

## **Forgotten pilots, airfields and aircraft: a transdisciplinary approach to the memory of the Republican Air Force during the Spanish Civil War (1936-1939)**

F. Xavier Hernández-Cardona  
*University of Barcelona, Spain*

Xavier Rubio-Campillo  
*University of Edinburgh, UK*

Andrés Besolí,  
*University of Barcelona, Spain*

David Íñiguez  
*University of Barcelona, Spain*

Rafel Sospedra  
*University of Barcelona, Spain*

As the adage goes, “History is written by the winners” and the Spanish Civil War (1936-1939) is an example of how difficult it is to revert this process. Franco’s regime (1939-1975) developed a range of narratives focused on a) the justification of the military rebellion against the democratically elected Second Republic government, b) the “*damnatio memoriae*” of the Republican armed forces and c) the development of a collective guilt about the war. The transition from fascist dictatorship to democracy did not contest Francoist official discourse and forged a “pact of oblivion” based on the idea that Spanish society should look into the future and forget about the conflict at all levels: from personal memories to cultural heritage. One of the victims of this process of targeted forgetfulness was the Republican Air Force because it was an uncomfortable thorn on Francoist narratives. If the Republic was immersed in chaos and its army non-existent then how did it manage to contest the skies against the most modern German and Italian aircraft? This work describes the activities developed by a long-term public archaeology project designed to rediscover the memory of the people that formed the Republican Air Force. This multifaceted initiative explored the materiality of air warfare through a combination of battlefield archaeology, educational research, museum exhibitions and community engagement. The results presented here are an example of how community-based archaeology projects can promote new critical narratives and rediscover silenced voices even after decades of heavily-biased official history.

**Keywords:** Spanish Civil War, aviation archaeology, memorialisation, education, digital archaeology

### **Introduction**

The Spanish Civil War (1936-1939) shaped the political and social dynamics of Europe during the prelude to the Second World War. The conflict was a clash of two radically different views of Spain: the Second Republic government formed by a broad left wing coalition and a military rebellion supported by the social elites, the Catholic church and far-right movements. The war received widespread attention due to the involvement of foreign governments (Germany, Italy, and the Soviet Union) while thousands of volunteers across the globe joined the Republican cause to fight against fascism. The victory of the right-wing rebels (who called themselves “Nationalists”) was followed

by a period of intense repression and isolationism as General Franco established a ruthless dictatorship that would continue until his death in 1975.

Spain is the only Western country where fascism won a war and established a long-term repressive dictatorship. While coming to terms with a fascist past has been challenging in several countries, the fact remains that Francoism had complete freedom to create its own version of the conflict. The official history of the regime developed two main approaches to the conflict: a) the message of “total victory” and b) the concept of “collective and shared guilt” (Sánchez Leon, 2012). The transition to a democratic government after Franco’s death in 1975 did not generate new perspectives on the war because the different sides of the conflict forged a “pact of oblivion”; if Spain wanted to move forward then it should forget about its traumatic past. As a consequence, the official discourse that Spanish democracy inherited and continued, was the narrative of the civil war as an exercise of collective shame that needed to be forgotten (Cazorla Sánchez & Shubert, 2018).

A necessary element of the narrative developed by Francoism was that the Republican government was not legitimate because in reality the country and the army were ruled by armed anarchists and communist militias. This discourse is contested by the fact that the Republican army was qualitatively similar to Franco’s forces in terms of equipment, training and offensive capability; for this reason the fascist regime tried to erase the memory of the Republican armed forces including the Republican Popular Army, the police corps such as the *Guardias de Asalto*, the Republican Navy, and especially its most modern branch: the Republican Air Force. This attempt of “damnatio memoriae” of the Republican armed forces was mainly focused on the final battles of the conflict (the Ebro: Jul-Nov 1938, Segre: Apr 1938-Jan 1939 and Catalonia: Dec 1938 – Feb 1939) which were fought with similar technology and tactics that would be seen at the outbreak of the Second World War.

The beginning of 21<sup>st</sup> century saw a change of stance about the conflict and Francoism as a diverse group of academics (historians, archaeologists, law experts, etc.) discussed to what extent forgetfulness was the best way to overcome this traumatic past (Ruiz Torres, 2007). These voices highlighted the negative consequences of the “pact of oblivion” such as the impunity of the perpetrators, the difficulties to repair the consequences of Franco’s repression, and the lack of knowledge about the dictatorship by younger generations (Aguilar & Ramírez-Barat, 2014). At the same time, a growing number of social actors, grassroots movements and political parties demanded the recovery of Republican memory and heritage despite the growing reticence of right-wing parties. Both sides have been in constant debate over the past 20 years on topics such as the exhumation of mass graves, the ban of Francoism symbology in public spaces, and the removal of Franco’s body from the Valley of the Fallen (Ferrándiz, 2019; Jerez Farrán & Amago, 2010).

Despite some small achievements, the reluctance of state-wide institutions to address the limitations of the “pact of oblivion” has limited the effectiveness of these fragmented efforts and has been unable to challenge the narratives developed by Franco’s regime.

It has been argued elsewhere that archaeology can contribute to the recovery of the forgotten memories of a conflict through the study of its materiality (González-Ruibal, 2007; Schofield, 2005). The approach is able to contest official discourses by providing new critical narratives grounded on the heritage left by silenced actors (Mcguire, 2008). The value of this perspective can be strengthened by interdisciplinary efforts involving the community living on and around the battlefield; it can also provide a human-centered approach to the conflict not only focused on technology and tactics but also telling the story of soldiers and civilians (Moshenka, 2009a; 2009b).

Air warfare is one of the most prominent topics of this focus on personal experiences of the conflict because the bombings of the fascist air forces had a huge impact on the civilian population of the Republican rear-guard. The memory of these bombings has been thoroughly explored (Arañó & Capdevila, 2018; Gallego Vila, 2019), but the air force that defended this population has not been equally studied. While valuable, this focus on the impact of the bombings while ignoring the Republican air force has contributed to the portrayal of the Republic as powerless against the Fascist armies, thus reinforcing Franco’s narrative on the non-existence of a real Republican army. This selective memory is rather unique as a majority of studies on World War Two air warfare campaigns such as the Battle of Britain (1940) or the allied bombings over Germany (1942-1945) suffer the opposite bias: a focus on the air forces instead of the civilian casualties. This unique unbalance between civil and military perspectives is part of a lack of interest of Spanish academia on military history and conflict archaeology as these topics have been traditionally linked to far-right political views and amateur scholars (González-Ruibal, 2007; Iñíguez, 2007).

The archaeological discipline has seen a change of interest in this conflict due to a growing number of initiatives developed by a younger generation of archaeologists during the last decade. It is worth noting that these researchers are often driven by interests in public archaeology, cultural heritage and contemporary material culture (see, for example, Acosta & Otaola, 2018 on the heritage of the Condor Legion in the Basque Country; Ayán Vila, et al., 2017 on the excavation of Republican defensive positions in the same region; Tejerizo-García & Rodríguez Gutiérrez, 2019 on post-war maquis actions in Galicia).

This work presents a public archaeology project developed by the DIDPATRI (Didàctica del Patrimoni - Universitat de Barcelona) research group over the last two decades, aimed at recovering the memory of the Republican Air Force. The initiative is part of the larger movement to recover and promote the heritage of the Spanish Civil War and for this reason it was designed as a

transdisciplinary effort to a) improve our understanding of the Republican air force, b) disseminate this research through the communities where squadrons were based and c) promote the remembrance of the pilots, mechanics and support personnel that formed this branch. The framework of the project was based on archaeological research but it also comprised aspects as diverse as archival research, educational resources, outdoor exhibitions and memorialisation events. These activities were organised in conjunction with town councils, educators and local groups interested in the past of their communities. The project was developed in the region of Catalonia (North East Spain) as this focus facilitated the interaction with local stakeholders while focusing the efforts on the area that saw the longest and most intense activity of the Republican Air Force.

The paper is structured as follows: The first section provides context to the research by summarizing the role played by the Republican Air Force during the late phases of the war. The next section discusses the airfields that represented the main archaeological sites where the materiality of the air force could be identified. The paper then presents the research and outreach framework which is further explored in discussion of the archaeological research, exhibitions and educational resources, and memorialization. The paper concludes with remarks on the challenges of recovering the memory of the Spanish Civil War and the ways this framework could be applied to other conflicts.

### **Air warfare at the end of the Spanish Civil War**

The Spanish Republic was at a critical juncture during the summer of 1938. The capture of Teruel and the Nationalist counterattack (December 1937-January 1938) exhausted the strongest units of the Republican army and left the Aragon front weakly garrisoned (Cardona, 2006). The lack of Republican reserves was exploited by the Nationalists whose offensive split the Republic's forces in two parts in April 1938, thus leaving Catalonia and the vital access to the French border isolated from the rest of the Republican territory (see Figure 1). The situation was worsened by the international embargo on the Republic (see Howson, 1998; Viñas; 2013) and the air and naval superiority of the combined Fascist armies, which constantly attacked the rearguard cities and industrial complexes.

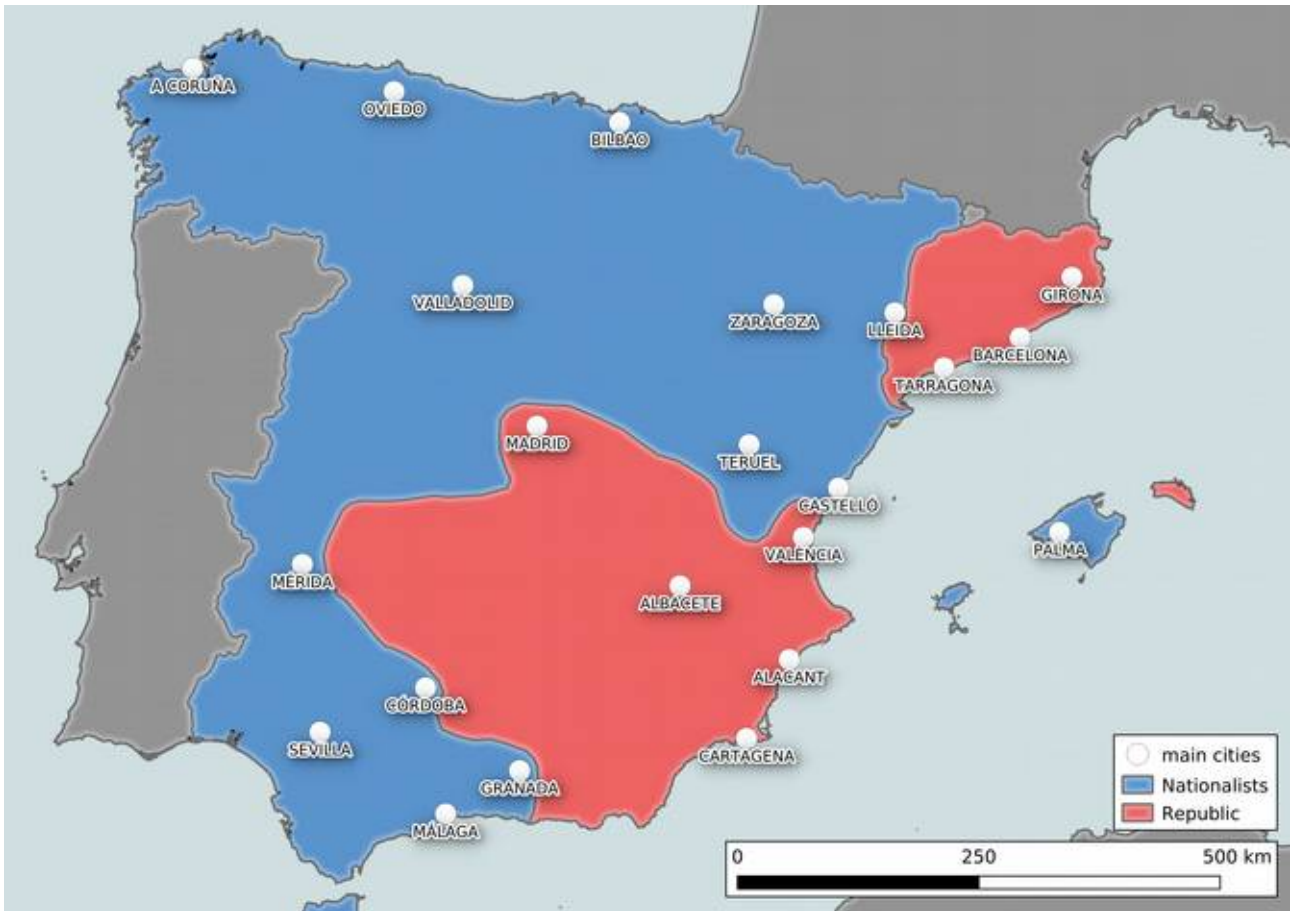


Figure 1 – Territories controlled by the two sides during the summer of 1938.

The Republic reacted to this situation by organizing two offensives along the entire Catalan frontline as defined by the Segre and Ebro rivers. The second front developed into the largest battle of the war as the Republicans attempted to re-establish the connection between the two isolated regions. The offensive was stopped after gaining some key strategic positions which were slowly retaken by the Nationalist army over the span of four bloody months. The attrition war on these two fronts depleted the resources of the Catalan territory and allowed the Nationalist armies to organize an overwhelming offensive that reached the French frontier in just two months (January-February 1939). The question here is how did Franco manage to win such a large portion of territory after two years of slow advances; this string of Nationalist successes during the late phase of the war can be explained by an increasing quantitative imbalance thanks to the support of Italy and Germany and particularly by the achievement of air superiority over the Republican Air Force after the battle of the Ebro.

The Republican Air Force was created in 1937 as an ad-hoc amalgamation of small units strengthened by support from the Soviet Union (Kowalsky, 2010 : ch 14). The squadrons were mainly composed by three soviet models: the biplane fighter Polikarpov I-15 “Chato” (*snub nose*), the monoplane fighter Polikarpov I-16 “Mosca” (*fly*) fighters and the fast light bomber Tupolev SB

“Katiuska”. A majority of planes were assembled on arrival by ship or during the brief moments where the French border was open, while some fighters were also built in Catalan factories (Gesalí & Iñíguez, 2012: 178-183). In terms of pilots, the air force was created around a small group of enthusiasts that learnt to fly in pre-war civilian aeroclubs. This cadre was complemented by soviet pilots and several Spanish pilots that were sent to Kirovabad (Azerbaijan) to be trained on the new models. The new squadrons were very successful and the higher technological quality balanced the combined numerical superiority of the Spanish Nationalists, Italian Aviazione Legionaria and German Condor Legion.

The battle of the Ebro was the swan song of this air force as well as the Republic’s Popular Army (Esdaile, 2019: 282-291; see also Henry, 1999;). The offensive crossed the Ebro river in Catalonia in order to stop the Nationalist offensive against Valencia and ultimately close the gap between both regions. The attack was able to conquer a large bridgehead over the Ebro dotted with mountains and rough terrain before Nationalist reinforcements stopped the Republican advance. Franco reacted by launching a string of attritional attacks over a period of four months in an attempt to bleed out the resources of the weakened opponent.

Air warfare played a key role during these offensives. The opening of the French border just before the battle allowed the Republican air force to renew its battered units while the Nationalists moved the bulk of its planes to the area. The Nationalist numerical superiority in available bombers was very important and the German and Italian aircraft were able to combine tactical support at the Ebro with strategic bombing against targets at the rearguard: cities, key communication nodes, military infrastructures but also airfields (Iñíguez, et al., 2017: 5-11). The number of fighters was more balanced, but the arrival of new models such as the Messerschmitt 109 gave the Nationalist fighter patrols a qualitative edge. The attrition of both air forces was high, but the lack of spare parts to repair damaged planes due to the closure of the French border as well the return of veteran Soviet pilots to the Soviet Union (while German and Italian pilots stayed remained throughout the conflict) was ultimately decisive: by the end of the battle the Nationalists had achieved air supremacy. The Republican Air Force practically ceased to exist after the battles of the Ebro and the Segre as the daily actions against larger formations and the constant attacks to its airfields caused a high toll that particularly affected veteran pilots and modern equipment; as a consequence, the Republican air force would only count with 100 planes during the next Nationalist offensive against Catalonia (Gesalí & Iñíguez, 2012: 454-456).

### **The network of Republican airfields**

The intense activity of the Republican pilots during these battles was only possible thanks the creation of a network of airfields within Catalan territory. Bomber squadrons were based on

airfields located near the French border while fighters were deployed across a network of small airfields. The core of the network was known as “*El Vesper de la Gloriosa*” (The Nest of the Glorious, see Iñíguez, 2002) and hosted six airfields within fighter operational range of both battles (see Figure 2).

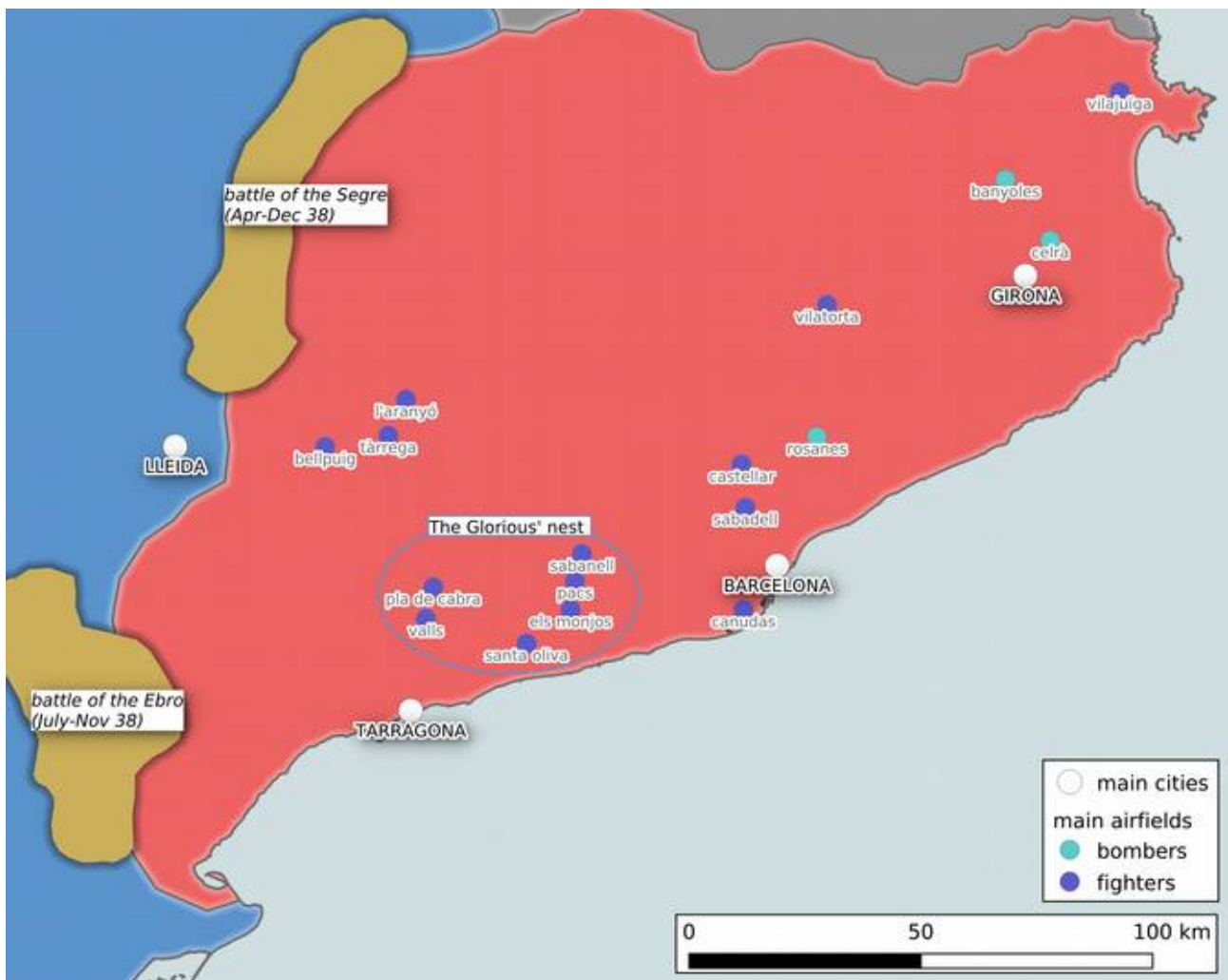


Figure 2: Location of the most important Republican airfields in Catalonia during late Spanish Civil War (May 38- Feb 39).

Each of these airfields was capable of hosting one squadron (around 12 aircraft) including basic maintenance, ground staff and logistic infrastructure. Despite their importance, they did not leave long-lasting structures and air raid shelters are the most visible trace of these airfields in the current landscape as they were built along their perimeter near the locations where ground staff worked.

The runway was not paved and the airfields did not have any air defences or major buildings as they relied on camouflage to prevent attacks. However, the airfields left a strong social memory beyond the scarce tangible heritage. First, the airfields were built by a mix of military personnel and civil population from nearby towns. Second, the squadrons used civilian buildings for a diversity of tasks such as squadron control, communication, maintenance and storage. Finally, each squadron was composed of over 100 people (pilots, mechanics, drivers, soldiers, medics, etc.) whose accommodation was distributed in civilian houses located near the airfield.

### **A transdisciplinary framework for conflict heritage**

The cultural heritage of contemporary military units can be traced across a very diverse set of sources such as official records, personal archives, archaeological evidence and oral memory, both from military and civilian populations (Moshenka, 2009b). As a consequence, any effort to recover the memory of a 20th-century conflict should adopt a transdisciplinary approach covering this heterogeneous corpus of evidence.

This need is particularly important while doing aviation archaeology. The heritage generated by combat squadrons is mostly intangible and the traces left within the archaeological record are often invisible and rather unconventional (Ledwidge, 2018). Aviation archaeology does not only study the direct traces of the airfields but also indirect evidence from a wide diversity of contexts (de la Bédoyère, 2008; Robertson, 1983). The study of air warfare also comprises logistic infrastructures, air raid shelters and anti-aircraft positions, craters and other landscape scars caused by air bombing (Capps Tunwell, et al., 2016), crash sites (Holyoak, 2001), and war memorials to airmen and civilians that suffered the consequences of air raids (Ramsey, 2000).

The battle for Spanish skies during the Civil War is no exception as the temporary structures developed in the airfields were even more ephemeral than what can be found within World War Two contexts such as the Battle of Britain (Ramsey, 2000) or the allied bombing campaign in Europe (Cantoro, et al., 2017). The preservation of the few permanent structures built in the Republican airfields has also been degraded by a range of factors including a) the attempt of Franco's dictatorship to erase any memory of the Republican army, b) a social unwillingness to confront the traumatic experiences of the conflict and c) the political actors of the late 20th century who were more interested in rapid urban development than the preservation of cultural heritage (Iñíguez, 2008).



The research program (2002-present) led by the DIDPATRI group was created to promote the remembrance of the Republican Air Force by interpreting this wealth of evidence while emphasizing the human face of the conflict. The aim was to create new critical narratives of the conflict grounded in archaeological findings while at the same time projecting this historical memory beyond the heritage of conflict itself (González-Ruibal, et al, 2018). The effort required other areas of knowledge, and for this reason the transdisciplinary approach generated links between archaeology, history, outreach and memorialization as a means to improve the presentation of cultural heritage of the Spanish Civil War.

The need to explain this overlooked aspect of the conflict was the motivation behind new research on the Republican Air Force. These studies included field and geophysical surveys on the Republican airfields, continued work in a variety of international archives and the design of unstructured interviews with individuals that belonged to the corps or were involved in the airfield construction and daily life (pilots, mechanics and civilians). This interdisciplinary effort also involved research on innovative outreach strategies including new museum exhibitions, educational resources and reenactment events. The initiative promoted the symbiotic remembrance of the bombing raids and the Republican pilots that tried to stop the fascist bombers through the dissemination of research results and the creation of new memorials.

### **Rediscovering the airfields**

A majority of studies on air warfare during the Spanish Civil War has been focused on the strategic bombing campaign of the combined fascist air forces against the Catalan rearguard (Arnabat, et al., 2009; Solé & Villarroya, 2003; Thomàs, 2019). This corpus of research has been useful in highlighting the consequences of the air raids within the civil population but it has explored neither the active defence organised by the Republican air force, nor the importance of material culture generated by the use of combat aircraft. This lack of knowledge of the Republican air combat units required additional research on the role of the Republican Air Force. The project thus focused on the most important cultural heritage linked to these squadrons: the airfields.

#### *Written sources*

The documents related to the Republican Air Force creation, organisation and activities are spread across several international archives. A first phase of research identified documents in Spanish institutions such as the archives of the *Asociación de Aviadores de la República* (Association of Republican Aviators, Madrid), *Archivo Histórico del Aire – Ministerio de Defensa* (Villaviciosa de

Odón, Madrid); *Archivo Militar General – Ministerio de Defensa* (Avila) and the *Centro Documental de la Memória Histórica – Ministerio de Cultura* (Salamanca). These Spanish archives were complemented by a number international centres such as the *Archivo dell’Ufficio Storico dell’Aeronautica Militare* (Rome, Italy), and the Spanish Civil War Collection at the *Rossiiskii Gosudarstvenni Voennyi Arkhiv – RGVA* (Former Red Army Archive, Moscow). The archival work allowed the team to shed new light on the construction of the airfields, the structure of the Republican Air Force and the intense activity during the battles of the Ebro, the Segre and the conquest of Catalonia by Franco’s troops.

The most valuable documents in terms of heritage and archaeological research was the collection of aerial photographs taken by the German Legion and the *Aviazione Legionaria*. The air raids of these air forces assessed the accuracy of the bombings by photographing the targets from oblique and vertical perspectives (Bonilla & Cano, 2013). The vertical photos revealed particularly useful because they could be georeferenced and converted into orthophotos, thus allowing for comparison against current cartography using a common geographic coordinate system (see Figure 3).



Figure 3: Italian bombing raid against the airfield at Els Monjos (6th August 38). The image shows the georeferenced original vertical photography taken by Italian air crew (AHEA) overlaid to an orthophoto at scale 1:5000m published by the Institut Cartogràfic i Geològic de Catalunya.

Some of the most interesting findings from these archives were related to previously unknown topics such as the limitations caused by the lack of reliability of the I-16 engines or the strategic

goals of the Italian bombing campaign against the Republican rearguard (see Arnabat, et al., 2009; Gesalí & Iñíguez, 2012).

### *Oral memory*

The study of the official reports was complemented by ethnographic works on two main topics: the extreme experience of air combat and the daily life of the airfield. Three pilots, two mechanics, four soldiers and two workers of the Republican Air Force were interviewed using an unstructured approach. The impact of fascist air raids over the area of the “Nest of the Glorious” was also recorded through the interviews of 22 civilians that lived near the airfields while the bombing campaign reached its peak (see Arnabat, et al., 2011). These narratives on air attacks in Catalan small towns were especially valuable because almost all previously interviewed victims of these bombings lived in cities. Additionally, the old age of the interviewees meant that most of them passed age a few years after the recordings. The effort was also used in dissemination works as two memoirs were published within the DIDPATRI project; one written by the fighter pilot (Ramoneda, et al., 2010) and the other one by a mechanic (Capellades, 2010).

### *Archaeological fieldwork*

Archival work and oral memory were used to plan the archaeological research on the airfields of the “Nest of the Glorious”. The airfields selected for archaeological works were Pacs, Sabanell, Els Monjos and Santa Oliva. The main reason behind the choice was the preservation of their landscape; intensive urban development during the last 50 years has destroyed a large percentage of the area occupied by the rest of the sites. The airfields were studied following a combined approach including: a) landscape analysis, b) metal detecting surveys and c) geophysics survey on selected structures.

Firstly, personal memories, maps, intelligence reports and georeferenced reconnaissance photos were used to identify common terrain features and define the perimeter of the airfields. The shape of the runways was often well preserved because the fields were converted to vineyards after the war, thus recovering previous agricultural functions. The visual surveys focused on the identification, georeferencing and recording of airfield-related structures (air raid shelters, trenches, command posts, accommodation quarters, etc.) which had uneven states of preservation because most of them are not legally protected as archaeological sites. Each structure was catalogued with a unique record including spatial coordinates via GPS handheld devices and additional information such as its airfield, structure type and state of preservation.

Second, metal detecting surveys were carried out following the methodology defined by battlefield archaeology (Connor & Scott, 1998; Scott, et al., 2009). Each airfield had one to three 1000-meter runways that took up a surface area of 50-100 hectares. This large size and the lack of structures on most of the perimeter were the main factors behind the organisation of fieldwork on a set of extensive surveys instead of focusing on a small area. These surveys covered areas with high human activity such as air raid shelters, storage and repair spots. The survey team was organized by pairs of archaeologists with previous expertise with metal detectors and who explored the area with parallel perpendicular transects (see Figure 4). Each recovered metal artefact was recorded with unique identification and GPS-based georeference (for the details on the survey method see Rubio-Campillo, 2008). A majority of the findings were unequivocally linked to the airfields' activity such as ammunition (both fired and unfired), shrapnel, aircraft panels and personal objects.



Figure 4: One of the archaeological teams that explored the Els Monjos airfield with a metal detector, handheld GPS device and digging equipment.

Spatial analysis was used to find areas with high densities of cartridges of ammunition rounds which identified the weapons tests performed before every sortie; the tests were made just before starting the takeoff run so they marked the locations where the masked aircraft were parked. A similar link between archaeological proxy and activity was made with maintenance spots as the surveys found repair spots with several thin aluminium sheets used to cover fuselage holes caused by enemy guns (Rojo, et al., 2011)

It is worth noting that these activities had the support of local interest groups and hobbyist metal detectorists in the region. This was a conflictive issue because there is a large community of

amateur metal detectorists in Catalonia which often loot conflict-related sites, despite this being illegal under both Spanish and Catalan legislation (Alay i Rodríguez, 2016; Yáñez, 2016). It has been argued elsewhere that the negative impact of illegal artefact looting can be somehow countered by effective collaboration and education on the problems caused by unrecorded findings (Ferguson, 2013; Rodríguez Temiño, 2016; Schriek & Schriek, 2014). This project used an active role in terms of promoting the value of cultural heritage for the local community through a reflexive approach on the cost of war and the experiences of the individuals involved in the conflict (both military personnel and civilians living near the airfields). The integration of these volunteers within the archaeological surveys had a high cost in terms of mentoring and supervision but it successfully involved the local community interested in military history and aviation.

It is worth discussing here a common theme on the interaction with the landowners of the agricultural fields where surveys were planned. They were initially worried about the possibility that we may find something valuable enough to require legal protection. This negative stance changed when the team announced that we were working on the airfields; a popular opinion in Spain is that the heritage of recent periods is not valuable enough to be protected and as a consequence there was no risk that we may find something important: we were just digging scrap metal. Beyond landowners, the local community was very keen to know more about the airfields for two reasons: a) the older generations had some fragmented information on the airfields and wanted to expand it and b) the younger generations were excited to know that their town played an important role as the base of a fighter squadron. The later reason is a recurring theme across all battlefield archaeology because the sites that are well preserved are the ones located far from heavily populated areas; the battle or military activity that has happened on these small towns is often the most widespread event linked to the place and for this reason it attracts the interest of the people living there.

Third, the best-preserved structures were selected for geophysical surveys thanks to a collaboration with SOT Archaeological Prospection. This privately-owned company specializes in archaeological geophysical surveys and it deployed a range of techniques in the field including Ground Penetrating Radar (GPR) and Magnetometry surveys on spots defined by georeferenced images of the fascist air forces. The effort focused on the remains of buried structures and anomalies such as lookout posts, air raid shelters and bombing craters (Sala, et al., 2011) (see Figure 5)

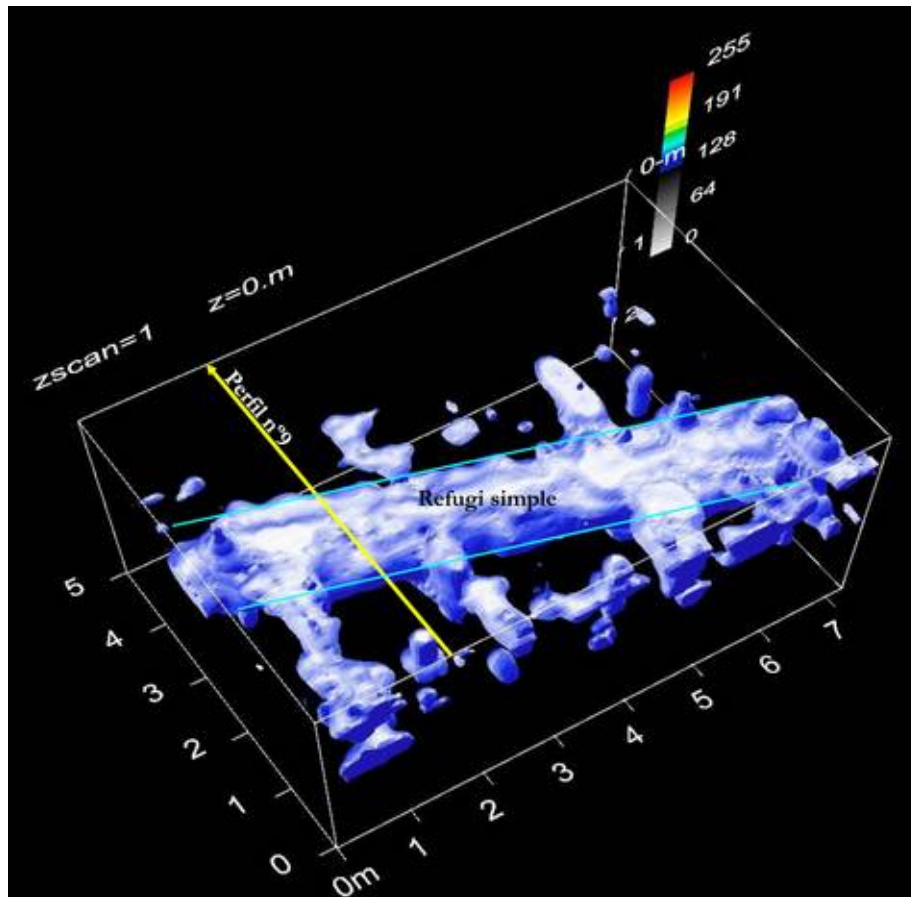


Figure 5. GPR processed signal of an air raid shelter at Els Monjos airfield

Post-survey work created a geospatial database of recovered artefacts and identified structures. The classification of the different items was influenced by criteria established in First World War airfield studies (Faulkner & Durrani, 2008). Over 1000 items were catalogued based on the following types: “military equipment”, “maintenance”, “aircraft parts”, “daily life”, “farming uses”, “unknown” and “others” (the later one including objects belonging to unrelated chronologies). The first two categories were the most helpful on revealing the traces of the air force activity and particularly the ammunition fired by the Republican fighters (mostly weapons tests) and the Francoist aircraft (shrapnel from bombing and bullets from strafing events). The database was then used to identify spatiotemporal patterns using Geographical Information Systems and data visualization using Libre Office Base, QGIS and R Statistical software (this computational approach was based on Rubio-Campillo, et al., 2011).

The research framework integrated information from archives, oral memory, archaeological surveys, geophysics and spatial analysis (Arnabat & Hernández Cardona, 2011). It allowed us to improve our understanding on the creation of the airfields and the activity developed there that supported the Republican army during the last year of the war. Common patterns were identified

across the airfields of the Republican Air Force, thus revealing how diverse military personnel applied the same theoretical regulations defined by the corps. In any case, the most important knowledge acquired by these tasks was focused on the daily life of the ground crew, the pilots and the impact of the airfield on nearby civilians which was often ignored by official reports. All these archaeological works allowed the team to record a diversity of artefacts and structures such as improvised air raid shelters used by ground staff in case an enemy air attack caught them near the planes, tin plates used to patch bullet holes in airframes or the identification of parking spots for masked planes. These findings were valuable assets that could be used by the other two components of the project: dissemination and memorialization.

### **Reimagining an air force**

The research efforts on the Republican Air Force were designed as part of a wider initiative of public engagement on conflict heritage (Feliu-Torruella, 2018; Feliu-Torruella & Hernández, 2013; Hernández Cardona & Rojo, 2012; Sospedra, et al., 2018). Research activities on this engagement assessed the effectiveness of different approaches to the local community and to formal education contexts: open lectures, on-site visits, small-sized temporary exhibitions and classroom resources (Coma & Rojo, 2010). We focus here on the three most important components developed by the program: a) digital archaeology visualization methods, b) outdoors interpretive panels and c) a visitor centre.

#### *Conflict and visualization*

The current state of Computer-Generated Imagery (CGI) offers a wide range of techniques that can be used to develop new visualizations of our past, including Augmented Reality, 3D reconstructions, game-based approaches. The use of these technologies can be extraordinary engaging but it also poses some challenges such as the need of context for any visualization or the best ways to create interpretive tools (Tan & Rahaman, 2009).

This project aimed to present the social dynamics generated by the air force beyond the aircraft and the materiality of the conflict. Virtual heritage tends to overlook these aspects as 3D reconstructions often focus on architectural elements of the scene instead of the activities that were developed within the buildings. We tried to avoid this pitfall by creating a set of visualizations generated with a mix of 3D-based images, live-action pictures and illustration techniques (see Figure 6).





Figure 6: Visual reconstruction of daily life at Els Monjos airfield

First, the current landscape on the airfield area was adjusted to the descriptions and photos collected from the archival work. Second, 3D models of aircraft, buildings and additional elements were created and rendered to match the scale and perspective of the scene. Finally, the collaboration with reenactment groups such as *Grupo de Recreación Histórica – Ejército del Ebro*, *Agrupación F.A.R.E* and *XV Brigada Mixta*, allowed us to capture soldiers in historically accurate uniforms and add them to the composition. This method generated a set of digital visualizations of the airfields where 3D models were complemented by the explicit representation of social activities and individuals; they portrayed a variety of aspects such as air combats based on personal accounts and logs, bombings captured by reports and photography or daily life activities based on oral history.

The approach not only allowed the team to develop educational resources for public dissemination, but it also promoted interest about the airfields from reenactment groups. It also posed new research questions on the airfield's organization and the way ground-based activities were developed (Hernández Cardona & Romero, 2014). The generated CGI is extremely flexible because it can be used in a wide diversity of media and devices (panels and exhibitions, video games and virtual/augmented reality systems, mobile apps and printed publications). The visualizations were not only used on interpretive panels and at the visitor centre (described below), but they were also the basis to publish two popular history books (Hernández Cardona & Hernández Pongiluppi, 2018; Íñiguez, et al., 2017).

### *Outdoor exhibits and public engagement at Rosanes*

The Rosanes airfield was the base for a squadron of light bombers Polikarpov R-Z that protected the Catalan coast against the Nationalist navy deployed at Mallorca. The airfield landscape is well preserved because the runway was transformed into farming lands and a golf course. The site is located near the town of La Garriga where DIDPATRI already developed a small audiovisual exhibition inside the railway station air raid shelter (Coma & Costa, 2008); the town council wanted to extend this experience by adding Rosanes to the growing network of cultural heritage sites related to the Republican army.

The new project implemented an outdoor experience based on a self-guided walking route around the airfield. Two interpretive panels were built with materials that were waterproof (weathering steel, stainless steel and aluminium) and that also minimized damage by vandalism. These elements were designed as low-level boards including an array of interactive mechanical and audio resources (see Figure 7).



Figure 7: One of the two interpretive panels deployed at Rosanes. The resources of the panel help visitors to understand the creation of the airfield, the daily life of the squadron and the transformation of the landscape.

These interpretive panels were not isolated items as they were integrated within a larger plan to promote the heritage of the Spanish Civil War in the region. The airfield was used as the central piece through the addition of signal panels identifying relevant elements (e.g. air raid shelters, control buildings), open lectures from ADAR members that lived on the airfield during the war, events organised by local cultural groups and announcements (physical and online) organized by the town council. The support of local school teachers was particularly important because they provided valuable advice on how best these approaches to heritage could be integrated within their teaching activities; the team used here a critical framework based on action research activities (Carr & Kemmis, 1986; Coma & Rojo, 2010).

### **The Republican Air Force visitor centre**

The most ambitious outreach project was the creation of the Republican Air Force visitor centre, *Centre per la Interpretació de l'Aviació Republicana i la Guerra Aèria* (CIARGA). The centre was funded by the Research ministry of the Catalan government and had the double aim of promoting public awareness on aviation archaeology heritage while leading the research on air warfare.

The centre was located at the Masial del Serral which was the command post of the Els Monjos airfield. The main challenge of the centre was the limited budget of 200.000€ that did not allow for the creation of a new building for the museum as the amount was supposed to cover both the infrastructure and the permanent exhibition that should be hosted inside. A decision was made to base the museum on a prefabricated hangar of 170 square metres that was built near the former command post and adjacent to the largest air raid shelter of the airfield. The structure allowed the design team to allocate most of the budget to the exhibition while providing a visual landmark that could be easily related to aviation.

The exhibition was structured along three main topics: the aircraft, the airfield and the experience of the people linked to its activity. Archaeological artefacts were displayed within interpretive panels to provide context to the display. The exhibition also included resources such as detailed scale models of the main plane types deployed at Els Monjos (Polikarpov I-15 and Polikarpov I-16), a diorama of the community centre where the aircraft were assembled (La Magaridoia), touchscreens providing information on several topics (the planes, the war, the landscape, etc.) and the replica of a I-15 cockpit coupled with a flight simulator where visitors could sit inside the plane and fly it virtually. The human component was presented through short films combining reenactors and interviews to experts and protagonists of the events explained at the exhibition. The daily life of the

airfield was also portrayed on a set of museum displays including sculptures and historically accurate scenographies (see Figure 8).



Figure 8: Recreation of the command post of Els Monjos with pilots answering the scramble alarm call

All these resources were created in collaboration with the local groups that were already involved in the project; the team not only included local volunteers but also reenactment groups such as *Agrupación F.A.R.E.* and the group of flight simulator gamers *Aviadores Virtuales Asociados*.

### **Restoring memories**

It is obvious that the archaeology of the Spanish Civil War is not neutral because unearthing the materiality of the Republican army directly challenges the silence imposed by Franco's regime (Ayán Vila, 2008). This ethical position does not mean that a heritage project should fully identify

with one side, but that may be able to promote democratic values and reject far-right ideologies. In essence, the heritage of the Spanish Civil War should provide a more critical and richer view of the conflict than previous narratives by combining research and outreach (González-Ruibal, et al., 2015).

The DIDPATRI efforts were co-developed with grassroots associations and the local community who were interested in memorializing the conflict. In 2011 commemorative plaques were installed at some of the sites of the Battle of the Ebro where DIDPATRI developed archaeological works such as La Fatarella, Flix and Corbera d'Ebre (Rubio-Campillo & Hernández Cardona, 2015). A new monument was built to remember the pilots, mechanics and ground personnel of the Republican Air Force. The artist Mar H. Pongiluppi made the bronze bas-relief which was installed near the CIARGA visitor centre at Els Monjos as can be seen in Figure 9. The rationale behind this location is that the monument becomes a landmark on the same landscape where these people lived and died while defending the Republican territory from enemy bombers; it also was a perfect spot for future commemorative events organised by the local community in remembrance of its past.



Figure 9: Commemorative plaque in tribute to the members of the Republican Air Force (Els Monjos airfield).

### **Concluding remarks**

The recovery of the lost memories that shaped our past is always a challenge; this challenge is even more difficult when there has been an active effort to erase these stories from the official history as is the case with the Spanish Civil War and its “pact of oblivion” (Sánchez León, 2012). In this context, the materiality of the conflict is a powerful ally to scholars willing to make this traumatic past public (González-Ruibal, 2007).

The transdisciplinary nature of this long-term project on the Republican Air Force blurred the limits of the different disciplines in an attempt to foster a more critical and complex engagement in relation to the events of the civil war; the DIDPATRI team included archaeologists, historians,

artists, educators, reenactors, amateur metal detectorists and the local community on a joint effort to explore not only the military history of the conflict but also the traces of this conflict that can be perceived on the current landscape.

This intense collaboration between scholars, enthusiasts and communities was complemented by uneven official support from the different administrations (i.e. Spanish government, Catalan autonomous institutions and local councils). The initiative received some funds from the Spanish government mainly aimed at research activities, but the most important contribution was the creation of the ETRP *Estació Territorial de Recerca del Penedès* research group (ETRP) in 2007. This research group focused on the study of aviation-related heritage and particularly on the airfields of the Republican Air Force in the area (i.e. the Nest of the Glorious). ETRP was funded by the Catalan research administration (*Direcció General de Recerca*) in collaboration with the *Institut d'Estudis Penedesencs* and the *Santa Margarida i els Monjos* town council. ETRP was an important contributor to the project described in this paper thanks to its focus on research and local dissemination activities. It is worth mentioning that ETRP was not an isolated case, as the Catalan government also created the “Memorial Democràtic”<sup>1</sup> in 2007. The Memorial Democràtic is an official institution aimed at restoring the memory of democratic values in Catalonia from 1931 to 1980. Unfortunately, the economic crisis of 2008-2014 hindered the investment in these institutions up to the point that ETRP closed after 3 years while the budget of the Memorial Democràtic was cut by more than half during the period. This intense yet brief official support can be seen in contrast to the long-term collaboration with the different interest groups (local stakeholders, educators, history enthusiasts, reenactors). This imbalance was an important lesson learnt during the project: institutional support is economically valuable but it is also fragile due to economic and political dynamics while community support proved far more reliable even if it could not exhibit the same amount of financial muscle.

This effort to rediscover the story of the Republican Air Force was also useful to explore innovative methods to study and present the materiality of conflict. It was the first experience of aviation archaeology within Spain and for this reason we expect that its results may contribute to a much needed scientific approach to the study of the civil war. At the same time, the new approaches developed in digital archaeology, visualization and heritage-related resources can be easily transferred to other projects aimed at creating new critical narratives of our history grounded in evidence. We believe that this combined approach, involving both research and outreach, is the best way to promote a critical approach to complex scenarios of memory amongst the future generations.

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## Notes on Contributors

F. Xavier Hernández-Cardona

Historian and archaeologist. Professor of Didactics of Social Sciences at the University of Barcelona. Coordinator of the historical and exhibition project for the Museum of the History of Catalonia. He has directed a diversity of musealization works: Ibiza Walls; "Donec Perficiam" at the Born Exhibition in Barcelona, the Republican Aviation Interpretation Center (Els Monjos). He has directed archaeological excavation works related to the historical spaces of the Battle of the Ebro. He is the author of several articles and books on didactics of history, didactic museography, military history and uniformology. He has researched the military history of the Spanish Civil War.

Correspondence to: Room 127, First Floor, Edifici Llevant, Department of Applied Didactics:, Teaching and Learning of Social Sciences Section, Faculty of Education, University of Barcelona, Pg. de la Vall d'Hebron, 171, 08035 Barcelona, Spain. Email: [fhernandez@ub.edu](mailto:fhernandez@ub.edu)

Xavier Rubio-Campillo

Dr Xavier Rubio-Campillo is a lecturer in Archaeology at the University of Edinburgh. His main task at this position is to explore and teach new digital approaches to interpreting and presenting the heritage generated by past human activity.

Before joining the School in 2016, he worked as the team leader of the Humanities research group at the Barcelona Supercomputing Centre (2009–2016). He has participated in several interdisciplinary projects applying computational methods to improve our understanding of the past, such as SimulPast and EpNet.

Conflict archaeology is one of his main research topics where he applies spatial analysis to explore the role that landscape plays in military actions. His published works explore a large chronological diversity ranging from battlefields of Julius Caesar's civil war (Puig Ciutat, 49 BC), the war of the Spanish Succession (Talamanca, 1714) or the Spanish Civil War (the Ebro, 1938).

Andrés Besolí,

Andrés Besolí holds a PhD in Didactics of Social Sciences and Heritage from the University of Barcelona (Spain), where he lectures in didactics of history, heritage and geography (cultural landscapes) and is also a fellow of the Research Group in Didactics of Heritage. His interdisciplinary academic background consists of two main areas of specialism. One of them deals with the exploration of the potentialities of interactive digital storytelling for generating compelling narratives in the domain of interpretation and dissemination of history and heritage, both in educational and public settings. Another facet of his research concerns the study of the 20th-century

history of Europe and its troublesome material inheritance. In this regard, his interest lies in the rising social heed given to the so-called 'difficult' history and 'conflicted' heritage and how they are managed and showcased in the present.

David Íñiguez

Dr. David Íñiguez Gràcia is a lecturer at the University of Barcelona where he teaches about History and Geography Education. His undergraduate degree is in History of Art (2000) and he holds a PhD in Social Sciences Education from the University of Barcelona (2010). He is also a member of the research group Didpatri.

He has written over 15 books about the Spanish Civil War and air warfare in Catalonia, some of them in a long-standing collaboration with David Gesalí, another important researcher of this field. As a researcher, he has participated in a large number of research projects focused on the archaeological heritage of the Spanish Civil War and particularly its aviation through a combination of Spanish and international military archives, oral memory and heritage.

His research also explores historic memory; from this perspective he is an active member of ADAR, the Spanish Association of the Republican Airmen.

Rafel Sospedra

Lecturer at the Department of Applied Didactics (Teaching and Learning of Social Sciences Section, Faculty of Education, University of Barcelona). Member of the DIDPATRI research group. (2010-present). From 2005 to 2010 he was Director of the Socialization of Science area at the Catalan Institute of Human Paleoecology and Social Evolution (IPHES-URV), the institute responsible, among others, for the Atapuerca excavations (Burgos, Spain). His professional work has been developed in the field of knowledge transfer, specifically in museography, heritage teaching and cultural tourism, where in the last twenty years he has been involved in numerous public and private projects.



<sup>1</sup>**Notes**

This can be seen here: <http://memoria.gencat.cat>