

Operation IVORY SOAP: Army Air Force's Floating Depots in the Pacific Theater during World War II



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Operation Ivory Soap was a top-secret World War II initiative that addressed the logistical challenges of the Pacific Theater's rapid "island-hopping" campaign by creating mobile, floating aircraft maintenance depots. Developed after a 1943 survey revealed that traditional land-based facilities could not keep pace with advancing combat lines, the project involved converting 6 10,500-ton Liberty ships into large Repair Ships and 18 smaller vessels into Auxiliaries. These "Army Posts afloat" were uniquely manned by a combination of civilian Merchant Marines, Navy gun crews, and Army Air Forces technical specialists who performed up to fourth-echelon repairs close to the front lines. Equipped with specialized shops, oxygen manufacturing plants, and Sikorsky R-4B helicopters, these vessels provided essential support for B-29 operations and other combat groups when land-based facilities were unavailable. Despite significant inter-service resistance and technical hurdles, the project successfully bridged a critical logistical gap, proving the strategic value of water-borne maintenance – a concept that continues to influence modern military initiatives today.

Ray Ortensie, Director

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During World War II, the predecessors of today's Air Force Materiel Command's jurisdiction did not extend overseas; however, it was responsible for providing equipment and supplies for all Army Air Forces (AAF) units as well as served as the central repository for issuing technical guidance to all service organizations.¹ Early in the war, it was assumed that overseas maintenance organizations would be highly mobile and rely on Zone of Interior (the continental United States) establishments for support. Eventually, major theaters established air depots² that performed a wide variety of maintenance services much like state-side depots, allowing the flexibility of advanced depots to take on various tasks to return aircraft to the fight faster as well as concentrating on battle damage. The best example of this was in the European Theater with the depots in England at RAF Burtonwood, known as Base Air Depot 1 (BAD 1), and Warton Aerodrome, known as Base Air Depot 2 (BAD2), that worked with numbered Air Forces in

Western Europe during the final years of World War II. However, in the Pacific Theater,³ the lack of physical terrain became an issue along with the Allies rapidly evolving "island-hopping"⁴ campaign that illuminated a critical logistical challenge for the Army Air Forces – providing



Figure 1: Burtonwood Servicing Centre, or Base Air Depot 1 (BAD 1), servicing a 97 Bomb Group B-17 Flying Fortress in March 1943.

timely and effective aircraft maintenance and repair facilities for combat units constantly on the move. Traditional land-based depots, which required weeks or months to dismantle, relocate, and re-establish, proved too slow for the accelerated pace of operations in the Pacific Theater. This pressing need for enhanced mobility and responsive support gave birth to a Top-Secret military operation called Operation Ivory Soap, the Army Aircraft Repair Ship Project. This innovative undertaking was designed to furnish floating maintenance and repair capabilities for the AAF and inspired future maintainers some 80 years

¹ In writing this essay, the author utilized NotebookLM for initial thematic organization and mindmapping, and all research findings were independently verified against primary sources.

² Air depots were the massive industrial hubs of the Army Air Forces responsible for supply, repair, and overhaul of military aviation assets and served as the "backbone" of the supply efforts for thousands of aviation assets.

³ The Pacific Theater was the largest geographical area during the World War II conflict, stretching from the Aleutian Islands in the north to Australia in the south, and from the coast of China to Pearl Harbor, Hawaii. The Theater was split into two major Allied commands: Pacific Ocean Areas (POA) led by Admiral Chester Nimitz that focused on the Central and North Pacific and the Southwest Pacific Area (SWPA) led by General Douglas MacArthur that focused on the Philippines, New Guinea, and Australia.

⁴ Island hopping, also known as leapfrogging, was the Allied military strategy in the Pacific Theater during World War II, led by the United States, to bypass heavily fortified Japanese-held islands and seize the lighter-defended locations that could support forward airbases and naval power, slowly cutting off Japanese supply lines while moving closer to the Japanese homeland.

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into the future to look back at this effort again as the Indo-Asia-Pacific⁵ region grows in importance. This essay will delve into the origins, development, operational aspects, and capabilities of these unique vessels as well as the significant logistical and organizational hurdles encountered in bringing it to fruition.⁶

Background and Genesis of the Project

The concept of mobile aircraft repair facilities was not new to the United States Army Air Forces, with the official recognition of this necessity dating back to 1942 when Colonel Lyman P. Whitten,⁷ Director of Base Services, Air Services Command, had, in fact, requested fifteen 250-foot boats equipped with limited shop facilities and spares for use as “Aircraft Tender and Supply Ships” in the Pacific Theater by Fiscal Year 1944. Nevertheless, it was not until early 1943 when Air Service Command (ASC), deeply concerned with maintenance problems in the Southwest Pacific Theater,⁸ formally requested that “consideration be given in obtaining and equipping floating depot repair boats” with equipment like land-based aviation depots. However, these early suggestions and requests did not immediately translate into direct action. In the fall of 1943, an inspection party that included Lieutenant General Brehon H. Somervell, Commander of Army Services Forces, Major General Oliver P. Echols, chief materiel officer for the Army Air Forces, and Major General Charles P. Gross, Chief, and Brigadier General John M. Franklin, Assistant Chief for Water Transportation, both of the Transportation Corps, conducted an intensive survey of the supply and maintenance facilities and investigated the existing inadequacies and the clear need for mobile aircraft repair within the Pacific Theater. It was during the visit at Perth, Australia, where the US Navy showcased their repair ship *Luzon*

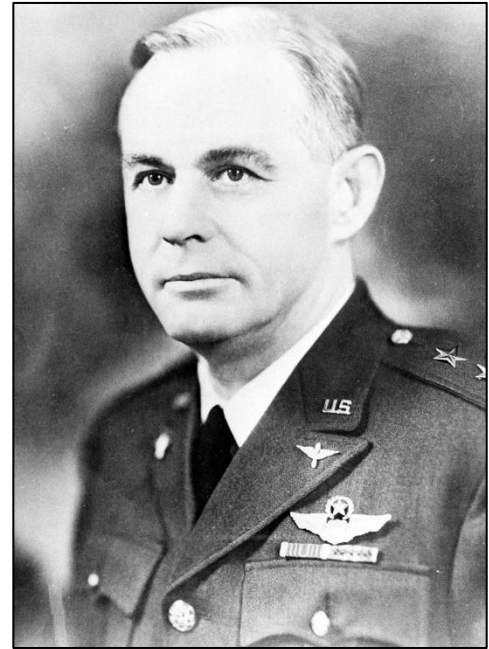


Figure 2: Maj Gen Oliver P. Echols, Chief Materiel Officer, Army Air Forces

⁵ Is a vast geopolitical and maritime region stretching from the west coast of the United States to the western shores of India where it possesses over 60-percent of the world’s population and contains seven of the world’s largest militaries.

⁶ The mobile repair shop, an equipped van with tools and machinery provided mobile maintenance in North African and Europe between 1943 to 1945. Wesley Craven & James Cate, *The Army Air Forces in World War II, Volume Six: Men and Planes*, Washington: Office of Air Force History, 1955, pp. 391-392. McDonough, Roger H., *History of the Army Aircraft Repair Ship Project, November 1943 – September 1944*, AAF Air Technical Service Command: March 1945; Hohns, Maj Robert L., “The Value of Floating Aircraft Maintenance Facilities in Eastern Asia Area,” Maxwell AFB: Air Command and Staff School of Air University, November 1948, pp. 1, 3, 6; Monay, Col William H., “Floating Aircraft Repair and Maintenance Depots,” Air Command and Staff School of Air University, May 1947), pp. 9-10; Sherrard, Lt Col Wright J, “Evaluation of Floating Units,” Maxwell AFB: Air Command and Staff, November 1948), pp. 2-3; Pappas, Breck, “Operation Ivory Soap,” *Mobile Bay Magazine*, 2 December 2016, Accessed 19 August 2025, <https://mobilebaymag.com/operation-ivory-soap/?hl=en-US>.

⁷ Retired as a Major General commanding Middletown Air Materiel Area at Olmstead AFB, Pa., in the early 1950s.

⁸ The South West Pacific Area consisted of Australia, the Philippines, New Guinea, the Dutch East Indies, Borneo, and the Western Soloman Islands.

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that the inspection party was first impressed by the concept, and the potential, for a similar floating aircraft repair system for the Army Air Forces.⁹

As the offensive against Japan intensified,¹⁰ land-based facilities struggled to provide enough maintenance support for front-line units. Traditional methods for moving air depots and service groups proved too slow and impractical for such a fast-moving conflict. General Echols noted in November 1943 that fourth echelon maintenance¹¹ and overhaul facilities were often established only to be rendered inefficient because the war moved away from them, leaving them too far to the rear with poor communication.



Figure 3: Maj Gen Oliver Echols, with Brig Gen William Ryan, visit 13th Air Depot at Tontouta Air Field on 27 September 1943. 13th Air Depot would service some engines during the war.

This resulted in significant time, materiel, and manpower being spent building facilities, only for a backlog of work to accumulate or for the war to shift locations, grounding planes that could have been repaired. An example of this was the costly transfer of Tontouta Air Depot at New Caledonia and its movement to Guadalcanal (roughly a 1,000 nautical miles distance), an effort Major General Robert G. Breene, Commanding General, Services Supply, US Army Forces in the South Pacific,

argued that the current approach was not worth the minimal gains, suggesting instead that water-based mobile depots would eliminate the time, materiel, and manpower of moving said depots. This problem was not exclusive to the AAF as the Army Service Forces also experienced significant supply lags for ground troops, with an eight-week delay observed between troops moving to Bougainville from Fiji and their supplies. These inadequacies of the existing arrangements led to an intensive survey of supply and

⁹ Hohns, *Floating Aircraft Maintenance Facilities*, pp. 1-3, 8-10; McDonough, *Aircraft Repair Ship Project*, pp. 5-6, 8, 13, 22; Sherrard, *Floating Units*, pp. 2-5, 9-10; Monay, *Floating Aircraft Repair*, pp. 8-10; Guerny, *The Floater: Army Air Force's Aircraft Repair Unit No. 3*, Oct 1944-Mar 1945, Chantilly, VA., ca. 1962, pp. 1-2.

¹⁰ Immediately after the Japanese attack upon Pearl Harbor, the US entered the war with the first few months taking a strategic defense against Japanese forces in Southeast Asia. The key offensive was during the Battle of Midway in June 1942 followed up with the Guadalcanal Campaign in August through February 1943. Then, in August 1943, the US began the Island-Hopping Strategy with the taking of the Solomon Islands, "leapfrogging" past 10,000 Japanese troops on Kolombangara. Next, in November, the US began the Central Pacific Campaign and the invasion of the Gilbert Islands.

¹¹ Fourth echelon maintenance includes "all operations necessary to completely restore worn or damaged aircraft to a condition of tactical serviceability and the periodic major overhaul of unit assemblies, accessories, and auxiliary equipment; the fabrication of such parts as may be required in an emergency or as directed in technical instructions; the accomplishment of technical compliance changes as directed; replacement, repair, and service checking of auxiliary equipment; and, the recovery, reclamation, or repair and return to service of aircraft incapable of flight." Army Air Force Regulation 65-1, *Supply and Maintenance*, 14 August 1942, p. 6.

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maintenance facilities in the Pacific in the fall of 1943 that revealed widespread inadequacies and emphasized the critical need for mobile aircraft repair capabilities.¹²

Upon his return from the Pacific, General Echols formally directed ASC to furnish "necessary information relative to such a floating plant on which this office may base a request for floating equipment of suitable characteristics." ASC, leveraging expert advice, including plans and specifications for similar conversions from the Navy, and inspired by the *Luzon*, began an intensive study to identify the most suitable ships. While General Echols initially suggested one large vessel as an experiment, ASC's reply on 1 December 1943 recommended utilizing several ships, specifically advocating for 6 large repair ships and 18 smaller auxiliary craft. These auxiliaries were envisioned to carry mobile repair crews, capable of reaching downed aircraft in otherwise inaccessible locations using DUKWs¹³ carried aboard the vessels. General Echols accepted this upward revision and even added a request for 50 more 178-foot cargo vessels for supply transport, underscoring the AAF's growing commitment to the project. ASC interpreted General Echols' November 1943 letter as a "green light" for the project and began proactively assembling equipment and supplies in anticipation of the conversions, even before formal designation of the vessels, a "calculated risk" that ultimately saved precious months. The project would call for the conversion of six 10,500-ton Liberty Ships into "Repair Ships" and eighteen smaller vessels into "Auxiliaries," to serve as floating repair facilities. These were to be equipped with modern equipment, manned by highly trained groups of specialists, and known as Floating Air Depots that could operate close to combat zones, providing immediate support for a range of aircraft repairs, and generating essential supplies like oxygen and water, in areas where land-based facilities were not immediately available. Their intent was to move with combat groups to provide immediate repair capabilities as operations shifted to new airfields in Theater during the campaign but were not intended to replace land-based organizations but serve as a complement to them.¹⁴

Acquisition of Ships

The procurement of essential vessels for the Army Aircraft Repair Ship Program, specifically the six primary repair ships, encountered significant inter-agency resistance, notwithstanding the pressing requirements for mobile aviation repair in the Pacific Theater. It involved a "calculated" approach, inter-service negotiations, and adaptations to existing resources. As stated above, the early recognition for a "floating" depot concept was recognized in 1942 but no direct action came about until the fall of 1943 following the intensive survey in the Pacific and the direction to ASC in November to gather information.

¹² Sherrard, *Floating Units*, pp. 2-5, 9-10; McDonough, *Aircraft Repair Ship Project*, pp. 5-8, 13, 22; Hohs, *Floating Aircraft Maintenance Facilities*, pp. 1-3; Monay, *Floating Aircraft Repair*, pp. 8-10; Guerny, *Floater*, pp. 1-2.

¹³ A DUKW was a 2.5-ton, six-wheeled amphibious truck used during World War II with the primary purpose to ferry supplies and equipment from ship to shore. DUKW was a manufacturer's code based upon: "D" indicating the model year; "U" referring to the body style, utility (amphibious); "K" for all-wheeled drive; and "W" for dual rear axles.

¹⁴ Sherrard, *Floating Units*, pp. 2-9; McDonough, *Aircraft Repair Ship Project*, pp. 7-10, 22, 39, 42; Hohs, *Floating Aircraft Maintenance Facilities*, pp. 1-2, 5; Monay, *Floating Aircraft Repair*, pp. 3, 6, 9-10, 12, 16, 23-25; Air Service Command, "Floating Depot," *Correspondence on Security*, 15 May 1944.

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This in turn began ASC's study to identify suitable ships, consulting Navy experts, and examining the Naval repair ship *Luzon* for shop layouts. Interpreting the November direction by General Echols, ASC proceeded with designing shop layouts and authorizing significant equipment purchases even before vessels were officially allocated. In May 1944, the AAF directed the term "Floating Depot" be discontinued and replaced it with "Army Aircraft Repair Ship Project" (AARS) and at the same time deemed the proper classification of final disposition and organization of units involved be at the "Top Secret" classification and all other matters at "Secret."¹⁵

The formal application for the six large vessels, Liberty ships,¹⁶ was submitted to the Transportation Corps (TC) on 1 January 1944, with these to serve as the main Repair Ships. Crucial to the expedited



Figure 4: Adm Ernest J. King, USN

procurement and conversion of these vessels was the sponsorship provided by Generals Gross and Franklin of the Transportation Corps. Following their initial informal approval, General Franklin secured a unanimous resolution from the Joint Military Transportation Committee, which was subsequently forwarded to the Joint Chiefs of Staff (JCS). However, at the JCS level, Admiral Ernest J. King, Chief of Naval Operation and Commander-in-Chief, US Fleet, strongly objected. His main concerns centered around two main points: the method of converting the ships and whether civilian or Navy crews would operate them. King argued that the Navy's experience with such floating facilities had not been adequately considered and wished the conversions to be integrated with the Maritime Commission's overall conversion program, but the AAF feared this would cause indefinite delays due to the Navy's high priorities on surface craft. King was also adamant that, given the ships would operate within bombing range of the enemy, they

should be manned by Navy crews rather than civilian or Army personnel, contrary to the Army's preference for Transportation Corps providing civilian crews. King stated that while the Army Air Forces would control the repair organization, the Navy must provide the ship's crews and gun crews. Relations strained during meetings with now Brigadier General Lyman P. Whitten, Chief of Air Services Division, warning that if the Navy continued to demand oversight of AAF programs, the AAF would retaliate by scrutinizing Naval operations. General Henry "Hap" Arnold, Commander in Chief, US Army Air Forces, in his reply to Admiral King, expressed pleasure at the Navy's agreement on the usefulness of the vessels but stood firm on the Army handling conversions independently, citing a recent reduction in Army construction that ensured facilities were available without undue interference. Regarding manning,

¹⁵ Air Service Command, *Classification of Floating Depot Project*, 13 May 1944.

¹⁶ Liberty Ships were 10,500-tons, 441.5-feet long, 57-feet wide with a 22-foot draft. They could travel at 11-knots and a cruising range of 12,000 miles. They were equipped with eight cargo booms with anywhere from 5- to 15-ton lift capacity. McDonough, *Aircraft Repair Ship Project*, pp. 1, 21

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General Arnold contended the Army could provide either civilian or military crews, noting that ships would typically operate in the intermediate zone where civilian-manned vessels were already present and offered up a compromise – proceed with the program without delay and he would accept Navy crews if it was later determined necessary. The final compromise proposed that the Army would handle conversion, Merchant Marine personnel would operate the vessels, and the Navy would furnish gun crews to augment the AAF-trained crews. This compromise led to the Navy’s blessing and, despite the dispute causing a few weeks’ delay, Admiral William D. Leahy, Chief of Staff to the Commander in Chief, on behalf of the JCS, requested the Maritime Commission and Transportation Corps to work out the transaction details with the allocation of six C2-S-CL hulls (Liberty ships) to the Transportation Corps on 17 January 1944. The first three Liberty ships were acquired in April with the first completed Repair Ship, the *SS Rebecca Lukens*, delivered on 20 September; the *SS Daniel E. Garrett* left the Mobile dockyard on 11 October.¹⁷

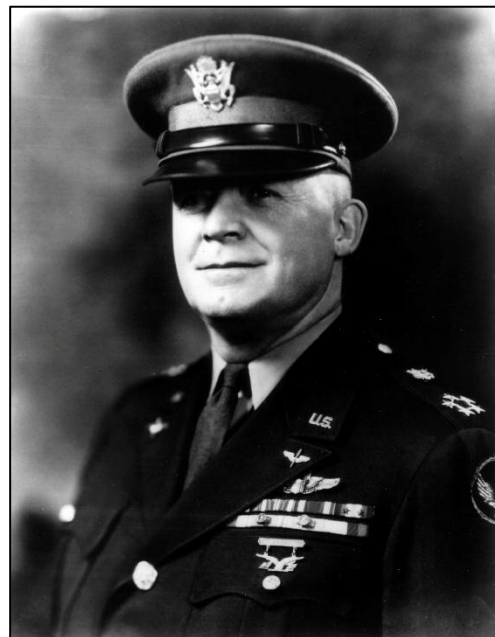


Figure 5: Gen Henry “Hap” Arnold, Commander-in-Chief, US Army Air Forces

The acquisition of the smaller Auxiliaries¹⁸ also faced difficulties. The AAF initially requested 36 smaller vessels with the Requirements Division of the Army Services Forces (ASF) initially objecting to increased requirements; however, an informal agreement between Generals Franklin and Whitten scaled the number down to 18. Fortunately, the Transportation Corps had 212 supply boats under construction at the Higgins Shipyard

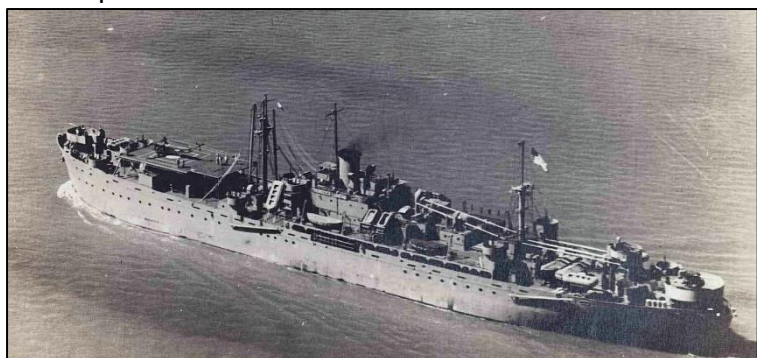


Figure 6: USS Rebecca Lukens on trial run.

¹⁷ The six Aircraft Repair Ships were: the *SS Daniel J. Garrett*, the *SS Rebecca Lukens*, the *SS Richard O’Brien*, the *SS Thomas LaValley*, the *SS Robert W. Bingham*, and the *SS Nathaniel Scudder*. Sherrard, *Floating Units*, pp. 3-5; McDonough, *Aircraft Repair Ship Project*, pp. 9-15, 57-58; Hohn, *Floating Aircraft Maintenance Facilities*, pp. 1-3, 18; Monay, *Floating Aircraft Repair*, pp. 9-10; Floating Depot, *Correspondence on Security*; Sherrard, *Floating Units*, p. 9.

¹⁸ Auxiliaries, also known as Army Aircraft Repair Ships (Auxiliary), were 178-foot long, 36-foot wide with a 9-foot draft. They had a cruising range of 3,500 miles at 12 knots with a deadweight tonnage of 1,000-tons. The eighteen Auxiliaries were: *FS-204 Col Clifford P. Bradley*, *FS-205 Col Richard E. Cobb*, *FS-206 Col John D. Corkille*, *FS-207 Col Demas T. Craw*, *FS-208 Col Everett S. Davis*, *FS-209 Col Sam L. Ellis*, *FS-210 Col Oliver S. Ferson*, *FS-211 Col. Percival E. Gabel*, *FS-212 Col Donald M. Keiser*, *FS-213 Col Douglas M. Kilpatrick*, *FS-214 Col Raymond T. Lester*, *FS-215 Col Donald R. Lyon*, *FS-216 Col William J. McKiernan*, *FS-217 Col Armand Peterson*, *FS-218 Col Charles T. Phillips*, *FS-219 Col Edgar R. Todd*, *FS-220 Col Harold B. Wright*, and *FS-221 Col Francis T. Ziegler*.

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in New Orleans¹⁹ with 18 diverted for the AAF Project.²⁰ Major General Lucius B. Clay, Director of Materiel, ASF, directed the Chief of Transportation to make these vessels available on 26 April. This diversion saved significant time, though it meant accepting standard designs rather than custom-built craft. Construction of the first Auxiliary at Higgins Shipyard began on 22 May and delivered to Brookley Field, near downtown Mobile, Alabama, docks on 27 October, more than a month after the first Repair Ship's departure due to issues arising regarding clear lines of responsibility between the AAF and Transportation Corps for procuring materials like generators for the Auxiliary vessels. Overall, ship acquisition for the Army Aircraft Repair Ship Project was a testament to adaptive military project management under wartime exigencies, showcasing effective inter-service cooperation despite initial disagreements and logistical hurdles.²¹



Figure 7: Freight/Shipping (FS) ship assembly line at the Higgins Shipyard's Industrial Canal facility in New Orleans (www.nationalww2museum.org).

Organizational Structure and Project Management

The high priority and unique nature of the Repair Ship Project required significant Project Organization and Management to address the complex challenges of providing mobile aircraft maintenance in the Pacific Theater. This involved establishing a dedicated organizational structure, defining roles and responsibilities, coordinating across multiple branches, and overcoming various logistical and bureaucratic hurdles. It necessitated the establishment of special administrative machinery within ASC to expedite conversion, supply acquisition, and personnel procurement and training. Major General Clements McMullen, Chief of the Maintenance Division, established an ASC Project Committee to ensure coordination within Headquarters regarding the construction, outfitting, and manning of the vessels as well as approved key design decisions, actively functioning even before the large vessels were formally

¹⁹ In the 1960s, these same facilities were utilized by the Chrysler Corporation to build the first stages of the Saturn I and Saturn IB and later Boeing the first stage of the Saturn V for the NASA Space Program. From 1973 to 2010, Martin Marieta manufactured the Space Shuttle's external fuel tanks here.

²⁰ The second group of 18 vessels, intended to bring the total to 26, was never allocated due to other program pressures, and the units activated to man them were later disbanded. Initially, LCTs (Landing Craft, Tank) or other flat-bottomed landing craft were considered for the auxiliaries due to their ability to land directly on beaches. However, their high priority for Navy use made them unobtainable.

²¹ McDonough, *Aircraft Repair Ship Project*, pp. 1, 15-16, 26; Monay, *Floating Aircraft Repair*, pp. 10-12, 18; Sherrard, *Floating Units*, pp. p. 5, 9, 14; Hohns, *Floating Aircraft Maintenance Facilities*, pp. 1, 3; Guerny, *Floater*, p. 1.

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assigned. Key representatives from the Maintenance, Supply, Personnel and Training, and Construction and Utilities Divisions were appointed as an operating committee that proved highly efficient in managing this large-scale military program. Major Miles Kracman initially chaired the committee, but in

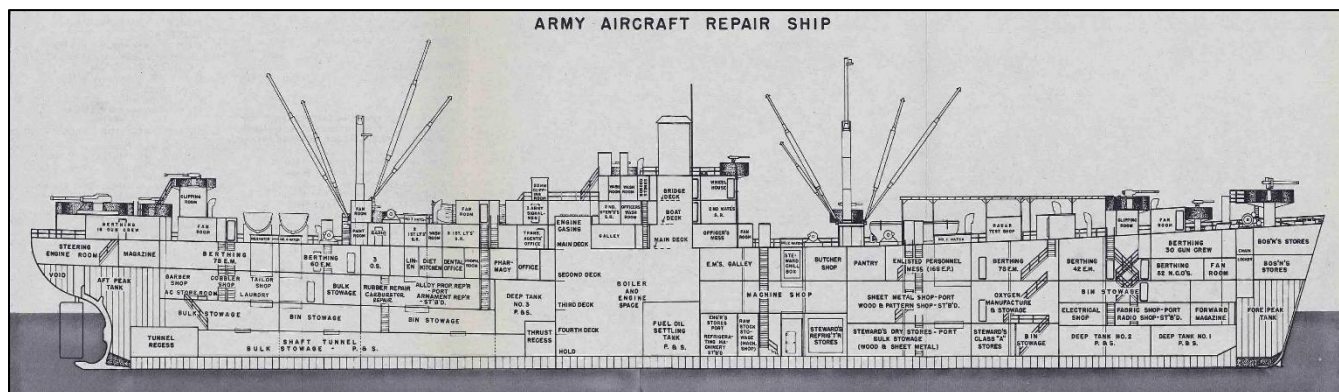


Figure 8: Aircraft Repair Ship (Liberty) layout.

May 1944, Colonel Oscar F. Carlson took over, with his higher rank lending increased credibility in dealing with others. Colonel Carlson devoted his full time to the project, significantly aiding its rapid development as well as arranging for the appointment of Special Project Officers at Mobile (Lieutenant Colonel Joseph T. Kingsley and later Lieutenant Colonel William McCraw) and San Antonio (Colonel G.J. Garner and Lieutenant H.O. Merryweather) Air Service Commands to expedite local affairs. Mr. Marvin T. Koerner, Project Engineer in the Construction and Utilities Section, began with the project at its inception and was key in developing the proposed shop layouts based upon the Navy models.²²

At the AAF level, the Marine Section, led by Major David D. Lent, became the focal point for the project. Major Lent was

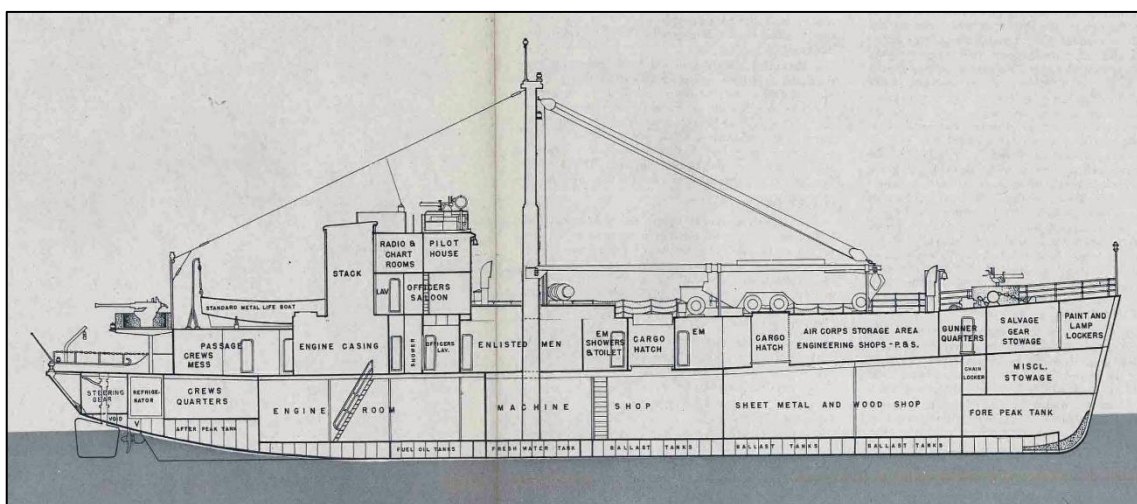


Figure 9: Auxiliary Repair Ship (Freight/Shipping) layout.

personally responsible for the procurement of the ships, negotiating with the Transportation Corps for their conversion, and serving as the central point of contact at AAF Headquarters for all related matters.

²² McDonough, *Aircraft Repair Ship Project*, pp. 16-18, 20; Monay, *Floating Aircraft Repair*, p. 11.

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Lieutenant Colonel W.R. Weber was appointed as liaison officer at AAF to ensure proper channeling of all communications and to keep the ASC Project Officer informed. Transportation Corps was vital for making the vessels available and converting them according to AAF specifications. Generals Gross and Franklin personally sponsored the project within the Transportation Corps and their assistance in expediting acquisition and conversion becoming crucial to the Project success. General Franklin also presented the resolution to the Joint Military Transportation Committee. Major John S. Terrell, New Orleans Port of Embarkation, was responsible for supervising the loading of tactical supplies onto the ships. The Joint Chiefs of Staff provided the final approval for the allocation of the six large vessels, despite initial Navy opposition.²³

The Project faced several significant management challenges during its beginning. Admiral King initially objected to the project because the AAF ignored the Navy's experience with floating facilities, but General Arnold eventually proposed a compromise. Another significant issue was the lack of an assigned or established

priority for the project, which was crucial for obtaining equipment and manpower as well as the difficulties in the responsibilities between the AAF and the Transportation Corps for material and equipment procurement. Then the constant changes and downward revisions in the Table of Organization and Equipment (T/O&E) for personnel, as well as discrepancies between personnel and equipment sections, created confusion and problems in manning units. Obtaining helicopters²⁴ was difficult due to competition from other agencies, necessitating an increase in the total contract and securing cooperation from other branches to defer deliveries.²⁵



Figure 10: A Sikorsky R-4B Hoverfly aligns itself on the tiny flight deck of the SS Daniel E Garrett somewhere in the Pacific.

²³ McDonough, *Aircraft Repair Ship Project*, p. 19.

²⁴ Sikorsky RB-4B *Hoverfly's* were acquired for this mission.

²⁵ McDonough, *Aircraft Repair Ship Project*; Monay, *Floating Aircraft Repair*, pp. 29-30, 36.

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Ship Conversion and Equipment

The Army Aircraft Repair Ship Project involved the acquisition and conversion of various vessels to provide mobile aircraft maintenance facilities, recognizing the need for such support in the Pacific Theater's "island-hopping" campaign and a direct response to the serious logistical problems where land-based depots quickly became too far to the rear as the war moved forward, wasting significant time, money, and manpower in establishing new facilities. The project eventually focused on two main types of ships: large Repair Ships and smaller Auxiliary Vessels, equipped with specialized shops and tools. Repair Ships were converted 10,500-ton Liberty ships designed to operate in support of several



Figure 11: The SS Nathaniel Scudder operating in the Philippines.

combat groups, providing elaborate repair and testing equipment, who could provide fourth echelon maintenance and overhaul of airplane components and engine accessories with full engine overhaul abandoned in favor of returning engines to the States, aligning the project with capabilities of mobile facilities and the changing war situation. The Auxiliary Vessels, known as Army Aircraft Repair Ship (Auxiliary), were intended to service approximately the number of

planes assigned to one group and provide up to third,²⁶ and in some instances, fourth echelon repair on damaged planes. They were meant to operate in close support of the larger Repair Ships, potentially closer to the front lines. The conversion of the six Liberty ships into Repair Ships commenced in April 1944, with the vessels delivered to Waterman Steamship Company and Alabama Drydock Company in

²⁶ Third echelon maintenance embraces "repairs and replacements that required mobile machinery and other equipment of such weight and bulk that ground means of transportation was necessary. Those units charged with this level of maintenance required specialized mechanics who could perform field repairs and salvage, removal and replacement of major unit assemblies, fabrication of minor parts and minor repairs to aircraft structures and equipment. Normally, this echelon embraced repairs that could be completed within a limited time period that was determined by the situation." Army Air Force Regulation 65-1, *Supply and Maintenance*, 14 August 1942, p. 6.

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Mobile, Alabama. The initial estimate for conversion was approximately 90 days, but this proved optimistic, with the first boat not completed until 20 September.²⁷

Repair Ships: The formal request for the Liberty ships was forwarded to the Transportation Corps by the AAF on 1 January 1944, and after the initial opposition by Admiral King, the Joint Chiefs of Staff approved the allocation. The first three Liberty ships were turned over



Figure 12: The SS Richard O'Brien operating off Okinawa in August 1945.

to the Transportation Corps in April with the first Repair Ship, the SS *Rebecca Lukens*, delivered on 20 September; the SS *Daniel E. Garrett* was on-loaded with supplies on 11 October and became known by its crew as "The Floater."²⁸

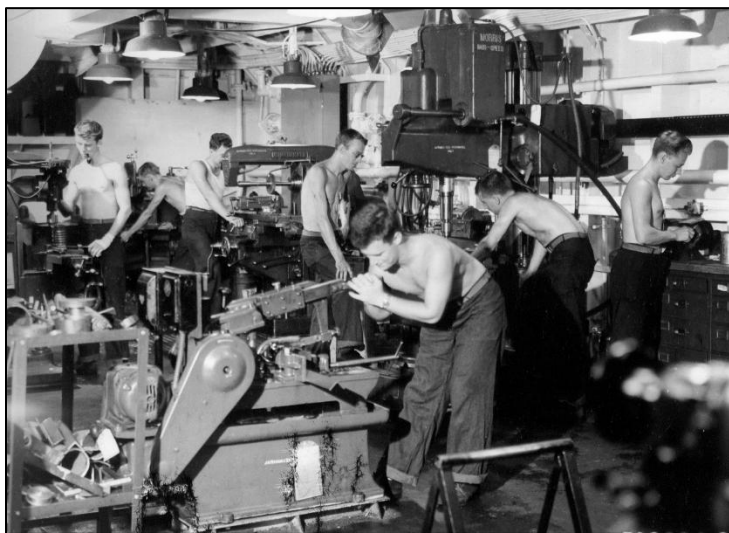


Figure 13: Men of the 6th Aircraft Repair Unit (F) work in the Machine Shop somewhere in the Pacific, April 1945.

It was initially anticipated that conversion would take roughly 90 days with the first ships ready by mid-July; however, this proved optimistic, as the first one was completed on 20 September. Mr. Koerner developed the conversion plans, drawing inspiration from the shop layout of the Naval repair ship *Luzon* along with the help from Major Lent, who secured plans and specifications from the Navy. However, ASC's initial plans to locate shops on the second deck²⁹ and berth³⁰ personnel were rejected by the Transportation Corps due to Merchant Marine personnel's refusal to be quartered

²⁷ McDonough, *Aircraft Repair Ship Project*, pp. 22-28, 32-33; Hohns, *Floating Aircraft Maintenance Facilities*, pp. 1-5; Monay, *Floating Aircraft Repair*, pp. 2-3, 6-9, 16; Sherrard, *Floating Units*, pp. 2, 4-7; Guerny, *Floater*, p. 4; Kracman, Maj. Miles & Maj M.C. Goodman, "ATC Goes to Sea," *PLANE FACTS*, Air Technical Service Command, February 1945, pp. 2-3.

²⁸ McDonough, *Aircraft Repair Ship Project*; Hohns, *Floating Aircraft Maintenance Facilities*, pp. 1, 3; Guerny, *Floater*, p. 1; Monay, *Floating Aircraft Repair*, p. 12; Sherrard, *Floating Units*, pp. 9, 14.

²⁹ The second deck is the first complete deck located directly below the main deck. It is the fully enclosed deck used for various purposes, in this case workspaces. The third deck was the second complete deck below the main deck.

³⁰ The berth on a naval ship refers to the designated sleeping area.

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below the waterline;³¹ with a comprised reached, shops were then planned for the third deck. Feedback from the field, specifically from the Fifth and Seventh Air Force Service Commands,³² offered critical comments on proposed shop layouts. While valuable, incorporating all suggestions would have necessitated highly specialized ships, which was impractical given the urgency to have ships in theater asap and a practical attitude prevailed; completing the project as planned with minimal disruption, emphasizing rapid production of an all-purpose ship. ASC provided equipment lists, detailing electrical requirements and installation specifics, while it was also determined that it was more efficient to install the shop equipment machinery in the conversion yards based upon the Engineer Corps' experience rather than at Mobile Air Service Command docks. Finally, a lack of assigned priority for the project hindered the acquisition of equipment and manpower. The AAF avoided directly requesting a "top" priority but advised the War Production Board and War Manpower Commission that the vessels were a "must" for servicing Group I to IV airplanes in the Pacific with the Labor and Manpower Officer tasked to ensure the project had a "must" rating. While this action eased labor shortages, it did not establish a priority for equipment, and material procurement proceeded without it.³³

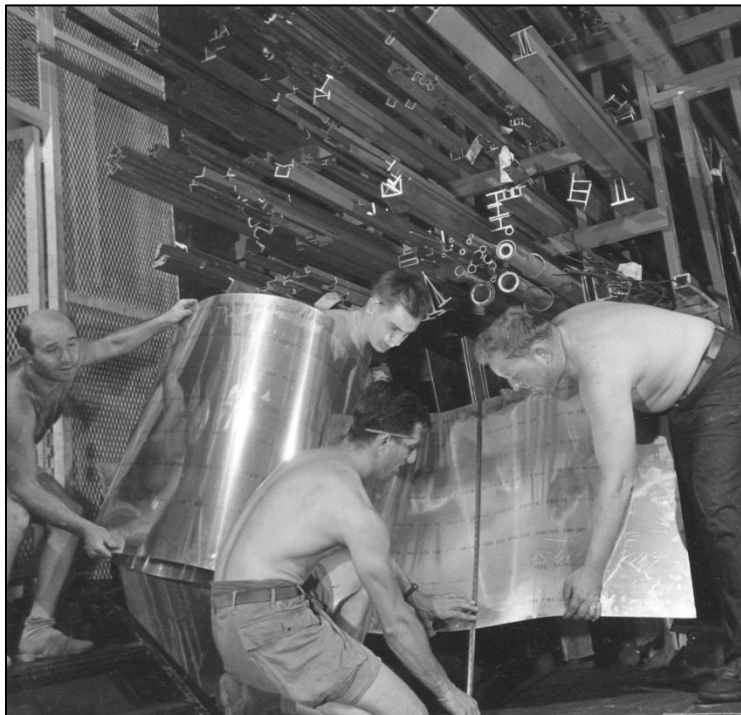


Figure 14: Men of the First Aircraft Repair Unit (F) measure a piece of sheet metal for a Boeing B-29 Superfortress of the 21st Bomber Command.

³¹ Merchant Marine refused to be quartered below the waterline due to the high risk of entrapment and death during a torpedo attack. Liberty ships were known to sink and/or break apart within minutes of an attack, below waterline meant navigating the dark, flooded, and shifting corridors to reach lifeboats was extremely difficult.

³² Fifth Air Force Service Command was the logistics and maintenance arm of Fifth Air Force and responsible for keeping aircraft flying across the vast distances of the Southwest Pacific Theater. They established and managed major facilities like the Townsville Air Depot in Australia and later forward depots in Finschhafen and Hollandia. The Seventh Air Force Service Command was the logistics and industrial support organization for Seventh Air Force in the Central Pacific. They supported the Hawaiian Air Depot as well as the all the tiny island airbases in support of the island-hopping support and later reorganized into a more mobile tactical support to provide immediate repair and supply to areas such as Saipan and Okinawa. They managed the critical flow of supplies to the Gilbert, Marshall, and Mariana Islands.

³³ McDonough, *Aircraft Repair Ship Project*, pp. 24-28; Monay, *Floating Aircraft Repair*, p. 12; Sherrard, *Floating Units*, p. 14.

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Repair Ships were equipped to handle almost every kind of aircraft repair except engine overhaul, which was initially contemplated but later abandoned in favor of returning the engines to the States. Shops were designed to fashion parts not easily available in forward areas, with extensive testing equipment, and typically located on the third deck with crew berthing and other facilities. The Machine Shop was the largest of the shops housing heavy equipment for repair of landing gear, hydraulic struts, and valve repair. Next was the Sheet Metal Shop for repairing damaged surfaces and fashioning replacements. The Propeller Shop was equipped with machinery to repair and align aluminum propellers but machinery for repairing steel propellers was removed based upon field recommendations. The Plating Shop, an addition based upon recommendations, provided cadmium coating for steel surfaces to prevent corrosion. The Armament Shop served to repair both Repair Ships and aircraft armament as well as turret

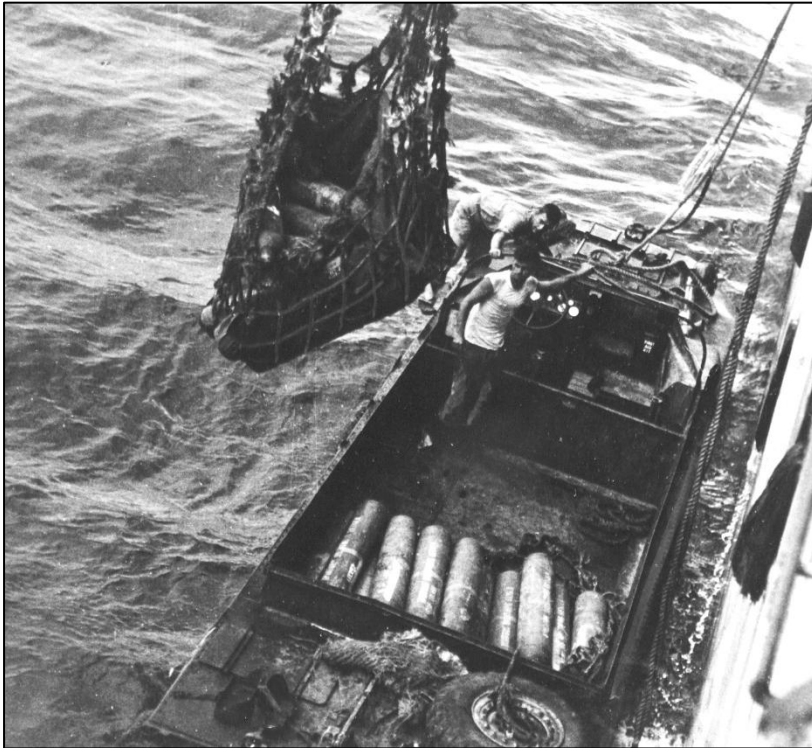


Figure 15: Crews lowering cylinders of breathing oxygen into a DUKW for B-29s at Saipan.

stands and equipment for fighters and bombers. The ship's Water Purification System could produce 15,000 gallons of water a day, exceeding ship personnel needs, which allowed the surplus to be supplied to land-based units. The Oxygen Plant was a unique feature that could manufacture liquid and breathing oxygen in quantity, designed to operate 24-hours-a-day that was critical for support to the high-altitude Boeing B-29 *Superfortress* units. Finally, the first two Repair Ships were equipped for third and fourth echelon repair of the *Superfortress* fire control system.³⁴

³⁴ McDonough, *Aircraft Repair Ship Project*, pp. 26-28, 33-35; Monay, *Floating Aircraft Repair*, pp. 6, 19, 24-26; Guerny, *Floater*, pp. 8-9; Kracman, *ATSC*, pp. 2-3; Sherrard, *Floating Units*, pp. 14, 17.

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To enhance mobility and usefulness, Repair Ships carried special equipment for crews to reach inaccessible areas. Thirty-foot workboats were utilized to be dispatched to crash sites for the retrieval of damaged aircraft and parts as well as the use of DUKWs to carry men and equipment to set up temporary camps for spot repairs.

Each Repair Ship was assigned two Sikorsky R-4B *Hoverfly* helicopters utilized for observation, spotting down planes, rescue, and transporting personnel and supplies between ship and shore. Obtaining these helicopters was difficult due to competition from other agencies but was resolved by increasing the total contract and securing cooperation from other agencies. To accommodate, each ship had a large steel platform measuring 72 feet long by 40 feet wide installed 12 feet above the main deck to provide a clear flight zone. Initially, Transportation Corps was reluctant to install these due to potential Navy objections regarding the AAF flying aircraft



Figure 16: A Sikorsky R-4B Hoverfly hovers near a Repair Ship somewhere in the Pacific.

from ships with the AAF eventually arranging to make the installment themselves; however, Transportation Corps did complete the installation.³⁵

Seen as a likely target, each Repair Ship was equipment with one 5-inch gun in the aft, one 3-inch gun in the forward, two 40-mm weapons in the forward and aft, twelve 20-mm guns strategically places around the ship, and degaussing equipment for anti-mine protection. Protective devices against chemical warfare were placed on each ship, including chemicals, decontaminating equipment, and Navy-type gas masks. Weapon selection was made by the Navy with placement by the New York Port of Embarkation (NYPOE) of the Transportation Corps with the approval of the Chief of Naval Operations.³⁶

³⁵ McDonough, *Aircraft Repair Ship Project*, pp. 26-28, 39-42; Monay, *Floating Aircraft Repair*, pp. 3, 12, 35-39; Sherrard, *Floating Units*, p. 14; Kracman, *ATSC*, pp. 2-4; Hohns, *Floating Aircraft Maintenance Facilities*, p. 3.

³⁶ McDonough, *Aircraft Repair Ship Project*, pp. 30-32, 58.

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Auxiliary Vessels: Much like Repair Ships, the AAF had a clear desire for their requirements as stated above. Initially, the AAF set out with an initial design centered around the LCTs³⁷ (Landing Craft, Tank) or some other flat-bottomed landing craft for their ability to land directly on beaches but due to their high priority for US Navy

use, this made them unobtainable. AAF

settled upon supply boats or what were typically referred to as Freight and Supply (FS) boats that would become known at Auxiliaries. They were 178 feet in length, 36

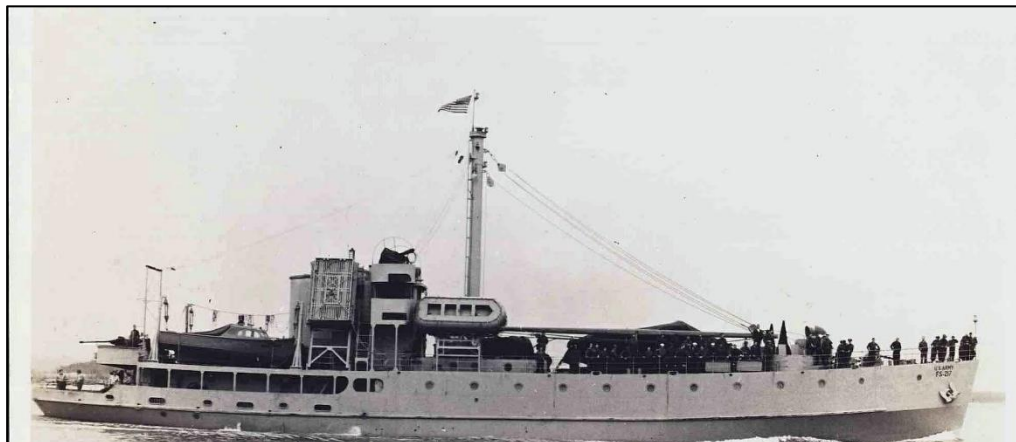


Figure 17: The Auxiliary, FS-217 Col Armand Peterson.

feet in breath, could

travel at a speed of 12 knots, and cruise to a range up to 3,900 miles. Initially requesting 36 vessels, requirements were scaled down to 18 by an informal agreement with the Transportation Corps. These 18 were diverted from 212 boats under construction at the Higgins Shipyard with the diversion saving considerable time, though it meant accepting the standard designs with some conversions. These conversions involved significant construction challenges, including transforming their “well deck” design to a “flush deck”³⁸ in order to accommodate the two decks of maintenance shops. Preliminary plans were drawn up by the ASC Project Engineer and forwarded to the Transportation Corps, with detailed drawings prepared under naval architects in New Orleans. Construction on the first Auxiliary at Higgins Shipyard began on 22 May 1944, and much like the Repair Ships, initial agreements did not include the installation of Air Force equipment, but this was later changed for efficiency with Higgins performing the installation under joint Transportation Corps and ASC supervision. One major difficulty arose in August concerning the procurement of generators for the electrical systems due to conflicting demands from other programs. The Transportation Corps appealed for written authority regarding the urgency of the small boat program with the AAF reminding the Army Service Forces that the urgency had already been established. The problem was resolved when Vice Admiral Howard Vickery³⁹ directly intervened on 17 August, directing that the needed motor generator sets be diverted for the Auxiliary Vessels; the issue

³⁷ Landing Craft, Tank (LCT) was an amphibious assault vessel designed to transport and land heavy tanks, vehicles, and supplies directly onto enemy-held beaches.

³⁸ The primary difference between was a flush-deck ship had one continuous deck from bow to stern, while a well-deck ship had “steps” or lower sections between the raised parts of the hull.

³⁹ Vice Admiral Howard Vickery was the pivotal figure within the massive American shipbuilding effort during World War II and was often called the “Miracle Man” as he was the primary leader responsible for the design and construction of the merchant fleet that sustained the Allied war effort. He served as the Vice Chairman of the US Maritime Commission and the Deputy Administrator of the War Shipping Administration.

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was due to “conflicting demands” of higher-priority programs with generators originally slated for other War Department and Navy programs. These were eventually procured from Electric Machinery Company in Minneapolis, Minnesota, and flown to New Orleans, saving considerable time. This issue highlighted a lack of clear demarcation of responsibilities between AAF and Transportation Corps for material procurement.⁴⁰



Figure 18: Members of the 6th Aircraft Repair Unit (F) operate a 5" gun during gunnery practice somewhere in the Pacific, May 1945.

maintenance such as propeller, electrical, paint, battery, instruments, fabric, machine, wood, radio, radar, armament, and sheet metal.⁴¹

Challenges: ASC's proactive approach to acquiring and storing supplies, even before formal vessel nomination, interpreting General Echols' November letter as a “green light” for the program, provided a significant head start with this “calculated risk” credited with saving months. A major challenge was the lack of definitive information on deployment areas and tactical units to be serviced. While initial plans were general, attempts were made to incorporate feedback from Fifth and Seventh Air Force Service Command on shop layouts and equipment. However, the urgency of the project often meant prioritizing quick completion over extensive customization for specific theaters. This was resolved when the first three Repair Ships and accompanying Auxiliaries were committed to the Very Heavy Bomber (VHB) program, simplifying supply planning. Special supply lists, including frequently needed B-29 spare parts for third and fourth echelon maintenance and raw stock, were immediately developed. However,

⁴⁰ McDonough, *Aircraft Repair Ship Project*, pp. 24-30; Monay, *Floating Aircraft Repair*, p. 10.

⁴¹ McDonough, *Aircraft Repair Ship Project*, pp. 30-32, 58.

Like the Repair Ships, armament was considered a crucial element on Auxiliaries, being viewed as high value targets. Auxiliaries were equipped with a 40-mm gun aft, two 20-mm guns forward, and two .50-caliber anti-aircraft weapons on the flying bridge. The Navy selected the weapons with the NYPOE determining their placement upon final approval from the Chief of Naval Operations. Defensive equipment also included degaussing equipment against floating mines and protective devices against chemical warfare. Shop facilities on Auxiliaries were more limited in scope, focusing on basic equipment for routine

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with only two Repair Ships ultimately allocated to the VHB program, the B-29 supplies for the third ship were divided between the first two, leading to overcrowding of the 57,000 cubic feet of storage space. Loading of tactical supplies was conducted at the Mobile Air Service Command docks under the supervision of the Transportation Corps, with professional stevedores and unit supply personnel assisting. Detailed supply lists were developed, providing a 90-day reserve for Repair Ships and a 30-day reserve for Auxiliaries. Major Harvey L. Simms, Air Services Division working for General Whitten, oversaw the acquisition and storage of over 100,000 items per large vessel at Mobile.⁴²



Figure 19: Communication Section personnel of the 6th Aircraft Repair Unit (F) pose for a photograph somewhere in the Pacific, September 1945.

Personnel and Training

The mission of the Army Aircraft Repair Ships and Auxiliaries demanded small, highly efficient, and versatile organizations capable of extensive maintenance repairs under diverse field conditions. These tactical units needed to be robust enough for field maintenance and combat but flexible for shipboard environments. These units were entirely new, differing from any groups previously deployed by the ASC, and required specially trained officers and men to ensure effective combat teams. The organizational



Figure 20: Machine Section personnel of the 6th Aircraft Repair Unit (F) pose for a photograph somewhere in the Pacific, September 1945.

structure aimed for simplicity and efficiency, with units projected for Repair Ships divided into Administrative, Tactical, Service, and Technical Divisions. A key saving in personnel was achieved by employing one unit of command, eliminating the need for squadron-level commanders or first sergeants and duplicating administrative personnel found in standard Service or Air Depot Groups in order to streamline operations and eliminate redundancies. This allowed Repair Units to operate with significantly fewer personnel (22 officers

⁴² McDonough, *Aircraft Repair Ship Project*; Kracman, *ATSC*, pp. 4-5; Sherrard, *Floating Units*, pp. 2, 4-5; *Floating Depot, Correspondence on Security*; Monay, *Floating Aircraft Repair*, pp. 14-18.

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and 340 enlisted men) compared to a standard Service Group (46 officers, 1,113 enlisted men) while performing up to fourth echelon maintenance for combat groups. The Auxiliaries, manned by Maintenance Units, were authorized three officers and 48 enlisted men each. The initial program called for 6 Repair Ships and 36 Auxiliaries, totaling 240 officers and 3,700 enlisted men, though the number of Maintenance Units was later reduced to 18, bringing total personnel to 186 officers and 2,836 enlisted men. A significant challenge in personnel procurement was the shortage of highly skilled technicians, as most positions demanded specialized expertise. This problem was exacerbated by a lack of experienced technical men, with many enlisted personnel scoring well within the classrooms rather than having practical experience. Efforts were made to man units from within ASC, including vertical upgrading, lateral reclassification, and on-the-job training. Because of this shortage of qualified personnel, this was one of the factors behind the decision to cut the Maintenance Units from 36 to 18.⁴³

Repair Units⁴⁴ assigned to the Repair Ships were activated at Kelly Field, Texas, on 15 March 1944. The authorized strength for Repair Units was initially set at 18 officers, and 302 enlisted men was later formalized by the Tables of Organization and Equipment (T/O&E) 1-011 on 27 June 1944 to 22 officers and 362 enlisted men, though this fluctuated with changes in Tables of Distribution (T/D) and later the T/O&E with these constant changes in the T/O&E causing confusion. However, this T/O&E controversially revised officer and enlisted grades downward, and efforts to restore them were unsuccessful. Discrepancies between personnel and equipment sections, such as providing bombsight



Figure 21: Maj Gen Clements McMullen, Commanding General of Far East Air Service Command, poses with officers of the 6th Aircraft Repair Unit (F) aboard the ship somewhere in the Pacific, June 1945.

maintenance equipment without corresponding specialists, were also noted, eventually resolved by authorizing personnel in movement orders. The units were designated for dual functions, with many personnel assigned additional duties. Due to limited personnel and space limitations, many individuals were assigned dual functions, for instance, supply clerks also handled ordnance, signal, and chemical supplies and operated automotive equipment. Commanding Officer roles for Repair Units, ideally a full colonel, saw initial inconsistency with majors and lieutenant colonels in command, leading to

⁴³ McDonough, *Aircraft Repair Ship Project*, pp. 45-50, 55, 63-64; Monay, *Floating Aircraft Repair*, pp. 14, 16, 18, 29, 32; Sherrard, *Floating Units*, pp. 7, 9; Hohns, *Floating Aircraft Maintenance Facilities*, p. 4.

⁴⁴ Floating Air Depot units were redesignated Aircraft Repair Units (Floating) in May 1944.

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recommendations for immediate assignment of higher-ranking officers. Personnel were also responsible for depot inspection, overhaul, and fourth echelon repair of aircraft components, engine accessories, photographic equipment, tires, rubber goods, aircraft armament, radar, radio equipment, and oxygen generation. They were also trained in salvage and reclamation procedures.⁴⁵

Maintenance Units⁴⁶ assigned to the Auxiliaries were activated at Daniel Field, Augusta, Georgia, with the first 18 units beginning training on 2 June 1944. Their authorized strength was 3 officers and 41 enlisted men, later increased to 48 enlisted men with the addition of a gun crew. Rumors that these units would be Navy-controlled and that AAF personnel would transfer to the Navy caused initial consternation among enlisted men, only resolved by official orders assigning them to Air Force units. These units provided third-echelon maintenance, salvage, and repair for a single combat group and were typically attached to a repair ship for administration. The command officer held the rank of Captain, despite efforts to upgrade it to a Major. Personnel challenges also plagued these units as the 19th through 36th Maintenance Units, activated in June, were later disbanded by September due to personnel shortages caused by demands of higher-priority programs.⁴⁷

The actual operation of the vessels was the primary responsibility of Merchant Marine personnel (civilians), comprising approximately 1 officer and 70 men for Repair Ships, and smaller crews for Auxiliaries with personnel receiving a 100-percent premium for their service in forward areas. This arrangement was a crucial compromise following Navy objections to the Army Air Forces operating these ships. The Navy's insistence on manning the ships would have required a prohibitive number of personnel (167 Navy men for a Repair Ship compared to 50 for Army crews), severely reducing vital depot space. In terms of command, the ship's master (a civilian) held absolute authority over all personnel, including military, while the vessel was at sea. Upon reaching port, however, command reverted to the military commanding officers of the respective Repair or Maintenance Units. For defensive armament, a joint crew system was

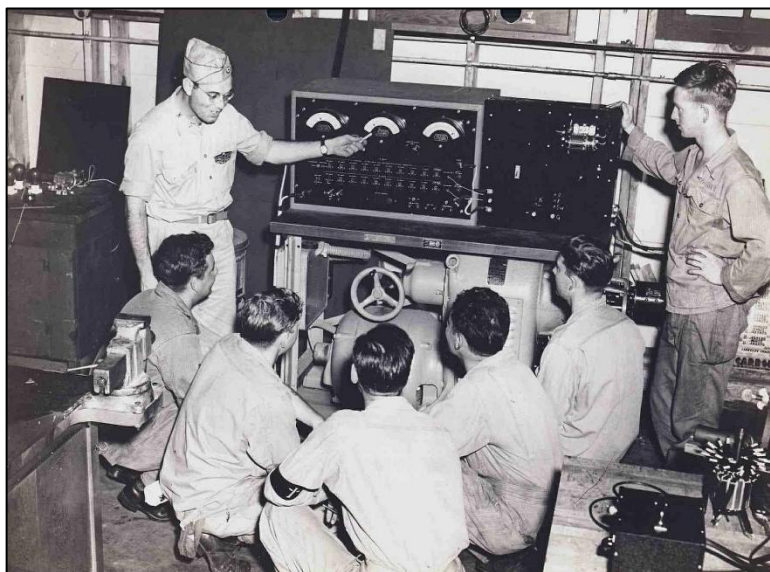


Figure 22: Enlisted men going through training.

⁴⁵ McDonough, *Aircraft Repair Ship Project*, 50-54; Monay, *Floating Aircraft Repair*, pp. 3, 6-7, 11, 21, 29-30; Sherrard, *Floating Units*, pp. 5-9; Muller, 1st Lt George, *History of Unit Number Two*, Mar-Apr 1944, pp. 1-7; Knutson, 2nd Lt Howard, *Historical Record*, 3rd Floating Air Depot, Mar-May 1944, pp. 1-9.

⁴⁶ These units were redesignated "Aircraft Maintenance Units (Floating)" in May 1944.

⁴⁷ McDonough, *Aircraft Repair Ship Project*, p. 54; Monay, *Floating Aircraft Repair*, pp. 6, 11, 21-22; Sherrard, *Floating Units*, p. 7.

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adopted. The Navy appointed a gun crew of 1 officer and 25 men, which augmented an Army Air Forces crew of 1 officer and 30 enlisted men for the Repair Ships. The Navy's role included training the Army personnel to eventually take over the weapons.⁴⁸

Training Program: The training program for Repair and Maintenance Units was comprehensive and unique, encompassing the dual military-marine training organized into three phases – Unit, Shipboard, and Technical training – with a duration of five-months, later extended to six, but did not include combined training with tactical groups due to time constraints and the anticipated roving mission of the units. In addition, many men trained in multiple specialties due to small unit sizes. The Mobile Air Service Command (MASC), located in Mobile, Alabama, was designated as the primary training jurisdiction due to its favorable weather, protected waters for marine training, well-equipped shops, experienced training section, and accessible docks. The Civilian Training Branch at Mobile played a significant role, adapting courses and developing new materials for enlisted personnel with the 4535th AAF Base Unit, established on 22 May to

centralize all project training activities at Mobile. Training objectives for the Repair Units aimed at producing organizations capable of depot inspection, overhaul, and fourth echelon repair of airplane components, engine accessories, photographic equipment, tires, rubber goods, aircraft armament, radar, radio

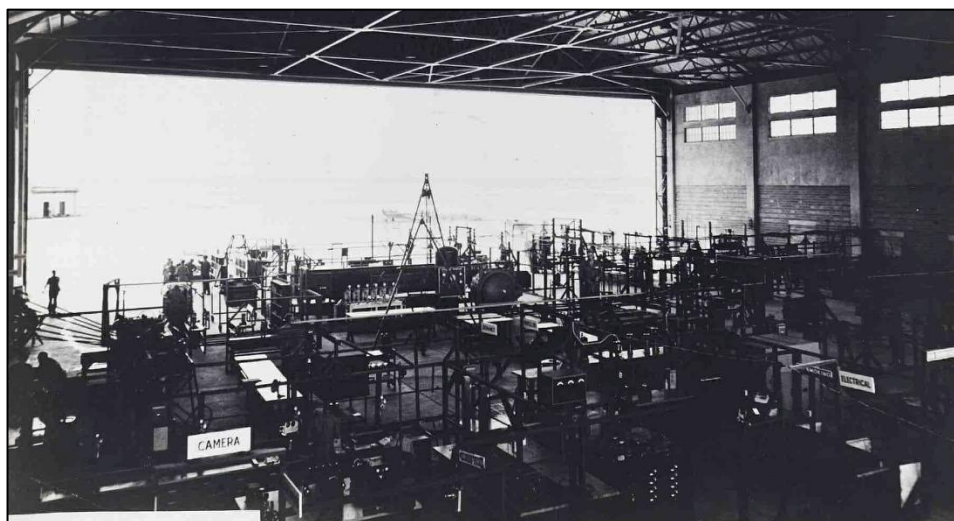


Figure 23: Repair Ship mock-up training at Brookley Field.

equipment, and breathing oxygen generations. Maintenance Units (Auxiliaries) focused on providing third echelon aircraft maintenance, salvage, reclamation, and repair.⁴⁹

Technical training was conducted at Brookley Field using mock-up shops that precisely replicated the shipboard layouts and equipment beginning in May. This allowed personnel to practice in conditions simulating confined ship spaces. Initially, delays in mock-up completion led to many men repeating basic courses, causing morale issues. To address this, qualified personnel were permitted to receive on-the-

⁴⁸ McDonough, *Aircraft Repair Ship Project*; Monay, *Floating Aircraft Repair*, pp. 11, 18; Hohs, *Floating Aircraft Maintenance Facilities*, p. 3; Kracman, *ATSC*, pp. 4-5; Sherrard, *Floating Units*, p. 2.

⁴⁹ McDonough, *Aircraft Repair Ship Project*, pp. 59-63; Sherrard, *Floating Units*, p. 15; Monay, *Floating Aircraft Repair*, pp. 3, 6, 11, 20-22; Gruelich, Jay, "Floating Supply Depots," *BRIEF*, Vol 1 No. 49 (7 November 1944), pp. 2-3; Sherrard, *Floating Units*, p. 7.

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job training in Brookley Field's maintenance shops. This provided invaluable practical experience in areas like engine maintenance, electro-plating, plexiglass, and propeller blade straightening, while also providing additional manhours for the maintenance shops. Next, men were sent to marine training.⁵⁰

Marine training was conducted at Grand Hotel in Point Clear, Alabama, located on Mobile Bay, that provided ideal waters for elementary seamanship and amphibious craft operation. The school, led by Lieutenant Colonel Matthew Thompson, included Transportation Corps instructors and Maritime Service

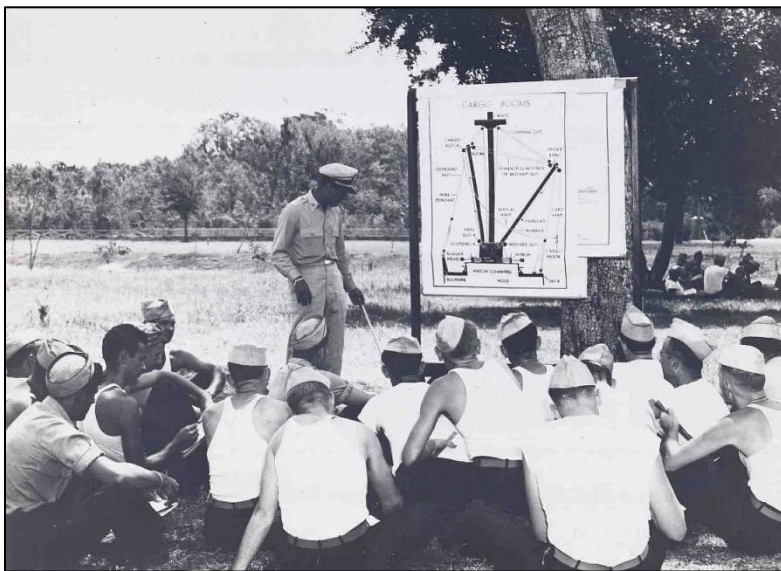


Figure 24: Men receive training in rigging.

petty officers. The Grand Hotel owner offered to let the troops use the hotel for free, as his contribution to the war effort; however, Thompson did not feel staying free was right with the two agreeing to a



Figure 25: Men receiving DUKWs training.

dollar and "that was that." Training equipment included DUKWs, T-boats,⁵¹ J-boats,⁵² lifeboats, and an "abandon ship tower" for practicing abandoning ship procedures. The comprehensive curriculum, initially 232 hours over 30-day, was compressed to two weeks due to deployment urgency. The curriculum covered elementary and advanced seamanship, navigation, rigging, lifesaving, small boat operation, DUKWs, cargo handling, and intensive swimming. A chemical defense course was added

⁵⁰ McDonough, Aircraft Repair Ship Project, 65-67; Monay, Floating Aircraft Repair; pp. 21-35; Sherrard, Floating Units, p. 15.

⁵¹ A US Army "Tug-Transport" or Design 259 utilized in training. It was a 65-foot diesel-powered boat designed to be a tug but also utilized as a passenger-cargo vessel.

⁵² A US Army small utility vessel specifically designed and built by Higgins Boat utilized for utility work, harbor patrol, and as fireboats.

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later. A special two-week course was added for the maintenance of DUKWs and diesel engines.⁵³

After marine training, men went to the final stage of advanced technical unit training conducted at Brookley Field utilizing the mock-up shops that replicated shipboard layouts and equipment. Due to having only one mock-up for each ship type, operations ran on a 24-hour basis to accommodate all units. However, a persistent challenge was the lack of opportunities for actual work on live aircraft. To offset this, students were sent through MASC for practice on reparable parts and sections of B-17s and B-29s, but the quality of training was affected due to the inexperienced instructors within the



Figure 26: Men receive training on instrument repair within the mockup space at Brookley Field.

ALC. Reparable aircraft parts were shipped to Mobile from other ALCs to provide “live” work opportunities during this period.⁵⁴

Personnel were then sent to various external schools for highly specialized training not available at MASC, covering topics such as specific aircraft components (B-29 systems, propellers, automatic pilots, superchargers), helicopter operation and maintenance, oxygen generator plant operation, camera repair, signal communications, and shallow-water diving. Notably, Air Force gun crews received intensive training at the Naval Armed Guard School in Norfolk, Virginia, where Air Force gun crews received a month of intensive training on Navy weapons. Some traveled to Freeman Field, Indiana, and the Sikorsky factory in Bridgeport, Connecticut, for helicopter pilot and maintenance training, while some traveled to the Air Products Company in Chattanooga, Tennessee, to learn how to operate the oxygen manufacturing plant. Others attended the Engineering School at Fort Screven, Georgia, for shallow-water divers training for aircraft salvage and repair. Finally, radio and radar specialists went to either Kelly or Robins Fields for signal training.⁵⁵

⁵³ Sherrard, *Floating Units*, p. 15; McDonough, *Aircraft Repair Ship Project*, pp. 69-73; Pappas, *Operation Ivory Soap*; Gruelich, *Floating Supply Depots*, pp. 2-3.

⁵⁴ McDonough, *Aircraft Repair Ship Project*, pp. 35-36, 65-67, 74-77; Monay, *Floating Aircraft Repair*, pp. 12, 21-35, 39; Sherrard, *Floating Units*, p. 15; Gruelich, *Floating Supply Depots*, pp. 2-3; Hohns, *Floating Aircraft Maintenance*, p. 3.

⁵⁵ McDonough, *Aircraft Repair Ship Project*, pp. 77-80; Monay, *Floating Aircraft Repair*, p. 35.

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The final phase, shipboard training, was intended to be a month-long provisional step but due to time constraints and the urgency of deployments, this training took place in transit to theater. This training included ship orientation, drills, sanitation, cargo handling, and on-the-job training. However, the ships often remained in Mobile only long enough for supplies to be loaded before deployment. Thus, much of the projected training, particularly cargo handling and on-the-job training, had to occur while the vessels were enroute overseas, effectively making shipboard training become shipboard practice. For the first two Repair Ships, this phase largely became “shipboard practice” during their transit overseas, focusing on tasks like unpacking and stowing supplies, as there was not enough time to complete it at Mobile.⁵⁶

Challenges. The training program was beset by several personnel-related difficulties. As mentioned above, most positions required specialized expertise with there being a lack of experienced technical men and those men that the program did receive not meeting qualification, thus requiring additional training. Because of various issues with T/O&E, there were issues with downgraded officers as well as limited personnel causing many individuals to be assigned dual roles. Due to a number of men frequently away on detached service for specialized schools, leave and/or furloughs, absence rate reached as high as 44-percent for a unit causing a disruption in training schedules. A consistent challenge was the ability to obtain qualified and experienced instructors causing instructor shortages as well as some instructors having no more experience than their trainees.

Despite these difficulties, the project pushed towards training the necessary personnel to staff the Repair Ships and Auxiliaries. To address the lack of dedicated moral personnel, Brookley Field developed Special Services training – covering fitness, music, film, and education – that proved critical for maintaining the welfare of men confined to ships for long periods. The Army Services Forces cooperated by granting increased allotments for Special Services equipment with Repair Units receiving \$5.75 per individual and Maintenance Units receiving \$10.75 per individual.⁵⁷

Capabilities and Limitations

The floating aircraft maintenance facilities, both the Repair Ships and Auxiliaries, offered distinct advantages. First and foremost, the ships were designed for a high degree of mobility that enabled them to move with combat groups to provide immediate repair and maintenance within combat zones where land-based facilities were not immediately available. They could move in with invasion convoys⁵⁸ or soon thereafter, eliminating the need for dismantling, packing, or loading equipment.⁵⁹ Second, repair ships were equipped to perform depot inspections, overhaul, and fourth echelon repair on airplane

⁵⁶ McDonough, *Aircraft Repair Ship Project*, pp. 80-82; Monay, *Floating Aircraft Repair*, p. 34.

⁵⁷ McDonough, *Aircraft Repair Ship Project*, pp. 63-69, 78; Monay, *Floating Aircraft Repair*, pp. 31-33, 37; Sherrard, *Floating Units*, pp. 31-33.

⁵⁸ Invasion convoys, sometimes called either “invasion fleets” or “task forces,” were massive, organized naval groups of ships designed for transport, protection, and to land thousands of troops and their equipment onto enemy-held islands.

⁵⁹ McDonough, *Aircraft Repair Ship Project*; Hohns, *Floating Aircraft Maintenance Facilities*, p. 11; Monay, *Floating Aircraft Repair*, p. 26; Sherrard, *Floating Units*, pp. 2-3.

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components, engine accessories, photographic equipment, tires, rubber goods, aircraft armament, radar, radio equipment, and breathing oxygen generation. They were specifically noted for supporting critical aircraft like B-29s for fourth echelon maintenance in the Marianas. Auxiliaries focused on third echelon aircraft maintenance, salvage, reclamation, and repair, providing basic equipment for routine maintenance.⁶⁰ Third, ships featured compact, yet well-equipped shops designed to manufacture parts from raw stock (steel, lumber, aluminum) that were difficult to obtain in forward areas.⁶¹ Fourth, Repair Ships were self-sufficient and capable of producing 15,000 gallons of potable water per day, with any surplus intended to supply land-based tactical units as well as provide electric power for all shops aboard and could potentially deliver power to small shops on shore.⁶² Finally, the Auxiliaries extended the reach of the Repair Ships, furnished with specialized equipment to access areas inaccessible to larger vessels.⁶³

Despite these capabilities, the project faced limitations. First, the size of the ships limited the number of personnel, the space for shops, and the amount of

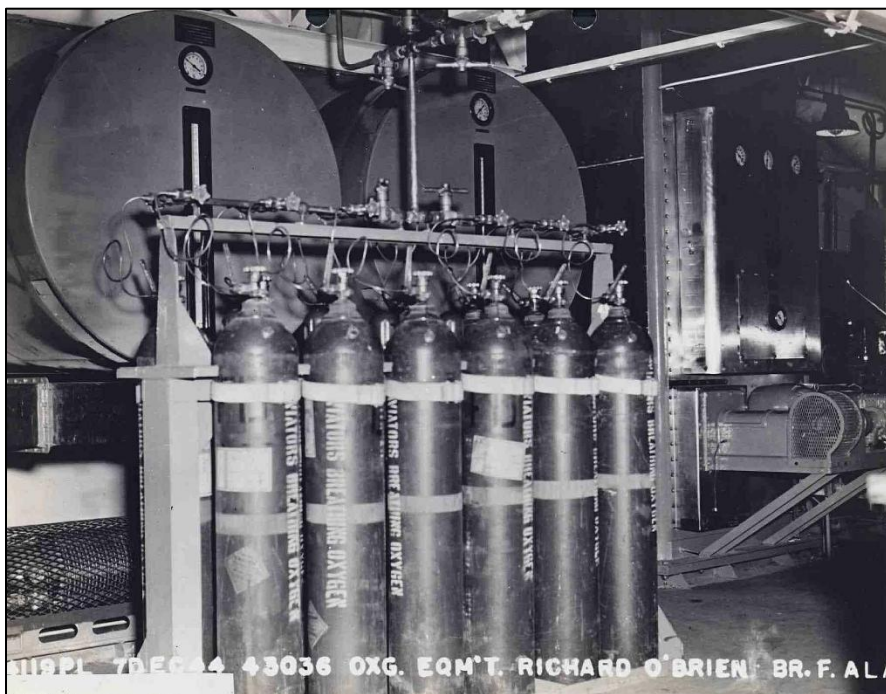


Figure 27: Oxygen Shop for support of the B-29s.

equipment and supplies that could be carried, potentially reducing operating efficiency due to cramped conditions. A lack of spare parts and raw materials could quickly reduce output. Second, the concentration of repair shops made the vessels highly desirable targets for enemy aircraft and submarines. Their high mobility paradoxically increased their vulnerability when anchored. Third, shortages of skilled crew members and the use of Merchant Marine personnel led to some morale issues.

⁶⁰ McDonough, *Aircraft Repair Ship Project*, pp. 2-3, 32-34, 38; Hohs, *Floating Aircraft Maintenance Facilities*, pp. 5, 11; Monay, *Floating Aircraft Repair*, pp. 1, 3, 6, 23-26; Guerny, *Floater*, pp. 4, 10; Sherrard, *Floating Units*, pp. 7, 15, 17, 21.

⁶¹ McDonough, *Aircraft Repair Ship Project*, pp. 2-3, 32-34, 38; Monay, *Floating Aircraft Repair*, pp. 1, 3, 6, 23-26; Kracman, et al, *ATSC*, pp. 2-3; Guerny, *Floater*, p. 7; Sherrard, *Floating Units*, pp. 14-15, 17, 21; Hohs, *Floating Aircraft Maintenance Facilities*, pp. 5, 11

⁶² McDonough, *Aircraft Repair Ship Project*; Monay, *Floating Aircraft Repair*, pp. 12, 26; Sherrard, *Floating Units*, p. 14.

⁶³ McDonough, *Aircraft Repair Ship Project*; Monay, *Floating Aircraft Repair*, pp. 12, 35-39; Sherrard, *Floating Units*, p. 14; Hohs, *Floating Aircraft Maintenance Facilities*, p. 3.

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The long confinement aboard ships and scarcity of recreational aids and mail delays impacted morale. Finally, the R-4B helicopters had a small payload and limited their utility for carrying large parts.⁶⁴

The Army Aircraft Repair Ship Project provided a critical, mobile solution to the logistical challenges of aircraft maintenance in the Pacific. While the ships offered extensive repair capabilities and flexibility, they contended with persistent issues related to personnel training, equipment procurement, internal coordination, and the inherent limitations of shipboard operations and supply chains during wartime.

Operations and Impact

The Aircraft Maintenance Units (F)⁶⁵ and Aircraft Repair Units (F) were all deployed in the Far East Air Forces and assigned specifically with the Far East Air Service Command (FEACOM). Some of the units

were used tactically as planned either on the Repair Ships or Auxiliaries while others were employed as the commander saw fit. The mission of the Repair Ships was to perform depot inspection, overhaul, and fourth echelon repair of airplane components, while the Maintenance Units (Auxiliaries) focused on third echelon aircraft maintenance, salvage, reclamation, and repair. Both these ships were intended to operate 24-hours-a-day with shops designed to be compact but well-equipped, emphasizing the manufacture of parts from raw stock (steel, lumber, aluminum) that were not easily



Figure 28: Sikorsky R-4B Hoverfly preparing to land on Repair Ship.

available in forward areas. Auxiliaries were outfitted for mobility with 30-foot workboats to dispatch for retrieval of damaged parts from coastal areas, DUKWs to carry men and equipment to downed aircraft, and, the R-4B helicopters were utilized for observation, spotting downed planes, rescue work, and transporting personnel and supplies from ship to shore.⁶⁶

⁶⁴ Monay, *Floating Aircraft Repair*, pp. 14, 21, 26-27, 30-33, 35-37; Hohns, *Floating Aircraft Maintenance Facilities*, pp. 11-12; Sherrard, *Floating Units*, pp. 8, 18-19; McDonough, *Aircraft Repair Ship Project*, pp. 30, 39.

⁶⁵ "F" stands for Floating.

⁶⁶ McDonough, *Aircraft Repair Ship Project*; Monay, *Floating Aircraft Repair*, pp. 3, 6, 12, 25, 37-39; Kracman, *ATSC*, pp. 2-3; Hohns, *Floating Aircraft Maintenance Facilities*, pp. 1, 3, 7.

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The 1st Aircraft Repair Unit (F) departed Mobile in September 1944 and arrived at Guam in December,



Figure 29: Instrument shop performs 4th echelon repair on aircraft instruments in the Philippines area, April 1945.

marking the culmination of the project's initial idea. The units were primarily involved in the later stages of the Leyte, Luzon, Iwo Jima, and Okinawa campaigns. The SS *Daniel E. Garret* was specifically deployed to support initial B-29 operations in the Marianas. Its crew had to reorganize and re-wire ship systems and facilities at sea due to supplies being misplaced during hurried loading. Mobile supply depots (converted river barges/scows) were also utilized by the 7th AAF Service Command to service islands, proving

useful in saving shipping space and aiding the rapid establishment of bases.⁶⁷

The 1st Aircraft Maintenance Unit (F) arrived at Eniwetok on 30 January 1945, and then moved to Tacloban, Leyte, Philippines. The unit's personnel, with limited equipment, were later airlifted to Nichols Field, Manila, to operate as a Base Utilities Shop, eventually reassigned to the Maintenance Division of the Air Depot Group for the remainder of the war. The 4th Aircraft Maintenance Unit (F) arrived in theater on 25 February, committed to the Iwo Jima operation. It was assigned to the 386th Air Service Group located on Iwo Jima to perform third and fourth echelon repair of items the Service Group could not handle, such as instruments, accessories, dope, fabric work, and sheet metal. Later, at Saipan, its responsibilities were assumed by a Repair Unit, demonstrating its versatility in an aircraft assembly project alongside other units like the 1st Aircraft Repair Unit (F) and 16th Aircraft Maintenance Unit (F). The 4th



Figure 30: Sheet Metal shop manufactured and repaired all structural parts for aircraft.

⁶⁷ Hohs, *Floating Aircraft Maintenance Facilities*, pp. 1, 5, 7; McDonough, *Aircraft Repair Ship Project*, pp. 43-44; Monay, *Floating Aircraft Repair*, p. 11; Guerny, *Floater*, pp. 1, 5-7, 11-12; Gruelich, Pvt Jay, VII AF Service Command, "Floating Supply Depots," *Floating Supply Depot Supporting Documents*, 1944.

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AMU (F) occasionally had to deploy to shore installations for heavier echelon repair, indicating their limitations as purely floating units for certain tasks but highlighting the versatility of the Auxiliaries. The 4th AMU (F) moved to Okinawa, where it operated until the war's end, showcasing its mobility by shuttling between spots to manage workloads.⁶⁸

The 5th Aircraft Repair Unit (F) arrived at Biak on 8 February and was reassigned to the 5th Air Service Area Command at Tacloban, Leyte, Philippines, where it began operations handling serviceable and stock issue equipment. Operating in conjunction with the 15th Air Depot Group and the 7th Air Service Group, the 5th ARU(F) competently handled a sizable workload of all echelon repair of aircraft accessories and parts from Manila to Nichols Field. The use of DUKWs for collecting reparable items was hampered by their small payload. To streamline operations, a shore collection point was established to coordinate 24-hour transfers and re-transfers. Helicopters assigned to the Repair Units were even called upon to evacuate wounded ground personnel 25 miles north of Manila, an interesting sidelight to their capabilities. The unit then moved to Okinawa, operating similarly to its Manila experience.⁶⁹



Figure 31: All engineering activities of the Army Aircraft Repair Ships within the Philippines area were directed by the HQ's 6th Aircraft Repair Unit (F) Engineers Headquarters Office.

The *SS Daniel J. Garrett*, one of the six 10,500-ton Liberty ships converted was especially crucial for backing up the initial B-29 operations in the Marianas, as the B-29 was the most complex aircraft built. The *Garrett's* cramped hull was transformed into a functional, self-contained unit, a testament to the designers' ingenuity. Upon their arrival in Mobile Bay, the crew, including mechanic-stevedores, had to overcome initial chaos due to hundreds of tons of

crated materials haphazardly loaded on deck. They rebuilt electrical wiring, installed communications systems, set up administrative offices, medical clinics, and even barbershops, transforming the ship into a complete Army Post afloat.⁷⁰

When the *Garrett* arrived at the Panama Canal, Colonel Kingsley, the unit commander, navigated the sensitive issue of his men's status as "troops in transit," clarifying that the ship itself was their permanent

⁶⁸ Hohs, *Floating Aircraft Maintenance Facilities*, pp. 1, 6-9.

⁶⁹ Hohs, *Floating Aircraft Maintenance Facilities*, pp. 9-10.

⁷⁰ Guerny, *Floater*, pp. 1, 3-7.

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military station, granting them the rights and privileges of a Base Camp. At Pearl Harbor, visiting AAF Engineering Officers were impressed by the extensive maintenance capabilities, including welding, electro-plating, heat-treating, sheet-metal repair, overhaul of carburetors, generators, magnetos, and instrument repair. The oxygen-generating equipment, the largest mobile unit of its kind outside the continental U.S., was particularly admired.⁷¹

Operating westward into the Pacific, the *Garrett* became the fourth echelon maintenance shop for the 21st Bomber Command at Guam, providing critical support for the B-29 fleet and later moving to support the fleet at Tinian. It could perform top-echelon repairs that shore-based personnel could not handle, including complete overhaul of sensitive instruments. During the intense incendiary bombing of Japan mainland in March 1945, the *Garrett* played a vital role. For example, after a raid on Nagoya left 18 B-29 fuel-transfer pumps of the 313th Bombardment Wing in need of overhaul on Tinian, the *Garrett's* crew, utilizing their RB-4s, rapidly repaired and re-tested the pumps and dispatched them back to the airfield in less than 2.5 hours, allowing the grounded bombers to take part



Figure 32: A Sikorsky R-4B Hoverfly hovers over a B-29.

in the incendiary blitz that evening. This demonstrated the critical impact of the floating depots on combat operations. Once other Repair boats were completed and entered the theater, they operated near Eniwetok in the Marshall Islands, Saipan and Tinian in the Northern Mariana Islands, Iwo Jima, Guam, and Okinawa.⁷²

Conclusion

The Army Aircraft Repair Ship Project represented a practical and realistic attempt to solve a serious logistical problem in the Pacific Theater during World War II, providing mobile aircraft repair and

⁷¹ *Ibid.*, pp. 7-9.

⁷² *Ibid.*, pp. 9-12.

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maintenance facilities for rapidly advancing combat groups. The Repair Units, converted Liberty ships, proved successful in accomplishing their assigned mission, demonstrating their value in supporting operations where land-based facilities were unavailable. They offered high mobility, immediate operational readiness, and the flexibility to adapt to various combat situations, even producing fresh water and power for land-based units. The experience of the *USS Daniel J. Garrett* vividly illustrates their vital role in maintaining the Boeing B-29 *Superfortress* fleet, particularly for critical missions.⁷³

Those Repair Ships, such as the *Garrett*, that were assigned to support the B-29, were crucial for backing up initial operations in the Marianas. They provided fourth-echelon maintenance, including complete overhaul of items like carburetors, generators, and magnetos, and delicate balancing of propellers. They also tore down and rebuilt sensitive instruments like altimeters, fluxgate compasses, drift meters, tachometers, and various gauges. In one instance, a Repair Ship provided vital fuel-transfer pumps and

other components for grounded aircraft due to engine issues, swiftly transporting them to airfields via helicopter.⁷⁴

While the project encountered numerous difficulties during its setup and operation – including Navy opposition, complex conversions, personnel recruitment challenges, and



Figure 33: The SS Nathaniel Scudder at Manila, Philippine Islands, in August 1945.

training hurdles – the AAF's foresight, proactive planning, and the ingenuity of its personnel allowed the program to advance rapidly. The "calculated risk" taken by the Air Service Command in assembling equipment and supplies before formal approval significantly expedited the project.⁷⁵

Despite the challenges and their relatively short period of wartime availability (arriving in theater in early 1945), the floating maintenance facilities successfully bridged the logistical gap until permanent land-based installations could be established. The inherent capabilities of these floating units, such as eliminating delays in setting up shops and providing mobility, remained valuable considerations for

⁷³ McDonough, *Aircraft Repair Ship Project*, pp. 1-3; Hohs, *Floating Aircraft Maintenance Facilities*, p. 1; Sherrard, *Floating Units*, 11; Monay, *Floating Aircraft Repair*, pp. 6, 23-26; Sherrard, *Floating Units*, pp. 2, 7, 15, 24; Guerny, *Floater*, pp. 4, 9-12; Gruelich, *Floating Supply Depot Supporting Documents*, pp. 7, 21.

⁷⁴ Guerny, *Floater*, pp. 3-4, 9-11.

⁷⁵ McDonough, *Aircraft Repair Ship Project*, pp. 9-11, 22, 24-25, 28-29, 42, 46-48, 52-53, 65, 76-77; Monay, *Floating Aircraft Repair*, pp. 16, 18, 28-29, 31; Sherrard, *Floating Units*, pp. 9, 24.

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future logistical planning, especially in scenarios where establishing large land-based installations was impractical or time-consuming. While new developments point towards completely airborne logistical support, the unique advantages of water-borne maintenance facilities suggest their continued relevance in a dynamic operational environment.⁷⁶

Postwar assessments and evaluations of the Army Aircraft Repair Ship Project highlighted both its groundbreaking successes and significant limitations, informing future logistical planning. First, Repair Units were generally successful in accomplishing their assigned missions and demonstrating the inherent soundness of the original concept for mobile floating facilities. Their ability to provide logistical support in areas where land-based services were not immediately available was clearly demonstrated. However, the smaller Maintenance Units proved to be “inadequate” due to their limited size and equipment.⁷⁷ Second, the high mobility was considered the “greatest capability” of the units, allowing them to move quickly with combat operations without the time-consuming process of dismantling and relocating land-based depots. The ability to be “ready to immediate operation” on a 24-hour basis upon arrival in a combat zone was a significant advantage. They were also highly valued for their role in providing “supplemental assistance” to shore installations and bridging the logistical gap until more permanent land facilities could be established.⁷⁸ Finally, despite armament, the concentration of repair shops made the vessels “extremely desirable targets” for enemy aircraft and submarines, especially when anchored. The size of the vessels fundamentally limited the number of personnel, the space available for shops, the amount of equipment that could be carried, and the quantities of supplies. The project suffered from a lack of established priorities, hindering the timely procurement of critical materials and equipment. A persistent “lack of spare parts and raw material” could quickly reduce output.⁷⁹

Officially declassified in 1953, Operation Ivory Soap lingered for years in obscurity with even those who participated in its activities not fully understanding the full weight of their contribution to the war efforts in the Pacific. While the project faced numerous internal and external challenges, the core concept of mobile, self-contained floating aircraft repair facilities was validated by their performance during World War II. A direct response to the critical and dynamic logistical demand of World War II’s Pacific Theater, where traditional, static land-based maintenance facilities proved too slow and inflexible for rapidly advancing forces. The project aimed to overcome these limitations by providing mobile, floating repair and maintenance capabilities that could operate close to combat zones, providing immediate support for a range of aircraft repairs, and generating essential supplies like oxygen and water, in areas where

⁷⁶ Sherrard, *Floating Units*, pp. 20-22, 24; Hohs, *Floating Aircraft Maintenance Facilities*, pp. 16-17; Monay, *Floating Aircraft Repair*, pp. 6, 8-9; Guerny, *Floater*, p 2; Sherrard, *Floating Units*, p.2.

⁷⁷ McDonough, *Aircraft Repair Ship Project*; Sherrard, *Floating Units*, pp. 2-24.

⁷⁸ Hohs, *Floating Aircraft Maintenance Facilities*, p. 11, 16; Monay, *Floating Aircraft Repair*, pp. 26; Sherrard, *Floating Units*, pp. 21-22.

⁷⁹ McDonough, *Aircraft Repair Ship Project*; Hohs, *Floating Aircraft Maintenance Facilities*, pp. 1, 11-12; Monay, *Floating Aircraft Repair*, pp. 26-27, 30-31, 33, 35-37; Sherrard, *Floating Units*, pp. 8, 18-19, 24; Kracman, *ATSC*, pp. 4-5.

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land-based facilities were not immediately available, moving with combat groups to provide immediate repair capabilities as operations shifted to new airfields. The Army Aircraft Repair Ship Project was conceived to provide the increased mobility and immediate repair capabilities essential for overcoming the critical logistical challenges of the Pacific “island-hopping” campaign. In an address to the US House of Representatives in 1998, Congressman Tony P. Hall of Ohio honored the veterans of Operation Ivory Soap by saying, “This is another one of the never-told stories out of the dust vaults of declassified secret records.” However, even

more telling is the more recent look by the US Air Force and its modern adaptation of Operation Ivory Soap with the current Forward Logistics Operating Support Ship (FLOSS) initiative, the utilization of on-site sustainment and repair of airframes during major theater operations via ships. Building off the US



Figure 34: The SS Curtiss (T-AVB-4) off Guam in September 2018.

Marine Corps Aviation Logistics Support Ships (T-AVB) in operation since the mid-1980s, the idea of FLOSS connects back to our historical past with providing sustainment support in a contested environment in the Indo-Asia-Pacific region that provides agility and flexibility to our combat forces of today.⁸⁰

⁸⁰ Pappas, *Operation Ivory Soap*; Gamache, Lt Col Andrew, “Aircraft Maintenance on a Boat? Well, Technically a Ship: The Concept for Forward Logistics Operating Support Ships (FLOSS),” *Logistics Officer Association*, 15 December 2024, <https://atloa.org/forward-logistics-operating-support-ships/>, Accessed 22 August 2025; Sherrard, *Floating Units*, p. 24.

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