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I'M BACK!

For those who flew our Stearman PT-17, NC67412 when painted in colorful civilian paint, the ship has emerged in the colors of the United States Navy. Yes, that is NC67412 sporting the paint of a Navy N2S-3 primary trainer. Read more about this amazing ship later in the newsletter. And yes, it flies as well now as it did back then. Photo left was taken at Fantasy of Flight in 2004 while patiently waiting for the next pilot to fly her. Above photo was taken on August 6, 2009 after a complete restoration from the frame up.

INTRODUCTION

In the last newsletter we began exploring the history of Naval Primary Flight Training for WW2. While the Navy trained pilots at NAS Pensacola, Florida and Corpus Christy, Texas using Naval Air Factory N3N aircraft, there were big changes needed in 1942.

NAVY AND MARINE PRIMARY FLIGHT TRAINING



Above, the Naval Air Factory N3N-3 primary flight trainer pre-1942. The Navy officially implemented the new flight-training program on May 15, 1942. During the transition period, flight students continued to be trained under the prewar program utilizing the N3N-3 and Boeing N2S aircraft. Sixteen Naval Reserve Air Bases (NRAB) were used initially for Primary flight training. They were: Glenview, Dallas, Grosse Ile, St. Louis, Minneapolis, Squantum, New Orleans, Los Alamitos, Hutchinson, Livermore, Pasco, Ottumwa, Memphis, Olathe, Bunker Hill and Norman. For more information on training activities, go to the following web site: http://www.navalweather.org/NWSA_Committee_Historian.htm.

In 1936 the Boeing Stearman NS-1 series primary trainers were introduced and would eventually replace the NAF N3N's except for those ships equipped with floats.



Through the years NAS Pensacola and Corpus Christi tried to keep up with demand for Naval and Marine aviators, eventually yielding to a great expansion in training facilities and aircraft. Left a flight of Boeing NS-1 trainers fly formation, possibly at NAS Pensacola in 1936. The Navy procured approximately 61 of the Wright R-790-8 powered ships for primary flight training before the start of WW2. The R-790-8 was a military derivative of the famous model Wright J-5,

producing 220 horsepower.

Qualifications for cadet candidates in January 1942 were: 1) Be between age 20 and 27, 2) Be native-born or hold citizenship by virtue of the naturalization of his parents, 3) Be unmarried and agree to remain so for at least 2-years, 4) Have at least 2-years of college or 1-year of college plus business experience, 5) Be able to pass rigid physical and psychological examinations and, 6) Agree to remain on active duty for a period of 4-years unless released by the Navy Department. Those cadets who qualified for training enlisted as seamen, second class (class V-5, aviation), in the Naval Reserve and reported to one of sixteen Naval Reserve Aviation Bases for elimination training. These requirements were lowered when there was a greater need for aviators as the war grew in intensity. While there they were paid at the rate of \$36 per month and subsistence of \$1 per day, in addition cadets received a number of items free of charge, such as uniforms, quarters, medical and dental attention, and premiums paid on a \$10,000 Government life insurance policy. Left, giant blackboard at a training base shows whereabouts of training planes and pilots, gives weather and other data. Duty Officer keeps the records current. It was extremely important to know the whereabouts of each aircraft and the time it was due to return in case of an accident at an outlying landing field.



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Left, the Stearman NS-1, serial number 73-0001, Bureau Number (BuNo) 9677 as delivered to the U.S. Navy May, 1934. On December 21, 1934, flight tests of the NS-1 were completed at Naval Air Station (NAS) Anacosta, D.C. Sixty-one ships were procured during the year 1935. The Stearman Model 73 -- U.S. Navy designation NS-1 -- was the first airplane supplied in

quantity under contract to the military in 1934. On the front engine case just behind the propeller are the magnetos that provide ignition to the spark plugs. Here the magnetos are covered with an aluminum fairing to keep rain and moisture out of the magnetos.

THE ONLY ORIGINAL STEARMAN NS-1

The sole surviving Stearman NS-1 on display at the Kansas Aviation Museum in Wichita, Kansas, with large wheels and Wright R-790 radial engine producing 220 horsepower. The company's first production contract for military trainers was for 41 U. S. Navy NS-1's in 1934, with option for 20 additional ships. It is the opinion of many that the NS-1 trainer is the airplane that saved Stearman from the great depression and the reason that there is a Boeing Wichita today. The Model 73, Navy NS-1 had the classic lines that was to define the most popular WW2 primary training aircraft ever manufactured – the Boeing PT-13/PT-17, N2S-1 through N2S-5 Stearman aircraft. Most of these ships were powered with either Continental R-670 or Lycoming R-680 air-cooled radial engines producing 220-225 horsepower.



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POWERPLANT FOR EARLY NAVY TRAINERS

The powerplant for the early Stearman NS-1 and Naval Air Factory N3N-1 was the Wright R-790-8 radial engine, the military version of Wright's famous J-5. Approximately 180 N3N-1s were all delivered between 1936 and 1938 and approximately 61 NS-1 ships delivered between 1935 and 1936. The Wright R-790

featured dual magnetos mounted to the nose case of the engine facing inwards toward the crankshaft. The engine was the first mass-produced air-cooled radial engine in the United States, the factory being located in Paterson, New Jersey. This was essentially the same engine as Charles Lindbergh used in the Spirit of St. Louis in his epic flight non-stop to Paris in 1927. It is unknown just how many military J-5's were produced, however approximately 3339 engines of all J-5 models were produced from 1924-1929. The next engine to come from Wright was the military R-760-8 that was installed in the later N3N-3 ships. The Naval Air Factory assembled special military engines at the plant in Philadelphia, Pennsylvania.



R-760-8 and the civilian R-760-ET engines were produced from 1929 through 1945; approximately 1392 engines of all dash numbers were produced.

DESIGNATIONS OF NAVY TRAINERS

The Navy had its own system to designate various aircraft within the fleet. In particular, the letter “N” was used to designate a training ship. The second letter identified the manufacturer of the ship; in this case “S” identified the Stearman Division of Boeing and the one indicated first model, thus NS-1. This system was revised during wartime to include: “SN” to identify Scout/Training and the manufacturer was the third letter. Examples of this designation change would be: SNJ (North American), SNV (Vultee), SNB (Beechcraft or Boeing), etc. When the Navy procured the Stearman model 75 primary training ships they added the number 2, thus N2S-1 (first model) through N2S-5 (fifth model). N3N indicated training aircraft, third type manufactured by the Naval Air Factory. The Navy did not change designation of primary training aircraft; they were kept N2S, but basic and advanced trainers were designated as “SN.”

The model number was changed to N2S-1 and an order for 250 ships was filled 1940-1941. In 1941 the N2S-2 made its appearance and 125 ships were delivered. The largest single batch of Navy Boeing Stearman trainers was the model N2S-3 with 1875 ships being delivered 1942- 1943. In 1942 Boeing delivered 577 model N2S-4 ships and 1943-1945, 750-model N2S-5 ships were delivered. Interesting to note that in 1945, an additional 1260 airframes were cancelled by the Navy as the war was ending. From the years 1936-1945, the Navy procured approximately 3,638 Boeing Stearman Division aircraft for primary flight training. None of the Boeing built Stearman Division ships were equipped with floats for water landings. The Navy still used N3N's to instruct water landings. Approximately 995 N3N aircraft were produced by the Naval Air Factory prior to and during the war. These aircraft were powered by a Wright R-760-8 radial engine that was also assembled at the NAF under contract to Wright Aeronautical Corporation of Paterson, New Jersey. The NAF produced its own propeller, exhaust system and carburetor air scoop for the N3N ship.

Below, a Wright R-760-8 powered N3N-3 on floats as displayed at the National Air and Space Museum.



Below, Tom Metzger flies his N3N-3 in Colorado. Tom reports, “I operate the N3N-3 from a 2800 foot sod airstrip (1CO8) at 6,300 feet elevation and need to get all the power available not so much for the takeoff but for the climb thereafter. Attached a photo of the biplane at 7,000 feet (1000 feet +/- agl) over the countryside south east of Denver.”



PROGRESS REPORT ON STEARMAN RESTORATION PROJECT



After a thorough disassembly and restoration, Waldo Wright's old Stearman appears new as a Navy model N2S-3, although the official designation is still a PT-17. Some of the Navy ships were brightly painted with grey and yellow with red or green bands around the fuselage. The major components were delivered to Fantasy of Flight and we began to assemble the ship. Left the center section and lower wings are in place, as is horizontal and vertical stabilizer. Assembly

of the ship took 4-days and several hands were involved.

To the right the wings and tail are completed, the engine installed and landing gear fairings in place. Much work still to be completed, as the aircraft now will be rigged in accordance with the N2S-3 maintenance manual. The next project is to pick up the ship and level it laterally (wing tip to wing tip) and longitudinally (nose to tail).



Left, the ship is in level flight attitude and ready for the rigging process. This step requires two people; one on each end of the streamline wires to loosen and tighten the wires to position center section and wings precisely to achieve good stable flight.

Right, assembled, rigged and ready for flight, NC67412 is proudly displayed in front of Waldo's tent at Fantasy of Flight. Final checks and inspection is time consuming and only at the completion is the aircraft ready for its first flight.



First flights are always fun because, as Chuck Yeager has always said, "You don't know the outcome until you're back on the ground and the engine is shut-off!" This is my second "first flight" with this ship, the first back in 1992 when I flew it for the first time.



Left, about ready to lift off the ground on first flight. It is a very special feeling to test fly an aircraft after major overhaul or repair and one I have experienced many times. Fortunately all my test flights have been successful! So Boeing Stearman NC67412 is back on line at Waldo Wright's Fantasy of Flight operation. Come see and fly this beautiful airplane of the past and a

tribute to our Naval aviators of WW2.

The (1st) restoration of a 1942 Boeing Stearman, NC67412

This is my first attempt at adding to our popular quarterly newsletter. I am young Waldo, or Rob and I have had the pleasure of flying with many of our Stearman pilots over the past 6 years. The below story of our yellow Stearman was written back in 1992 when the "family" Stearman first flew. This airplane is very special to me as I witnessed this airplane being restored by my father during my youth. It took 18 years from start to finish and this is the airplane that started my aviation career. It is indeed my sweetheart and my favorite airplane out of all those that I have flown over the years. When the time came for a second restoration, selling the ship was never an option. Waldo Sr. wrote the history of the airplane years ago and I have his permission to use his words in this story. His words will be written in *italics*, so you will know when he is speaking.

The saga begins in 1976 when I acquired parts of a Stearman biplane from Steve Sprague of Visalia, California. These parts were "spare", consisting of a fuselage (firewall aft), that had been metalized with a hopper installed for crop dusting

operations. The outside metal appeared to have been seared by a hot fire, however, no damage had been done to the fuselage structural tubing. There were 4 wing panels that were junk, along with a center section and empennage. We found some struts and wires, but nothing else. These parts were hauled back to my shop in Reedley and limited restoration began.

By 1980 the fuselage had been restored back to stock configuration, sandblasted and primed. The side and lower stringer panels were purchased new; the turtle deck was original. Instrument panels, seats and interior hardware was installed. The fuselage was covered with Stits Poly Fiber and finished with Aerothane polyurethane enamel paint. All cockpit metal was made new, as was the stainless steel firewall. The empennage and ailerons were covered with Ceconite fabric and finished with nitrate and butyrate dope. They were prepared for final finish but not painted.

It was at this point, I remember the fuselage was covered in plastic and pushed to the back of my fathers shop. Many times over the next several years, I would sneak into my fathers shop, uncover the rear cockpit of its plastic cover, crawl in the rear seat and spend many hours “flying” this airplane, dreaming of the day when I would actually fly her. Never in my wildest imagination did I think that this airplane would be ultimately responsible for taking me down a career path as a professional pilot.

In 1986 I began construction of the wings from “scratch”. Wing ribs were built from an aluminum jig and new spars were fabricated. Also, repairs were made to the center section including new leading edge ribs and plywood leading edges. New root ribs were constructed and installed. Repairs to the original trailing edge and bow assembly were made.

The project was set aside while I finished my 1929 Command-Aire restoration project and work would not begin again until 1990.



The Command-Aire was the source of great pride when I was a kid because like the Stearman, I witnessed this airplane rise from many rusted and corroded parts over the years to a become a beautiful one of a kind biplane. It still remains the only 5C3 flying in the world and is considered the “Patriarch” of the Waldo Wright’s fleet.

Now back to the Navy Stearman story...

By 1991, the newly fabricated wings were covered with Stits Poly Fiber and finished through silver. The engine was installed in the fuselage but not operated because the center section and fuel tank and fuel lines had not been installed at this point.

In early 1992 the balance of the airplane was painted with Stits Aerothane polyurethane and the striping was put on all surfaces. The entire aircraft was assembled and rigged at Reedley College for the benefit of the graduating class of Airframe students that year. Also a weight and balance was completed and empty weight and empty weight center of gravity calculated. An equipment list was made along with a loading schedule. The FAA performed a conformity inspection on the aircraft and NC67412 was granted its first permanent “Standard” airworthiness certificate.

I was living in Italy during this time and returned to California during the summer to see the Stearman return to the sky. It was an exciting time for all involved, but there was a sense of relief and accomplishment on Waldo’s face when the project neared its’ end. Pictured below is the “family Stearman” in all its’ glory prior to its first flight way back in 1992.

The engine was test run but did not develop sufficient oil pressure. After several hours of trouble-shooting, I decided to remove the accessory case and discovered that two 1/8” pipe plugs were missing form the oil system and therefore all oil pressure developed by



the pump was being dumped directly into the oil sump. I installed the two plugs, reassembled the accessory case with great difficulty, timed the magnetos, installed the starter and ran the engine. It finally started and the oil pressure was 60 psi at idle! The engine was ground run for about 2 ½ hours.

On Father’s Day, June 21, I test flew the aircraft from the airstrip at Reedley College before quite a crowd of people. The aircraft performed flawlessly and before the end of the day, I had flown it about 4 hours, taking many friends for rides at the Selma Airport.

The airplane flies great and has all the characteristics of a good “stock” Stearman aircraft. It is tricky of the ground but handles exceptionally well in the air. Ailerons are very light, which makes rolls, lazy eights and any other maneuvers a real delight. It was

an absolute thrill flying the airplane that day after a 17-year restoration and continues to be exciting every time I fly her.

RESOURCES:

“Training the Naval Aviator”, by Capt. A. C. Read, FLYING and POPULAR AVIATION, January 1941

WESTERN FLYING, April 1941

“The Naval Air Factory”, by Capt. Holden C. Richardson, AERONAUTICS, volume 4, issue 23

WEB SITES:

<http://www.uswarplanes.net/pt13pt17.html>

<http://www.kansasaviationmuseum.org/media/presskit.pdf>