization of the *ship decks plans* and the generation of a *spatial database* which can then be used in several applications. Two of them are described in Sections 4.6 and 4.7.

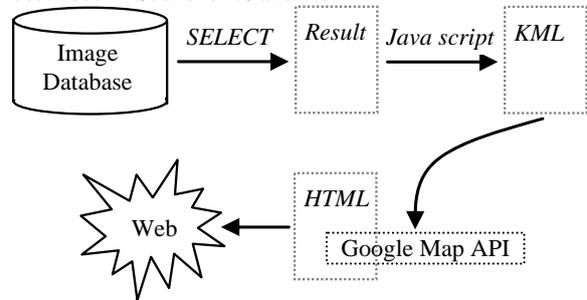


Figure 6. The procedure towards the generation of the Google Maps API Application.

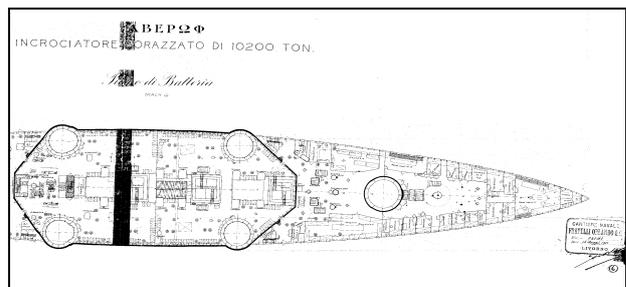


Figure 7. The scanned paper plan of the 1<sup>st</sup> deck (part of).

The spatial database has been implemented in *ESRI ArcGIS* software package. A separate shapefile has been generated for each deck, with polygonal features for all cabins, rooms and open-air spaces. The associated attribute tables have been populated with the corresponding equipment, machines or arms.

#### 4.6 Virtual Visits in the Museum “G.Averof”

A series of *virtual visits* to the Museum “G. Averof” can be generated by loading the content of the *Spatial Database of the Ship Decks* (Section 4.5) in a multimedia software package and authoring the visit scenario.

In cooperation with the Museum personnel, we are currently composing a pilot *virtual visit* in the Museum (Georgakas 2008). The *Adobe Flash (Micromedia) software package* has been adopted to generate a web accessible virtual visit, while the first results are already uploaded at the Project web site (Figure 2).

#### 4.7 Virtual Presentations of the Daily “Life” on the Ship

Similarly to the action presented in the previous paragraph, we plan to combine the *Spatial Database of the Ship Decks* (Section 4.5) with the *Historical Photographs Database* (Section 4.1) and associate the photographs taken on the ship with their location (on the ship) both in space and time.

This will assist the generation of numerous virtual presentations of the daily life on the ship, a rather worthy tool to the historical research.

#### 4.8 The Geographic Catalogue Server

It is obvious from the previous Sections that this Project produces a wide digital content of various types and formats, ranging from digital image files to web mapping applications. In order to make this content available and increase usability, we have been generating a *geographic catalog server*. This server will be able to diffuse all the digital content on the web, using widely accepted standards for services and protocols (such as those proposed by ISO/TC211 and OGC). In other word, the catalog server will transform the digital repository to a *Spatial Data Infrastructure* (SDI; Williamson et al., 2004) for the history of the battleship “G.Averof”.

The software package adopted to implement the geographic catalog server is the *GeoNetwork Open Source Server* (Figure 8). We have stored in this server appropriate *metadata* for the digital content (i.e., digital photographs, deck plans and battle plans) and the applications generated under this project. The metadata are in XML format and follow the specification of ISO19139.



Figure 8. The initial screen of the Catalog Server for the battleship “G.Averof”. Available at: <http://averof.dynalias.net/sdi>

The metadata items have been generated in an automated procedure, similar to the one in Figure 6 and they are subsequently imported (*batch import mode*) to the GeoNetwork Catalog Server. Figure 9 presented graphically the procedure for the generation of the photographs metadata items.

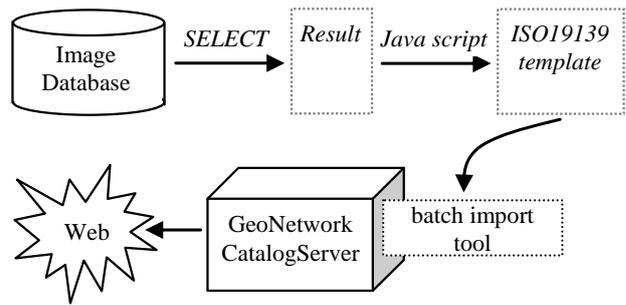


Figure 9. The procedure towards the generation of the metadata items for the historical photographs.

Figure 10 presents the metadata of a historical photograph as presented to the end-user. As mentioned above, this metadata is encoded based on an ISO19139 template (XML format).

Should Web users be authorized, they are capable to connect to the GeoNetwork server, access, browse the metadata and retrieve the geospatial content and/or applications. The server provides them an efficient interface to pose queries on metadata items with thematic, spatial and temporal predicates.

Figure 11 presents the customized query interface in GeoNetwork Catalog Server for the battleship “G.Averof”. End-users may enter: (a) the *thematic predicates* at the left side of the screen (e.g., a Keyword=“Naval battle of Elli”) and/or at the right side of the screen (e.g., Category= “Image file”); (b) the *spatial predicate* on map frame at the middle of the screen (e.g., Spatial Query Window=[min\_long, min\_lat, max\_long, max\_lat]); and/or (c) the *temporal predicate* at the top-right side of the screen (e.g., Temporal Interval = [1911–1915]).

## 5. CONCLUSION

This paper presents a series of systems and tools generated or under development to promote and enrich the Archives of the legendary warship “G. Averof”. Special attention has been given to the *spatio-temporal dimension* of the battleship history, while modern technologies in *web mapping* and *catalog services* have been adopted.

Our future actions are twofold. Firstly, to complete and further customize the systems and tools described in Section 4. This is expected to be concluded by the end of this Project in December 2008. Secondly, to launch a new Project with special focus on the analytical functionality over the historical repository. Our research, towards this direction, will include the enhancement of semantics associated to the digital content, the establishment of semantic networks, and the adoption of more efficient multimedia presentations.

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Hellenic Navy, <http://www.hellenicnavy.gr/>  
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ISO/TC211, <http://www.isotc211.org/>

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### ACKNOWLEDGEMENTS

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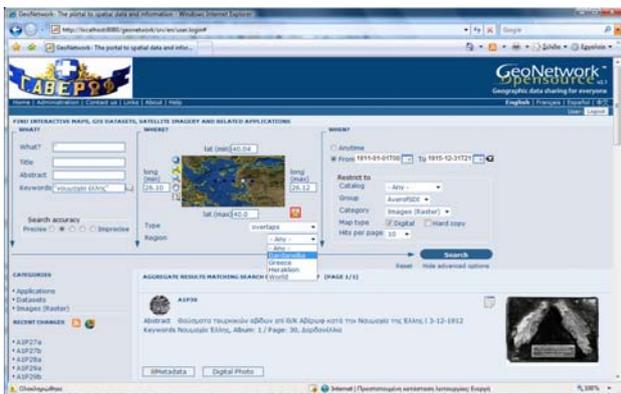


Figure 11. An example query to the metadata items of the Catalog Server for the battleship "G.Averof".

**A1P29A**

Abstract Ζημιές στο Θ/Κ Αβέρωφ μετά τη Ναυμαχία της Έλλης | 3-12-1912  
 Keywords Ναυμαχία Έλλης, Album: 1 / Page: 29a, Δαρδανέλλια

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<b>Date type</b>	Publication
<b>Presentation form</b>	imageDigital
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<b>Maintenance and update frequency</b>	asNeeded
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<b>Descriptive keywords</b>	Δαρδανέλλια (place).
<b>Access constraints</b>	copyright
<b>Use constraints</b>	restricted
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<b>Character set</b>	utf8
<b>Topic category code</b>	location

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**Temporal Extent**

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**End date** 1912-12-03T00:00:00

**Extent**

**Geographic bounding box**

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	<b>South bound latitude</b> 40.022	

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**Metadata standard name** ISO 19115:2003/19139  
**Metadata standard version** 1.0

**Metadata author**

<b>Individual name</b>	Emmanuel Stefanakis
<b>Organisation name</b>	Harokopio University of Athens
<b>Position name</b>	Assistant Professor
<b>Electronic mail address</b>	estef@hua.gr
<b>Role</b>	pointOfContact

Figure 10. The metadata items for a historical photograph (damages from the naval battle of Elli 12/Mar/1912) as presented to the end-user. This metadata is encoded based on an ISO19139 template (XML format).