

## Building the Navy's Bases in World War II: History of the Bureau of Yards and Docks and the Civil Engineer Corps, 1940-1946

Department of the Navy ° Bureau of Yards and Docks

### Chapter XVIII Bases in South America and the Caribbean Area, Including Bermuda

Related discussions can be found in Chapters 8 ("[Air Defense of the Western Hemisphere](#)") and 9 ("[The Early Development of Air Transport and Ferrying](#)") of *Army Air Forces in World War II*, Vol. I, *Plans & Early Operations, January 1939 to August 1942*; and the two *Western Hemisphere* volumes of *United States Army in World War II*: [Framework of Hemisphere Defense](#) and [Guarding the United States and Its Outposts](#).



LTA Steel Hangar, Built by the 80th Seabees, at Carlson Field, Trinidad

#### Part I -- The Caribbean Area

World War II development of the naval shore establishment throughout the Caribbean and Central American area divides itself broadly into two phases; the defense period and the war period.

With the exception of a radio station at San Juan, Puerto Rico, the naval shore establishment in the Caribbean in 1939 was confined to Guantanamo Bay, Cuba; the Panama Canal Zone; and a small area on the island of St. Thomas in the Virgin Islands. Hepburn Board recommendations called for development of Guantanamo into a fleet operating base with airport facilities to accommodate one carrier group and one patrol squadron. On St. Thomas, a small airfield occupied by the Marine Corps was to be expanded to support a Marine squadron of 18 planes on a permanent basis, and the adjacent waterfront was to be developed to serve a patrol-plane squadron in a tender-based status.

For the Canal Zone, where the Navy maintained a naval air station for patrol planes and a submarine base at Coco Solo, the board recommended an increase in the air facilities sufficient to accommodate seven squadrons of patrol planes, with a supporting industrial establishment capable of complete engine overhaul, and the establishment of a naval station at Balboa, on the Pacific end of the Canal, to support submarines, destroyers, and smaller craft.

For Puerto Rico, the board recommended the development of Isla Grande in San Juan harbor as a secondary air base, to contain facilities for one carrier group, two patrol-plane squadrons, complete engine overhaul, and berthing for one carrier.

Congress approved the base program as recommended by the Hepburn Board in May 1939, and partial financing was provided in the 1940 appropriation bill. The initial construction effort in the Caribbean area began in October with the award of a fixed-fee contract for the air-station development at San Juan, Puerto Rico.

Meanwhile, as 1939 drew to a close, the initial success of Axis aggression in Europe and the increasing submarine sinkings in the Atlantic, resulted in Congress again reviewing naval requirements. Recognizing that security hinged on ability to defend ourselves, Congress, pursuant to the recommendations of the Navy Department, authorized an additional 11-percent expansion in combatant-ship tonnage, with a concomitant increase in naval aircraft to 10,000 planes. The President signed the bill on June 14, 1940. The program for the development of shore facilities was immediately revised upward, and the scope of the Caribbean bases redefined.

Guantanamo, under the new program, was to furnish complete facilities for three patrol squadrons, eight carrier squadrons, and four additional patrol squadrons with tender support. The strategically located air station already under construction at San Juan was to be expanded to accommodate six patrol squadrons and two carrier groups, with additional facilities for the temporary use of two patrol squadrons with tender support. Facilities for ten patrol squadrons were scheduled for the air station at St. Thomas.

Development of the bases recommended by the Hepburn Board began immediately. Two contracts were awarded on June 17 and July 11 for work in

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Western Atlantic and Canal Zone Defense Area

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the Canal Zone, and a third on July 1, for Guantanamo. Because of St. Thomas's geographic proximity to Puerto Rico, the contract then under way at San Juan was expanded on July 8 to include the work on the neighboring island.

Meanwhile, the German submarine campaign was being prosecuted with telling effect. Britain had been severely affected by the general attrition of operations at sea, particularly in loss of destroyers. The United States needed extra bases to consolidate its defense in the Caribbean. Accordingly, the two governments entered into negotiations which culminated in the "[Destroyers for Bases](#)" agreement, signed September 2, 1940. Britain received fifty over-age destroyers. The United States received the right, under terms of a 99-year lease, to construct bases in eight British possessions, all in the Caribbean defense area, except one -- Newfoundland (Argentia), which became part of the North Atlantic defense area discussed in [Chapter 19](#). The southern group consisted of Bermuda, Jamaica, the Bahamas, Antigua, St. Lucia, Trinidad, and British Guiana.

On September 11, 1940, the President appointed a board, with Rear Admiral John W. Greenslade as senior member, to survey the naval shore establishment with a view to the requirements of the two-ocean Navy, at that time scheduled for accomplishment by 1946. Beginning its work in the Caribbean, the board, which included Army, Navy, and Marine Corps officers, participated in conferences with British experts to determine the exact location for the new bases. Tentative lease agreements were reached by the end of October 1940, but final agreements, together with decisions on such matters as customs, taxes, and wage rates for local labor, were not settled until March 1941.

The Greenslade Board submitted its recommendations on January 6, 1941. Broadly conceived, these studies divided the strategic concept of our national defense into geographic areas, beginning in the North Atlantic and rotating clockwise through the Middle Atlantic, South Atlantic, Gulf, Caribbean, and Central America, completing the arc in the North Pacific. Insofar as they pertained to the Caribbean and contiguous areas in the Atlantic and the Pacific, they became the basic blueprint for all subsequent base development in that area.

Naval defense of the Panama Canal, the focal point of our communications between the two oceans and South America, is, on the Atlantic side, primarily a matter of controlling the approaches to the Gulf of Mexico through the Florida Straits and the approaches to the Caribbean through the Yucatan Channel and the navigable passes of the greater and lesser Antilles. To accomplish this, the Greenslade Board divided the Caribbean into three areas, focusing major strength at Puerto Rico, Guantanamo, and Trinidad, each major operating base being supplemented by secondary outlying air bases to supply essential air surveillance.

At Puerto Rico, the Greenslade plan called for development of the Caribbean defense, with facilities to include a thoroughly protected anchorage, a major air station, and an industrial establishment capable of supporting a large portion of the fleet under war conditions. Puerto Rico was to be the "Pearl Harbor of the Caribbean," furnishing logistic support to outlying secondary air bases developed on Antigua, St. Thomas, and Culebra.

Guantanamo was to be a major supporting base, capable of supplying limited maintenance, training, supply, and rest areas. It would also furnish a link in the supply chain from the Gulf area to other Caribbean bases. Jamaica and the Bahamas, as outlying secondary air bases, were to supply air surveillance in the Guantanamo area.

Bermuda was to be equipped to support carrier and patrol aircraft, cruiser, destroyer, and submarine forces capable of defense against strategical surprise on our middle Atlantic front.

Trinidad was to be organized as a subsidiary operating base, with major air facilities capable of supporting a large portion of United States naval forces. It was also to include training and advance-base operations projected to the south and east. Secondary air bases were to be located at St. Lucia and British Guiana, and emergency advance bases were to be placed along the northeastern coast of Brazil, each to be linked logistically to Trinidad and geared to the defense plan of that area.

Provision for adequate defense of the Canal from the Pacific presented a far more difficult problem. There were no potential sites for air bases, either on American soil or on territory which could be

secured by lease or treaty. Only Cocos Island and the Galapagos group, the former controlled by Costa Rica and the latter by Ecuador, presented possibilities.

Early in 1940 the General Board of the Navy and

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### **Tenth Naval District Headquarters, San Juan, Puerto Rico**

San Antonio Channel is shown at the upper left

the Army-Navy Joint Board studied the subject and reached the conclusion that preparations must be made for the operation of constant air patrols over a wide area to the west of Panama. They recommended that patrol squadrons of seaplanes, supported partly by tenders and partly by shore installations, be based near Guayaquil on the Ecuadorian coast, in the Gulf of Fonseca in Nicaragua, and in the Galapagos. The Galapagos, it was decided, were to be the key installations, and they were subsequently fortified by both the Army and the Navy, under a program directed by the Army engineers.

By December 7, 1941, basic plans for the defense of the Caribbean and the Panama Canal were rapidly taking shape. The program was further expanded during 1942, with the development of bases at Salinas, Ecuador; Barranquilla, Colombia; Curaçao, in the Netherlands West Indies; Puerto Castilla, Honduras; on the Gulf of Fonseca and at Corinto, Nicaragua; on Taboga Island, at the Pacific end of the Canal; and at Almirante, Chorrera, and Mandiga, in Panama. These were all small installations to support seaplanes, lighter-than-air craft, and small surface craft. A chain of air bases was also established along the coast of Brazil.

During the two years that followed, the tempo of construction activity increased steadily, reaching its peak in the early months of 1943. By that time the major features at each base had been completed and were being fully used by the occupying forces. The contractors' forces were withdrawn before the

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year ended. Station maintenance, as well as minor items of new construction necessary for more efficient operations, was henceforth accomplished by Seabees or by local labor under the direction of the station Public Works Department.

As the progress of the war in Europe became more favorable to the Allied cause and the submarine threat diminished in the Caribbean during 1944, each of the Caribbean bases diminished in importance; consequently, all except the major installations at Trinidad, San Juan, Guantanamo, and the Canal Zone were reduced to a restricted or caretaker status by the fall of 1944.

### ***San Juan, Puerto Rico***

Except for a radio station and hydrographic office, the Navy had no installation on the island of Puerto Rico prior to 1939. Construction, which resulted in a major naval shore establishment, was accomplished under a single fixed-fee contract awarded on October 30, 1939.

In its original form, this contract comprised 44 related projects devoted primarily to the construction of the San Juan Naval Air Station on Isla Grande. Subsequent additions increased the scope to include base development on the islands of St. Lucia and Antiqua and the naval operating base at Roosevelt Roads.

Isla Grande is a 340-acre site in San Juan Harbor, between San Antonio Channel and San Juan Harbor. Except for an airstrip operated by Pan American Airlines and a small area occupied by the U.S. Public Health Service quarantine station, most of the site was a combination of mangrove swamp and tidal mud flats. Despite the necessity for dredging operations of considerable magnitude to reclaim the low-lying land, the site was selected because of contiguous waters ideal for seaplane operation, unrestricted air approaches, and the nuclear value of the existing airfield.

The layout prepared by the Bureau of Yards and Docs utilized the existing runway as the base of design for the air station. The seaplane operating area used the waterfrontage along the harbor, leaving the area between the two air activities for industrial and personnel structures. Seventy percent of the air station had to be built on a blanket of dredged fill. This site preparation, while an extensive operation, was accomplished simultaneously with, and as a by-product of, the dredging operation necessary to deepen the seaplane runways and the navigable reaches of both San Antonio and Martine Pena channels.

Facilities initially provided placed the station in the category of a major air base, equipped to serve two squadrons of seaplanes and one carrier group, with an industrial section. The major facilities of the seaplane area comprised two Navy standard steel hangars, an engine-overhaul shop, four seaplane ramps with connecting bulkhead, asphalt-paved parking areas, and a 450-foot concrete tender pier. The center line of the existing airfield was shifted slightly to conform more nearly with prevailing winds, the field was then lengthened, widened, and surfaced with asphalt to make a 5,400-by-500-foot runway. This strip and a secondary north-south 2,300-by-150-foot runway, together with a utility hangar, became one of the important bases of the Naval Air Transport Service in the Caribbean.

Located in an area frequented by high-velocity winds, most of the buildings were designed as permanent structures, using steel and masonry for industrial buildings and reinforced concrete for personnel units. Flat roofs and a cubical design gave an architectural treatment in keeping with local civilian practice. Pile foundations were necessary under all permanent structures, including underground pipe and duct lines, because of unstable soil conditions and a time schedule which demanded immediate use of filled areas.

The Tenth Naval District, including the Bahamas and the Antilles from Cuba to Trinidad, was established November 14, 1939, with San Juan designated as administrative headquarters. Buildings to house the district headquarters were begun in September 1940, on a tract of land bordering San Antonio Channel, directly opposite the air station. The buildings were one-story frame structures, equipped with cable lashings over the roof and anchored to the ground on either end as a safety measure against hurricanes. In addition, the Fernandez Juncos and San Geronimo quarters were erected to house headquarters personnel. Reinforced concrete and prefabricated steel-frame stucco construction was used.

A new quarantine station and hospital were undertaken simultaneously on a tract of land adjoining the district headquarters group. Built of reinforced concrete, these were constructed to replace the 40-year-old buildings of the U.S. Public

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Health Service which occupied an area required for seaplane parking.

As the number of naval activities in the San Juan area expanded beyond the original air activity, the fixed dimensions of the Isla Grande site made necessary the purchase of additional land directly south of the air station.

The first of these new activities was a low-cost defense-housing project in suburban San Juan, designated as San Patricio. Added to the contract in October 1940, this facility comprised 200 duplex single-story structures built with prefabricated steel frames, concrete floors, and stucco exteriors.

On February 13, the San Juan contract was further augmented to include construction at St. Lucia and Antigua, and to permit the assembling and fabricating of materials and equipment for temporary shore facilities to house a Marine detachment at each base. This latter item introduced the production-line principle to the construction of bases and was one of the early steps in the development of advance base structures.

As the summer of 1941 approached, gratifying progress was being made toward strengthening the air defenses in the Caribbean. Corresponding facilities necessary to support the Navy's surface craft in that area, however, were seriously deficient, and that at a time when the nation's ship yards were operating on a 24-hour basis, producing vessels for the authorized increase in ships for a two-ocean Navy. There were not drydocks between Charleston and the Canal Zone; nor, except for limited facilities at Guantanamo, were there any bases for repairs, fuel, and supplies.

In order to strengthen this weak link in our defenses, a major program of new construction was added on July 8, 1941, to the San Juan contract. This new program, in addition to the development of a major fleet base at Roosevelt Roads, provided operating and repair facilities in the San Juan area, additions to the air station, a radio station, and an ammunition depot.

Fortunately, the Insular Government had built a graving dock in San Juan Harbor, on a site contiguous with the air station. Functionally complete at the time, this 660-by-83-foot dock was taken over by the Navy in July. The approach channel was deepened and widened, a 600-foot approach pier built, and additional berthing provided by dredging and bulkheading a slip between the approach pier and an adjoining tender pier at the air station. Ships, storehouses, and other supporting industrial facilities were built in the area adjacent to the drydock, and a net depot was also developed.

In September 1941, a public works department was organized to serve all San Juan activities, except the naval air station for which a separate station public works department was established. The San Juan public works department performed station maintenance and operation functions as well as extensive new construction of projects not included in the contract. Except for the public works foreman and quartermaster the entire mechanical and labor force comprised local Puerto Ricans, who responded well to a training program in building trades and other skills, under the direction of the public works officer.

Similarly, the combined clerical force of the district public works office and of the San Juan activities public works office, utilized Puerto Ricans under trained supervisors.

The extensive use of Puerto Ricans in mechanical trades and clerical work constituted an interesting innovation in this primarily agricultural land, and the employment of female clerical personnel on so great a scale broke centuries-old sociological precedents.

San Antonio Channel was also deepened to 35 feet adjacent to the north shoreline of the air station, and the waterfront improved with 2,000 feet of quay wall and 2,000 feet of sheet-pile bulkhead to accommodate carriers and other surface craft.

The San Juan section base, a complete facility equipped with barracks, administration building, warehouses, and waterfront improvements, was constructed under the same program, on a site adjoining the 10th Naval District headquarters.

The air station was improved and increased in all categories to give it complete facilities for the operation and maintenance of five patrol squadrons of seaplanes and one carrier group.

The ammunition depot, built on a 2,100-acre site in the hills southwest of the harbor, at Sabana Seca, was planned and developed as a complete and self-contained facility equipped with roads, railroad spur, personnel structures, sewage-disposal unit, magazines, and storage structures.

Concurrently, the radio station, located on a reservation within the city of San Juan, was equipped with a bombproof communications building and a third antenna tower, 250 feet high.

Increased fuel storage, water supply, and hospital

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#### **Drydock Area, San Juan, Puerto Rico**

Administration building (with tower) at right; outfitting and tender piers, upper right.

facilities were required to keep pace with this growth. Consequently, a fuel depot at Catano and water development at San Patricio were added to the contract in October. The naval hospital was undertaken later, during January 1942, on a site adjacent to the housing project at San Patricio.

The fuel depot comprised seven 27,000-barrel pre-stressed concrete and three 27,000-barrel steel tanks, built into the hillside for concealment and protection; a timber pier, 350 feet long; a pumping plant, with heating equipment; personnel buildings; and a shop. All buildings were of reinforced concrete.

The San Patricio water development comprised two drilled wells, a filter plant of 500,000 gallons per day capacity, and a 200,000-gallon reservoir. A 10-inch main, laid under the Martin Pena Channel, served the air station, and a 6-inch main, under the San Antonio Channel, served the district headquarters and adjoining activities. The hillside location of the reservoir made possible adequate gravity pressure throughout the entire system.

Two hundred beds were provided at the naval hospital in a compact structure comprising a main central building housing garages and heating units. All buildings were single-storied, with reinforced-concrete walls and timber roofs. Buttresses and steel ties held the roofs to the ground as a precaution against wind damage.

Maintaining the flow of materials became a trying and hazardous task subsequent to our entry into

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the war. The Germans were quick to take advantage of their opportunity and made an incursion into our coastal waters in January 1942. During April and May, enemy submarines sank eight cargo-laden ships en route to Puerto Rico, resulting in costly delays on construction projects.

As 1942 drew to a close, the gradual completion of major construction operations at San Juan permitted a transfer of the major effort to Roosevelt Roads. Early in 1943, all dredging operations were completed, as were the water-filtration plant, the San Patricio housing development, and the ammunition depot at Sabana Seca. The drydock and repair unit were completed in March, and the main plane runway in April. The remaining activities were completed and the contract terminated by August 28, 1943.

New construction as well as station maintenance and operation at Roosevelt Roads was henceforth accomplished by the station public works department, augmented by CBMU 516, which arrived on August 26, 1943. The public works officer was given the additional title of officer in charge of new construction, under which he was vested with authority to hire both persons from the States and Puerto Ricans, giving them a modified civil-service status.

### *Roosevelt Roads*

Roosevelt Roads, on Vieques Passage, at the eastern end of Puerto Rico, was intended to become the major fleet operating base of the Caribbean. As initially planned, it was to be equipped with a protected anchorage, a battleship graving dock, major repair facilities, fuel depot, supply depot, hospital, a major air station for both land- and seaplanes, and numerous other shore-based activities. These were to provide the necessary supporting services for 60 per cent of the Atlantic Fleet, and represented, in broad outline, the requirements indicated by the strategic situation as envisaged in the spring of 1941. It was a tremendous project, requiring five years to complete, at an estimated cost of \$108,000,000.

The extreme eastern end of Puerto Rico was the only location on the island capable of accommodating a base of this magnitude, together with sufficient water area for development as a fleet anchorage. The Navy, accordingly, purchased 6,680 acres at Ensenada Honda, Puerto Rico, and a substantial portion of the island of Vieques, including all of the western end, 7 miles east of Puerto Rico. Vieques Passage, between the two islands, was to be developed as an anchorage by constructing two breakwaters. The two sites were similar, with salt flats, mangrove swamps, and steep, weathered hills, some of which were 400 feet high.

In the early summer of 1941, the development of Roosevelt Roads was awarded to the fixed-fee contract then underway at the naval air station at San Juan. The initial award included the dredging necessary to provide channels from the mainland sites into Vieques Passage, the construction of approximately 14 miles of breakwater to provide a sheltered anchorage for the fleet, a battleship graving dock with complete accessories, a bombproof power plant, a large machine shop, and the construction plant and equipment necessary to accomplish a program of this magnitude. The contract was subsequently expanded from time to time, beginning in October 1941 and continuing through 1943, to cover the construction of a fleet supply depot, ammunition storage, personnel facilities, a 200-bed hospital, a section base, a net and mine depot, and a major air station for both landplanes and seaplanes.

No facilities of any kind were existent in May 1941 when work was begun at Ensenada Honda, on a tent camp and access roads.

When the year ended, the number of workmen had increased from 200 to 3,000, a temporary construction camp with an expected life of five years had been built, dredging had been started on the approach to the drydock, and a pier had been completed which permitted material and equipment to be unloaded at the site rather than having to be trucked across the island from San Juan. Work was also begun on Vieques Island for the development of a quarry to furnish rock for the proposed breakwater.

The entry of the United States into the war had brought about changes in the plans for Roosevelt Roads. A review of the present and potential enemy naval forces in the Atlantic, the type of warfare conducted by the Axis in the Mediterranean, the necessity for maintaining a large portion of our major naval units in the Pacific, and the shortage of shipping and critical materials led to the decision to reduce the scope of the undertaking.

During February 1942, work was started on the section base, a 120-unit housing project, and an extensive system of roads designed to link the various shore activities then underway. Form work on the drydock was started in April and the first concrete poured in June. In August, certain items

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Caribbean Area

were deferred and others curtailed. Henceforth the priority projects were the drydock with associated industrial facilities, water supply, and the air station for landplanes. Plans for the supply depot, receiving station, hospital, radio station, and seaplane base were abandoned.

Within the industrial area the drydock, a bombproof power plant, a sewage pumping station, and a machine shop were completed. The drydock, 1,100 by 15 feet, and built in the dry, was used for the first time in July 1943. The power plant, a bombproof structure with 4-foot-thick concrete walls, was equipped with two 5,000-kw steam-driven generators.

The drydock was dedicated on February 15, 1944, and the Bolles Drydock, in memory of Captain Harry A. Bolles, (CEC) USN, who was killed in Alaska in World War II.

The water-supply system obtained water from the tail race of the Insular Power Plant on the Rio Blanco and delivered it through 11 miles of 27-inch concrete pipe by gravity to a 46,000,000-gallon raw-water reservoir on the base. It was then treated by coagulation, filtration, and chlorination, and delivered to fresh-water reservoirs by pumps, for gravity distribution to the entire base. The treatment plant had a daily capacity of 4,000,000 gallons.

Of permanent construction, the naval air station at Roosevelt Roads was equipped with three concrete runways, 6,000 by 300 feet, concrete taxiways and parking area, a large steel hangar, quarters for personnel, a large concrete storehouse, gasoline storage, and magazines for ready ammunition.

In building the runways, it was necessary to remove unstable clay subsoil and replace it, to a minimum depth of 3 feet, with selected backfill, placed under controlled-moisture conditions. Shoulders were surfaced with a 3-inch layer of rolled coral dredged from the bay. Storage for gasoline was provided in six 50,000-gallon and four 250,000-gallon pre-stressed-concrete tanks. Elsewhere on the base, storage for 118,000 barrels of fuel and diesel oil were built and piped to the completed fuel dock at the section base.

In addition to the quarry, which in itself was a major operation, Vieques Island was developed as a naval ammunition depot. This facility, located on the western third of the island, was equipped with 107 magazines and ammunition storage buildings of the concrete arch type for high explosives. Two 80-foot drilled wells and two large storage tanks were built for fresh water and fire protection.

The anchorage development was begun in October 1942 when the first rock fill was placed at the Vieques end of the west breakwater. Work continued until the project was deferred in May 1943. When the cease-operations order was issued, 7,000 feet of the breakwater had been completed, and everything was in readiness for major construction involving the quarrying and placing of 20-ton rock.

Field work under the contract was terminated on August 28, 1943. A total of \$56,000,000 had been expended on the development, including a considerable amount of temporary construction.

Roosevelt Roads was commissioned as a naval operating base on July 15, 1943; more than a year later, on November 1, 1944, it was redesignated a naval station and placed in a caretaker status under the supervision of a public works officer, assisted by a small detachment of personnel from CBMU's 507 and 517 and a station labor force of Puerto Ricans.

### ***Culebra Island***

Culebra Island, lying midway between Puerto Rico and the island of St. Thomas in the Virgin Islands, was established as a naval reservation in 1917 and at various times during the years between wars was used by the Marine Corps for winter maneuvers. Its two installations, a 2,400-foot sod-surfaced airstrip and a camp site, were in a rundown condition when World War II began.

Of value chiefly because of a fine sheltered harbor and potentialities as an emergency landing field, a minor construction effort was expended to rehabilitate the camp for immediate use. The sewerage, fresh- and salt-water systems, cold storage, and messing facilities were renovated and improved under the San Juan contract during the summer of 1942. Further maintenance and repair work was undertaken again during February 1944 by a detachment from CBMU 507 stationed at St. Thomas.

Because of the way the war developed, Culebra remained insignificant throughout the period, and in September 1944 was reduced to caretaker status.

### ***St. Thomas, Virgin Islands***

St. Thomas, 50 miles east of Puerto Rico, is 14 miles long, varying in width to a maximum of 4 miles, with an approximate area of 32 square miles. Most of the island rises directly out of the sea in high rocky cliffs, with the major portion of the surrounding water either shallow or made useless

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**Bourne Field, St. Thomas**  
Industrial area for the Marine aviation facility

by barrier reefs. On the south side of the island, however, there are three excellent bays, so situated that peninsulas and small islands form natural breakwaters. Two of these bays were developed for

Navy use; Lindbergh Bay for seaplanes and Gregerie Channel for submarines and deep-draft vessels.

When, in July 1940, the fixed-fee contract operating at San Juan was extended to accomplish the development of St. Thomas, there existed on that island Marine air base, established in 1935, as well as a radio station and a submarine base, both dating from World War I. The air base, known as Bourne Field, comprised two 1,600-foot sod-surfaced runways which were used by the Marines as an outlying training field; the radio station was a minor installation, and the submarine base had long since been abandoned as such.

The initial program called for improvements and additions to existing facilities to accommodate a Marine squadron of 18 planes on a permanent basis and a waterfront development to serve one patrol-plane squadron in a tender-based status.

The main east-west runway at Bourne Field was extended to a length of 4,800 feet, and a 100-foot extension was added to the steel hangar, together with additional quarters, an administration building, additional gasoline storage, a cold-storage building and commissary, extensions to roads and services, and a new 60-bed dispensary and hospital. A concrete ramp, hangar, and utility shop were also built to accommodate seaplane operations in Lindbergh Bay.

Fifty low-cost housing units were added to the contract during October. Financed from National Defense Housing funds, these were built of prefabricated light-steel frames with concrete floors and stucco exteriors, identical with those built at San Juan. Reinforced concrete and structural steel were, in general, used for all other buildings, both

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### **Catchment Area for Laundry and Power House at the Submarine Base, St. Thomas**

for permanency and as a precaution against hurricanes.

Due to the irregular terrain and the general presence of rock close to the surface, the runway extension was made by dredge-filling a marsh on the eastern end of the field. It was also necessary, because of the shallow soil overburden, to resort to drilling and blasting for practically all excavations necessary for foundations and underground services.

By midsummer 1941 the scope and purpose of St. Thomas had been redefined, in accordance with the Greenslade studies and the requirements of the two-ocean Navy and 15,000-plane program. As a consequence, the contract was again supplemented on July 8, 1941, to provide for further additions to the air station and the development of a completely new facility -- a submarine base, on Gregerie Channel and adjacent to the air station.

Under the new construction program, the aviation shore facilities were expanded to meet the operational requirements of two Marine squadrons and the emergency operation of six patrol seaplanes. Additional barracks, services, magazines, recreational facilities, and fresh-water storage were built. Housing for service personnel, when completed, provided for 700 enlisted men in three barracks, one barrack for 40 officers, and 24 housing units for married non-commissioned and commissioned officers.

The waterfront development at the submarine base, built in dredge-deepened waters, comprised three finger piers, each 350 by 30 feet, and twelve 19-pile dolphins. Construction included quarters

for 900 enlisted men and 42 officers, an administration building, storage buildings, torpedo overhaul shop, and a bombproof powerhouse in which were installed four 750-kva diesel-driven generators. Two 10,000-barrel steel tanks, with a pump and filter plant, were installed for diesel-oil storage.

Fresh water for both the air station and the submarine base was obtained by collecting rainfall. Five hillside catchment areas, totaling 13 acres, were built by removing the foliage and thin layer of top soil from the underlying rock. The water thus collected was funneled into a number of concrete reservoirs, chlorinated, and pumped directly into the distribution pipe lines.

Under a later program, undertaken in October 1941, a section base and net and boom depot were

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### **McCalla Field Headquarters, Guantanamo Bay**

built on the waterfront adjacent to the submarine base. Two additional finger piers, one 500 feet and the other 350 feet long, were constructed, together with the necessary industrial buildings to house these activities. A new radio station, equipped with three 150-foot steel towers and a reinforced-concrete transmitter building, was also constructed to replace the inadequate station built in World War I.

Still further additions and improvements built during 1942 were directed toward bringing into better balance the facilities constructed under the initial development plan. The program was climaxed finally in December by a major increase in liquid-fuel storage and the paving of the east-west runway at Bourne Field. Two 100,000-gallon tanks, of pre-stressed concrete, for gasoline, and six of a similar type for diesel oil, with a capacity of 135,000 barrels, were built.

On June 11, 1943, CBMU 507, with a complement of 256 enlisted men and 4 officers, arrived at St. Thomas. The civilian contract was terminated 15 days later, the maintenance unit carrying to completion a number of buildings and installations left unfinished by the contractor. Using native labor to augment their own force, they also accomplished an extensive program of miscellaneous construction and improvements to facilitate better operation and make the base more nearly self-sustaining.

### ***Guantanamo, Cuba***

At the outset of the emergency, facilities in

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existence at Guantanamo Bay, comprised a naval station equipped with shops, storehouses, barracks, two small marine railways, a fuel oil and coaling plant, a Marine training station, and an airfield. The station, used by the fleet while on winter maneuvers, reflected the period of strict naval economy between wars, having been relegated to practically inactive status.

The site, acquired by lease from the Cuban government on July 2, 1903, for an annual rental of \$2,000, completely encircles the bay and contains approximately 36,000 acres, of which 13,400

acres are land and the remainder water and salt flats. The greater part of the water is navigable, forming an excellent land-locked harbor, with depths ranging up to 60 feet.

Initial development in the bay area consisted of an air station. By 1944, there had been developed a major naval operating base, equipped with ship-repair facilities, fuel depot, supply depot, and other related activities. These new facilities were accomplished under a single fixed-fee contract, awarded July 1, 1940; construction operations began two weeks later.

Included in the initial program were five major projects: a Marine Corps base for 2,000 men, a fuel-oil and gasoline storage depot, two airfields, and improvements to existing radio facilities.

Within the limits of the area under Navy lease, there were two sites suitable for airfields. One of these, McCalla Hill, adjacent to the eastern shoreline of the harbor entrance, was already developed as a field within the tract of land allocated to the Marine Corps. Leeward Point, directly west of McCalla Hill and across the bay entrance, offered the second site.

The area allocated to the Marine Corps was relinquished in order that the existing McCalla Hill airfield might be enlarged and a seaplane base be established there. In exchange, the Marine Corps was provided with a new and self-contained base for a force of 2,000 men, with all necessary utilities, such as barracks, administration buildings, dispensary, mess halls, storage buildings, laundry, roads. The buildings were of semi-permanent character, with concrete foundations, tile ground floors, wooden superstructure, and asbestos shingle or tile roofs.

The airfield on McCalla Hill was equipped with three asphalt runways -- one, 300 by 4,900 feet, and two cross runways, 200 by 2,300 feet -- built to the limit of the land available. Warm-up platforms, a hangar and utility building, administration and operations building, magazines, quarters, barracks, and well halls were provided. At the seaplane base, facilities installed included a concrete parking area of approximately 560,000 square feet, two seaplane ramps, each 100 feet wide, and a large, steel hangar.

At Leeward Point airfield, across the bay entrance, two runways, a hangar, storage facilities, distribution systems for water, diesel-oil, and gasoline, a small power plant, a magazine, a barrack and a small-boat landing were built. The main runway, 6,000 feet long, and a cross strip, of 3,500-foot length, were paved with asphalt 150 feet wide.

Fuel-oil storage, constructed under the original program, included 18 tanks of 25,000 gallons each and 10 tanks of 26,000 barrels each, grouped in tank farms at four separate locations. All were built of steel and located underground. Water lines, access roads, and chemical fire-fighting equipment were installed at each of the four locations. In addition to the pumping equipment and distribution lines which were installed to link these systems together, one ethyl-blending plant was provided for ethylizing raw gasoline.

Housing proved a problem from the very beginning of the construction period, for both continentals and Cubans. For those who lived in the two nearest Cuban cities, Caimanera and Boqueron, it meant a 5-mile boat ride each way or a much longer drive by automobile. To help relieve the situation, 200 low-cost homes, built in a community group on the reservation, remote from the area occupied by the principal naval activities, were added to the contract in October.

That month of October 1940 also saw a second major addition to the contract, which provided facilities needed for a fleet anchorage and operating base. Extensive dredging operations, totalling 16,000,000 cubic yards, were undertaken to deepen certain areas of the bay to permit mooring of deep-draft vessels. Also constructed were 17 destroyer, 10 cruiser, and 3 battleship moorings. These were of steel sheet-piling, cellular in design, filled with dredged material, and capped with concrete.

The October supplement to the contract also included three storehouses, a chapel, additions to an existing machine shop, a net and boom depot, and miscellaneous small projects.

For years, one of the main drawbacks to the development of Guantanamo Bay as a fleet operating base was the lack of fresh water. During the

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early days, water had to be purchased on yearly contract from the neighboring cities of Caimanera and Boqueron, barged from there to the station, and pumped into storage tanks. This method of supply was costly, unreliable, and even dangerous when considered from the point of view of health. In 1934, Congress authorized the Navy Department to enter into a 20-year contract for water to be supplied to the station by pipe line. The pipe line was placed in operation in July 1939, water being obtained from the Yateras River, 10 miles distant, and pumped to the station through a 10-inch main.

As this system was definitely limited by the size of the pipeline, it became necessary, in view of the development planned for Guantanamo, to increase its capacity. This project, begun in September 1941, furnished an additional 2,000,000 gallons per day. A new pumping plant, installed at the Yateras River, pumped water through 50,000 feet of 14-inch main to two treatment plants on the station. Midway along the pipe line a 500,000-gallon concrete reservoir was built for reserve water storage and as a fire precaution; three steel tanks, with a combined capacity of 2,000,000 gallons for treated water, were built on the station.

A new section base and an underground hospital were also begun during September 1941. The U-shaped pier, supported on timber piles, with a 260-foot base and two wings, each 350 by 30 feet, was built at the section base. Twelve barracks, each with a capacity for 230 men, a mess hall, and a new machine shop were also provided.

The underground hospital, a bomb-proof structure, comprising four concrete arch-type units built into a hillside, was fitted with 92 beds and complete hospital equipment, including two stand-by power plants for light and forced ventilation.

With the advent of war, the importance and value of Guantanamo was a major link in the chain of Caribbean defenses was reflected in the steady increase in construction activity throughout 1942. The capacity of the fuel depot was greatly expanded, beginning with the addition of a diesel-oil filter plant in February 1942, two 27,000-barrel pre-stressed concrete tanks in April, and seven 50,000-barrel tanks during May. These underground tanks were interconnected, with pipe-line extension, to a floating oil-dock in the fleet anchorage area.

A degaussing and deperming installation was authorized in March 1942; a 330-ton marine railway and a 3,000-ton timber floating drydock, in June; and an anti-aircraft training center, in July. In November extensive ship-repair facilities and an auxiliary outlying airfield were begun.

Included in the ship-repair project were three timber piers, 625 feet, 1,120 feet, and 250 feet long, respectively; a timber causeway, 400 feet long; and a 2,360-foot marginal wharf, the platforms of which were a composite of wood and concrete. Two large buildings, a repair shop and rigging loft, and several small industrial buildings were also included.

The outlying airfield, at Los Canos, 30 miles north of McCalla Hill Field at Guantanamo, was built to serve as an emergency landing field and as a training area for carrier-based aircraft. It was built on 450 acres of land leased from the Guantanamo Sugar Company and equipped with three 4,500-foot runways, one of which was paved with a penetration asphalt surface, 150 feet wide. Quonset huts served for personnel housing and administration offices.

Upon completion of the Los Canos project in September 1943, this field, with the facilities provided at the McCalla Hill and Leeward Point fields, composed the naval air station, which supported the operation of three squadrons of patrol seaplanes, one carrier group of 90 planes, and one utility squadron, in addition to the temporary operation of four additional patrol squadrons with tender support and one additional carrier group with the parent ship present.

Upon the termination of the contract on September 30, 1943, the Public Works Department, augmented by 1,800 men transferred from the contractors' payrolls, carried on all uncompleted contract projects. These consisted primarily of completing the ship-repair facilities and the installation of machinery in otherwise completed structures at various locations. The peak of operational activity was reached during the summer of 1944, when, because of the Allied advances in the European theater and the almost complete elimination of the submarine menace in the Caribbean area, orders were issued for the curtailment and consolidation of the activities at the base.

### *Haiti*

Using Lend-Lease funds, the Navy constructed a 1,000-ton marine railway at Part-au-Prince for use by the Haitian Coast Guard. This facility, built under

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the Guantanamo contract, was completed in April 1944 and turned over to the Haitian government the following month. Except for the railway, no other construction was done on Haiti.

## **Part II -- The Canal Zone**

When anxious eyes were directed toward the defenses of the Panama Canal in the fall of 1939, the naval shore establishment then in existence in the Zone was limited on the Atlantic side to an air station for seaplanes and a submarine base at Coco Solo, a radio station at Gatun, and a small section base at Cristobal. On the Pacific side, at Balboa, were located the administrative headquarters of the 15th Naval District and, directly across the Canal, on the west bank, an ammunition depot. Another radio station, located at Summit, about one third of the distance from Balboa to Coco Solo, and a half a dozen fuel tanks at either end of the Canal, and a few minor installations completed the list. For fueling and ship repairs, the Navy was entirely dependent on the industrial plant owned and operated by the Panama Canal. These centered around a battleship graving dock at Balboa and a small dock, 390 feet long, at Cristobal on the Atlantic end of the canal.

Using these existing facilities as a nucleus, the Navy began to strengthen and enlarge its installations during the summer of 1940. Guided by the Hepburn Board recommendations, the initial effort was undertaken by two fixed-fee contracts, awarded June 17 and July 11, and devoted primarily to enlarging the air station and submarine base at Coco Solo and constructing housing and a new office building at Balboa for the administrative offices of the 15th Naval District,

The scope of each contract was enlarged considerably during the pre-war period, as defense plans for the Canal were broadened and new installations authorized. When war was declared, several entirely new activities were well underway, with work concentrated in the Coco Solo area and on a new tract of land on the west bank of the Canal, directly across from Balboa.

By the end of 1940, work had begun on a new supply depot at Balboa, and on the Farfan Radio Station on the west bank, together with the enlargement of the two inland radio stations at Gatun and Summit. Two net depots were started in December, one at each end of the Canal, and during the same month a third contract was awarded for 1,400 housing units, 1,100 at Coco Solo and the

remainder on the west bank at Balboa. The following summer two naval hospitals, one at Coco Solo and the other at Balboa, were begun.

That summer of 1941 also saw the start of intensive work on the development of a new naval operating base on the west bank at Balboa. With further expansion impossible along the congested waterfront, this west bank area became the locale for the major war construction effort in the Canal Zone.

The war years of 1942-1944 saw an enormous increase in the tempo of construction activity, the major effort being concentrated in three categories; fuel storage, ship-repair facilities, and the development of several advance bases to support distant air patrols. The Gatun tank farm on the Atlantic side, and the Arraijan farm, on the Pacific, were started in February 1942, and subsequently these huge storage reservoirs, 32 miles apart, were connected by a multiple pipe-line, installed under a fourth fixed-fee contract, awarded August 4, 1942, and completed in 1943.

In April 1942, work was started on a second graving dock adjoining the existing Panama Canal dock at Balboa, a bombproof command center, additional housing in the district headquarters area, and additional frame warehouses at the supply depot. In June, a third graving dock, to adjoin the other two at Balboa, was put under contract, and work was begun on two new marine railways, adjacent to the existing drydock at Cristobal. Meanwhile, the ammunition depots at Coco Solo and Balboa were enlarged, as were the facilities at the Coco Solo submarine base and air station and the Balboa operating base.

Advance bases were established during 1942 and 1943 on Taboga Island at the Pacific entrance to the Canal, on the Galapagos Islands off the coast of Ecuador, at Corinto in Nicaragua, Salinas in Ecuador, Chorrera and Mandinga in Panama,

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Puerto Castillo in Honduras, and Barranquilla in Colombia.

The peak of construction activity was reached in the summer of 1943, and three of the four major contracts were terminated during the late fall of that year. After the termination of the fourth contract in April 1944, several smaller lump-sum contracts were awarded for minor additions and improvements and to care for current needs.

Two groups of Seabees, Detachment 1012, which arrived September 9, 1942, and Maintenance Unit 555, which arrived in December 1943 as a replacement for the first group, served in the 15th Naval District. Due to the difficulty of procuring civilian labor for work in outlying areas, both units were used mainly at the advance bases. Some of the men, however, were stationed within the Zone, to operate power houses and perform specialized maintenance work.

### *Coco Solo*

*Naval Air Station.* -- The Coco Solo air station occupies 185 acres of hard land, on the east side of Manzanillo Bay. Existing facilities in 1939 included a small landing-field, three plane hangars, one blimp hangar, barracks, officer's quarters, three seaplane ramps, and a few miscellaneous buildings.

When the development of the station was begun on August 1, 1940, the approved plan contemplated expansion sufficient to serve seven patrol squadrons of seaplanes. The original site, though limited, was considered to be the most advantageous that could be found in the Canal Zone; consequently, maximum expansion was advocated rather than construction of an additional base in another locality.

The greatest single deficiency existing at the station was the lack of sheltered water for full-load take-off immediately adjacent to the base. There was a wide gap of open water between the eastern breakwater and Margarita Point, through which heavy ocean swells entered Manzanillo Bay, frequently making seaplane operations hazardous. In addition, the station lacked sufficient hangars, ramps, parking aprons, housing, storage, and repair facilities.

The initial construction effort, therefore, was concentrated on closing the 3,800-foot gap in the Margarita breakwater. Rubble-mound construction, laid on a 15-foot coral mat, was used, the wall itself having a coral-fill core, covered with heavy rock and armored with pre-cast concrete blocks. It was built entirely from a temporary timber trestle, without the use of floating equipment other than the hydraulic dredge used for placing the foundation and core.

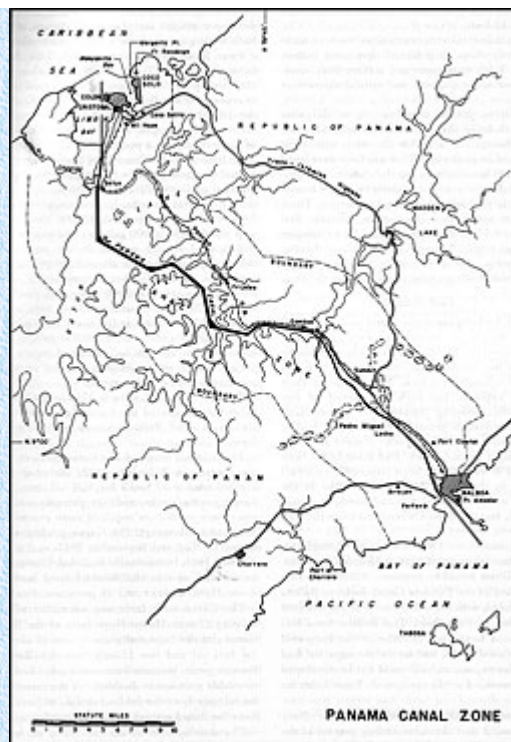
At the air station proper, three large steel hangars, four seaplane ramps, 700,000 square feet of concrete parking area, engine test stands, and a large aircraft assembly and repair shop were added to the operating area fronting on Manzanillo Bay. To make expansion possible, it was necessary to reclaim 30 acres of beach by dredge. A steel sheet-pile sea-wall, 2,100 feet long, was driven to enclose two edges of this newly made land.

Other construction accomplished at the station included a barrack and mess hall for 1,000 men, a new wing to an existing barracks to care for 400 men, a bombproof command center, an operations building, a large administration building to house the administrative offices of both the air station and the adjoining submarine base, and several large warehouses.

Dredging operations at the air station were also extended to furnish coral fill for the construction of new runways at Army's adjacent France Field. When that field was completed, 1,700 feet of concrete taxiway, 66 feet wide, was built to connect the two stations. The Navy, henceforth, used Army facilities for the operation of its landplanes in the Coco Solo area.

*Submarine Base.* -- Established in 1917, and later modernized, the submarine base occupied a 130-acre peninsula bounded on the north by Margarita Bay and on the west and south by Manzanillo Bay. Important additions to all existing facilities were accomplished under the wartime construction program begun during the fall of 1940, developments being confined entirely within the limits of the existing boundaries.

A mole pier, 300 feet wide, enclosed with steel sheet-piling, was built as an extension to the original north quay wall, to provide additional berthing space and increase the basin area. This pier, paved with concrete, was equipped with water, oil, and air lines, a railway spur, a large transit shed, several storehouses, and shop buildings. The south quay was likewise extended a distance of 500 feet and equipped with water, oil, and electric services. A net depot, comprising a large storage building and a 16,000-square-foot paved weaving-slab was



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built along this quay, and the basin dredged to a depth of 32 feet.

In the industrial area, extensions were made to the torpedo shop, ship fitters' shop, and battery shops. A large storehouse and a three-story structure to house the machine and optical shops were erected.

A low-lying, 20-acre area fronting on Margarita Bay was inclosed with 3,200 feet of steel sheet-pile seawall, brought to a usable elevation with coral fill dredged from the bay. This was later developed as the main housing area for the station, construction including seventy four-family two-story houses and two large bachelor-officer dormitories. These units were constructed of concrete, with the first floor placed 6 feet above the ground for ventilation and garage space. A chapel and library, a theater, tennis courts, and a recreation building for enlisted men and officers were also located in the area.

### *Fuel Storage*

In 1940, fuel storage in the Canal Zone presented a serious hazard. There were two tank farms -- one at Balboa, on the Pacific side; the other at Mount Hope, on the Atlantic side -- neither of which was protected against air attack. Not only were their positions exposed, but each was served by one unprotected pumping station. The Balboa tank farm was on high ground adjoining the harbor entrance channel, and its tanks presented an excellent target for air attack. Had these farms been destroyed it would have been impossible to refuel shipping in the Canal Zone. The solution to the problem was clearly underground bombproof storage tanks, located at points removed from the harbor.

At the same time, it had become increasingly apparent that in event of war, additional fuel-handling facilities would be required. All Navy vessels were fueled at the Panama Canal docks at Balboa and Cristobal, with the exception of diesel-powered craft based at Coco Solo. The Balboa farm had only limited bunkering facilities at the congested Panama Canal docks, had no reserve capacity, had no

land for expansion, and could not be developed as a terminal for the proposed Trans-Isthmian pipeline.

In January 1941, the Secretary of the Navy recommended that the commanding general of the Canal Zone call a conference of all interested parties, including the governor of the Canal Zone and the commandant of the 15th Naval District, to develop a project for placing all storage of liquid fuels underground at the earliest practicable date.

Four localities were considered, final decision being left to the Navy. Plans were also considered for a pipe line connecting both coasts in order to replace tanker shipment through the Canal, but the difficulties and cost of construction caused that matter to be dropped until 1942, when the course of the war made it a project of vital urgency.

In June 1941, the Navy Fuel Storage Board submitted its report relative to the quantity, type, and location of liquid fuel storage to be provided in the 15th Naval District. It recommended fuel oil, 1,000,000 barrels; diesel oil, 220,000 barrels; aviation gasoline, 5,900,000 gallons; and suggested distribution of storage on the Pacific and Atlantic sides in proportions of 60 and 40 percent, respectively. It was further recommended that an additional reserve 3,800,000 gallons of gasoline be stored on the Atlantic side near Coco Solo, in order to be readily available to the naval air station, and that on the Pacific side, 2,100,000 gallons of reserve gasoline storage be combined into a single project under the cognizance of the Army. All storage was to be underground.

The sites selected were a 1,700 acre tract, near Cristobal, designated the Gatun farm, and an 820-acre tract near Balboa, known as the Arraijan farm.

The original scope of the Gatun project, which was begun in February 1942, included fifteen 27,000-barrel steel tanks for fuel oil, two 27,000-barrel gasoline tanks, and four pumphouses. When emergency conditions required more extensive underground oil-storage, the Gatun project was enlarged in May and September 1942, and again in January 1943. It eventually included fifteen 27,000-barrel and eleven 50,000-barrel steel tanks and seven 27,000-barrel tanks of pre-stressed concrete.

The Gatun tank farm was connected with the existing 27-tank Mount Hope farm of the Panama Canal and the Cristobal piers by two 20-inch lines for fuel oil and two 12-inch lines for diesel oil. Booster pump stations were constructed in the line to enable a tanker to discharge at the rate of 8,000 barrels per hour for fuel oil and 6,000 barrels per hour for diesel oil.

The development of the tank farm at Arraijan progressed concurrently with the project at Gatun. Planned originally to consist of eighteen 27,000-barrel

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and two 13,500-barrel tanks, the Arraijan farm eventually included two 13,500-barrel and twenty-six 27,000-barrel pre-stressed concrete tanks, and four pump houses. Two 18-inch and one 12-inch pipelines connected the farm with the fueling piers at Balboa. The tanks, pump-houses, all design details, and method of construction were similar to the Gatun project.

To provide reserve storage for aviation gasoline, seven 13,500-barrel steel tanks were installed in the naval magazine area, adjacent to the Coco Solo air station. This project, which likewise was begun in February, eventually expanded to include five additional tanks of 27,000-barrel capacity for ready diesel-oil storage to supply the submarine base. These were connected through an 8-inch pipe to the eight 25,000-gallon tanks at the air station. The diesel tanks were, in similar fashion, connected with the Panama Canal tanks at Mount Hope, the fueling piers at Cristobal, and, eventually, with the tank farm at Gatun, making the entire system mutually flexible.

Japanese seizure of the oil fields in the Netherlands East Indies during the early days of the war made it necessary to rely entirely on the Americas for oil deliveries to the Pacific theater of operations. With a large portion of the United States refineries located along the Gulf of Mexico and the East Coast, and those in South America likewise accessible from the Atlantic and Caribbean, fuel deliveries to the Pacific depended upon the use of tankers and the Panama Canal. A certain and continued supply of liquid fuel was a strategic imperative.

During the summer of 1942, German submarines took a heavy toll of our tanker fleet plying the Atlantic and the Caribbean, which, apart from the loss of oil involved in these sinkings, seriously reduced the number of fast tankers available to transport oil in the quantities needed. These losses were a matter of grave concern in view of the oil demands involved in future operations planned for the Pacific campaign.

Accordingly, the installation of the proposed pipe line across the Isthmus, connecting the Gatun and Arraijan tank farms, became a project of immediate military necessity. Such a pipe line would confine the use of older, smaller, and slower tankers to a shuttle service between the fueling piers at Cristobal, the supply sources along the Gulf of Mexico, and the huge refineries at the Dutch islands of Aruba and Curaçao. It would also serve to eliminate tanker traffic through the Canal and materially speed up the loading and return of the large, fast tankers carrying oil to the Pacific. The installation of this pipe line was accomplished under a fixed-fee contract, awarded specifically for this purpose, on August 4, 1942. As initially planned, the project called for the installation of one 20-inch and one 10-inch welded-steel pipe lines, each 33 miles long, connecting the Gatun and the Arraijan tank farms. Construction was started in October.

In addition to one Canal-crossing, 4 miles of the run was under the waters of Gatun Lake. The rugged terrain and jungle along the route presented many problems in ditching, grading, and placing of the pipe itself. Even Gatun Lake had to be cleared of submerged obstacles.

In spite of an unduly severe rainy season, the two pipe lines were completed and used for the first time on April 18, 1943. By the end of 1943 the entire system was completed and in full operation.

In April 1944, a year after the first test had been run, work was started to double the capacity of the pipe line. A second 20-inch fuel line and a 12-inch line to carry gasoline were laid directly over the original 20- and 10-inch pipes.

Built at a cost of \$20,000,000, the Trans-Isthmian pipe line was built to handle a daily flow of 265,000 barrels of fuel oil, 47,000 barrels of diesel-oil and 60,000 barrels of gasoline.

### *Housing*

As a part of the general expansion program undertaken in the Canal Zone, two housing developments, totaling 1,400 units, were built to provide for the families of married enlisted personnel and civilian employees of the 15th Naval District. These units, built under a contract awarded in December 1940, were divided, 1,104 being on the Atlantic and 296 on the Pacific end of the Canal.

The larger development, Coco Solito, was constructed on a 33-acre, filled-in site, one mile south of the air station at Coco Solo. Laid out with six east-west streets and three north-south ones, Coco Solito contained 91 twelve-unit, one eight-unit, and one four-unit apartment buildings. The structures were of similar type and design, three stories high, of concrete and frame, with galvanized-iron roofing

and the ground floors available for garages and laundries.

The housing area at the Pacific end of the Canal encircled San Juan Hill on three sides, spreading over approximately 100 acres of rolling ground which required considerable clearing and leveling. It included 66 four-unit apartments, 2 officers' houses, 2 bachelor officers' quarters, and 5 B-1-type barracks, together with several community buildings, storehouses, a public-works shop, administration, subsistence, and service buildings.

At Lacona, 296 apartments for civilian personnel were completed in December 1941. This group comprised 24 twelve-unit and one eight-unit apartment houses.

A new 12-inch water main replaced the former 8-inch one supplying Balboa, and a 750,000-gallon water reservoir was built on San Juan Hill to serve naval activities.

### *Hospitals*

To care for the large increases in personnel which accompanied the expansion of the naval establishment, a new 200-bed naval hospital was built on a 40-acre tract of high land, on the north side of the new Trans-Isthmian Highway, about 3 miles from the Coco Solo air station. This facility consisted of a four-story structure, with additional buildings for quarters, laundry, garage, and sewage plant, all of reinforced concrete. It was commissioned in September 1942, and later enlarged by the addition of two temporary wards of frame construction, to provide 500 beds.

A second hospital was built on a 50-acre tract adjoining the operating base on the Pacific side. Construction of this 400-bed facility was begun in the late fall of 1941. It was commissioned August 15, 1942, and put to immediate use, though only partially completed.

All the buildings were of temporary frame construction, one-story high, and well ventilated. They included six standard H-type wards, connected by covered passageways, quarters, and administration building, and laboratories, messhalls, and garages. Location and general layout were chosen so as to be readily adaptable if permanent structures were eventually erected on the site.

### *Ammunition Storage*

The naval magazine area at Coco Solo, originally completed in 1937, was more than doubled both in storage capacity and in area, during the war-construction period. Under the initial program, begun in November 1940, new additions were confined within the original area of 700 acres. After war was declared, further increase in storage facilities was ordered and the area of the reserve increased to 1,500 acres, of which 140 were devoted to the Coco Solo tank farm. Both the earlier work and the later additions required a considerable amount of clearing, excavating, and road building. Altogether, 40 storage structures of various types, ranging from concrete arch-type underground magazines for high explosives to frame storehouses, were built.

The capacity of the existing West Bank Ammunition Depot, commissioned in September 1937, was increased fourfold during the period from 1940 to 1943, a total of 47 ammunition magazines being built, of which 34 were concrete arch-type high-explosive magazines.

These were linked together by a system of access roads, and the newly developed area enclosed by 7 miles of wire fencing. In addition, sentry stations, telephone lines, quarters for assigned personnel, and a temporary mine-anchor storage building were included in the development.

### *Radio Stations*

The two major radio stations, located at Gatun and Summit, were considerably enlarged, and a third, known as the Farfan Radio Station, was installed at Balboa.

At the Gatun station, three existing towers were removed and replaced by three 150-foot steel towers; a new two-story reinforced-concrete, bombproof transmitter and command post was added.

To the station at Summit, which had been completed in 1935, were added housing, an extension to the transmitter building, a new bombproof transmitter and receiving building, and a 300-foot and an 800-foot tower.

Erecting the 800-foot tower presented an unusual construction problem. Approximately 135,000 cubic yards of excavation were necessary to level the surrounding terrain before placing the ground grid-system, which comprised 24 bare copper wires extending radially for a distance of 600 feet. The 20-foot square tower rested on a single, huge insulator and was supported vertically by eight equally spaced guy cables, attached at a height of 515 feet.

The Farfan Radio Station, an entirely new development,

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located on an 860-acre reservation south of the Balboa operating base, was equipped with complete services. The installation included five steel towers, a two-story bombproof operations building, and housing facilities.

### *Cristobal*

The Panama Canal maintained its ship-repair facilities serving the Atlantic end of the canal at Cristobal. These, comprising the Mount Hope shops and a graving dock, 390 feet by 80 feet, were supplemented by two marine railways of 1,000-ton and 3,000-ton capacities and a 1,000-foot marginal wharf.

As a part of the fuel-storage program, the dock was equipped with fuel, diesel-oil, and gasoline pipe lines to facilitate the transfer of liquid fuel to the Gatun tank farm. Dredging to a depth of 35 feet provided an adequate turning basin in the vicinity of the marine railways and the marginal wharf.

The old section base at Cristobal was supplemented by new buildings to house and feed 450 men assigned to the inshore patrol.

### *Balboa*

An area opposite Balboa, the only practical location for the expansion of waterfront facilities at the Pacific entrance, had been under study for several years as a possible site for a submarine base. In the summer of 1941, the development of a small operating base was begun at a point where a pier had been built four years previously, to afford access to the ammunition depot. An extension was made to this pier and two new finger piers were added.

The two new piers, each 40 by 704 feet, were built of reinforced concrete. Concrete piles were cast at the concrete plant at Fort Randolph, on the Atlantic side, then producing piles for the Margarita breakwater, and shipped through the Canal. Pipe tunnels built into the piers provided space for fuel-oil, water, and power lines. The original ammunition depot pier was lengthened 220 feet and the waterfront area dredged to provide a 45-foot depth alongside the old pier, and a 33-foot depth at the new ones. A fourth pier, 1,000 feet long, north of the ammunition pier, was planned and the necessary dredging completed, but the project was cancelled.

Several hundred foot out from the shoreline a head quay, or transverse wharf, 50 by 834 feet, was built to join the inboard ends of the three piers. A fill of dredged material was to be placed behind the quay, but after filling had progressed behind the first completed section, a serious slide damaged that portion of the quay. The damaged part was not rebuilt, and no more fill was placed.

An industrial area for the new base, adjacent to the piers, was provided with shops for repair and overhaul of torpedoes, batteries, communication equipment, and other items of comparable magnitude. In addition, a three-story general storehouse, 100 by 300 feet, was erected to house top-off stores for Pacific-bound convoys.

South of the industrial area, a net and boom depot was established, equipped with a steel-frame net and boom building and several temporary storehouses. In addition, the depot was provided with a paved area of 12,000 square feet for net weaving and 74,000 square feet for storage.

The 15th Naval District headquarters area, covering 40 acres, was increased to 65, and a new, 3-story, reinforced-concrete office building, a bombproof command center, and additional housing for service personnel were built.

A four-story concrete store house, 80 by 200 feet, adjacent to the Balboa piers, completed in November 1941, formed the nucleus of the Balboa supply depot. After our entry into the war, when the Zone became the last stopping-off place for vessels en route to the Pacific, eight temporary frame structures, each 50 by 300 feet, were erected on an 18-acre plot, half a mile north of the main warehouse. These structures were completed in March 1943, together with a sorting and handling shed and a 75,000-square-foot lumber-storage yard. A much-needed refrigerator storehouse to replenish ships' food-lockers was completed during May 1944.

During World War I, when the construction of the Pacific terminal of the Canal was under discussion, it was decided to build two graving docks at Balboa; one to take any vessel that could pass through the canal locks and the other to care for smaller ships. Construction of both was started, but only the larger, known as Drydock Number 1, was completed. When work on the smaller dock, Drydock Number 2, was stopped, early in 1915, the head wall and south side wall had been completed and the floor of the dock excavated into rock to the required depth. Thereafter, Dock Number 2 was carried in the shore development plans as an essential project to be provided at Balboa.

After the outbreak of World War II, Drydock

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Number 2 was approved as a project in January 1942, and construction began immediately. It was redesigned to accommodate two destroyers or two submarines abreast, and a third dock for small vessels was built alongside, so located as to use the north wall of Dock Number 2 as one of its own.

All three drydocks share the use of the adjoining shops operated by the Panama Canal.

A pumping plant and electrical substation, a wharf along the north wall of Dock Number 3, a pier between Docks 2 and 3, and a cellular sheet-pile extension of the north and south walls of Dock Number 2, to form an approach pier, aiding the lateral control of vessels during docking operations, were also built. Some new machinery was purchased and installed in the Panama Canal ships to improve the repair capacity. By the end of 1943 the total repair facilities available in the Canal Zone were estimated as equal to those at Pearl Harbor on December 7, 1941.

## Part III -- The Destroyer Bases

The eight bases, popularly known as "Destroyer Bases" because of their acquisition from Britain in exchange for over-age destroyers, operated to advance our sea frontier several hundred miles into the Atlantic on a broad arc, with Argentina, Newfoundland, as the north anchor and Trinidad as the south anchor, with Bermuda between. Individually and collectively they were of significant value in that they afforded strategically located sites upon which to base tactical and patrol aircraft for the control of the Caribbean.

Development and fortification of each base took into account the limitations imposed by location and character of terrain. Santa Lucia, in the Windward Islands, Antigua, Jamaica, British Guiana, and the island of Great Exuma in the Bahamas were equipped as secondary air bases and the remaining three, Trinidad, Bermuda, and Argentina, as major air bases. For immediate strategic reasons, Trinidad, Bermuda, and Argentina were given top priority and eventually became important bases for the operation of ships as well as planes. Argentina is discussed in the [chapter](#) dealing with bases in the North Atlantic.

A major air base, as visualized by the Greenslade Board, was to be equipped with complete facilities for operation, storage, and supply, engine overhaul, and complete periodic general overhaul of all types of planes. A secondary air base was a smaller installation, having facilities primarily for the operation, routine upkeep, and emergency repair of aircraft.

At the very beginning of their construction history these bases shared a common plan calling for the installation at each of emergency shore facilities to house a Marine detachment. This phase of their development was initiated by the Bureau of Yards and Docks on October 30, 1940, by assigning to the fixed-fee contract then operating at San Juan, the task of purchasing the necessary materials and equipment in advance of operations on the site. This beginning permitted the preliminary work attending a project of this magnitude to progress simultaneously with the negotiations attending the transfer of these Crown lands.

The Greenslade Board submitted its recommendations to the Secretary of the Navy on October 27, 1940, and tentative leases for the lands required were drawn, based on these findings; the necessary topographic and hydrographic surveys were begun. Remoteness of the sites, unknown bidding conditions, and the pressing necessity for speed contributed to the decision to undertake the construction at each location by negotiated cost-plus-fixed-fee contracts.

At first, there were some difficulties as the local governments did not have a clear picture of the agreement between the British and the United States governments concerning the use of the leased areas, and it was necessary for the Bureau to secure temporary leases in order to avoid delaying construction until such matters as customs, taxes, wharfage fees, and wage rates for local labor could be settled. The Navy Department received authority to enter Bermuda, Trinidad, and British Guiana, on January 193, 1941; Antigua and St. Lucia, on January 13; Great Exuma, March 27. The Jamaican government authorized entry into Little

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**Barracks at Trinidad Naval Base**

Goat Island on January 16. Final lease agreements for all the bases were consummated March 27, 1941.

## *Trinidad*

The strategically important island of [Trinidad](#), commanding a vulnerable approach to the Panama Canal and the South American trade routes, lies off the coast of Venezuela. It is roughly 35 by 55 miles, with two long, narrow peninsulas extending westward toward the continent to form the Gulf of Paria, completely landlocked except for two easily guarded channels, each 7 miles wide.

The site for the naval shore establishment, on the northwest tip of the island, was acquired under two separate lease agreements, the first of which, dated April 22, 1941, involved 7,940 acres, including five small islands in the Gulf of Paria, the property of the Crown. The second acquisition, made during December 1942, involved 3,800 privately owned acres. The site consisted principally of steep hills and ridges, interspersed with flat valleys extending from four well-defined bays along the southern shore of the northwest peninsula. This location had the patent advantage of being remote from Port of Spain, the principal Trinidad city and port. From an engineering standpoint the flag areas along the shore, though limited, contained a minimum of swampy lowland, and the bay waters, with a minimum of dredging, were deep enough for accessibility by ships. The four bays -- Carenage, Chaguaramus, Teteron, and Scotland -- and two valleys -- Chaguaramus and Tucker -- each became the locale of a separate naval activity. Of the 11,740 acres acquired, only 1,200

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**Naval Supply Depot, Trinidad**

acres were developed, at widely separated locations.

The original plans for Trinidad called for the immediate construction of a naval air station with facilities to support the operation of one patrol squadron of seaplanes and the development of a protected fleet anchorage in the Gulf of Paria. The ultimate goal was the development of a subsidiary operating base and a major air station with facilities for two patrol squadrons and the temporary operation of two carrier groups.

On January 24, 1941, a fixed-fee contract was awarded covering the construction of the air station and the first installment of dredging. Construction operations, which began during March, were confined to the Carenage Bay area. Included in the initial phase of the program were a 500-by-50-foot tender pier, seaplane facilities, including a concrete-paved beach and a macadam parking area, two concrete seaplane ramps, a steel hangar and control tower, gasoline storage, and associated industrial, storage, administration, and personnel buildings. These major features of the station were of a permanent character, built of steel and concrete.

During the early months of the construction period the contractor's efforts were devoted to the many preliminaries attending a project of this magnitude. It was necessary to relocate a settlement of several hundred persons, build access roads, develop a quarry, and perform extensive clearing operations. One of the earliest projects undertaken was, of necessity, an aggressive campaign to combat malaria. Swampy bogs along the shore and the wet lowlands of Tucker Valley were drained, sprayed with oil, and later filled with dredged material. A force of 200 men devoted full time to the malaria program during the life of the contract.

Almost from its inception, the Trinidad contract, by a steady increase of added projects to its scope, reflected the trend of world events. The first increase, made in June 1941, was directed toward

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### Section Base Dispensary, Trinidad

developing Trinidad as a fleet base. A net depot, additional dredging, a fueling pier, and a fuel and diesel-oil storage depot were added to the contract. The fuel storage comprised five 27,000-barrel steel tanks and two 27,000-barrel pre-stressed-concrete tanks. The fueling pier was a 450-by-50-foot structure with a composite deck of concrete and laminated wood.

Dredging operations, begun in August 1941, were continued over a two-year period, during which time a total of 13,000,000 yards of material was moved to provide navigable channels to the various piers, water approaches to the seaplane base, a fleet anchorage in Carenage Bay, and the fill necessary to reclaim waterfront area. Of this total, more than 2,000,000 yards were placed in swamps to eliminate mosquito-breeding areas.

Shortly after the declaration of war, the long-range plans made for Trinidad were translated into a vigorous construction program through a series of major additions made to the contract during 1942. The first of these, a section base at Teteron Bay, was incorporated with the air station on February 20. At the same time, contracts were let for five large fleet warehouses and a radio station, a high-power link in the major radio network of the Western Hemisphere. The station was located in Chaguaramus Valley and was of unusual design in that its main antennae were strung across the valley, supported by the mountain ridges on either side.

In March construction of a 150-bed hospital in upper Tucker Valley was begun. May brought new additions to the air station, including a third seaplane ramp, additional parking area, and more personnel buildings, increasing the station's handling capacity to five squadrons of patrol planes. At the same time, two timber floating drydocks,

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### Administration and Subsistence Building, Trinidad Naval Base

Showing Carenage Bay and, beyond the Five Islands, the Gulf of Paria.  
Mountains in the background (upper right) are in Venezuela.

one of 3,000-ton capacity and one of 1,000-ton capacity, were incorporated in the contract. These were built on the site, in two dredged basins especially equipped for the operation.

In June, work was started on two 250,000-gallon concrete gasoline tanks, built underground and connected to the water displacement system installed to handle aviation gasoline at the air station. The total capacity of liquid-fuel storage constructed was in excess of 7,900,000 gallons.

Our entry into the war made our shipping a target for enemy submarines, and Germany was quick to take advantage of this opportunity by incursions into our coastal waters in January 1942. A squadron of ten Army bombers, equipped with radar detection devices, began operating from Langley Field, Va., in April and, as the year wore on, moved south to meet the shift in the U-boat threat,

operating successfully from Florida bases and later from Trinidad. By this time the squadron had been augmented by several hundred bombers, both Navy and Army, under the operational control of the Navy. The coastal convoy system was established in May and expanded, during the summer months, to the Gulf and the Caribbean. Notwithstanding these measures, there were five ships sunk between April and September, with cargo intended for Trinidad, which not only contributed to the cost but added considerable time loss. One of these ships carried the complete materials for a second seaplane hangar intended for the air station; the hangar was never built.

With each succeeding month during the summer of 1942 new projects were added. In August, a supply depot, comprising 20 large wooden warehouses with concrete floors, was begun on reclaimed swamp land in Chaguaramus Valley. During September, work was started on the assembly of nine steel barges and the installation of a degaussing range on Pelican Island.

From the struggle to combat the German submarine menace and the strategic necessity for adequate strength to protect our southern flank in the Atlantic, came the decision to equip Trinidad with facilities for ship repair. Begun as an air station and commissioned as such on October 1, 1941, Trinidad, a year later, became a complete naval operating base, equipped with a section base, net, supply, and fuel depots, a hospital, a degaussing range, a radio station, and ship-repair facilities.

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### **Building a Dike for Ship Repair Facilities in Chaguaramas Bay, Trinidad**

The work at the repair base, on Chaguaramus Bay, included extensive dredging and a waterfront development comprising four finger piers and a 1,800-foot quay wall. Two of these piers, one 350 feet and the other 600 feet long, were built on timber piles. The other two, 600 feet long, were supported by concrete piles. In addition, the base was completely equipped with shops, an administration building, a power plant built of reinforced concrete and equipped with six 700-kw diesel generators, five 2-story barracks to house 1,000 men, officers' quarters, and a laundry.

These additions beyond the original plan brought about major changes in site planning, making it necessary to develop overall plans for highways, electric-power distribution, communications, and water and sewerage system.

A few roads of good surface quality existed on the reservation, but they had eventually to be replaced as a result of heavy usage or relocated as the station expanded. Of the 57 miles of roads built within the reservation, 30 miles were hard surfaced, 11 miles were given a heavy penetration, and the remainder were coral-surfaced or dirt. Fortunately, road-building materials were readily at hand -- native coral sand dredged from Carenage Bay and emulsified asphalt produced locally, combining to yield a durable wearing surface.

Tucker and Chaguaramus valleys, the two principal watersheds, contain water-bearing sand and gravel deposits which were developed as a source of water supply by means of 25 wells, driven at scattered locations. The wells were connected to a system of 20 reservoirs, so located as to maintain gravity pressure in the distribution mains. The water was chlorinated at each well and required no filtering.

All supervising personnel, and the majority of the skilled trades labor used in construction in Trinidad were hired in the States and brought to the station under contract. Upon these men fell the

task of leading and teaching the local labor employed. Exclusive of a few outstanding individuals, the majority of the local workmen had

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**Naval Hospital, Trinidad**

received little or no education, were unaccustomed to United States procedures, and had difficulty in understanding the English of the continentals, who had equal difficulty understanding them. There was a definite caste distinction, not only among the different races but among the different employment classifications. They were temperamental among their own groups, which often resulted in serious fights, particularly between the men of Trinidad proper and those of the smaller islands. They had to be taught, checked, and coached, from the beginning of the operation to the end, which threw an enormous burden on the supervisors, intensified by the large labor turnover and the wide diversification of the project as a whole.

On December 30, 1942, when the 30th Construction Battalion arrived at Trinidad, the contractor was maintaining all completed and partially completed facilities in addition to performing his current construction program. The Seabees immediately took over the maintenance and operation of all completed or useably completed facilities, permitting the contractor to concentrate his personnel on construction work.

In January 1943, the Public Works Department was organized, officers and men of the 30th Battalion being assigned to the various maintenance and operating divisions. Those Seabees having specialized training were shifted into power house, refrigeration, transportation, and other activities. The remainder, other than administrative personnel, were used on minor construction jobs.

In April, the Bureau of Yards and Docks requested termination of the contract by June 30, 1943, and at the same time directed the station Public Works Department to take over new construction activities in addition to base maintenance. With more than 600 Seabees assigned to maintenance and 900 civilian employees to be replaced, the 30th Battalion was hard pressed to satisfy all demands for personnel. Accordingly, the 83rd Battalion was assigned to Trinidad, the first echelon arriving the latter part of May and the remainder during June. When the contractor terminated his activities on June 30, these two battalions carried

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**Small Boat Landing, Trinidad**

on with the uncompleted portion of the work, which amounted to 25 per cent of the authorized program.

Upon the termination of the contract, the Navy purchased a hydraulic dredge, and dredging operations were continued under a new contract, awarded primarily for the purpose of

indoctrinating Seabees in the operation of this type of dredge. After six months training the Seabee crew assumed complete supervision of this piece of equipment, and the contract was terminated in January 1944. Dredging operations were completed in the Trinidad area in June 1944, at which time the dredge was transferred to the Pacific area for further operations.

The original lease agreement did not include the upper reaches of Tucker Valley and the Maqueripe Bay area fronting the Caribbean on the north side of the peninsula. After our entry into the war, control of this area became essential to the military security of the base. In the supplemental lease consummated in December 1942, whereby these areas were included in the 99-year lease, it was agreed that the United States would build and turn over to the local government a roadway along the northern shore of the peninsula to permit the general public to have access to the beach at Maracas Bay in lieu of facilities formerly available at Maqueripe.

Work on this 7<sup>1</sup>/<sub>2</sub>-mile highway was started late in March 1943 by the contractor, continued by the Seabees upon termination of the contract in June, and completed and turned over to the local government in April 1944. Requiring the removal of

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#### **NAS Bermuda in the Process of Construction**

Morgan Island (foreground) and Tucker Island in the process of being made one.

Large building (center) is a seaplane hangar.

1,000,000 cubic yards from perilous mountainside heights, the road, as built through virgin jungle, was 24 feet wide, paved with asphalt macadam for a width of 14 feet, and nowhere exceeded a 10-percent grade, despite its climb from sea-level at Port of Spain to a 1,335-foot elevation within a distance of 2 miles.

While the Navy was engaged in developing the operating base on the Gulf of Paria, the Army was engaged in building two major airfields, known as Waller Field and Carlsen Field, which were also used by the Navy as bases for carrier planes and transport service.

When the Navy began lighter-than-air operations in the Caribbean in the fall of 1943, the 80th Seabees were brought in to build a station at Carlsen Field. To supplement the eight Army-owned buildings taken over by the Navy, the 80th Battalion built a large, steel blimp hangar, a mooring circle, paved runways, a helium-purification plant, and other operational appurtenances.

Upon the arrival of the 80th Battalion, the 11th Construction Regiment was formed to furnish the administrative framework within which the three battalions, augmented by 10,000 natives, functioned during the construction peak in the fall of 1943. The strength of the regiment was further augmented on December 16th by the arrival of CBMU's 559 and 560. From the date of their arrival, men of both units were assigned the maintenance and operational duties performed by the 30th Battalion, thus permitting the release and reassignment

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of this group, which was effected January 31, 1944.

By May 1944, the construction program at Trinidad was substantially accomplished, and the 80th Battalion, having completed the work at Carlsen Field, left on May 4, followed by the 83rd Battalion during the succeeding month. Immediately thereafter the 11th Regiment was disbanded, leaving the two maintenance units, raised to a strength of 750 men and 13 officers, to carry on public-works activities.

## *Bermuda*

[Bermuda](#), a group of small islands, chiefly coral and limestone, about 600 miles off Cape Hatteras, occupies a strategically important position, commanding sea and air approaches to the Middle Atlantic coastline. Both the Army and the Navy, recognizing its value as a base for air and surface craft, undertook an extensive construction program.

The Bureau of Yards and Docks awarded a fixed-fee contract on February 15, 1941, initially, to accomplish the construction of an air station for seaplanes, and subsequently expanded to include a fuel-oil depot, a supply depot, and operating base, a submarine base, and an anti-aircraft training school.

Adjacent water, ideal for seaplane operation, and proximity to existing ship channels resulted in the choice of Morgan and Tucker Islands, situated in Great Sound, within the hook of the western end of Hamilton Island, together with an adjacent area on Hamilton Island at Kings Point, as sites for the air station and the operating base. Darrell Island, also in Great Sound and about a mile and a half to the east, then in use as an air station by commercial airlines, was developed as an auxiliary seaplane base. Submarine facilities were constructed on Ordnance Island, at the eastern end of the Bermuda group, in St. Georges Harbor, adjacent to the town of St. George. This location, while remote from the operating base, was chosen because of the availability of the site, the existing facilities, and its proximity to the sea lanes serving the islands.

The general topography of the leased areas was gently rolling, varying in elevation from sea level to a maximum of 40 feet.

The base development plan issued by the Chief of Naval Operations to support the 15,000-plane program, indicated Bermuda as a major naval air station, with facilities for the operation of two patrol squadrons of seaplanes on a permanent basis and one additional squadron with tender support. In addition, facilities were to be provided to support the emergency operation of one carrier group from an airfield to be developed by the Army.

The initial construction effort began March 29, 1941. Dredge-filling the narrow funnel-shaped channel between Morgan and Tucker islands more than doubled their original combined area of 40 acres. The one island thus formed was then connected by causeway to King's Point, on Hamilton Island.

The principal structures built at the air station comprised a tender pier, three seaplane ramps and parking area, a large seaplane hangar, barracks for 1,100 men, quarters for 140 officers, a bombproof power plant, and the usual industrial, administration, and storage buildings. At the Hamilton Island site, underground storage was provided for fuel oil, diesel oil, and gasoline, as well as barracks for fuel depot and air station personnel, a 50-bed dispensary, a large magazine area, a radio station, and a 10-acre water-catchment area with storage for 5,000,000 gallons of rain water. All these installations were of a semi-permanent character.

Soon after construction began, it became essential that naval air patrols be placed in operation as quickly as possible. This was accomplished by using the established facilities owned by British Imperial Airways on Darrell Island. By an informal agreement with the British and local governments, permission to use this island on a temporary basis was granted. Here, existing

facilities were augmented by barracks, water supply, paved parking areas, landing floats, and other temporary essentials. This work was undertaken in May and the island put to immediate use, continuing so until March 1942, at which time the permanent naval air station was useably complete and in operation.

In June 1941 the contract was supplemented to undertake the development of submarine facilities on Ordnance Island. Under this program, and its subsequent additions, a number of existing buildings were rehabilitated to provide housing and messing facilities for crews while ashore, improvements and additions were made to the existing water and sewer systems, waterfront structures were repaired, and offshore moorings installed. The use of Ordnance Island was obtained under a lease extending to December 1955, under the terms of which the United States could regain all removable improvements placed by or on its behalf at any time before the termination of the lease. The island was returned to its owners in July 1945.

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During the late summer of 1942 the Riddle's Bay area, which had formerly been used as a golf course and resort area, was rehabilitated and equipped as a recreational area for naval personnel.

Concurrent with the construction program underway at the several areas leased by the Navy, the Army was developing Kindly Field, on Long Bird Island, at the eastern end of Bermuda. At this airfield the Army, pursuant to Joint Board directives, provided all landplane facilities constructed at Bermuda, including those used specifically by naval aircraft. Here, within the base area, the Army contractor, on a reimbursable basis, built facilities for the temporary support of one carrier air group of 90 planes. These included barracks for 550 men and 125 officers, messing facilities, storage buildings, nose hangars, and radio aids.

Inasmuch as Bermuda had no fresh water from ground sources, it was obtained for the air station and the operating base by use of seven evaporating units with a daily capacity of 50,000 gallons, and a system of rain-water catchment areas, which, including roof areas, totaled 20 acres. The water thus collected was stored in reservoirs and chlorinated before entering the distribution system.

Southlands, located along the south shore line of Hamilton Island, was secured under a short term lease for the development of an anti-aircraft training school. Construction included a night-vision training building, repair shops, magazine loading sheds, magazines, instruction buildings, and barracks, gun platforms and control tower, roads, walks, and services. This activity was transferred to Guantanamo Bay in January 1945.

On April 8, 1943, construction under the contract was terminated and a new contract negotiated with the original contractors to complete several major items of dredging still unfinished. This second contract remained active until June 28, 1944.

The 31st Construction Battalion arrived in Bermuda on December 4, 1942, and 27 officers and 1,027 men. Completed activities at the operating base, air station, and submarine base were then in full use.

On February 27, 1943, the 49th Battalion, with 27 officers and 1,080 men, arrived a month before the contract's termination, to augment the 31st Battalion. Together the battalions completed such unfinished projects as roads, utilities, grading, accessory buildings, and general clean-up. In addition, they undertook the operation, maintenance, and repair of the entire naval establishment under the cognizance of Public Works Department.

During mid-October 1943, the 31st Battalion, which had served continuously on Bermuda for nearly two years, was returned to the mainland after being replaced by CBMU 540, which was followed by

the CBMU 551 on December 11, 1943, to replace the 41st Battalion; the two maintenance units were then merged into one unit and designated CBMU 540.

Activities at Bermuda gradually diminished in importance during the fall of 1944, as the progress of the war in Europe became more and more favorable to the Allies. Consequently, the submarine base on Ordnance Island was reduced to caretaker status by January 1945, and all training activities were moved to Guantanamo. The antiaircraft training center was decommissioned on April 1, 1945.

Shortly after V-E Day further reductions were effected. Ordnance Island was returned to its owners, and the naval facilities at Kindly Field transferred to the Army for future custody. One July 31, 1945, the air station and operating base were reduced in status to an air facility and a repair unit.

### *Great Exuma*

The naval air station on Great Exuma Island was constructed, under the Guantanamo contract, to support a squadron of seaplanes used for patrol operations along the southeastern coast of the United States and the numerous passages through the Bahamas leading to the Florida straits and the Caribbean. It was a compact development of 324 leased acres on the southeast tip of the island, which occupied a strategic central position in the Bahamas. Construction was begun during December 1941, and the station was commissioned on May 15, 1942.

The principal operating facilities, comprising a 50-foot timber seaplane ramp, a concrete parking area, 400 by 300 feet, and a 180-foot barge pier, were located on a partly natural and partly dredged-in beach adjacent to the seaplane landing and takeoff area. This area of water, 3 miles long, is protected from the open sea by Stocking Island, which forms a natural barrier, one mile offshore, directly opposite the station.

The buildings erected had previously been fabricated and assembled under the San Juan contract for installation at each of the eight "Destroyer Bases." These, when later augmented by 28 quonset huts, totaled 79, including quarters for 80 officers

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**NAS Bermuda**

The completed facility, showing causeway and seaplane hangar (right) pictured on page 30 and 180 enlisted men, a 10-bed dispensary, and administration building, storehouses, a chapel, a bakery, a power house, and several industrial buildings. Located on high ground adjacent to the beach, they occupied an area of 459 acres. The remainder of the tract was devoted to magazines.

Great Exuma, like all the Bahamas, is of limestone and coral, which require crushing to proper size before being used for either road building or as concrete aggregate. During the early construction period, pieces of rock and stone were picked up from around the island by local labor at a set price per yard, and broken into usable size by women laborers using small hammers. Later, as the program expanded, portable crushers were imported to supplement this primitive labor method.

Dredging operations created a seaplane operating area with a minimum depth of 6 feet, improved the small-vessel anchorage in Stocking Harbor, and deepened the approach channel to the

anchorage. A considerable portion of the 750,000 cubic yards of dredged material was used to reclaim the beach area needed for seaplane operating facilities.

Fresh water for the station, obtained from seven drilled wells, was filtered, chlorinated, and stored in a 100,000-gallon underground reservoir built of concrete.

The summer of 1942 saw the completion of basic construction at the station. Henceforth, all minor items of new construction and station maintenance were done by the Public Works Department, using local labor. No Seabee personnel participated during either the construction or the maintenance period.

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The station was commissioned on May 15, 1942, and was used continuously for patrol operations until its disestablishment in June 1945.

### *Jamaica*

The naval air station on Jamaica was built under the Guantanamo contract, to provide base facilities for two squadrons of seaplanes whose mission was to patrol the approaches to the Caribbean via the Windward Passage.

The station was located on Little Goat Island, on the south side of Jamaica, in Portland Bight, about 30 miles from the city of Kingston. Leased in its entirety, the island had approximately 150 acres of firm ground surrounded by 150 acres of salt flats and mangrove swamps. The site afforded an excellent land-locked harbor, ideal for seaplane operations, and a satisfactory channel for shipping.

From the standpoint of type and number of buildings and of general layout, the station was essentially a duplication of the development on Great Exuma, in the Bahamas. It was equipped with two timber piers, a concrete seaplane ramp, a parking area, and a complement of buildings, which had previously been assembled and fabricated under the San Juan contract. These included quarters for 75 men and 25 officers, two administration buildings, a 10-bed dispensary, a power plant, a shop, utility buildings, and a warehouse. Fresh water was brought in by barge from the main island and pumped from the dock to storage tanks for treatment and distribution.

A total of 2,800,000 cubic yards of dredging was necessary to remove shoals from the seaplane runway and to deepened the anchorages and channel approaches to the piers. Gasoline storage, totaling 75,000 gallons, was provided in eleven underground steel tanks.

Upon completion of the contract work during the summer of 1942, subsequent maintenance and minor construction items were accomplished by the station Public Works Department. No Seabee personnel were used in either construction or maintenance.

The air station was commissioned April 4, 1941; it was reduced to caretaker status during September 1944.

### *St. Lucia*

The naval air station on St. Lucia, in the Windward Islands, was constructed under the San Juan contract, on a 221-acre site on Gros Islet Bay at the extreme northwest tip of the island. It was equipped to support the operation of a patrol squadron of seaplanes with tender support, having as its principal features a timber seaplane ramp, a concrete parking area, a tender pier, and a compact complement of supporting buildings. Construction began in February 1941 and was carried forward at a rate permitting occupancy by the using forces during the fall of that year.

The buildings, which had previously been fabricated and assembled by the San Juan contractor, included barracks for 200 men, quarters for 25 officers, a 10-bed dispensary, a power plant, ten 5000-gallon steel tanks for gasoline storage, three magazines, a cold-storage plant, and two industrial buildings. Concrete floors, prefabricated lightweight steel frames, and stucco exteriors were used for all buildings.

Rainfall collected on a 60,000-square-foot concrete catchment area furnished the fresh-water supply for the station. It was stored in two 80,000-gallon steel tanks and chlorinated before use.

The waterfront layout, as prepared by the Bureau, centered about a 40-foot timber seaplane ramp, a concrete parking apron, 300 by 800 feet, and a 40-by-350-foot tender pier with a timber deck supported on steel piles. A 500,000-cubic-yard dredging operation was necessary to deepen the water of the bay for the seaplane runways and the approach channel to the tender pier.

With exception of a few minor additions and improvements made at various times during 1942, the station was completed in December 1941. No Seabee personnel participated in its development other than to make a few minor repairs and alterations during the early summer of 1943. These men were drawn temporarily from battalions stationed at Trinidad.

The air station on St. Lucia was decommissioned on September 1, 1943, and placed in a caretaker status by Coast Guard personnel.

### *Antigua*

Crabbs Peninsula and the adjoining waters of Parham Sound, on the north shore of the island, were selected as the site for the naval air station on Antigua in the Leeward Islands. The facilities built were essentially a duplication of those developed on St. Lucia, with regard to general layout, type and number of buildings, waterfront structures, and magnitude of the construction problems

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involved. The station served one patrol squadron of seaplanes with tender support.

Construction was undertaken on the site during February 1941 under the San Juan contract and progressed concurrently with the work at St. Lucia. Using forces occupied it during the late fall of the same year.

After the conclusion of the contract work in June 1942, the station's Public Works Department, using local labor, made minor additions to the housing and other facilities when it became necessary to increase the operating force to meet the menace of the heightened German submarine campaign at the end of the year.

On February 1, 1944, the station was reduced in status to an auxiliary air facility and to caretaker status a year later. No Seabee personnel were used either in the construction or in the maintenance of the station.

### *British Guiana*

The United States Naval Air Station, British Guiana, constructed under the Trinidad contract and equipped with the minimum essential necessary to support the operation of a patrol squadron of seaplanes, was located on a 1,400-acre site 40 miles up the Essequibo River, at a point where the river provided a sufficiently long and unobstructed landing area in a vicinity free from malaria. Construction began in April 1941 and was completed during the fall of 1942. With the exception of a few supervisors, local labor was used until the station was commissioned in February 1942.

Shore facilities erected had previously been fabricated and assembled under the San Juan contract. These included barracks for 100 men, quarters for 25 officers, a power plant, ten 5,000-gallon steel tanks for gasoline storage, storehouses, water supply, and other related structures. A timber seaplane ramp, a 400-by-300-foot asphalt-surfaced parking area, and a timber tender pier were built to support seaplane operations. Some dredging and underwater blasting were necessary to provide 18 feet of water at the dock and to clear approaches to the seaplane ramp. All buildings were temporary, either of wood or prefabricated light-weight steel, the tender pier being of native timber.

When the importance of the station increased, following the incursion of German submarines into the coastal waters of South America, it became necessary to expand the shore facilities. The contract was accordingly supplemented in January 1942, to provide a 12-bed hospital, and again in March, to provide two 108-man barracks, quarters for 40 officers, and a new water-supply system. After several unsuccessful experiments with wells, water was finally taken from the Essequibo River and treated.

The contractor carried out the maintenance of the base until February 1943, when one officer and 30 men from the 30th Construction Battalion, stationed at Trinidad, arrived to operate the new Public Works Department. These men were replaced during January 1944 by 12 men from CBMU 559, who carried on normal maintenance until the station was decommissioned and reduced to caretaker status in September 1944.

When the use of nonrigid airships was extended to augment air patrols covering the coastal waters of South America, it became necessary to provide bases for these lighter-than-air craft.

Facilities were provided in British Guiana, at Atkinson Field, the Army air base on the east bank of the Demerara River, 25 miles upstream from Georgetown. A 2,000-foot runway and parking area, two mooring circles with connecting taxiways, a shop, and an administration building, were built by the Army for the Navy on a reimbursable basis. Construction, started in March 1943, was completed in September of the same year.

The field was first used in June 1943. Lighter-than-air operations were discontinued in this area in December 1944, but the base remained in use as a ferry stop for blimps travelling between South America, Trinidad, and the United States. No Seabee personnel participated in either the construction or the maintenance of this facility.

## **Part IV -- Bases in Central and South America**

In the interest of national security and defense, the United States Government made its first commitments for military construction in South America more than a year before our entry into the war. By authority of the President, on November 2, 1940, the Secretary of War entered into a secret

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contract with the Pan American Airport Corporation, a subsidiary of Pan American Airways, Inc. The purpose of this contract was to create a chain of airports and seaplane bases along the coast of Brazil, from the border of French Guiana to Uruguay.

Air facilities constituted most of the naval construction work undertaken in this area. However, on August 17, 1942, the Chief of Naval Operations issued an order basing ten destroyers, 30 corvettes, and destroyer escorts in the Brazilian area. The order further stated that minor bases for voyage repairs and the replenishment of fuel and supplies were to be established along the Brazilian coast. Until bases could be completed and provide adequate coverage, these minor bases materially aided both air and sea patrols against German submarines which operated successfully off the coast of Brazil.

The Dutch island of Curaçao was of twofold importance to the war effort of the United Nations. As one of the largest oil-refining centers in the world, it supplied the oil and high-octane gasoline without which the Allied campaigns in Europe and the Pacific would have been difficult almost to the point of impossibility. Moreover, it provided an essential defense base for the protection of the principal trade routes from northern South America, the Caribbean, and Panama, to all the war theaters.

Although there was little danger of an actual invasion of Curaçao, there was very great danger that Germany might attempt, by sabotage or commando raid, to stop the flow of oil. Dutch authorities took preliminary steps against sabotage, but lacked effective military forces. Fully aware of the strategic importance of the island and the lack of adequate military protection, the British sent forces into Curaçao to take control of the harbor and oil facilities on May 11, 1940, the day after the German army marched into Holland.

Shortly after the Pearl Harbor attack, the defense of Curaçao and the adjacent trade lanes was transferred from the British to the United States Army, whose forces arrived February 11, 1942. On February 24th the initial steps were taken to establish a naval operational command. Navy's first operations were directed toward the protection of the Lake Maracaibo tanker lanes, along which crude oil was supplied to the Curaçao refineries. The Navy also provided fast convoys of tankers with destroyer escorts between Curaçao and the Mediterranean and the United Kingdom.

Immediately after the outbreak of war in the Pacific, when other assaults following the Pearl Harbor pattern were expected, the Navy hurriedly began the task of establishing a number of advance bases in Central America to weld an outer defense ring around the Panama Canal.

In January 1942, seaplane bases were begun simultaneously at the Galapagos Islands and Salinas, Ecuador, to be followed during the early spring by the establishment of a base for PT boats on Taboga Island, Panama, and another seaplane base at Fonseca, Nicaragua. Unfavorable weather conditions in the Gulf of Fonseca later caused the abandonment of this location in favor of one at Corinto, also in Nicaragua.

Elsewhere in Central America a fueling base for seaplanes and small surface craft was installed at Puerto Castillo, Honduras, in November 1942. The following May, another refueling unit, this time for naval landplanes, was established at Barranquilla, Colombia, using the existing Soledad Airport, whose modernization had previously been financed by the Navy.

After blimps were assigned to the area, in 1943, facilities were provided in Surinam and three temporary lighter-than-air bases were set up at Mandina and Chorrera, Panama, and at Barranquilla, to expand further the facilities for aerial reconnaissance.

By November 1944, patrol operations were curtailed in the Caribbean and Central American areas, at which time these advance bases either had been or were, placed in a caretaker status.

### *Ecuador*

*Galapagos Islands.* -- Galapagos was the focal point for a wide arc of aerial patrols protecting the western approaches of the Panama Canal.<sup>1</sup> From these island, 800 miles from the Pacific Coast, naval seaplanes flew northeast to Corinto, Nicaragua, and southeast to Salinas, Ecuador. Army landplanes assisted in covering the southern route.

South Seymour (or Battia) Island was selected as a base. The island is low, dry, barren, and

volcanic, covered with from two to four feet of rocky soil, from which grows only sparse vegetation. It was necessary to import all materials, water, and provisions, as well as Ecuadorian labor.



### **Seaplane Base at Aeolian Cove, Galapagos**

The naval seaplane base, at Aeolian Cove, on the western side of the island, contained anchorage space in which refueling ships could be hidden.

Five days after the attack on Pearl Harbor, when the Panama Canal was considered in imminent danger of a similar attack, the Navy rushed a token force of 36 men aboard a British tramp steamer, to the Galapagos Islands to establish a refueling depot for patrol planes, a few days later, seaplanes were being refueled by hand pumps from a motor launch. A timber pier to handle unloading of gas drums and a 70-foot timber seaplane ramp were then planned. In January 1942 the Army surveyed for an 8,000-foot air strip and let a contract for its construction.

On January 24, 1942, Ecuador granted permission to proceed with essential construction in Ecuador (Salinas and Galapagos), specific agreements to be signed after Lend-Lease details had been settled.

Our immediate occupation of the Galapagos Islands served to provide a key point for aerial patrols, and to prevent the enemy from securing a nearby foothold, as was accomplished in the Aleutians.

The seaplane base, designed for two squadrons of patrol bombers, could accommodate 125 officers and 1,050 men. Construction by Army contract, which was combined with the contract for the base at Salinas on the Ecuadorian mainland, was fully under way by April 1942, and completed by mid-1943. The base at Galapagos was put into use while under construction, the first plane landing on the temporary wire-mesh parking area May 14. Quarters and dispensary were established; Navy shared the Army hospital.

Two units of Seabee Detachment 1012 were sent to Galapagos and Salinas, respectively, on September 27, 1942, to complete a varied program of construction work begun by civilian contractors, and to install equipment. They built two tank farms for diesel oil, fuel oil, and aviation gasoline, complete with concrete pump houses and submerged pipe lines, a radio building, and a pontoon pier, repaired the concrete seaplane ramp, and assisted with the Army pier, which was later used to land all supplies. The Seabees also installed a water-supply system, distillation units, and storage tanks for 75,000 gallons of fresh water and 75,000 gallons of salt water. After attempting unsuccessfully to drill wells, the Army imported water by barge.

The units of CBD 1012 were relieved January 1944, by a section of CBMU 555, who continued overhaul and maintenance work through the period of hostilities.

*Salinas.* -- The naval base at Salinas, selected as the southern terminus of the Pacific patrol arc, had its facilities changed, increased, diminished, and removed, all within a short period of time, its strength varying from 60 to 700 men during two years' expansion.

A specific agreement, including payment for expropriation of private property, was signed for the Salinas base on February 20, 1942.

At first, Salinas was scheduled to be a boat base; but it was changed to a seaplane refueling base before construction was well under way. This was developed into a naval auxiliary air facility, servicing and housing a complete patrol-plane squadron. Aviation activities were removed in May 1944, leaving an emergency refueling unit with crash boat service.

Salinas is on a peninsula on the western tip of Ecuador, fronting on Santa Elena Bay. The seaplane base was constructed adjoining the new Army air base, near a former summer resort town, on the north shore of a level tongue of sand, tipped

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by a promontory. The sheltered bay is suitable for a seaplane landing area, its semi-circular beach being protected somewhat by a line of rock, but the shallow water is stirred by a 10-foot tide and heavy breakers. Ships had to anchor more than a mile off shore and transfer supplies to small boats.

Construction began in January 1942, largely under Army contract, and the base was usably complete and operating in June 1942. The Army and Navy shared utilities -- water, power, telephone. Frame buildings were made from local materials, although some quonset huts arrived later, and the first seaplane ramps and parking area were built of steel mats, later replaced by concrete. To allow for swells, the pontoon pier was arranged so that its pontoons instead of being fixed, could pivot from a concrete emplacement on shore. Other facilities included a nose hangar, two 90-foot radio masts, an aerology and radio hut, twenty-four 1,000-barrel storage tanks, a warehouse, eight barracks, twelve quonset huts, quarters, and a dispensary.

Final construction was carried out by Unit 2 of Seabee Detachment 1012, which served from September 1942 until relieved by a section of CBMU 555, which remained from January 1944 until the evacuation of most of the base that summer.

The CBMU section built a taxi strip, 50 by 800 feet, from native materials and surfaced 14 miles of road between Salinas and Libertad.

In June the base was dismantled and machinery, supplies, and personnel were evacuated, heavy equipment, such as refrigerators and generators, being left in a preservation status. All packing, loading, and stowing of 3,000 tons of returned supplies and equipment was done by the Seabees.

Salinas was redesignated as Naval Air Detachment, Army Air Base, on July 24, 1944. The few men remaining to render emergency service were furnished with communication, medical, and messaging facilities by the Army. On February 1, 1946, the United States surrendered its jurisdiction over the naval base at Salinas, giving all permanent installations to Ecuador.

## *Nicaragua*

*Fonseca.* -- Advance Base, Nicaragua, which was to be the northern terminus for patrols flown from the Galapagos, was first set up on the shores of the Gulf of Fonseca at Money Penny Anchorage in the early spring of 1942. The bay, which had been surveyed during the calm season, proved too rough for seaplanes the remainder of the year, and the activity was transferred to Corinto.

The Fonseca base was situated in a shallow, bowl-shaped area adjacent to the beach on the western side of the Gulf of Fonseca. At this point the beach slopes gradually away from the shore, affording no deep-water anchorage. Ships bringing supplies had to anchor more than a mile from shore, and unload their cargo into lighters, which were emptied manually. Transportation was limited to air, water, or horseback, no road or railroad facilities being available. The most expeditious supply line was a 40-mile journey by boat to Port Morazon, where train service was available to Managua, capital of Nicaragua.

Maintained as an emergency landing base until October 1943, the Fonseca activity was then decommissioned, all materials, with the exception of permanent fixtures, being transported to Corinto.

*Corinto.* -- The naval base at Corinto was created to accommodate two squadrons of patrol seaplanes, two squadrons of PT boats, and 1,300 men. Situated 1,000 miles north of Balboa, its purpose was to serve as northern terminus of the patrol route covering the Pacific entrance to the Canal, and to supply small naval craft. In expectation of actual combat, it was defended by an Army coast artillery unit.

The seaplane base was built on a tip of land at Corinto, on the west coast of Nicaragua. Nearly all of the land was reclaimed from mud flats, mangrove swamps, and even part of the Bay of Corinto by filling it in with 275,000 cubic yards of beach sand.

The climate is sub-tropical, with a long rainy season, the rest of the year being almost completely rainless.

Excellent harbor and docking facilities were offered at Corinto, which provided deep-water anchorage, a dock, and a railroad siding, as well as commercial warehouses and fuel tanks. Native materials, particularly lumber, were utilized to a great extent in the initial construction, and local labor proved very satisfactory.

The naval auxiliary air facility at Corinto was established September 1942, operated at almost full capacity from September 1943 to May 1944, and was of diminished importance for the remainder of the period of hostilities.

Construction, begun in August 1942 by a civilian contractor, was completed a year later at a cost of

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**United States Naval Base, Corinto, Nicaragua**

about \$1,334,000. Observation planes were first stationed there January 21, 1943.

Maintenance, repair, and fueling facilities for seaplanes were constructed, including a concrete ramp and parking area, a nose hangar, aircraft servicing shops, a parachute tower, a radio station, and an aviation-gasoline tank farm on fourteen 1,000-barrel steel tanks connected by an 8-inch pipeline to four 5,000-gallon underground tanks. A unit for charging, repair, storage, and maintenance of torpedoes was projected, but not completed, as PT boats were never based there. Living, messing, and recreation facilities, and a 22-bed dispensary and surgery were provided; 15 warehouses furnished 16,400 square feet of storage space.

The Seabees completed construction work after expiration of the contract in August 1943, and also installed naval equipment. In December 1942, 85 men of the Ninth Battalion arrived; they were relieved in January 1944 by a section of CBMU 555, which remained throughout the period of hostilities. The Army base on Corinto Island (Isla Cardon) was added to the original contract in August 1943. It was begun by the contractors and completed by the Seabees, who continued to supply it until May 1944.

Full use was never made of the base's facilities. At most, one and a half squadrons of patrol bombers were based there from the fall of 1943 through the spring of 1944. When the squadron base was moved to Galapagos, a few observation planes

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remained, and two patrol planes made a daily reconnaissance flight to Galapagos. Until the end of hostilities, Corinto continued to supply numerous small fleet units with diesel oil, water, and fresh provisions. Water for ships was brought from a point 30 miles inland by railroad tank cars, as the Navy distillation and evaporation units produced only enough for daily needs.

By the spring of 1944, when the prospect of a Japanese attack on the Panama Canal became less likely. The functions of advance bases in the 15th Naval District decreased. Corinto was gradually reduced by removal of the Army defense force and plane squadrons, and surplus equipment was returned to the naval supply depot at Balboa.

On June 6, 1946, the naval air station was disestablished and all fixed installations were turned over to the Nicaraguan government.

## *Panama*

*Taboga Island.* -- A home base for PT-boat squadrons operating under the Panama Sea Frontier was set up as a war emergency project on Taboga Island, which overlooks the Pacific entrance of the Panama Canal, 10 miles from the Balboa piers. The island, owned by the Republic of Panama, has a clean, sandy crescent-shaped beach, backed by a stretch of level land, rising to a series of high mounds.

Its purpose was to act as a main maintenance, overhaul, and operating base for a flotillas of PT-boats, and as an operational training center for PT squadrons enroute to combat zones. Construction began July 6, 1942, on a timber pier, two small marine railways, overhaul shops, power plant, light and power systems, refrigeration building, water storage and supply, and a radio building. Later construction included a storehouse, mess hall, barracks, quarters, and 12 storage tanks for fuel oil and gasoline. A torpedo workshop, munitions storage, and numerous other facilities, services, and developments were subsequently added.

The buildings were of frame construction on concrete foundations, many erected without specifically planned designs, time being at a premium. Later additions included two barracks, a galley, dry-stores building, boatswain's locker, garage, armory, berth float, pile dolphins, and a towing platform. Fresh water was obtained from springs augmented by an auxiliary water-supply system. Anchors were fabricated, and cradles on the marine railways were changed to accommodate 80-foot PT boats.

Usable completion for several buildings was reached three weeks after work started, even in the face of lack of material, hard hand-excavating in laval soil, and slow delivery of all materials by barge from Balboa. The work began in July 1942, was half done by the end of August, when the base was commissioned, and 90 per cent complete by the end of the year. At its peak the major overhaul base on Taboga Island operated with 47 PT boats and 1,200 men.

The contractors left in July 1943, after finishing instalation of materials delayed in shipment from the United States. Seabees from Detachment 1012 took over construction and repair in September 1943, assembled two pontoon drydocks and erected magazines, warehouses, and other buildings with the help of local labor. A recreation camp was established on Morro Island, accessibly by sand bar at low tide. An Army telephone cable furnished direct communication with the mainland.

The Taboga station was decommissioned in March 1946, and all fixed improvements were turned over to the Republic of Panama.

*Almirante.* -- In the summer of 1943 a small refueling base was established at Almirante, Panama, on the Caribbean side, to refuel PT boats.

Naval Supply Depot, Balboa, acted as the assembly point for 35 PT-boat squadrons, furnished material to complete their allowance lists, and rigging the boats and their equipment for secure stowage aboard ship. They were loaded by two 250-ton floating cranes, made available by the Panama Canal authorities.

*Mandinga.* -- A lighter-than-air base was established at Mandinga, on the Caribbean side of Panama, 75 miles west of Coco Solo, to furnish aerial patrol for the eastern approaches of the Panama Canal.

Built by the Army on land leased from the Republic of Panama, the airfield was transferred to the Navy February 24, 1944. Three asphalt strips, 3,000 by 150 feet, used by the Army as an emergency fighter field, were taken over, gasoline was stored in drums, and a few temporary buildings were set in land cleared from the jungle.

A detachment of CBMU 555 arrived January 4, 1944, to add facilities required by the Navy and to maintain the base. Jungle was cleared and a portable mooring mast, helium-storage building, and a small radio station were erected.

Eight months later the blimp and its equipment was transferred to Barranquilla, and the Navy vacated

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the site, which was returned to the Army.

*Chorrera.* -- At Chorrera, about 40 miles from Balboa, an emergency fighter-plane base, with solid runways was abandoned by the Army in 1943. This base was occupied for a short time in 1944 by the Navy, who set up two portable stick masts, together with special helium equipment to service blimps. The station was disestablished in November 1945.

### *Netherlands West Indies*

*Curaçao.* -- Curaçao, an island with an area of 173 square miles, lies 46 miles north of Venezuela. On its southern shores, a remarkable series of land-locked bays form excellent harbors, the largest and deepest being Willemstad.

In the summer of 1942, the United States Army began the construction of Camp Parera for Navy use. By January 1943, the camp was usably complete, and the Navy forces, formerly housed in Willemstad, moved in. Initial development of the camp was completed in October 1943, and Camp Parera was transferred to the Navy. Facilities constructed under Army supervision provided housing for 100 officers and 550 enlisted men, a 25-bed hospital, an administration building, shop buildings, recreational facilities, essential utilities, and roads.

At Hato Field, Army construction for the Navy patrol-bomber command included housing for 620 men, storage buildings, an administration building, and a supplementary radio station. Other Army facilities were used jointly by the Navy.

Meanwhile, the first Seabee group, one officer and fourteen men detached from the 30th Battalion at Trinidad, arrived February 9, 1943, to form the Public Works Department for the operation and

maintenance of the naval shore installations. Additional Seabees arrived in June. A detachment of 89 men from CBMU 559 in Trinidad replaced the original Seabee group in January 1944 and, together with the Army, accomplished the maintenance and alterations of existing structures and utilities and made minor additions to the facilities at Hato Field and Camp Parera.

Both bases were disestablished in October 1945.

*Aruba.* -- The Dutch island of Aruba, 42 miles west of Curaçao, with extensive oil-refining facilities, occupied a strategic position in the Allied war effort similar to that of Curaçao. A small American naval force was stationed there, with jurisdiction over shipping control, convoys [GAT/TAG, OT/TO, TAW/WAT], and the assignment of escort vessels, to protect the refining facilities and tankers transporting their products.

Four buildings built by the Army engineers and two quonset huts, set up by Seabees in March and April 1943; were the only naval-owned installations built at Aruba. All other facilities were leased from, and maintained by, commercial concerns.

The base was disestablished in October 1945.

### ***Surinam***

At Paramaribo in Surinam (Dutch Guiana) the Army constructed a lighter-than-air station for Navy use. It was begun in February 1943, completed the following August, and used continuously until August 1944, at which time it was decommissioned and transferred to the Army in a caretaker status. Facilities, similar to those at Atkinson Field in British Guiana, were constructed, including runway, parking area, mooring circles, taxiways, shops, and an administration building.

Elsewhere in Surinam, the Army erected a stick mast at its Zandry Field for emergency landings of lighter-than-air craft. Several squadrons of Navy landplanes also used the Army facilities at Zandry Field during 1943 and 1944.

### ***Puerto Castilla, Honduras***

The dual purpose of the advance base established at Puerto Castilla, on the Caribbean coast of Honduras, was to service small craft enroute to Cristobal and to refuel seaplanes. The activity was never required to handle a volume of ships and planes equal to its capacity.

The base was located on a man-made island on the leeward side of a cape, Punta Caxinas, which half way encloses a natural harbor, Trujillo Bay, protecting it from prevailing winds. The site was granted the United States without limitation or cost, with the understanding that, on termination of the Navy's occupancy, fixed facilities would revert to the Honduran government.

Formerly the largest banana-exporting port in the world, the commercial establishment was equipped beforehand to service ships, with dockside rail sidings and experienced personnel available.

The climate was hot, but not unbearable, and malaria-control measures were very effective. Adequate drinking-water, piped 14 miles from a reservoir on the mainland, was also available, and most

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of the existing buildings were adaptable to Navy use.

Puerto Castilla was commissioned as a naval base and fuel depot on November 19, 1942. Some work had been done previously to convert a fruit-handling activity into a naval base. The small amount of construction materials required was an advantage, as shipping was then at a decided premium.

Construction of a timber seaplane ramp with parking area, a floating pier for a crash boat, and the remodeling of some buildings were carried out in the spring of 1943 by local laborers, under the supervision of Seabees from CBD 1012. An evaporator and two 1,000-barrel tanks with connections to the pier, two pump houses, with eight 1,000-barrel diesel-oil tanks, a 5,000-gallon wooden tank, and a concrete water tank were installed in the fall. In November, all construction was reported complete, and the Seabees were transferred.

Main facilities of the base were a power plant, a large machine shop, several large concrete buildings usable as barracks or offices, ample fuel and storage space, a dock capabler of handling vessels of battleship proportions, 4 miles of railroad track, and rolling stock consisting of a locomotive, flat cars, and a dragline. Dockside rail sidings facilitated ship loadings. Living quarters, in existing stucco-type buildings, were excellent.

The chief function of the base was to fuel and provision ships and to make some minor repairs. Although the base was designated a naval auxiliary air facility May 16, 1944, few planes called there, and this function was disestablished July 15 of the same year. Operation as a naval base for refueling small craft continued for another year. Final disestablishment and removal of salvageable naval equipment took place in February 1946, when all land and fixed equipment were turned over to the government of Honduras, in accordance with the terms of the treaty.

### ***Barranquilla, Colombia***

Barranquilla, Colombia, served as a naval base for aerial patrol by both landplanes and lighter-than-air craft operating over the Caribbean shipping lanes leading to the Panama Canal and to the Colombian oil ports.

The airport at Barranquilla, which was shared by Navy and the Pan American Airways, is the property of Aerovias Nacionales de Colombia (Avianca). It lies inland from the Caribbean, along the Rio Magdalena, 6 miles south of Barranquilla and just south of the town of Soledad. Prevailing trade winds at this location are so strong as to render light construction undesirable.

A naval refueling unit for a small number of observation and scout bomber planes was established at the Soledad airport, in May 1943, Avianca having granted permission to use the landing field without charge and to erect necessary temporary buildings. By informal agreement, the Navy had previously financed improvements made by Avianca to the field, including asphaltting the 4,500- by 400-foot turf runway and building a brick control tower. Avianca's facilities included two hangars and a repair shop. As the submarine menace mounted for ships passing through the Caribbean, construction kept pace with the increased need for aerial patrols.

The original naval base consisted of 15 wooden huts with canvas tops, used as barracks, dispensary, repair shop, ordnance shack, storehouses, and a 5,000-gallon water tank, all built by Avianca under contract. As strong trade winds repeatedly tore off canvas roofs, they were replaced with tile the following spring.

In May 1944, the base was designated a naval auxiliary air facility and enlarged to care for patrol bombers and a blimp. It was thought that existing structures should be replaced by permanent ones, but that plan was abandoned and more temporary buildings were added to those already in use, 13 quonset huts being obtained from the base at Salinas, which was being dismantled.

A small detachment of CBMU 555 managed the construction and installation of special equipment, assisted by local labor, paid for the Navy through Avianca. New installations included a stick mooring mast and a mobile mast, a helium building with pipelines to the mooring circle, two concrete magazines, 22 quonset huts, 290 frame huts with tile roofs, a mess hall, a dispensary, a refrigerator building, a ship's service, a 5,000-gallon water-storage tank, and a fire-protection tank and pump, as well as electrical equipment and all services. Further equipment was transferred in August from the blimp base at Mandinga, Panama.

Up to the time expansion was completed, on October 15, 1944, facilities were fully used. The following month, patrol operations in the Atlantic were curtailed, and both landplane and blimp detachments

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were withdrawn. The base then continued on a maintenance status until its disestablishment in March 1945.

## *Brazil*

Construction accomplished for the Navy dotted the entire coast of Brazil with air and naval bases which were vital to the anti-submarine campaign in the South Atlantic and provided stepping stones on the air route to Africa.

The northern coast of Brazil, an almost entirely flat coastal plain of low elevation, extends from the Brazilian-French Guianan border to the city of Natal. The eastern coast varies from the semi-arid and low-lying coastal region of Natal to the rugged mountain country from Victoria to Santa Cruz just south of Rio de Janeiro. The southern coast is composed of rugged mountain country as far as Rio Grande do Sul and thence develops into a flat, treeless plain extending to the Uruguayan border.

The coastal area, north of Rio de Janeiro, was the site for the major portion of construction. This region is sparsely populated, except in the vicinity of the ports, which are connected, for the most part, only by sea and airlines. Ship transportation became extremely difficult, as an appreciable amount of Brazilian coastwise shipping had been sunk by enemy action. The extremely poor roads between the ports were used during the construction only for the transportation of important strategic material which was too heavy for air cargo.

Most of the airport construction was accomplished by the United States Army, through a cooperative contract with the Pan American Airport Corporation. With the authorization of additional facilities at the airfields and of the projects necessary for the Fleet Facilities Program, further arrangements were necessary. Change orders to the Pan American contract and Army engineer-management contracts were issued, and the Bureau of Yards and Docks awarded cost-plus-fixed-fee contracts, lump-sum contracts, and service requisitions on local contractors. Bases constructed formed an extensive chain along the coast from Amapa, near the border of French Guiana, to Santa Cruz.

*Amapa.* -- Amapa, on the Amapa Grande River, was selected as the site for a naval air base to support the operation of two blimps and three patrol bombers. When naval construction was started on June 22, 1943, the Army had completed 3,000 feet of a proposed 5,000-foot runway, a grass runway about 5,000 feet long, and a portion of the accompanying permanent housing development. Construction for the Navy included housing and mess facilities for crews and maintenance personnel and a blimp take-off mat. All construction, both Army and Navy, was performed under the [Airport Development Program](https://www.ibiblio.org/hyperwar/USN/Building_Bases/bases-18.html). The base was fully utilized by lighter-than-air craft, but patrol bombers were based there only when the tactical situation required it.

The Amapa base was decommissioned June 30, 1945.

*Belem.* -- The next base along the Brazilian coast was at Belem. Here, Pan American and Brazilian airlines were operating from two 5,000-foot paved runways at Val de Caens and from a seaplane base in Belem harbor. Housing and fueling installations for the Army were well underway, when naval construction began on September 22, 1942. Two paved parking areas, one hangar, and personnel structures were built to provide for the operation of six patrol bombers. The Navy took over two warehouses and four 5,000-gallon gasoline tanks, all locally owned. A seaplane ramp was also built, the facilities, as completed on March 10, 1944, being adequate for the basing of 18 planes, either sea- or land-based, a connecting taxiway having been constructed from the facilities to the seaplane ramp.

The Belem base was decommissioned in June 1945.

*Igarape Assu.* -- On July 26, 1943, construction was started to provide for the operation of two LTA craft at Igarape Assu. There existed at the base two grass runways, 3,000 feet and 1,500 feet in length, respectively, built by the Brazilian Air Force. Personnel structures, storage and maintenance facilities, and a blimp take-off mat were constructed for the Navy under the Airport Development Program. The base was fully utilized by LTA craft. It was decommissioned in April 1945.

*Sao Luiz.* -- Naval facilities at Sao Luiz do Marauhao, constructed under an independent management contract let by the Army Engineers, were designed for the operation of two LTA craft and six patrol bombers. Two paved runways were under construction for the Army and two 3,000-foot grass runways were available when naval construction started on June 29, 1943. Housing, mess facilities, warehouses, fuel and helium storage, and shops were provided in five and a half months. The base was fully utilized by LTA craft and intermittently

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used by planes. It was disestablished in July 1945.

*Camocim.* -- A seaplane base at Camocim was begun on October 1, 1941, and nearly completed when it was determined that the base would not be used. Construction under the Airport Development Program had included a ramp, a paved parking area, and two 6,000-gallon underground storage tanks.

*Fortaleza.* -- When construction of Navy installations to support the operation of two blimps and six patrol bombers was started at Fortaleza on April 14, 1943, the program provided for a paved runway, 5,000 feet by 200 feet, and housing and fueling facilities for the Army. Naval construction, accomplished by a management contract let by the District Army Engineer, required nine months for completion. In addition to personnel facilities, a helium-storage building, four fuel tanks with a total capacity of 20,000 gallons, a paved parking area, a nose hangar, and a blimp take-off mat were constructed. All facilities were used to capacity after completion.

The Fortaleza base was decommissioned in June 1945.

*Fernando do Noronha.* -- Fernando do Noronha, a rocky, volcanic island, situated 210 miles from the eastern coast of Brazil, was developed as an air base, first for the Army and later for the Navy. Prior to the start of naval construction in April 1943, it became apparent that the Army would use the base to a limited degree only. Two runways had been constructed for the Army, one 6,000 feet by 150 feet and the other, 2,950 feet by 130 feet, so the only additional construction necessary for Navy involved a blimp take-off mat and a mooring circle. Patrol bombers and LTA craft were based there only as the tactical situation required. The Army Transport Command occasionally used the base for refueling on flights to Africa. It was decommissioned in June 1945.

*Natal.* -- On March 4, 1941, construction was initiated on a seaplane base at the mouth of the Potengy River, near Natal. The only existing facilities there were the Pan American Airways passenger terminal, a pier, and float-fueling facilities, but the Potengy served as a runway with practically unlimited range. Facilities for the basing of six patrol bombers, installed under the Airport Development Program, included a ramp and parking area, a nose hangar, and four gasoline tanks of 20,000 barrels total capacity. This construction program extended over a period of three years.

A landplane base, 8 miles southwest of Natal, known as Parnamarim Field, with two runways, 6,000 feet and 7,200 feet long, respectively, had been constructed for the Army. Construction of Navy housing, shops, and operating facilities was started on May 25, 1942, under an Army Engineer direct contract. In order to provide for expanded activities, additional construction was undertaken under a CPFF [cost plus fixed fee] contract. Naval construction required 19 months. The base was fully utilized by various types of tactical planes.

The Natal bases were decommissioned in June 1945.

*Recife.* -- Numerous naval facilities were established at Recife and used to maximum capacity. In May 1942, when naval construction was begun at Ibura Field, Army housing and runway development were well underway. The original plan for basing six patrol bombers was amended to provide for the operation of two patrol-bomber squadrons and one carrier group, together with facilities for refueling and the temporary mooring of one blimp.

In addition to housing and storage facilities, one blimp mooring, six hardstands, parking, fueling, and repair areas, and shops were constructed for the Navy. The original construction and that of LTA facilities were under the Airport Development Program; construction of additional housing was under a CPFF contract. Maintenance forces erected additional shops.

Knox Hospital, with a 150-bed capacity, was built during the summer of 1942. Under the original plan, 13 quonset huts were erected by the Airport Development Program forces; a ward, with two 188-by-23-foot wings, was later constructed under a lump-sum contract. In the summer of 1943, a newly built Brazilian government hospital was modified to provide a naval receiving station.

Construction of the fuel-oil storage depot in the dock area at Recife was started on November 4, 1942. Ten 10,000-barrel fuel-oil tanks were erected, with connections to the docks and to Ibura Field; existing storage tanks and pipe lines on the piers were also used. Construction required ten months.

An ammunition-storage base was also built at Recife, partly under the Airport Development Program, partly by Public Works Department maintenance forces, and partly under CPFF contract. The installation consisted of 13 steel arch magazines, three concrete magazines, two fuse and detonator buildings, and a barrack. The project was

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**Aratu Seaplane Base, Brazil**

completed in December 1943, one year after construction was initiated.

In December 1942, construction was started to provide for the operation of a destroyer repair unit and to furnish housing for enlisted personnel attached to the staff of the commander of the Fourth Fleet. The necessary shops, warehouses, and personnel structures were completed in two years under the Airport Development Program.

All naval facilities at Recife had been decommissioned by November 1945, and the ship repair facilities were transferred to the Brazilian government under Lend-Lease arrangements.

*Maceio.* -- Construction of seaplane facilities was started on June 1, 1941, on a point of land extending into Lagoa do Norte, 2 miles northwest of Maceio. When installations to support six patrol bombers were 75-percent complete, changes in operational plans indicated that the base would not be used. The construction of Navy facilities had required 23 months, but only certain storage and housing structures were used.

The establishment of a naval landplane base at Maceio was started on July 22, 1943. At that time, a 4,500-by-150-foot runway, an aircraft fueling system, passenger and radio facilities were available. Naval construction, designed for the operation of two blimps and six patrol bombers, consisted of housing, storage and shop buildings, a blimp take-off mat, and two mooring circles. LTA facilities were provided under the Airport Development Program; other installations, under the CPFF contract.

Maceio was disestablished in November 1945, and transferred, under Lend-Lease agreement, to the custody and control of the Brazilian government.

*Ipitanga* -- Construction of a landplane base for the Army at Ipitanga was begun in January 1942. There then existed one 1,968-by-131-foot paved runway. Naval construction called for operational facilities

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for half a patrol squadron and two blimps. Shortly after this was authorized, it became apparent that the base would not be used to any extent by the Army; consequently, Army facilities were transferred to the Navy.

Construction of this base involved housing, storage, and administration buildings, two 5,000-foot paved runways, a parking area, two prefabricated nose hangars, a blimp take-off mat with two mooring circles, and repair shops.

Two years were required for the construction of the base, which was fully utilized after completion. It was disestablished in July 1945.

*Bahia.* -- The Aratu seaplane base was built on a steep promontory about 12 miles north of Bahia. Its facilities included housing, two timber piers, storage buildings, 20 gasoline tanks of 5,000-gallon capacity each, a ramp, a parking area, a nose hangar, and shops. The base, begun on December 13, 1941, was used continuously after April 1943 for the operation of half a squadron of patrol bombers. It was decommissioned in June 1945.

A petroleum storage depot was started at Bahia on November 4, 1942. Existing storage tanks and pipelines were available and were interconnected with the new installations, which consisted of two 80,000-barrel and two 10,000-barrel tanks. Construction was completed in ten months.

A ship-repair base was established at Bahia, in January 1943, for half a destroyer-repair unit. Adequate power was not available, and a power plant was built. As existing facilities were available for docking, storage, and repair shops, the only construction necessary was housing for 56 officers

and 756 men. A 3,000-ton floating drydock, built in the United States, was assigned to the base. This base was completed in thirteen months, and fully used.

In November 1945 it was decommissioned and the facilities turned over the Brazilian government under Lend-Lease agreement.

*Caravellas.* -- A base for both blimps and planes was established at Caravellas. The construction of LTA facilities was started in October 1943, at what was formerly the Air France airport, where turf runways and a corrugated metal hangar already existed. In five months, all necessary construction had been completed for the operation of two blimps and the housing of 10 officers and 40 men.

Construction of the landplane base, designed for the operation of six patrol bombers, was started in January 1944, under a management contract awarded by the Army Engineers. Aviation facilities consisted of a paved 164-by-5,000-foot runway, with taxiways, a parking area, a high-speed fueling system of 15,600-gallon capacity, and a radio localizer station. Construction was slowed by difficulty in obtaining a suitable subgrade for paving and by bad weather. The base was completed in ten months, but was used only for emergency landings of patrol planes. However, Naval Air Transport Service planes landed there daily for topping off and for discharging passengers and freight. The base was disestablished August 1, 1945, when it was transferred, under Lend-Lease agreement, to the custody and control of the Brazilian Air Force.

*Victoria.* -- At Victoria Airport, 7 miles north of the city of Victoria, the Brazilian authorities had completed one 5,000-by-168-foot runway, a small hangar, and radio facilities. The installation of LTA facilities for the Navy in April 1944 required only the leveling of a take-off area and the provision of mooring circles. The construction was completed in 45 days by a Brazilian contractor who was working under the Brazilian Minister of Air. All naval forces had left the base by October 1945.

*Santa Cruz.* -- At Santa Cruz, the Navy also ordered construction of LTA facilities, and assisted the Brazilian government in the rapid completion of a 5,000-by-168-foot runway, with taxiways and parking areas, for the operation of six patrol bombers. The runway was extensively used by NATS and occasionally used by patrol bombers, as the tactical situation required. The base was decommissioned in September 1945, when it was transferred, under Lend-Lease arrangements, to the custody and control of the Brazilian Air Force.

## *Uruguay*

The United States offered its assistance to the Uruguayan government in the construction of a seaplane base at Laguna del Sauce and a commercial and military airport at Carrasco. Our participation commenced on February 10, 1944, and consisted of engineering counsel, equipment-operator instruction, and the loan of construction equipment. All work was accomplished, and paid for, by Uruguay.

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## Footnotes

1. Following a cruise in the Panama area by President Roosevelt in 1940, preparations were made to provide a wide area of constant air patrols west of the Canal. Aviation equipment for a seaplane base in the Galapagos Islands was procured and stored at Balboa. This base was the pioneer of a long succession of mobile units assembled for shipment to locations outside the United States. The list

used served as a guide for procurement of aviation materials for seven air bases, thus creating the term "*Galapagos units*." Depots were established November 1940, at Charleston, S.C.; near San Francisco; and at Balboa, where warehouses were constructed by the Bureau of Yards and Docks to house these huge stockpiles.

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*Transcribed and formatted for HTML by Patrick Clancey, HyperWar Foundation*