

Origins of Navy Patrol Aviation, 1911 to 1920s

THE DEVELOPMENT OF PATROL aviation in the U.S. Navy is really the story of Naval Aviation itself. It began as early as 1908, when the Navy detailed Lieutenant George C. Sweet and Naval Constructor William McIntee as observers at a test of a Wright brothers airplane at Fort Meyer, Va. They were so impressed by what they saw that the Navy extended an invitation to the Wright brothers to attempt the launch of one of their inventions from a battleship. The Wright brothers declined this opportunity to make aviation history. It was left to a Glenn H. Curtiss pilot, Eugene Ely, to make the first flight from a ship, flying off a platform built on the bow of the cruiser *Birmingham* (CL 2) at Hampton Roads, Va., on 14 November 1910.¹

The successful conclusion of the testing in Hampton Roads and the competitive interest of the U.S. Army in use of aircraft for scouting spurred the Navy to request \$25,000 in the 1911–1912 Naval Appropriation Act for aviation procurement. On 13 March 1911, the first office for dealing with Naval Aviation was organized with the detailing of Captain Washington I. Chambers to the Aeronautics Desk at the Bureau of Navigation (BuNav). His first task as head of aeronautics was placement of an order for the Navy's first aircraft on 8 May 1911. This date marks the official birth of U.S. Naval Aviation. His second task was the establishment of the first naval aviation camp at Greenbury Point, near Annapolis, Md., in the summer of 1911. Two Curtiss pusher floatplanes were sent to the camp, followed by a Wright airplane and a small group of naval officers hoping to learn to fly them.

The shortage of qualified instructors for the aircraft on hand led Chambers to relocate the aviation cadre from the Greenbury Point aviation camp to the Glen Curtiss Flying School in San Diego, Calif., in the winter of 1911. The aspiring students quickly became aviators over the winter months. The unit returned to the Greenbury Point facility in the summer of 1912. Here they continued their practice flights with the three air-

craft on hand and experimented with a variety of float designs being developed by the newly established aerodynamics laboratory at the Washington Navy Yard.

The shakedown period for the Navy's fledgling air force was brief. The skeptical admirals of the "old line Navy" wished to see the results of the Naval Aeronautics Desk experiments. In January 1913, the annual fleet exercises were conducted off Cuba. The duties of the unit were carried out with considerable success. It was noted after the exercise that the aircrews were able to discern the outline of submarines just beneath the surface and floating mines on the surface of the ocean. Messages with streamers attached were dropped on the decks of vessels below, giving the locations of these hazards.²

The results of the annual exercises proved satisfactory enough to temporarily silence the critics of Naval Aviation. In October 1913, the Secretary of the Navy established a Board of Aeronautics to plan the future of the Navy's newest addition. The board's first action was to relocate the Greenbury Point detachment from the Annapolis area to Pensacola, Fla., where better flying weather was available year around. On 20 January 1914, the first naval air station (NAS) was put in operation with the arrival of the detachment aircraft.³

The test of battle for the Navy's first aircraft unit came shortly after its move to Pensacola, barely 36 months after its birth. In early 1914, political unrest in Mexico led to an increase of incidents along the border. The harsh policies of Mexican president Victoriano Huerta in dealing with the insurgency resulted in eventual military intervention by the administration of U.S. President Woodrow Wilson. On 20 April 1914, two sections of two aircraft each were loaded aboard *Mississippi* (BB 23) and *Birmingham* (CL 2). The group aboard *Mississippi* saw most of the action during the conflict, flying 43 days in action scouting the enemy trenches around Veracruz. During a patrol near the city on 6 May 1914, one of this section's sea-

¹ Walter H. Sitz, Captain, USMC. *A History of U.S. Naval Aviation*. BuAer April 1925, Record Group #72, National Archives.

² Sitz: p 8.

³ "Air stations Established Prior to and During World War I." NHC Aviation History Branch, WWI Collection, box entitled WWI (NAS) Naval Air Stations (A-Z).

planes earned the dubious distinction of being the first Navy aircraft damaged by enemy fire.⁴

Further organizational changes continued to take place during this formative period of naval patrol aviation. The recommendations of the Board of Aeronautics resulted in moving the head of the Naval Aeronautics section from the offices of BuNav to the "Aviation Desk" under the Chief of Naval Operations (CNO) on 1 March 1916. Although nominally remaining under the BuNav organization, the new Aviation Desk began operating as a largely independent branch that evolved into the Bureau of Aeronautics (BuAer) after World War I.⁵

The entry of the United States into World War I came as no surprise to the naval establishment. The Naval Appropriations Bill signed into law on 29 August 1916, provided \$3,500,000 for aviation. It also authorized the establishment of a Naval Reserve Flying Corps and the purchase of aircraft, including 10 planes for loan to the Naval Militia. The funds also provided for the expansion of shore activities to support wartime requirements.⁶

The National Aerial Coast Patrol Commission, under the direction of Rear Admiral Robert E. Peary, was formed in 1916 to provide trained Aerial Coast Patrol Units and aircraft to patrol the coasts of the United States against potential enemy activity. Aerial Coast Patrol Units were recruited primarily from students at Yale, Harvard, Princeton and Columbia Universities. There was also a unit at Great Lakes, Ill. The members of these units were recruited into the U.S. Naval Reserve Force, Class 5 (Aviation), which had been authorized by the 1916 Naval Appropriations Bill. Several state naval militias, notably Massachusetts and New York, established aviation units that trained at Squantum, Mass., and Bay Shore, Long Island, N.Y., respectively.⁷

The several hundred naval aviators recruited and trained by the Aerial Coast Patrol and the various state naval militias, plus the few early naval aviators and experienced civilian aviators recruited directly into the USNRF, constituted the leadership of Naval Aviation in World War I.

On 16 October 1916, the German submarine *U-53* entered the harbor of Newport, R. I., to allow the captain of the vessel to "pay his respects to the naval authorities of the base."⁸ The *U-53* departed only a few

hours later after an extremely frosty reception by the base commander. Within 24 hours the U-boat captain sank five steamers of British, Dutch and Norwegian registration inside U.S. continental waters. This new-generation German submarine was one of the recently developed class of U-boats with extended cruising range and large displacement. The sole purpose of the visit and subsequent demonstration of formidable German technology was to deter the United States from entering the war or continuing to supply the Allied cause.

America Enters the War

WHEN THE BOARD OF AERONAUTICS chose Pensacola as the primary location for Naval Aviation in 1914, other potential sites had also been assessed. With the U.S. declaration of war against Germany on 6 April 1917, plans for these sites were dusted-off and put into effect. Additional air stations were established or transferred from state militias. The following is a list of the naval aviation stations in the Western Hemisphere and its assigned functions:

Akron, Ohio	Lighter-than-air training
Anacostia, D.C.	Experimental station
Bay Shore, L.I., N.Y.	Elementary flight station, emergency patrol station
Brunswick, Ga.	Patrol station
Cape May, N.J.	Patrol station
Chatham, Mass.	Patrol station
Coco Solo, Panama C.Z.	Patrol station
Halifax, N.S., Canada	Patrol station
Hampton Roads, Va.	Experimental and patrol station
Key West, Fla.	Elementary flight station
Miami (Dinner Key), Fla.	Elementary flight station and patrol station
Miami (Curtiss Field), Fla.	Marine Corps landplane training station
Montauk, L.I., N.Y.	Patrol station
Morehead City, N.C.	Patrol station
North Sydney, N.S., Canada	Patrol station
Pensacola, Fla.	Advanced ground school and flight station
Rockaway, L.I., N.Y.	Patrol station
San Diego, Calif.	Elementary flying station ⁹

Shortly after the entry of the United States into the war, the urgency of the situation and lack of sufficient training facilities led the Navy to accept the offer of the Canadian government to train pilot applicants at the School of Military Aeronautics, Royal Flying Corps, Toronto. In July 1917, 25 candidates reported for duty.

⁴ Sitz: p 8.

⁵ Walter H. Sitz, Captain, USMC. *A History of U.S. Naval Aviation*, BuAer, April 1925, Record Group No. 72, National Archives.

⁶ Archibald D. Turnbull, Captain, USNR and Lord, Clifford L., Lieutenant Commander, USNR. *History of United States Naval Aviation*, New Haven, Yale University Press, 1949, p 81 (hereafter: Turnbull & Lord).

⁷ Henry Woodhouse. *Textbook of Naval Aeronautics*, New York, The Century Company, June 1917, pp 135-176.

⁸ Charles E. Mathews, Lieutenant (jg), USNRF, "History of U.S. Naval Aviation During the World War: Patrolling and Patrol Station on the Western Atlantic." Unpublished document. BuAer 1921, Record Group #45, National Archives.

⁹ Sitz: p 12.

One of the students, Thomas H. Chapman, relates a tradition at that base: "The plane I was using was one of the veterans of CTS 85, as was evident from the right paw of the Black Cat painted on either side of the fuselage. We were the Black Cat Squadron, and after each crash the upraised right paw of the cat was marked with a white stripe. My plane had eight of those white stripes already and one more would finish the proverb."¹⁰

The situation in Europe was desperate in the Spring of 1917. With the entry of the U.S. on the side of the Allies, a number of foreign delegations soon appeared in Washington. At a meeting with a French naval delegation, the Navy promised to send aviators to France as soon as possible. Personnel were recruited, screened and transferred to Norfolk, Va., for transportation to France. What the French wanted was a contingent of trained naval aviators. What they received was "The First Aeronautic Detachment," U.S. Navy. Arriving in France in two ships on 7 and 8 June 1917, the detachment consisted of seven officers, 50 student naval aviators, 50 student aviation mechanics and 22 administrative support personnel. This was the first U.S. military or naval unit to arrive for war service in Europe during World War I. The French were initially dismayed to receive students rather than qualified aviators, but upon learning of the true situation of U.S. Naval Aviation, they readily agreed to provide the required training. The student aviators were transferred to the French Flying School at Tours, France, and the mechanics to the schools in St. Raphael.

The American students did not speak or understand French and this frequently resulted in humorous situations when students and instructors had to improvise to communicate. Lieutenant Joe C. Cline, USNRF, described one such event in his history of the detachment: "The type of airplane used for our primary instruction was the Caudron G-3, a French biplane with warping wings and a Nacelle two-place cockpit, powered by a 90 hp Enzani or LeRhône rotary engine. The instructor sat in the rear cockpit. After takeoff he would turn controls over to the student and instructions would begin. If the nose were high he would push forward on your helmet. If it was low, he would pull back on the helmet. If the left wing was down, he'd tap on the right shoulder, right wing down, tap on the left shoulder. Each flight per student was about 20 minutes duration. After each flight the instructor would pull out a pasteboard card with a line drawn down the center. One side was written in English and the other in French, and would explain all the mistakes you had made while in flight. He gave you hell in French while pointing to the English translation.

¹⁰ Thomas H. Chapman, Commander, USNR (Ret.), "A Naval Reservist in the Royal Flying Corps," NHC Aviation History Branch. Unpublished document, Naval Flying Corps folder, WW-I collection, box entitled WW-I (M-Z).

Perhaps it was just as well we did not understand his words!"¹¹

While the initial expansion of training was underway utilizing any and all means and facilities which could be identified, plans were being developed for an overall training system for Naval Aviation. This resulted in a three-phase program for pilots: ground school, elementary flight training and advanced flight training.¹² Lighter-than-air training and operations will be covered in another volume of this series.

Ground school instruction extending over eight weeks, was designed to indoctrinate student officers with the fundamentals of the naval service and to inculcate in them the conception of strict military discipline and secondly, to give them instruction in aeronautical matters. Ground schools were established at the Massachusetts Institute of Technology, and later at the University of Washington and the Dunwoody Institute, Minneapolis, Minn.

Elementary flight training was conducted at Bay Shore, Long Island, N.Y.; Key West, Fla.; Miami, Fla.; and San Diego, Calif. Advanced ground school and flight training was concentrated at Pensacola, Fla, the Navy's oldest, largest, and best equipped air station.

Aerologists were trained at the Blue Hills Observatory, Boston, Mass., and officer speciality training was conducted at several locations. Enlisted technical training was concentrated at the schools established at the Great Lakes Naval Training Center, supplemented with specific equipment training at many manufacturing plants.¹³ Additionally, elementary flight training was accomplished at Lake Bolsena, Italy, and advanced flight training at Moutchic, France, and Lake Bolsena.¹⁴

The magnitude of the growth of Naval Aviation and the training accomplished is illustrated in the following table:

	6 April 1917	11 November 1918
Officers (naval aviators)	38	1,656
Officers (student naval aviators)	0	288
Officers (ground)	0	891
Student officers (in training for commission)	0	3,881
Total officer personnel	38	6,716
Enlisted men (aviation ratings)	163	21,951
Enlisted men (general service ratings assigned aviation duty)	0	8,742
Total enlisted personnel	163	30,693
Total personnel	201	37,409

¹¹ Joe C. Cline, "Personal History of the First Aeronautic Detachment, United States Navy in World War I." Unpublished document, NHC Aviation Branch. WWI collection, box entitled WWI European Theater (A-Z).

¹² Charles E. Mathews, Lieutenant, USNRF, *History of U.S. Naval Aviation During the World War: Training in America*. Unpublished manuscript, BuAer 1921, Record Group No. 45, National Archives (hereafter: Mathews, Training).

¹³ Mathews, Training.

¹⁴ Sitz, p 34.

	<i>11 November</i>
	<i>1918</i>
Officers sent overseas	1,237
Enlisted men sent overseas	<u>16,287</u>
Total personnel sent overseas	17,524 ¹⁵

Aircraft Production

IN MANY WAYS THE SUPPLY OF aircraft and engines determined the tasks that could be accomplished. The Aircraft Production Board, created in May 1917, functioned during the war as the supreme authority with regard to aircraft production by and for the Army and Navy. In October 1917, the name was changed to the Aircraft Board. Overall, the influence of the board on the Navy's aircraft production program was neither frequent or detailed, but several actions of the board had major influences on Naval Aviation.¹⁶

Under the guidance of the Navy's senior representative, Rear Admiral David Taylor, the board decided that the Navy should be allocated the following plants to build aircraft and parts: a part of the Standard Aircraft plant at Elizabeth, N.J.; and the full output from Aeromarine Plane and Motor Company, Keyport, N.J.; Boeing Aeroplane Company, Seattle, Wash.; Burgess Company, Marblehead, Mass.; Canadian Aeroplanes, Ltd., Toronto, Canada; Curtiss Aeroplane and Motor, Ltd., Toronto, Canada; Curtiss Engineering Corporation, Garden City, N.Y.; Gallaudet Aircraft Corporation, East Greenwich, R.I.; L.W.F. Engineering Corporation, College Point, N.Y.; and the Victor Talking Machine Company, Camden, N.J.¹⁷

The board was also responsible for the creation and production of the Liberty engine. In May 1917, the engineering genius J. G. Vincent of Packard Motor Car Company and E. J. Hall of Hall-Scott Motor Car Company produced the design for the famous Liberty engine. It was rushed into production and the first engine passed its 50-hour check on 25 August 1917. This large V-12 engine was the first of its type and experienced a host of teething problems. A multitude of hoses and clamps shook loose during operation, causing leaks; timing gears shed teeth with regularity; crank shafts were of poor quality; weld failures around intake and exhaust ports caused problems; and carburetor gaskets frequently failed. Life expectancy of an average engine seldom exceeded 50 hours and required overhauls every 12–15 days on active service. Yet, in spite of these defects, the Liberty was considered one of the most reliable power plants used by the Allies during the war and remained the standard for aero engines over the next ten years.¹⁸

¹⁵ Sitz, pp 11–12.

¹⁶ Sitz: p 14–15.

¹⁷ Turnbull & Lord, pp 108–109.

¹⁸ John Lacouture, Captain, USN (Ret.). "NAS Chatham." Unpublished document, NHC Naval Aviation Branch, WW-I collection, box entitled WW-I (NAS) Naval Air Stations (A–Z).

Additionally, by a resolution adopted 6 November 1917, the board determined that "all air measures against submarines should have precedence over all other air measures." This gave the Navy priority in the War Industries Board over controlled raw materials, on the railroads for cars and trains, and in general made the Navy's task of creating a force of patrol flying boats for antisubmarine operations possible.¹⁹

The Naval Aircraft Factory

THE NAVAL AIRCRAFT FACTORY (NAF) was established in order to assist in solving the problem of aircraft supply which faced the Navy Department upon the entry of the U.S. into the war. The Army's requirements for an enormous quantity of planes created a decided lack of interest among aircraft manufacturers in the Navy's requirements for a comparatively small quantity of machines. The Navy Department concluded that it was necessary to build an aircraft factory, to be owned by the Navy, in order, first, to assure a part of its aircraft supply; second, to obtain cost data for the Department's guidance in its dealings with private manufacturers; and third, to have under its own control a factory capable of producing experimental designs.

On 27 July 1917, the Secretary of the Navy approved the project, the contract was let on 6 August and ground broken four days later. The entire plant was completed by 28 November 1917, one hundred and ten days after ground breaking. On completion, the greatest need was for patrol flying boats, so production of the H-16 design was started at the NAF. On 27 March 1918, just 228 days after ground breaking, and 151 days from receipt of drawings, the first H-16 built by the NAF was successfully flown. On 2 April 1918 the first and second NAF built H-16s were shipped to the patrol station at Killingholme, England. In the Spring of 1918, the British Admiralty provided the plans for the F-5 improved design but the plans required a major redesign for adaptation to American mass production. This was successfully accomplished and the F-5L model was successfully produced by the NAF and civilian manufacturers, using the NAF adapted plans.²⁰

Patrol Flying Boat Models

SEVERAL MODELS OF PATROL FLYING boats were procured during the course of the war. Two types were necessary because: the large boats could not be

¹⁹ Sitz: p 15.

²⁰ William F. Trimble, *A History of the Naval Aircraft Factory, 1917-1956*, Annapolis, Md., Naval Institute Press, 1990.

constructed in sufficient quantities, it involved shipping difficulties and drew too much water for use at certain French stations.

The single engine HS-1/HS-2 was developed from the successful Curtiss H-14 design. The original HS-1 proved deficient in load carrying capacity for antisubmarine operations. It was modified to the HS-2 configuration by addition of six feet of wingspan and provision for a larger rudder.²¹ One American pilot in France, Ensign Joe C. Cline, who later flew the HS-1 and HS-2 flying boats, had this interesting story to tell about the development of this early aircraft: "At Brest I saw my first American airplane. We had heard in glowing terms much about the Curtiss HS-1 seaplane with the famous Liberty engine, and they began to arrive from the States. After all necessary equipment for submarine patrol, such as bombs, radio, Aldis lamp and battery, pigeons, machine gun, fire extinguishers, and full load of gas for a four-hour patrol, nobody could get the plane off the water. Corry who had been promoted to Lieutenant Commander sent this report to Washington. In a short time a modification was made

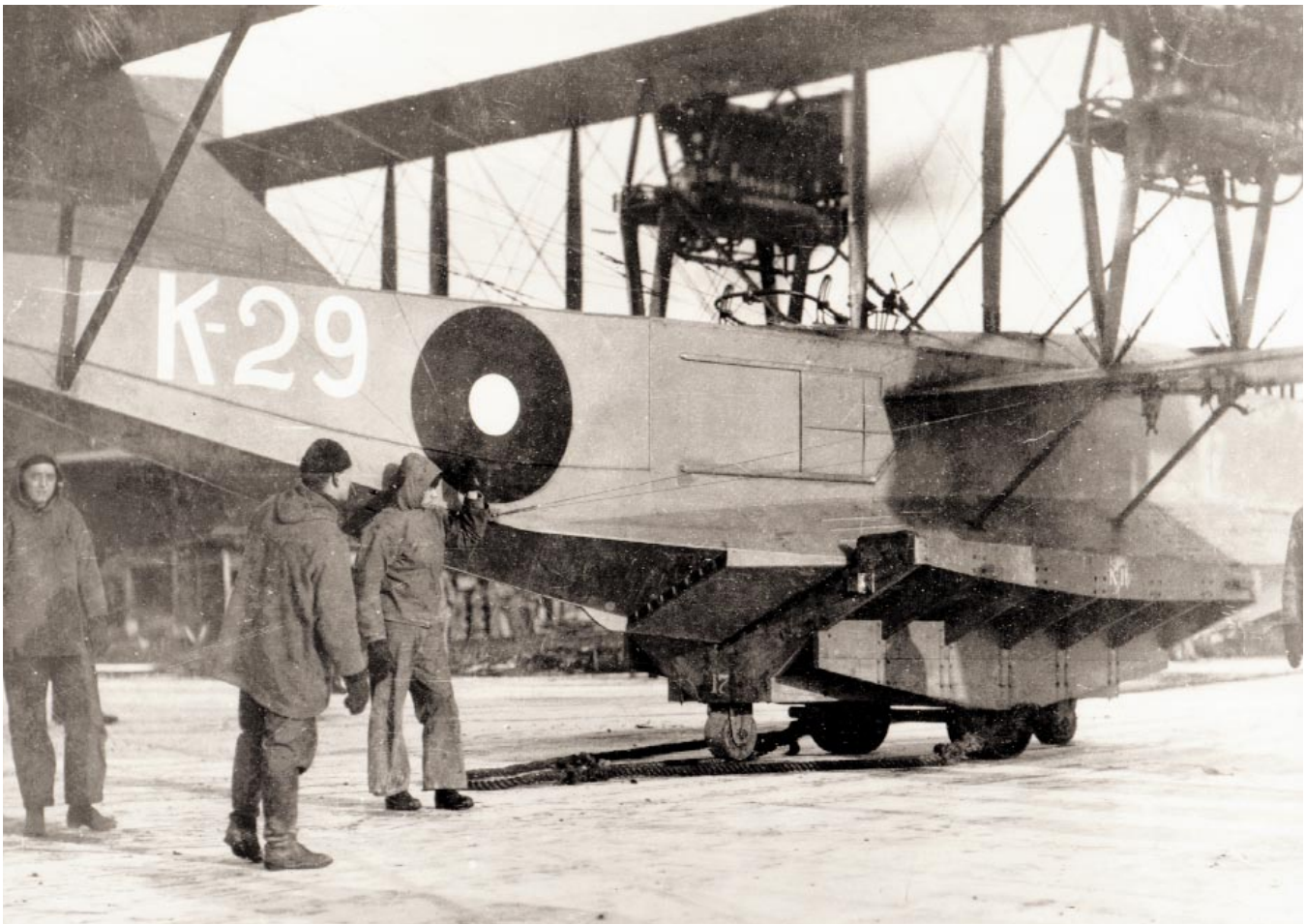
on the plane by adding six feet to the wing span and designating it the HS-2. It was still necessary to install three strands of Salmson cord on the right rudder bar to off-set torque in order to fly this crate."²²

The series of twin-engine flying boats procured, designated the H-16/F-5L was based on an original Curtiss 1914 design for a transatlantic flight and named the "America." The design was modified to a larger aircraft by Curtiss, the H-12, and was produced for the British Admiralty. The hull of the H-12 was further modified by the British at the Felixstowe Air Station by the addition of a deep vee bottom with two steps. The third iteration of the Felixstowe design known as the F-3 was produced in America as the H-16, utilizing Liberty engines. In December 1917 the British Admiralty produced a further modification of the design which provided additional load carrying capacity and additional endurance. For American production the design was adapted by the NAF and produced as the F-5L.²³

²² Cline, "Personal History of the First Aeronautic Detachment, United States Navy in World War I." Unpublished document, NHC Aviation Branch, WW-1 collection, box entitled WW-1 European Theater (A-Z).

²³ Sitz: pp 53-54.

²¹ Sitz: p 52.



An F-5L at Killingholm, England during World War I.



An F-5L (F2A) taking off at Felixstone, United Kingdom, circa 1918.

World War I American Patrol Flying Boat Production²⁴

Manufacturer	No. and Type Ordered	No. Delivered	No. Shipped Abroad
Boeing Airplane Company	50, HS-2	25	0
Curtiss Aircraft & Motor Corp.	19, H-12	19	0
	74, H-16	74	62
	410, F-5L	60	0
	674, HS-2	674	213
Curtiss Engineering Corp.	50, F-5L	50	0
Canadian Aeroplane, Ltd.	50, F-5L	50	1
Gallaudet Aircraft Company	60, HS-2	60	0
Loughhead Company	2, HS-2	2	0
L.W.F. Engineering Company	300, HS-2	250	10
Naval Aircraft Factory	150, H-16	150	78
	680, F-5L	137	0
Standard Aircraft Company	150, HS-2	80	6
Totals (by model)	1,236, HS-2	1,091	229
	19, H-12	19	0
	274, H-16	274	158
	1,140, F-5L	227	1
Total (all models)	2,669	1,611	388

Patrol Operations—Western Atlantic

INITIAL PROVISIONS FOR ANTISUBMARINE aircraft patrols were concentrated in the European Theater. Caution was observed with reference to the protection of shipping in the Western Atlantic, however, no threat materialized during 1917.

In early 1918, the report of a Special Board was submitted to the Chief of Naval Operations, noting the construction by the Germans of a number of large submarines of great cruising radius and capacity and the rapid expansion of shipping supporting American operations in Europe made submarine operations in American waters probable. It stated that a division of

four submarine cruisers, each armed with six inch guns, 36 mines and 16 torpedoes, capable of at least one month of activity on station off our eastern seaboard, could occur without warning.

In the months that followed, six of the cruiser U-boats—the *U-117*, *U-140*, *U-151*, *U-152*, *U-155*, and *U-156*—were sent to the shipping lanes along the east coast of the United States. They caused extensive losses along the eastern seaboard between May and October 1918. The losses included 79 vessels (42 U.S.) sunk by gunfire, 14 (2 U.S.) by torpedoes and seven (5 U.S.) by submarine-laid mines.²⁵

The first seaplanes used on patrols were single engine HS-1 and HS-2 flying boats. These aircraft were known as “flying boats” because their fuselage functioned in both air and water. By the middle of July 1918, sufficient numbers of these aircraft were on hand to extend patrols out to 75 miles from land near the principal harbors and important points along the eastern seaboard. Patrols were generally of three categories: standard patrols, emergency patrols and escort patrols. The first covered a fixed patrol area. The single-engine HS-1 and HS-2 flying boats could cover about 1,500 square miles during a five-hour flight. Larger H-12, H-16 and F-5L twin-engine flying boats could cover about 3,000 square miles during an eight-hour flight. Standard patrols were usually in formations of two aircraft at an altitude of around 1,000 feet. Emergency patrols were groups of two or more aircraft put into the air upon report of a ship sinking or submarine sighting. Convoy patrols generally consisted of two aircraft flying at 1,000 feet as a forward screen in front of the lead elements in the convoy.

Aircraft were equipped with Lewis machine guns, bombs with combined contact/pressure fuses, and the Davis recoilless 6-pounder gun. Each airplane carried a radio, signal flares, flash bulbs and even carrier pigeons as means of communication. Larger twin-engine flying boats carried a crew consisting of a chief pilot, assistant pilot/observer/navigator/bombardier/bow gunner, a wireless operator and an engineer/rear gunner. Smaller single-engine flying boats like the HS-1 had only a first pilot, second pilot and engineer. Frequently, especially on long-duration patrols, only the two pilots were aboard. Only two pilots manned the R-type Curtiss twin-pontoon floatplanes. Single-engine pushers like the HS-1 and HS-2 were never well liked by their pilots. Unlike the tractor-engine R-types and twin-engine H-16 and F-5L seaplanes, the little HS-1 and HS-2 flying boats had an engine mounted directly above and behind the crew. Even moderately rough landings could produce casualties if the engine broke loose from its mountings.

By the end of the war ten patrol stations had been completed along the Atlantic coast. Great emphasis

²⁴ Ibid.

²⁵ Mathews, *Patrolling*, p 2-5..

was given to the approaches to New York harbor and Chesapeake Bay due to the concentration of shipping in these areas. An estimated 419 pilots, 5,664 aviation enlisted ratings and 204 aircraft were available for patrols on a day-to-day basis.²⁶

The effectiveness of the coastal patrols was a subject of considerable debate in the naval community after the war. Throughout the 15 months of the war during which patrols were flown from the eastern U.S. seaboard, there was only one recorded sighting of a German submarine by seaplanes. On 21 July 1918, *U-156* was in the process of sinking a tug towing four barges off the coast near Naussett Harbor, only five miles from NAS Chatham. Repeated attacks on the surfaced submarine by HS-2 and R-9 seaplanes were unsuccessful due to the failure of their Mark IV bombs to detonate. One pilot, Lieutenant Eaton, became so frustrated that he made a second run and threw the heaviest item at hand, a monkey wrench. The captain of the *U-156*, observing that none of the bombs exploded and seeing a monkey wrench land on his deck, kept the aircraft at bay with machine gun fire and calmly remained on the surface, sinking the remaining barges before departing. Fortunately, few of the German U-boat captains were so bold, and most were kept from the seaplanes or remained submerged when seaplanes were with the convoys.²⁷

The extensive and comprehensive general plan for the patrol and protection of home waters was presented by the Navy General board in July 1918, and was approved by the Secretary on 19 August 1918. The Naval Aviation program portion of the plan provided for enlargement of existing air stations and the establishment of additional stations. New stations were planned for the coast of Maine between Rockland and Portland; the vicinity of Newport, R.I.; Charleston, S.C.; Port Arthur, Texas; and Galveston, Texas. Additional stations were proposed for Guantanamo Bay, Cuba; Samana Bay, Dominican Republic; and Vieques, Puerto Rico. Auxiliary bases were to be used in connection with existing and proposed main patrol stations. The plan called for a total of 33 rest and refueling stations with limited facilities.

With all these stations in operation, there would have been a main station at practically every 150 miles along the Atlantic and Gulf Coasts of the U.S. and a sub or rest station between each pair of main stations. On this basis, and with patrols extending 150 miles to sea, a limit which covers nearly all points within the 100 fathom curve, each main station would have been able to patrol 11,250 square miles, a task that could have been adequately performed by a complement of 18 flying boats in operational status at all times at each main station. The armistice intervened before the projected expansion could be accomplished.²⁸

²⁶ Sitz: p 11.

²⁷ Lacouture, p 14.

²⁸ Matthews, *Patrolling*, pp 215-216.

Patrol Operations—European Theater

PLANNING OF U.S. NAVAL AVIATION base sites in Europe began shortly after the arrival of the first U.S. military units in France in June 1917. Several fully equipped French-built bases were turned over to the Americans. Rapid progress in the development of new sites began in earnest with the appointment of Captain Hutch I. Cone as Commander U.S. Naval Aviation Forces, Foreign Service, on 24 October 1917, by the Force Commander, Vice Admiral William S. Sims.²⁹ Prior to the signing of the armistice in November 1918, Captain Cone had overseen the establishment of 21 bases in England, Ireland, France and Italy. Of these 21 bases, 16 were active patrol/bombing air stations with over 1,237 officers, 16,287 enlisted aviation personnel and 336 aircraft available for patrol on a day-to-day basis.

The survival of U.S. naval patrol aviation in the European Theater was a matter of some contention with the U.S. Army from the very onset. Concentration on the priorities of Army aviation had pushed Naval Aviation into the background at the beginning of America's involvement in the war. Brigadier General Benjamin D. Foulois, Chairman of the joint Army-Navy Aircraft Committee in Paris, continually did his utmost to deflect resources away from the Navy into Army channels. In 1919, the general told Congressmen that "he considered the Navy's plan to use land-based machines contradictory to the policies of the American Expeditionary Force (A.E.F.) and insisted that all American aircraft operating in France should have been placed under his control." Only the dissolution of the Paris committee in April 1918 preserved the future of Navy patrol aviation. In that same month, the Aircraft Production Board allocated 734 Liberty engines to the U.S. Navy.³⁰

Under the agreement with the French on the arrival of the First Aeronautical Detachment, in addition to the training provided to members of the detachment, the Navy agreed to maintain and operate four existing French air stations. Shortly thereafter, additional French air stations were authorized. In addition to Moutchi, which served as an advanced training station for patrol aviation, there were nine French stations engaged in heavier-than-air patrol operations. Other French stations were engaged in lighter-than-air, assembly and repair, kite balloon and support functions.

Agreements with the British government resulted in the Navy operating five patrol stations in England and

²⁹ Force Commander ltr. #cs6282 of 12 Jan 1918, NHC Operational Archives Branch. Box entitled WW-I—General.

³⁰ *Procurement of Aviation Material in Europe, 1917-1918*, Office of Naval Aviation, 1920:10. Unpublished document, NHC Naval Aviation Branch. WWI collection, box entitled WWI European Theater (A-Z).

Ireland, in addition to a kite balloon station and the assembly and repair station for the Northern Bombing Group. In Italy, the Navy operated an elementary flying station at Lake Bolsena and a very active patrol and bombing station at Porto Corsini, south of Venice. Additionally, the Marine Corps operated an antisubmarine patrol station at Punta Delgado, Azores, flying R-6 float planes.³¹

Individual pilots were also placed with British squadrons flying seaplanes out of English bases. On 15 February 1918, during a sortie from RNAS Felixstowe, a sharp, but brief combat occurred between a flight of two British H-12B flying boats and five German Hansa-Brandenburg W.29 mono-wing floatplanes. An observer in one of the German aircraft, Lieutenant Fritz Stormer, described the ensuing fight: “We were victorious over the Curtiss flying boats that we encountered over the sea and subsequently engaged in aerial combat. We suffered no casualties and only a few hits during these battles. We were able to demolish one of the craft in a formation of Curtiss flying boats because we had the advantage of speed and maneuverability”³² Ensign Albert D. Sturtevant, US-NRFC, and his three enlisted RNAS crewmen perished in that attack, making him the first U.S. naval aviation combat casualty of World War I.

American naval aviators had been on French soil since June 1917, but it was 22 November before the first American seaplane patrol flew over the English Channel from the U.S. Naval Air Station at Le Croisic (established only four days earlier). The flight consisted of six Tellier seaplanes, assembled by the Americans at the air station. American aircraft had not reached Europe by the time many of the air stations were being activated. It was not until 23 April 1918 that 37 Liberty engines, 36 HS-1 and two HS-16 seaplanes finally arrived for assembly at Le Croisic.³³

The lack of American-made aircraft was countered by the generosity of the Allies, who shared their thinly stretched aircraft output with the newly arrived units. The desperate shortages of suitable aircraft led to the acceptance of many outdated airplanes barely suited to the work at hand. The first coastal aviation groups commenced flying operations against German submarines in small single-engine French Tellier, Levy Le Pen and DD seaplanes. The squadron at Porto Corsini, Italy, in operation by August 1918, flew Italian FBA and Macchi M-5 seaplanes against the Austrians at Pola. In the north of France, the Northern Bombing Group, operating out of Champagne and Dunkirk, flew 600 hp, 3-engine Caproni bombers on night bombing missions.

The squadron at Porto Corsini was very active in pressing the attack against the Austrian naval base at Pola. In an action taking place on 24 August 1918, two Macchi M-8 flying boats were escorted by five Macchi M-5s en route to attack the Austrian base. Within 20 minutes one of the M-8s and one M-5 had to turn back due to engine trouble. The Austrians were well prepared for the attack, having formed a specialized fighter detachment for the defense of the base as a result of earlier attacks. The Austrians flew Phonix D.I land fighters. In the ensuing combat over Pola, the enemy forced down one of the American M-5s by damaging its engine. The burning M-5, flown by Ensign George H. Ludlow, landed safely on the water. Ensign Charles H. Hammann observed Ludlow’s aircraft going down smoking heavily and broke off combat with the enemy aircraft to land next to his friend’s sinking flying boat. Somehow Hammann managed to stow Ludlow aboard his tiny one-man aircraft for a rough takeoff over the pounding waves. After evading the Austrian aircraft, the two returned to Porto Corsini to find that their names had already been posted as “Killed in Action!” For this heroic act, Ensign Hammann was awarded the Medal of Honor—the first Navy aviator to be so honored.³⁴

Aircraft maintenance was a continual problem due to the short life of engines during combat operations. French and Italian engines seldom lasted as long as the Liberty engine. French Hispano-Suiza 200 hp engines generally averaged 48 hours between overhauls, Renault 80 hp engines lasted barely 24 hours and Italian Fiat 600 motors seldom ran more than four hours.

Despite the deficiencies in equipment, positive results were obtained through the efforts of determined American air and ground crews. There is little doubt that American naval air patrols contributed significantly to the suppression of German submarine activity. Total activity for the French bases, Killingholme, England, and Irish bases resulted in 44 sub sightings, 42 attacks, 16 submarines probably damaged, and four probable sinkings with one “assist” by an American destroyer.³⁵ As was the case off the coasts of the United States, the greatest contribution of American naval air power was the establishment of a threat sufficient to keep German submarines at bay along the convoy routes.

The hardships faced by the crews of these fragile aircraft while carrying out the patrols speaks highly of their dedication. Navy pilots faced hazards never encountered by pilots of land planes, as most of their

³¹ Sitz: pp various.

³² Dr. Fritz Stormer, translated by Peter Kilduff. “Seaplanes in Combat,” manuscript, NHC Aviation History Branch. WW-I collection, box entitled WW-I European Theater (A–Z).

³³ Cohen, Appendix #3: p 8.

³⁴ Cline, p 8.

³⁵ Sitz and Cohen. This is further substantiated by German records of WWI which list 6 U-boats sunk by aircraft. Erich Groner, in his book *German Warships, 1815-1945, Vol. II*, lists one of the six as being sunk by a Russian aircraft. This would presumably leave the remaining 5 to the credit of the U.S. Navy.

time on patrol was spent over water. In the following account Ensign J. Smith, USNRF, describes an ordeal following a landing at sea due to engine failure: "Thursday, Nov. 22, 1917—Weather conditions were not ideal for flying, clouds being very low and quite a sea running. After leaving Le Croisic, we started south steering course 195. On reaching Ile D'Yeu, found our drift to be considerably to the east. After picking up Point Breton on Ile D'Yeu, we sighted a four masted bark to the N.E. We circled over her a number of times increasing our radius on each turn until we were nearly out of sight of Ile D'Yeu. After searching the shore for mines and submarines, returned to Point Breton. Motor died and were forced to make a tail to wind landing. We found it possible to land the Tellier in rough water. Dispatched at 2:30 P.M. a pigeon with a (location) message.

The sea was very rough. Could not tell for certain our location. We took watches during the night. One bailed while the other 2 slept. As we could not get the motor started we thought over all possible things that could happen to it. Wilkinson found the left gas tank had not been feeding, too late to fix it as we could not see. Passed a very uncertain night. We knew they would do all possible things to help us.

Friday, Nov. 23, 1917—Put in a new spark plug, cleaned magneto, shifted gasoline from left to right tank. We were all so seasick that we could not work to best advantage. Bailed water out of boat (aircraft). Wilkinson finally got motor started at 11:40 a.m. Saw hydroplane and blimp to the north of us. Did not give up hope. Beautiful day. Got motor going and started to taxi towards Ile D'Yeu. We were not making much headway on account of the sea. Our left pontoon had filled with water. Finally decided our only hope was to try and get machine off water. As a result of trying, I broke left wing and got ourselves into a hell of a scrape. Things began to look black. There was no finding fault with anyone. Could not help marveling at the morale of the men. It was a case of heroic bravery on their part to see their only hope smashed. We took watches during the night by first laying on wing, then bailing, then sleeping. Wilkinson turned to and got all ready to cast adrift the left wing. We had anxious moments of the ship rolling over. No one faltered or failed to do his part. We all decided to die game to the end. As a result no one ate or drank water. Wing began to crumble. We all decided to let it stay on as long as possible. Sea began to grow bigger towards evening and the water began to come in. We all hoped that we would be able to ride out the night. Very uncomfortable night and we were all growing very weak. Very long night. Our hopes were beginning to go very low but no one showed it.

Saturday, Nov. 24, 1917—Day finally came. Wing getting near to the boat as it crumpled. It was heart-rending. We had to bail and stay out on the wing-tip.

As waves came over we began to feel lower and lower. It was finally decided to cast off wing and let what might come. We tried to get other wing ready to be cast off, but we could not get off nuts as we were so weak and tools were very inadequate. We were going over gradually on the starboard side. We were all on port side trying to keep her righted. We then saw that there was no hope of us staying up much longer unless we could get the wing off. We had just about given up everything when Wilkinson let out a yell." Ensign Smith and his crew were sighted by a French destroyer and taken to La Pallice. Their Tellier seaplane sank a few minutes after the crew had been taken off.³⁶

Patrol squadron pilots often endured hair-raising experiences much closer to home. One pilot, Ensign Joe Cline, recounts an unfortunate incident that occurred just as he was taking off from his base at Le Croisic: "We flew French Tellier seaplanes powered by 220 Hispano engines, and our job was to escort the convoys from the States through our sector from Quiberon to St. Nazaire in defense (against the threat) of submarines. Le Croisic was a little fishing village on the north coast of Brittany and was always a welcome sight after a long cold four hour patrol.

One afternoon I taxied to the outer harbor, warmed up my engine before taking off in a Tellier on patrol, headed into the wind, rocked the plane on the step, was just about to pull her off when a tremendous explosion blew the plane in half. Someone had not cocked the trigger spring properly on the two mark 4 bombs hung under the wings on each side of the boat, and the vibration at take-off caused them to fall off, sink into nine feet of water and explode. The time it took for the bombs to hit bottom and detonate was just enough at my speed to take the forward half of the boat outside the point of irruption (sic). The after half right behind the engine section was sliced off as though cut with a saw. There was a lighthouse at the harbor entrance, eighty feet high, and people who saw and heard the blast said the after part and tail surface were blown 50 feet higher.

The weight of the engine made the forward part sink stern first—my observer, Fred Lovejoy, and I started shedding clothes. We released our carrier pigeons and prepared to swim to the beach, which was not far, but the remaining half of the ship settled in that nine feet of water. We climbed on the nose which was out of the water and waited for the crash boat to come and get us. Neither of us had a scratch, I was only wet to my knees, but we both could have used a drink."³⁷

³⁶ Cohen, p 352.

³⁷ Cline, p 6.

Northern Bombing Group

THE NORTHERN BOMBING GROUP (NBG) was the only operational organization in Naval Aviation during World War I to operate using the squadron form of organization. Operational antisubmarine patrols flying out of naval air stations were identified by the name of their parent station, and were under the command of the station's commanding officer. The NBG was formed in 1918 in order to concentrate on the destruction of German submarines and their support facilities in Belgium. The Night Wing was composed of Navy squadrons flying the Italian Caproni multi-engine bomber. Headquarters of the Night Wing and Navy Squadrons 1 and 2 were based at St. Inglebert, France. Four additional Navy squadrons were planned. The Day Wing was ultimately composed of four U.S. Marine Corps squadrons flying the DH-4 and DH-9 bombing aircraft. The Day Wing operated from stations at Oye, France (Squadrons 7 and 8) and Le Frene, France (Squadrons 9 and 10).

Because the NBG received personnel prior to the arrival of its aircraft, pilots, observers and ground personnel were assigned to the following British squadrons: Number 214 Handley-Page night bombing squadron, Number 217 and 218 day bombing squadrons, and Number 213 Chasse Squadron. One pilot, Lieutenant (jg) David S. Ingalls (later Assistant Secretary of the Navy for Aeronautics), while attached to No. 213 Squadron, RAF, between 9 August and 3 October 1918, shot down four enemy aircraft and one observation balloon, thus becoming the first Navy "ace."³⁸

World War I Summary

BY THE END OF THE WAR, A TRIUMPH in industrial organization had been achieved in this country that almost equaled the military victory over the Germans. Naval patrol aviation grew from a fledgling detachment of only 38 aviators to 1,656 trained pilots by the end of hostilities, with another 5,070 under instruction, and 2,107 aircraft on hand.³⁹ But the victory and growth of Naval Aviation did not come without its price. Thirty-six naval officers and 86 enlisted aviation personnel in Europe had been killed in ground accidents, crashes, or were listed as missing in action. In the eastern Atlantic patrols off the coast of the U.S., 38 naval officers, and 48 enlisted personnel were listed as missing on patrol or killed in accidents.⁴⁰

³⁸ Commander Northern Bombing Group letter to Commander U.S. Naval Aviation Forces in France, HQ-702, of 3 Dec 1918, record group 26N, National Archives.

³⁹ Sitz: p 11.

⁴⁰ Sitz: p 11.

On the credit side of the ledger, Navy patrol aircraft in France had escorted 477 convoys, flying over 9,960 hours on patrols. Between June 1918 and the armistice, Navy pilots of the Northern Bombing Group had dropped over 141,854 pounds of bombs on enemy positions.⁴¹ The Navy patrol/bombing group at Porto Corsini conducted 745 combat operations flights during this period, with no casualties from combat. The British base at Killingholme conducted over 233 patrols; and the Irish bases at Wexford, Lough Foyle and Whiddy Island conducted over 380 patrols under the most difficult weather conditions. Nine U.S. bases reported a total of 19,019 hours flown on patrols by the end of the war—approximately 4,755 four-hour patrols compared to the 3,103 patrols conducted in the European Theater during this same period.⁴²

The raw numbers involved in describing the activities of the patrol squadrons during the war do not do justice to their importance nearly as well as a brief summary from Franklin D. Roosevelt, Assistant Secretary of the Navy, near the close of the conflict: "I had but to examine the weekly charts of German submarine operations to realize how much our aviators were doing to make these waters safe. To the men engaged in these duties, whether on land or actually flying, there came few of the thrills of actual war, but they will always have the deep satisfaction of knowing that their work, though silent, counted much in the winning of the war. I venture to predict that when the records of the German naval activities become available, we will find that the enemy also recognized the importance of the American Navy in the air as well as on the sea."⁴³

While Naval patrol aviation had emerged from World War I as a force tested in combat, its battles in the next decade would be fought in the halls of Congress, within the ranks of the old line Navy and with its inter-service rival, the U.S. Army Air Corps.

Post War Doldrums and the Ferment of the Twenties

THE CONCLUSION OF THE "War to End All Wars" was greeted by the American public with a great sigh of relief and a determination to get back to business. "Getting back to business" for most Americans in 1919 meant exactly that—the business of making money, not spending it on European troubles of little consequence to this side of the Atlantic. The manufacturing estab-

⁴¹ Cohen, p.249, and Commander, N. Bombing Group ltr. dtd. 18 DEC 1918, p.21.

⁴² Mathews, pp 65–211.

⁴³ Franklin D. Roosevelt, Asst. Secretary of the Navy, published statement, dtd. August 28, 1919. Naval Aviation Branch archives, Box #1663.

ishment that had helped to bring about the end of the war abruptly shifted gears to begin peacetime production of goods and services for civilian consumption. There was little interest in Congress, and even less among the electorate in the maintenance of an up-to-date military establishment. Just as the Navy had been required to operate its rusting fleet of ironclads for 25 years after the Civil War, that same Navy was now required to keep its aging F-5L and H-16 seaplanes flying long past their prime. The National Defense Act of 1920 which required the Army and Navy to coordinate their plans for military production did nothing to rescue the ship building and aircraft industries, whose business base collapsed at the end of World War I. In fiscal year 1919 the defense appropriation for the Navy was \$2,002,311,000. By FY 1922 the Navy budget had been cut 76.2 percent to \$476,775,000. The FY 1920 budget for Naval Aviation was \$20 million, reduced by FY 1921 to less than \$7 million.⁴⁴ Only two of the seven aircraft manufacturers supplying military aircraft during the war were still in business by 1921.

Patrol aviation and aviation in general faced considerable integration problems within the Navy. Despite the radical military cutbacks and retrenchments after World War I, a handful of visionaries strove to keep the pioneering spirit of aviation in the Navy alive. In 1914 Glenn H. Curtiss had constructed a transatlantic flying boat, *America*, for Lewis Rodman Wanamaker. Although the outbreak of World War I prevented Wanamaker from using the huge flying boat for the first transatlantic attempt, the design led to development and construction of four NC series aircraft in August 1917. The first, NC-1, was finished and test flown by October 1918. Commander John H. Towers proposed using the aircraft for a transatlantic flight during a meeting with CNO in the spring of 1919. Secretary of the Navy Daniels agreed after hearing the proposal, and put Towers in charge of the newly formed Seaplane Division One. The attempt at a transatlantic flight began on 8 May 1919, departing from NAS Rockaway, N.Y. Problems soon arose, and NC-2 had to be cannibalized for parts for the other aircraft of the Division. Pilots of the remaining aircraft were: NC-1, Lieutenant Commander Patrick N. L. Bellinger; NC-3, Commander Towers; and NC-4, Lieutenant Commander Albert C. Read. Seaplane Division One departed from Trepassy Bay, Newfoundland, on 16 May bound for Plymouth, England. NC-1 landed short of the first stop in the Azores and sank shortly after the crew was rescued. NC-3 also landed short of the Azores, but managed to taxi to its destination, Ponta Delgada, Azores. NC-4 made it all the way, continuing a few days later to Lisbon, Portugal, finally arriving at Plymouth on 31

May.⁴⁵ The flight of NC-4 served to bring Navy aviation into public attention and earned a higher place for aviation in U.S. Navy hierarchy. The feat was not rivaled in the eyes of the public until Lindbergh's solo flight in 1927.

The post World War I problems of reduction in military expenditures and the conservatism of Navy and Army leaders to maintain the status quo of its organizations without accommodating the growing demands for an air arm, in both the Navy and Army, led to some unhappy times. The situation in the Army actually became more acute than in the Navy and it left behind a heritage of bitterness that lasted for a long time. The same problems that existed in the Army were also present in the Navy. These aviation problems included lack of rank, of promotional difficulties, control of funds and policies by non-aviators, and curtailed plans for expansion. Similar attitudes existed among some senior officers in both the Army and Navy. "The ground officers of the General Staff had their counter-part in certain of the so-called battleship admirals."⁴⁶ However, the main difference between these two groups was the Navy never had any desire to develop a strategic bombing force.

The Navy managed to prevent a real explosion of differences that developed in the Army as a result of General "Billy" Mitchell's concept of air superiority. In the Navy, "the liberal attitude of the General Board, the support given aviation by key men in the fleet and in the Department like Admirals Fiske, Taylor, Sims, Fullam, Winterhalter, Badger, and many others, offset the intransigence of the Strausses, the Bensons, and the Wainwrights and prevented the development of lasting bitterness among the aviators, while the political sense and ability of Moffett and his colleagues in the Bureau of Aeronautics prevented the excesses with which their colleagues in the sister service exacerbated relations with their superiors."⁴⁷ Aviators in the Navy managed to be modest in their goals and aspirations and attempted to be one cog in the wheel and not the central hub.

The Navy was able to gradually, although at times painfully, evolve an organization to administer aviation forces afloat and ashore. The passage of time eventually produced a closely integrated surface and air fleet. Problems existed but they were usually kept out of public view and did not explode into open bitterness among factions within the Navy. Much of this credit must be given to Admiral Moffett, who was a shrewd politician and able to gain his ends peaceably within the Navy.

⁴⁴ Paolo E. Coletta, "Creating the U.S. Bureau of Aeronautics," *The American Neptune*, Vol. 50, No. 1 (Winter 1990): 51.

⁴⁵ John M. Lindley, "Wings Over the Ocean: A History of Sea-Air Aviation," *Naval Aviation News*, July 1977–December 1978: 33–35.

⁴⁶ *U.S. Naval Administrative Histories of World War II*, Office of the Deputy Chief of Naval Operations (Air), "The History of Naval Aviation 1898–1939," p. 1034.

⁴⁷ *Ibid.*, p. 1035.

The early and mid 1920s produced a period of ferment for aviation not only within the Navy but between the Navy and Army regarding control of aviation assets. However, because important elements had already been introduced in the Navy to weave aviation into its operations the integration of aviation moved along a smoother road. Air had been recognized as a coordinate type command in the fleet under each of the chief fleet commands. Command posts had been assured to aviators at naval air stations and over two-thirds of the aeronautic “bureaucrats” had to qualify as aviators or observers. Aviation became an integral part of the fleet and was about to prove its value in the fleet problems of the late 1920s and 1930s. It was the studies at the Naval War College games whereby more and more commanders gained a new appreciation of aviation’s potentialities.

While the debate over unification of airpower simmered on in the halls of Congress over the next few years, the Navy continued on with its incorporation of patrol aviation into the fleet. On 17 June 1922, the practice of numbering aircraft squadrons to conform to the number of the ship squadrons they served, was officially changed to a system of numbering all squadrons serially by class in the order in which they were initially authorized. The use of letter abbreviations to indicate mission was also adopted. Fleet aviation commands were redesignated Aircraft Squadrons of the Scouting and Battle Fleets. In conformance with

this reorganization, VP-1 was established on 4 March 1922, at NAS San Diego, Calif., as a utility squadron of six patrol airplanes (F-5L), under Aircraft Squadrons, Battle Fleet. This marked the first formal designation of a heavier-than-air patrol squadron (VP) in the U.S. Navy.⁴⁸ A further reorganization on 29 May 1924, added Naval Coast Defense Forces, with patrol squadrons assigned to each region: Chesapeake Bay Region, NAS Hampton Roads, VP-6 (two F-5L); San Diego Region, NAS San Diego, VP-1 (two F-5L); Panama Canal Zone Region, NAS Coco Solo, VP-10 (six F-5L and H-16); and Hawaii Region, NAS Pearl Harbor, VP-14 (two F-5L).⁴⁹

Despite the contentious intraservice bickering over the next decade, the future of naval patrol aviation had been secured. While the buildup and modernization of patrol squadrons was slow between the world wars, it was a steady progression guided by seasoned professional aviators. The heroic deeds of the many members of this community over the next 75 years of service could fill many volumes. To give credit to this aviation community, without writing volumes of historical work, the stories of these dedicated patrol aviation personnel can be seen in the composite histories of their squadrons beginning in Chapter Three.

⁴⁸ CNO, “Naval Aeronautic Organization for FY1923,” *CNO Order 26983*, 17 June 1922.

⁴⁹ CNO, “Naval Aeronautic Organization for FY1925,” *CNO Order s.c. 111-78:1*, 29 May 1924.

