

The Second International Conference on Aviation Archaeology and Heritage

Online

14-15 November 2024

AVIATION CULTURES



CONFERENCE



University of
Southern
Queensland

Day One

All times: **Australian Eastern Standard Time (UTC +10 hours)**

US Eastern (UTC – 4 hours)

Central European Summer Time (UTC + 2 hours)

STARTING:

Friday, 15 November Australian Eastern Standard Time

Thursday, 14 November US Eastern

Thursday, 14 November Central European Summer Time

0600 15 Nov. 1500, 14 Nov. 2200, 14 Nov.		Welcome and Acknowledgment of Country	Tash Heap
0605	0625	Conference introduction – The way forward for the discipline of Aviation Archaeology	Hunter Whitehead

Panel One: DPAA / Site formation practices

Chairs: Megan Lickliter-Mundon and Hunter Whitehead

0630-0930 (15 November) Australian Eastern Standard Time

1530 – 1830 (14 November) US Eastern

2230-0130 (14 November) Central European Summer time

0630 1530 2230	0700	The Power of Partnerships: Recent DPAA Partner Collaborations in Aviation Archaeology	Abigail Bleichner and Kevin Dalton
0700	0730	Excavating Large, Dispersed Underwater Aircraft Crash Sites; A Case of WWII B-24 Bomber From Italy	Piotr Bojakowski
0730	0800	Aquatic Aircraft Crash Site Formation and Modification Factors and Processes Impacting Wreckage and Associated Human Remains and Material Evidence	Stephen Richey
0800	00830	Building on Broken Wings, Recovered Souls: Photographic Depictions of the Most Common Crash Types to Aid in Archaeological Site Type Identification	Christopher Eck
0830	0900	Searching for the missing: An excavation of a PB5Y-5 Catalina in Espiritu Santo, Vanuatu	Jane Mitchell

0900	0930	Discussion and Questions	
0930	0955	Comfort Break / Networking	

Panel Two: Site specific aviation archaeology

Chair: Hunter Whitehead and Megan Lickliter-Mundon

1000 - 1230 (15 November) Australian Eastern Standard Time

1900-2130 (14 November) US Eastern

0200-0430 (14 November) Central European Summer time

1000 1900 0200	1030	'His aircraft is his last resting place': the affective archaeology and emotional heritage of Hudson A16-191	Kristen Alexander
1030	1100	Lake Huron Red Tails	Wayne Lusardi
1100	1130	Archaeology on a Dime: Aviation Archaeology on an Independent Researcher's Budget	Lisa Daly
1130	1200	A WWII Archaeological Investigation with Community Volunteers in Hong Kong	Winsome Lee and Michael Rivera
1200	1230	Discussion and Questions	
		Comfort Break / Networking	

Continued over page

Friday, 15 November

Panel Three: Heritage Management

Chair Daniel Leahy and Tash Heap

1700-1900 (15 November) Australian Eastern Standard Time

0200 – 0400 (15 November) US Eastern

0900-1000 (15 November) Central European Summer time

1700 0200 0900	1730	Dutch Airplane Wrecks Abroad - Inventory and Management Strategies	Bas Kreuger; Robert de Hoop and Martijn Manders
1730	1800	Forgotten Flights: A Professional Approach to Slovenian Aviation Archaeology	Uroš Košir, Andrej Gaspari, Aleš Bedič
1800	1830	World War II Aviation History: Preservation & Restoration in PNG	Charlie Wintawa
1830	1900	Discussion and Questions	
		End of Day 1	

Continued over page

Day Two

All times: **Australian Eastern Standard Time (UTC +10 hours)**

US Eastern (UTC – 4 hours)

Central European Summer Time (UTC + 2 hours)

STARTING

Saturday, 16 November Australian Eastern Standard Time

Friday, 15 November US Eastern

Friday, 15 November Central European Summer Time

Panel Four: Aviation but not aircraft

Chair: Hunter Whitehead and Megan Lickliter-Muldon

0130-0430 (16 November) Australian Eastern Standard Time

1030-1330 (15 November) US Eastern

1730-2030 (15 November) Central European Summer time

0130 1030 1730	0200	Stumbling upon a discipline: Malta and Aviation Archaeology Underwater	Timmy Gambin
0200	0230	In Search of Military Geoglyphs: Training Targets of World War II and the Cold War	Susan Edwards and Jeffrey Wedding
0230	0300	High Range, High Flight: NASA's Beatty Tracking Station	Jeffrey Wedding and Susan Edwards
0300	0330	Hiding in plane sight: the 'hidden' effects of aviation upon the landscape of Malta	Anthony Burgess
0330	0400	Aircraft test and development: A forgotten archaeology – The Blower Tunnel	Bob Clarke
0400	0430	TBA	George Schwarz
0430	0500	Discussion and Questions	Questions
		Comfort Break / Networking	

Continued over page

Panel Five: New Technologies and methodologies

Chair: Tash Heap

0900-1200 (16 November) Australian Eastern Standard Time

1800-2100 (15 November) US Eastern

0100-0400 (16 November) Central European Summer time

0900 1800 0100	0930	Case Study: Digitally Reconstructing Various WWII Aircraft Underwater Wrecks	Daniel Adams and Andrew Woods
0930	1000	Preserving the remains of a Vought F4U-1D Corsair fighter-bomber recovered off the coast of Kyushu, Japan	Paul Mardikian and Claudia Chemello
1000	1030	The Microbiomes of Submerged Aircraft Wrecks	Dominic Bush
1030	1100	Discussion and Questions	
1100	1200	Conference Wrap Up and Future Plans	Hunter, Megan, Tash and Daniel

Welcome!

Welcome to the Second International Conference on Aviation Archaeology and Heritage brought to you by Aviation Cultures Conference Inc.

Building on the collaborative spirit of the first International Conference on Aviation Archaeology and Heritage held in 2017, we have a range of speakers from the fields of archaeology, aviation heritage management, and community-driven aviation heritage groups delving into both the historical aspects of aviation and exploring innovative methods for preserving aviation heritage for future generations. We have a range of diverse contributions, from theoretical approaches to practical case studies, methodologies and policy in archaeology and heritage management. We hope that these interdisciplinary insights will contribute to a broader appreciation of aviation heritage and its enduring impact on society.

We have speakers from across the globe joining us, so thank you for getting up early and/or staying up late. We have done our best to incorporate everyone's time zones. For those who miss out because of the time differences. We will be recording the presentations and they will be made available via the Aviation Cultures Conference website.

Aviation Cultures Conference is a series of conferences where researchers and practitioners come together to share their knowledge and ideas about flight, and its place in history and society. First held in 2015, Aviation Cultures Conference has grown and evolved from small beginnings into major gatherings of people interested in not just what aircraft are and what they can do, but also what they mean, and have meant. To understand what kinds of things Aviation Cultures is about, read more about [our history](#), look at what we discussed in [past conferences](#), or watch [our introductory videos](#).

Thank you, we hope you enjoy the conference!

Your Co-convenors,

Tash Heap

Aviation Cultures Conference and the University of Southern Queensland

Hunter Whitehead

AerAqua Project

Megan Lickliter-Mundon

Henry M. Jackson Foundation (CTR) in support of the Defense POW/MIA Accounting Agency

Daniel J. Leahy

Aviation Cultures Conference

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The Power of Partnerships: Recent DPAA Partner Collaborations in Aviation Archaeology

Abigail Bleichner and Kevin Dalton

The Henry M. Jackson Foundation supporting the Defense POW/MIA Accounting Agency

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The Defense POW/MIA Accounting Agency's Partnerships and Innovation (PI) Directorate was created in 2015 in order to help the Agency leverage the expertise, assets, and capabilities of a global partner network in its effort to account for missing US servicemembers. Collaboration with Partners affords DPAA increased workforce capacity and access to technical and innovative programs not available within the Agency. DPAA and its many partner organizations conduct investigations and excavations to recover the remains of missing personnel throughout the world. These areas of investigation and/or excavation often represent complex battlefield landscapes, and the last known location of missing service members. Working closely with other DPAA Directorates and stakeholders, PI identifies and engages capable and dedicated partners aligned with DPAA's mission requirements to build an interconnected network of archaeologists, historians, and researchers. This paper will highlight the collaborations between DPAA and its partners on aircraft sites around the world.

Excavating Large, Dispersed Underwater Aircraft Crash Sites; A Case of WWII B-24 Bomber From Italy

Piotr Bojakowski

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In the context of conflict archaeology, addressing World War II military losses requires extensive research, follow-up archaeological testing and surveys, and collaborative approach working with local partners. The goal is often to fully excavate and eventually identify the remains of unaccounted for service members associated with such sites. This project showcases extensive research related to one of such unresolved cases of a B-24 (Liberator) heavy bomber aircraft of the U.S. Army Air Forces. On 3 March 1944, after successfully releasing its bombs, the aircraft was hit by the enemy flak and crash into the Tyrrhenian Sea off the coast of Italy. Since 2014, ongoing archaeological and historical research has aimed to locate the aircraft and determine the fate of the missing crew members. This article focuses on the current state of the project, site formation processes, and key methodological considerations of excavating large, heavily dispersed underwater aircraft sites underwater.

Aquatic Aircraft Crash Site Formation and Modification Factors and Processes Impacting Wreckage and Associated Human Remains and Material Evidence

Stephen Richey

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A thorough understanding of how aircraft crash sites are formed and modified is critical to forensic search and recovery efforts. The multitude of factors and processes involved makes such a task daunting especially when one considers not only the wreckage but the human remains and material evidence associated with them. The presenter-- drawing upon his masters research - offers a taxonomy of these factors that will aid in search, documentation, and recovery efforts as well as further need research.

Building on Broken Wings, Recovered Souls: Photographic Depictions of the Most Common Crash Types to Aid in Archaeological Site Type Identification

Christopher Eck

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In January 2020, the author presented “Broken Wings, Recovered Souls: Understanding Site Formation Processes and Developing a Lexicon for Terrestrial Military Aircraft Crash Site Types Associated with the Recovery of Missing Personnel Remains,” at an aviation archaeology panel held during the Society for Historical Archaeology Conference in Boston. This was followed by his publication of a more detailed chapter of the same name in the book, *Strides Towards Standard Methodologies in Aeronautical Archaeology* (Springer 2023). In this presentation, the author seeks to provide in greater detail a number of photographic examples of the eight crash site types described in his prior work. Drawn from archival and personal sources, the presentation should guide archaeologists in better recognizing the several types of military aircraft wreck sites and debris fields that may be encountered and aid them visually in understanding what evidence may be present, and depict a number of the activities and post-crash processes that frequently occur and affect aircraft loss site integrity where human remains likely may be found for recovery.

Searching for the missing: An excavation of a PBV-5 Catalina in Espiritu Santo, Vanuatu

Jane Mitchell

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As WWII and the Japanese Imperial Army progressed through the Pacific, Vanuatu became one of the most significant allied bases of the Pacific theatre. Espiritu Santo, Vanuatu's largest island, was an important support and supply base that saw the construction of large infrastructure to support air and naval operations and accommodate the large numbers of troops stationed there. The Luganville Seaplane base was located in the southeast and seaplanes and flying boats took off and landed in the Second Channel. In 1944, a US Navy PBV-5 Catalina and its crew responded to an enemy submarine report. The airplane bounced four times during its attempted take-off before turning nose-first into the water and buckling on impact. Of the crew of nine, three survived, and six were killed in the crash. Four individuals were recovered over the next few days. Two remain missing.

In 2022, a DPAA partner team, Sealark Exploration and Discovery, was deployed to search the Second Channel for wreckage believed to be associated with the loss. They discovered the wreckage of a PBV-5 Catalina at a depth of 32 m. In 2024, an excavation was undertaken to investigate the aircraft wreck site further.

Panel two

Site specific aviation archaeology

'His aircraft is his last resting place': the affective archaeology and emotional heritage of Hudson A16-191

Kristen Alexander

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On 24 May 1942, three Hudsons from 32 Squadron RAAF were flying from Townsville, QLD to Bowen. Two collided. A16-191 crashed in mangroves near Giru. Wreckage was strewn about. Flame and smoke from exploding bombs billowed skywards. Four airmen were killed, including Sergeant Jim Herman. A search party discovered unidentifiable fragments of human remains. Families were given the impression that the crew were interred at the site: 'It will be a source of pride to you that ... his aircraft is his last resting place'. A16-191 has been visited frequently over the decades. Parts have been graffitied, collected, displayed, and appropriated for aircraft restoration. Locals speak of the continuing presence of buried and unburied human remains. In the emotional imaginaries of Jim Herman's loved ones, A16-191's wreckage is a war grave – a 'sacred site'. This paper considers A16-191 as a site of affect. It explores its affective archaeology and emotional materiality, and its human residue. It discusses the tension between those who believe the crash zone is a sacred site and should remain untouched, and those who have removed artefacts for museum exhibits and repurpose. Lastly, it examines Giru's Bombers' Memorial, an artefact of emotional heritage dedicated to A16-191's crew.

Lake Huron Red Tails

Wayne Lusardi

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In 2014 the remains of a World War II aircraft were discovered by divers in Lake Huron off the Michigan coast. A Bell P-39Q Airacobra and its pilot, Lt. Frank H. Moody, a Tuskegee Airman, were lost in the training accident. Working with museum, governmental and private partners, the author has led multiple expeditions to the site during the last decade with the goal of systematically mapping, documenting, recovering and conserving the aircraft wreckage.

Archaeology on a Dime: Aviation Archaeology on an Independent Researcher's Budget

Lisa Daly
Independent Researcher
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Terrestrial aviation archaeology in Newfoundland and Labrador, Canada, offers many challenges due to the diversity of terrain. From rocky hills to bogs to shallow ponds to forests, each type of terrain dictates the methods that can be used to record sites, as does the location and distances needed to travel. Added to that, funds are often limited, especially for independent researchers. Working with the permitting agency of a jurisdiction, aviation archaeology is still possible on a tight budget and can allow for the recording of crash sites. This paper will explore different methods used by archaeologists, with a focus on the author's own work in Newfoundland and Labrador. It will explore the potential for inexpensive research which can still enrich the history of an area, using material culture to further the understanding of aviation, memorialize sites, and offer them archaeological protection (depending on local regulations and laws). As technology evolves, the research can continue to improve and even independent researchers and enthusiasts can use archaeological methods to records and share information.

A WWII Archaeological Investigation with Community Volunteers in Hong Kong

Winsome Lee and Michael Rivera
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This talk presents a community archaeology project centered around the remains of a World War II-era aircraft that crash-landed in the mountains of Tai Tam on 16 January 1945. The project represented an exciting opportunity to bring together students, local historians and members of diverse backgrounds and investigate Hong Kong's history as a community. Our volunteers helped to uncover and examine the physical remains of the crash site, as well as photograph and catalog the pieces for archaeological investigation. Their help led us to essential details about the events leading up to, and after, the TBM-Avenger bomber aircraft's crash. These findings also shed light on the technological capabilities of historical, geophysical, and archaeological researchers in Hong Kong, and highlighted the potential for further community involvement in learning and reflecting on the city's rich past.

Dutch Airplane Wrecks Abroad - Inventory and Management Strategies

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The Cultural Heritage Agency of the Netherlands is conducting a project to make an inventory of and manage Dutch aircraft wrecks located in foreign territories. This initiative is integrated into Maritime Stepping Stones (MaSS <https://mass.cultureelerfgoed.nl/?language=en>), a specialised database aimed at documenting and preserving maritime and aviation cultural heritage. Initially MaSS was designed for maritime heritage but recently it's been expanded to accommodate aircraft wrecks. The project examines the historical significance of these wrecks, primarily from World War II, highlighting their importance in both Dutch and international contexts. The methodologies used for the inventory, such as archival research, diving expeditions and strong international partnerships, ensure a thorough and accurate inventory. Management strategies include conservation practices, navigating legal frameworks, dealing with MIA/KIA, war graves and engaging local communities in heritage stewardship. The project also demonstrates how MaSS enhances data accessibility, supports research, and promotes educational initiatives. By emphasising these efforts, the initiative aims to underscore the importance of preserving wrecked cultural heritage and the collaborative efforts required to protect these historical assets for future generations.

Forgotten Flights: A Professional Approach to Slovenian Aviation Archaeology

Uroš Košir, Andrej Gaspari, and Aleš Bedič

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Aviation archaeology is a recent development for the Slovenian archaeological community, with the first non-invasive field research carried out in 2008 and the first excavations of an aircraft wreck in 2019. Analysis of historical and other sources shows that over 260 aircraft crashed in Slovenia during the Second World War, apart from the not yet fully accounted losses from First World War, representing a significant potential for scientific research of these sites.

Notable archaeological investigations conducted so far include the excavation of a Supermarine Spitfire F.IX MJ116 in the Ljubljana Marshes and a German reconnaissance aircraft, the DFW C.V, in the southern Julian Alps. Recent efforts have united archaeologists, amateur researchers, and enthusiasts, exemplified by the study of the American B-24G Liberator "Bugs" 42-78259 and its crew. These investigations focus not only on the material remains and technical aspects of the aircrafts, but also aim to explore the multilayered history of the aircraft, their crews, and the events surrounding the wrecks from the time of the crash to the present day. Despite the challenges posed by the uncontrolled removal of the remains, the numerous plane crash sites in Slovenia represent a significant opportunity for archaeology to provide new and relevant data on this important historical and technical heritage of modern conflicts in this part of Europe.

World War II Aviation History: Preservation & Restoration in PNG

Charlie Wintawa

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Papua New Guinea is not a new player in the airplane restoration industry. PNG has WWII 'balus' on restorations and are displayed in overseas museums and hangars awaiting museum's facility for repatriation. The recent removal of the B-17 'Swamp Ghost' in Popondetta and shipped to the United States of America will soon add to the list of airplane types still flying. The story of WWII balus is numerous in books, films, magazines, art, songs and dances aims to capture the significant events and experiences. In Europe, America, Australia and New Zealand restoration projects are undertaken to put the warbirds in the sky. PNG also holds the mysteries of the balus and their airmen carefully concealed in the jungles and swampland and coral reef. Prewar aviation history that remains unsolved is that of the woman aviator Amelia Earhart. War Relics in general is governed by the National Cultural Property (Preservation) Act 1965, and National Museum & Art Gallery Act 1992; and the museum functions is to administer the Act. Since the removal of the "Swamp Ghost" in 2007 in Popondetta and its departure in 2006 after years of court decisions has forced the national Museum to impose a temporary ban on salvage and export of war time aircraft . Though this helped saved the remaining airplanes from salvage operations, it does not prevent the work of the scrape metal and aluminum dealers from vandalizing these remaining airplanes. Despite the moratorium on exports of war time aircraft from PNG, the PNG National Museum still does not have a facility (Hanger) to keep any airplane if salvaged for display or even if repatriated from overseas. Besides aircraft wrecks have continued to be located and some of these airplanes (wreckages) contain human remains is sensitive to museum legislations and overseas agencies have partner the museum in retrieving the remains.

End of Day one!

Day 2!

Panel four

Aviation – but not aircraft

Stumbling upon a discipline: Malta and Aviation Archaeology Underwater

Timmy Gambin

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Abstract TBA

In Search of Military Geoglyphs: Training Targets of World War II and the Cold War

Susan Edwards and Jeffrey Wedding

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The term “geoglyph” typically evokes images of giant stylized creatures, imaginary beings or geometric forms sculpted into the landscape. These ancient earthworks appear across the globe from the Nazca Lines in Peru to Kazakhstan's Steppe Geoglyphs. However, not all these features are ancient. Twentieth century military activities generated landscape features that share many characteristics with the earthworks attributed to prehistoric groups. This is especially true once the military incorporated aircraft into their tactical arsenal. During WWII thousands of U.S. airmen trained stateside before being sent overseas. Evidence of their training exists in the large earthen targets on the former bombing ranges. These “military geoglyphs,” a term first coined in the 2000s, take the form of trenches, aerial bombing targets, surface gunnery targets and navigation aids. Satellite imagery available on the internet allows anyone to become a military geoglyph hunter. While our focus has been identifying these training aids in the arid, sparsely vegetated, and less populated terrain of the western U.S, remnants of the distinctive earthworks can be found around the globe. We present a classification scheme for these military structures, discuss environmental and human impacts faced by the landscape features, and suggest some potential preservation and data collection measures.

High Range, High Flight: NASA's Beatty Tracking Station

Jeffrey Wedding and Susan Edwards

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During the 1950s and 1960s, the U.S. government launched a complex series of programs with the goal of manned space flight. The "X-series" of experimental aircraft/spacecraft were developed to test concepts, human endurance, new polymers, instrumentation and components that would be analogs for materiel being prepared simultaneously for the crewed vehicles of the Mercury and Apollo programs. High-speed/high-altitude flight tests would require much greater airspace than Edwards Air Force Base offered. A 400+ mile long flight corridor was established from Wendover Utah, diagonally across Nevada and down to Edwards AFB in southeast California. Project High Range was initiated to support the new flight corridor with ground-based RADAR tracking, communications, and telemetry receiving. Three tracking stations were constructed, one at Edwards AFB to function as the master control station, and two in Nevada - one near Beatty, and one near Ely. These sites, each nearly 200 miles apart, established a linked communications network that put NASA in contact with its aircraft anywhere over Nevada and southern California. After decades of vandalism and exposure to the elements, the Beatty site was razed. Little remains now except concrete foundations, historic photographs, and the stories and memories of those who once worked there.

Hiding in plane sight: the 'hidden' effects of aviation upon the landscape of Malta

Anthony Burgess

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The impact of aviation on Malta can be seen in many ways, from the obvious such as airports and anti-aircraft sites, to the less obvious or even invisible. In this presentation, a number of ways in which aviation manifested itself in Malta will be examined, such as the airfields, air raid shelters and anti-aircraft sites, charting how they changed during the war, warping the physical landscape as they did so. Such dramatic effects to the physical landscape also affected the mental landscape for all those involved too, their minds attuned to the sounds and sights associated with the airspace unfolding above their heads. The end result is an island archipelago that is saturated with its effects, effects that continue to shape its physical and mental landscape today.

Aircraft test and development: A forgotten archaeology – The Blower Tunnel

Bob Clarke

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Full-size aircraft test and development, by its very nature, leaves precious little landscape evidence. Consequently, the recording and preservation of such sites before their loss is a critical aspect of both aviation and industrial archaeology. This paper introduces one such test rig, the 'Blower Tunnel', a 35 ft wind tunnel powered by four Rolls-Royce Merlins.

A brief history is presented before a number of questions are posed regarding the place of such sites in international aviation heritage. It goes on to question the legacy of preservation by record and wonders whether an international rethink is needed over the more enigmatic aspects of aviation archaeology.

Title: TBA

George Schwarz

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Panel five

New Technologies and Methods

Case Study: Digitally Reconstructing Various WWII Aircraft Underwater Wrecks

Daniel Andrews and Andrew Woods

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In this presentation we will provide an illustration of around a dozen different WWII aircraft wrecks that we have digitally reconstructed from underwater video footage and digital still photography. These datasets have been collected variously by divers and ROV surveys at locations around the world including north of Hawaii, Chuuk Lagoon, Papua New Guinea, Solomon Islands, and Bikini Atoll. Utilising advanced photogrammetric 3D reconstruction processing techniques, we have created 3D models of various aircraft including the B17 flying fortress, multiple Zeros, multiple Gruman Avenger torpedo bombers, Curtiss Helldiver dive bomber, Nakajima B6N torpedo bomber, and others. The 3D models provide a unique view of each site which can be viewed in a range of different ways including virtual reality and online 3D model viewers. During this presentation we will place you in the cockpit and take you on a virtual tour of the aircraft wreck models that we have created.

Preserving the remains of a Vought F4U-1D Corsair fighter-bomber recovered off the coast of Kyushu, Japan

Paul Mardikian and Claudia Chemello

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Preserving the remains of a Vought F4U-1D Corsair fighter-bomber recovered off the coast of Kyushu, Japan

Abstract: On March 18, 1945, in the midst of one of the most furious battles of the Pacific, twenty-two-year-old U.S. Navy Corsair pilot Ensign Loren F. Isley flew off the deck of the USS Intrepid and never returned. In 2006 the remains of his Vought F4U-1D Corsair Fighter-Bomber were caught in a fisherman's net off the coast of Kyushu, Japan. The recovered engine, propeller and wing section were sent to the U.S. Navy's History and Heritage Command (NHHC) Underwater Archaeology Branch in 2016 and recently returned to the aircraft carrier that launched it 78 years ago, now the Intrepid Sea, Air & Space Museum in New York City. Terra Mare Conservation was contracted by the museum to preserve the artifacts on board the USS Intrepid in 2023, in collaboration with NHHC and the Intrepid's Aircraft Restoration Shop. The treatment proposed for these artifacts was governed by the circumstances of their recovery and the fragility of the materials. A very long timeframe between recovery and conservation played a significant role in the conservation work plan. Archaeological artifacts recovered from a marine environment are very reactive if exposed to air and allowed to dry out without proper treatment which can cause irreversible deterioration. This can be avoided if the artifacts are kept wet and rapidly conserved. Since this wasn't possible, the treatment plan was designed to enhance the stability of the artifacts and comprised thorough cleaning of all components including with dry ice (frozen CO₂), followed by cycles of washing, corrosion inhibition, consolidation and coating of the metal.

The Microbiomes of Submerged Aircraft Wrecks

Dominic Bush

Ships of Discovery

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Proponents of historic aircraft salvage have levied charges of inaction against archaeologists, citing unchecked degradation as the impetus for recovery. To counter these claims, and better understand the degradative forces that place these sites at risk, the totality of environmental factors needs to be comprehensively assessed. This includes a site's microbiome, as previous research has indicated that colonizing microorganisms have the potential to detrimentally impact various forms of underwater cultural heritage. However, aluminum aircraft of World War II have yet to be the focus of similar investigations, leaving a void in the field's understanding regarding in situ preservation threats. To help rectify this, four submerged aircraft wreck sites in Hawai'i were chosen for biofilm sampling and DNA sequencing. The sequencing results allowed for an interpretation of the microbial assemblages associated with corroded and non-corroded wreck surfaces. While no significant taxonomic differences were identified between corroded and non-corroded samples, the study succeeded in defining the microbial communities of submerged aircraft wreck site biofilm, which appeared compositionally-distinct from those of the surrounding seawater and sediment. In addition to identifying key constituents, the data indicated that environmental factors, including the background microbiome and sedimentary interactions, play a prominent role in shaping site biofilms.