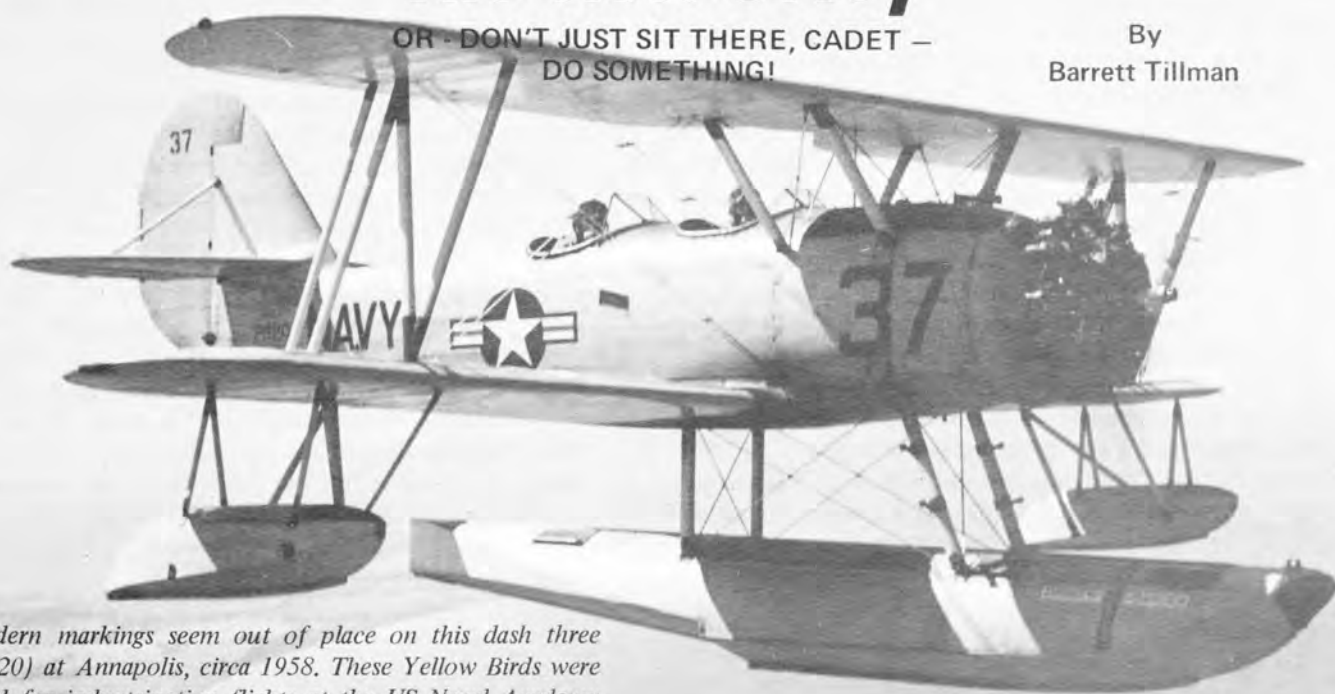


The N3N Story

OR - DON'T JUST SIT THERE, CADET -
DO SOMETHING!

By
Barrett Tillman



Modern markings seem out of place on this dash three (2920) at Annapolis, circa 1958. These Yellow Birds were used for indoctrination flights at the US Naval Academy until 1960. All were based on floats, later sold. (Photo: Peter M. Bowers.)

Development

One of the first trainers of all-metal construction, the mainstay of Navy primary flight schools in the late '30s and early '40s, and the last biplane in U.S. military service, all happen to be one and the same airplane — the N3N. Now, more than 33 years after its initial flight, the Yellow Bird is still going strong; not fast, but strong.

Designed and built by the Naval Aircraft Factory of NC-4 fame, the N3N was part of the Navy's increased pre-war aviation program. The need for a rugged, easily maintained trainer was plainly evident, and with this in mind the NAF engineers designed a conventional aircraft which incorporated numerous original construction features.

The basic design followed the accepted primary trainer criteria of the day: a single-bay, fabric-covered biplane seating two pilots in tandem arrangement. Departure from the conventional, however, was evident in replaceable wing-tips, all-metal construction, aluminum alloy main frame extrusions, and quick conversion from float to landplane. The conversion process, taking only two hours, was given a warm reception in the training command. An extra feature was removeable fuselage panels along the entire port side, making for ease of maintenance and inspection.

A Navy-built Wright Whirlwind engine rated at 220 hp powered the earliest N3Ns, but the vast majority were fitted with the 235 hp Wright R-760. Anti-drag speed rings were standard on nearly all Yellow Birds, but were usually discarded as they obstructed visibility and increased cruise speed by only five mph.



ABOUT THE AUTHOR

A sophomore at the University of Oregon and majoring in journalism, Barrett Tillman's interest stemmed from his first view of an airplane flying over the family ranch in Oregon — a Stearman Duster. A private pilot, Tillman owns and flies N3N (Bu Aer 2613). His father flew N3N's at Corpus Christi and elsewhere when a naval aviation cadet. At present, he is writing a series for IPMS on Fighter Aces' Aircraft.

(Photo - Author)



The first Yellow Bird, the XN3N-1 (BuAer 9991) as it appeared in 1936-37. (Photo: Peter M. Bowers).

The XN3N-1 (BuAer 9991) was delivered to NAS Pensacola for pre-acceptance trials in 1936. After modifications on the prototype, the first production batch, numbering 85 N3N-1s, began delivery that summer. An order for 25 more was cancelled before the second and third batches of 80 and 15 planes, respectively, were accepted. Dash one production terminated in Spring, 1938, with 180 examples being delivered.

Following construction of a single XN3N-2 (BuAer 0265), which incorporated a redesigned tail, the XN3N-3 was accepted in 1939. This was actually a modified dash one (0020) with the new tail and a simpler landing gear. The dash three was the most-produced version of the N3N, with 816 aircraft being accepted between April 1940 and January 1942. Total production, including prototypes, ended with 998 over a six-year period.

Into Service

Most Yellow Birds served at the Navy's primary and advanced flight schools well into the war, gradually being replaced by the N2S Stearman. By September 1941, however, with production in full swing, the N3N was reaching the apogee of its military career. During this period some 800 N3Ns had been delivered, including 339 to NAS Pensacola and 128 to NAS Corpus Christi.

By 1945 most N3Ns had been declared surplus and were bought by crop duster operations. About 100 were retained by the Navy. Many found their way to the U.S. Naval Academy at Annapolis where they were used as indoctrination trainers until 1960, the last biplanes in the U.S. armed forces.

The N3N wartime counterpart in the trainer role was the N2S Stearman, often based at the same fields as the Yellow Bird. Aviation cadets being what they are, it was no surprise when the N3N and N2S were pitted against each other in races and mock dogfights. The Stearman had an initial advantage in that it was over 200 pounds lighter (2940 vs. 2717), owing to its welded tube fuselage and wooden wings. The N3N was generally the faster of the two, however, because of its edge in horsepower and more streamlined fairings.

The Stearman's lighter wing loading and more sensitive controls allowed it to outmaneuver the N3N at almost any altitude. But the first commandment of air fighting is, not to play the other fellow's game. N3N pilots discovered that a steep dive and zoom-climb would give them the upper hand in dogfighting. The N3N's great structural integrity was such that a 7-G pullout at 174 knots (200 mph) could be accomplished without approaching the maximum 9-Gs for which it was stressed. The Navy's usual combat fighter tactics against Japanese aircraft were, in fact, based on much the same principal as the N3N used against the N2S. Once a Stearman jumped a Yellow Bird, the N3N pilot usually split-essed and dived out of range.

On landing, the N3N stayed planted, once the tail started down, but the N2S was prone to "float" even after flare-out. The consensus around flight schools was that your chances for recovery from a groundloop were much better in an N3N because the ailerons and rudder remained effective longer than those of a Stearman, due to their size. The N2S had only lower ailerons, whereas the N3N had both top and bottom, plus a rather large rudder.



Study of N3N-3 landing gear, simplified from earlier N3N-1. Track is 6 feet, wheel size 30x5. Note outward camber of the tires and 9-foot Hamilton Standard prop. (Photo: Author).

Flying The Yellow Bird

As for climbing in and flying the N3N, the pilot's handbook of 1 February 1940 gives a straightforward, if somewhat colorless, description of operations:

The N3N-3 airplane may be taken off, flown and landed in the manner of all conventional airplanes of this type. The flying characteristics of the airplane are normal in all respects, there being no special features incorporated that would require special attention.

The rear cockpit is especially roomy. Instrumentation is sparse but adequate, the main features being altimeter, tachometer, airspeed indicator, compass, turn and bank indicator, and a combination fuel and oil temperature/pressure gauge. The seats are adjustable vertically but not forward, resulting in a feeling that the stick is always just across the county line.

Communications between student and instructor were accomplished via the usual gosport system common to trainers of the period. In addition to placards in the cockpit, the instructor's goggles headband often carried the notation, Climb and Glide — 65 knots, on the pretext that if the student looked at the posterior of his instructor's head long enough (which he did) he would eventually learn the best climb and glide speed.

Starting procedure is the frustrating handcrank method, whereby a crank is inserted and vigorously turned until the inertia flywheel gains sufficient momentum and the starter T-handle is pulled. Some bases had a few 110 volt energizers for use in place of the crank, much to the delight of the fledgling Naval aviators. (Ask any pilot who learned to fly N3Ns if the APU wasn't the greatest labor-saving device since the plow.)

Takeoff and landing checklists are identical and placarded in the cockpits: mixture rich, fuel on, elevator tab set, and tail wheel locked. A zero-wind takeoff is usually made within 300 feet with immediate and positive aileron control. A neutral stick position with full throttle and 2,000 rpm is all that is needed to get the N3N flying, as it will easily lift off in the three-point attitude. The tail can be raised during the roll but it accomplishes little and will not appreciably shorten takeoff distance.

The dash three will climb 900 feet per minute and settle down to cruise at 87 knots (100 mph), at 1800 rpm. Aerobatics require some muscle but control response is positive and more than adequate through all standard maneuvers. A 10-turn spin in either direction can be recovered in one turn, anything less requiring only a quarter to half turn for recovery. The falling leaf was quite popular with students, as the N3N could easily be "walked" down with the large rudder.

Landings are best done using the full-stall technique, although there is no trouble "wheeling her on." After an extra check of the tail wheel lock, the Yellow Bird is over the fence at about 65-70 mph and stalls at 50 with a full load. If done perfectly, the tailwheel touches an instant before the main gear settles on, control response being good all the way down. N3N brakes leave something to be desired but are adequate on any sort of acceptable runway. Visibility on landing is better from the rear cockpit than the front. The instructor does not have as much horizontal reference as the student. The rear seat occupant can judge altitude and attitude effectively by looking over both bottom wings.

Navigation has intentionally been neglected until this time, as there is actually very little that can be said about getting the N3N from A to B. Suffice it to say that the best type of navigation is the time-honored IFR method (I Follow Railroads), keeping in mind the classic bit of Navy advice, "For heaven's sake, don't fly down the center of the track because you're bound to meet an Army pilot coming the other way."

How to land an N3N. Camera caught this privately-owned dash three (2613) at the instant of three-point touch-down. Compare extended shock absorbers with front view in number 2. Based at Pendleton, Oregon, this is only N3N with speed ring still flying. (Photo: Author).