



Ready or Not . . .

Naval Aviation's Aircraft and Ships on the Eve of Pearl Harbor

By Hal Andrews

Enterprise at Norfolk with its air group loaded aboard. Typical until 1941 was the half-monoplane, half-biplane composition: folded-wing TBD-1s at rear, then fixed-wing BT-1s, biplane SBC-3s, and F3F biplanes forward.

In early 1940, the newly winged Lensign Naval Aviator reporting to his first fleet squadron stood about an even chance of flying a biplane or monoplane combat-type airplane. This was at a time when the U.S. airlines were flying all their passengers in modern, all-metal, low-wing monoplanes. And the German Messerschmitt fighters, already proven in Spain, were wreaking havoc with their adversaries in the European fighting.

Joining one of 24 carrier squadrons, the four newest getting ready for the *Wasp* (CV-7) to be commissioned in April, the even chance prevailed. Only the four torpedo squadrons were fully monoplane equipped. They had been flying their Douglas TBDs, the first monoplanes in the carrier squadrons, for two years or more. Expansion and replacement had largely stocked the patrol squadrons (VP) with Consolidated PBY monoplanes; only four of 20 VP squadrons were still flying the older Consolidated sesquiplane P2Ys. For scout-observation pilots flying from battleships or cruisers, and for Marine second lieutenants, it was all biplanes.

The war in Europe, now several months old but at a temporary lull, had highlighted the advantages of the new,

higher performance monoplane combat aircraft. While getting less international attention, Japanese military operations on the Asian mainland and Formosa had done the same. Overall, though, the U.S. Navy's aircraft inventory wasn't that far behind the military aircraft of the rest of the world – particularly those of other navies.

Germany's Luftwaffe, Britain's Royal Air Force (RAF), France's L'Armée de l'Air, and the Japanese Army and Navy – and the U.S. Army Air Corps – had progressed further towards reequipping their front-line units with monoplanes, but many factors had affected military decisions on the transition from biplanes to monoplanes. Significantly, the now-vanquished Polish Air Force had been one of the first to make this transition, but had been overcome by numbers and the later, more advanced German fighters. The early French monoplane fighters were also not up to the front-line standards of the war. While clear evidence of aircraft modernization and its effectiveness was available from both Japan's Army and Navy air operations in China, it was generally downplayed, along with almost everything else Japanese.

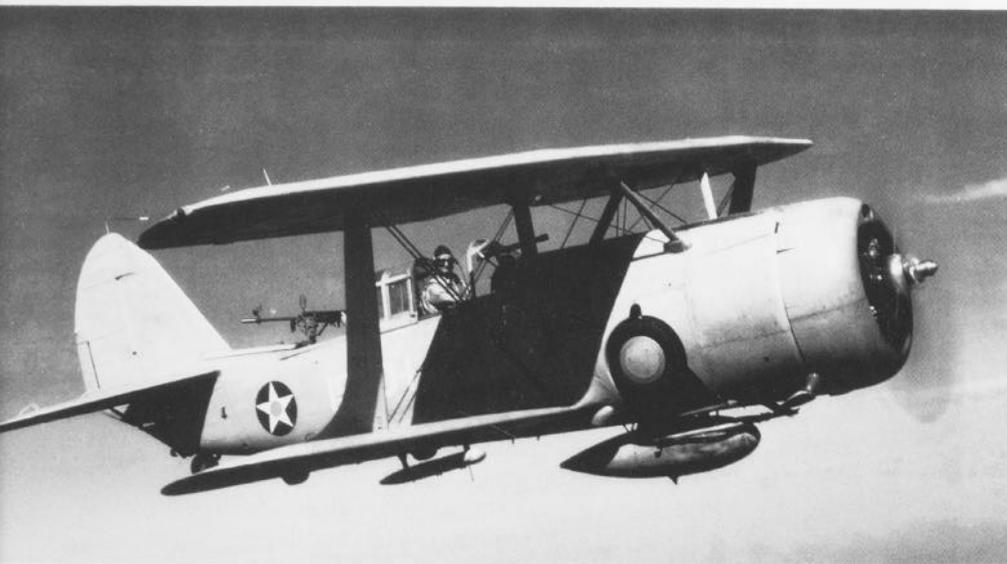
For those Navy pilots, fledgling or

experienced, who looked beyond the satisfaction of having achieved an important career goal in their assignment to a fleet squadron, concern with the reports of German and British fighter capabilities relative to those of their current aircraft was tempered by the knowledge that the U.S. was maintaining a neutral stance. And new monoplanes were on order, with design capabilities to match those of any potential combatants as they were known. In fact, the popular view – one has only to look at U.S. aviation publications of the period – was that the future airplanes in store for them were more than a match for the aircraft then in combat. The fact that torpedo-bomber pilots had to throttle back their TBDs and slow down to permit simulated attacks by their air group fighter pilots flying Grumman biplanes was only a temporary situation. While most of the Navy's first monoplane Brewster F2A-1 fighters had gone to help Finland in her fight with Russia, they would soon be replaced by an improved version, with Grumman monoplane F4F-3s to follow.

For confidence in what could be expected from the U.S. airplane manufacturers, it was obvious that the Douglas DC-3 transport was the standard of the world for airlines, with the companies already delivering new models of greater size and performance. Along with the Brewster fighters going to help the Finns, reports of the Curtiss *Hawk* 75A fighters bought by France were that they were doing the job against the vaunted German Messerschmitts. And the Army Air Corps would soon be getting Curtiss P-40s, a higher performance and better armed advanced model of the *Hawks'* P-36 equivalents. Furthermore, as discussed in the lead article of this series, "Ready to Mobilize" (*Naval Aviation News*, September-October 1989), events set in motion in 1938 were already acting to strengthen this country's naval – and Army – forces,



President Bush got his initial flight training in a Spartan NP-1, one of 201 which were among over 1,300 primary trainers ordered in Summer 1940.



On the eve of the Pearl Harbor attack, VMO-151 was still flying biplane SBC-4s; other Marine combat squadrons had completed transition to monoplanes.

including the accelerated transition to more effective – and more – ships and aircraft.

The focus of the carrier air groups was clear, and the scout-observation types were tied to surface operations of the fleet, but the issue of longer range operations in both the Atlantic and Pacific was more muddled. From actual war experience, bombing, scouting, and antisubmarine operations were all in the picture. However, roles and missions disagreements with the Army Air Corps entered in. Regardless, the need for the larger, faster, better armed flying boats on order was recognized. And lighter-than-air operations were being revitalized to explore their place in offshore and extended operations supporting the Atlantic Neutrality Patrol. Even the Marines could look forward to the early receipt of monoplanes to replace the mainstay of their air-to-ground strategy – the dive-bombers.

Recognizing that not only advanced models were involved, but many more of them were planned, training aircraft were also addressed. The initial low-wing monoplane trainers were in service; all were landplanes: first the initial fixed-gear North American NJ-1s, followed by their retractable-gear derivatives, the SNJ-1s. These would introduce the flight characteristics of the new fleet aircraft into pilot training,

which the traditional use of obsolete fleet types wasn't accomplishing; and there would no longer be enough of the latter to support the expansion of training under way. While still at peace here, it was an uneasy peace; the war in Europe and the Sino-Japanese conflict were all too real.

Spring ended the lull in Europe. Germany occupied Denmark and invaded Norway, where Britain responded with the first carrier action of the war – though their (and the Norwegian) fighters proved no match for the German Messerschmitts. In April, President Roosevelt announced his 50,000-airplane program, the same month that the *Wasp* was commissioned as the sixth active fleet carrier. In May,

Germany unleashed her Luftwaffe and Panzer divisions on the low countries and into France, skirting France's "impregnable" Maginot Line in another "Blitzkrieg" attack. With U.S. leanings clearly on the side of Britain and France – the 50,000-airplane program was seen to include quantities for their support – the country's neutrality was bent as far as possible towards helping them.

Further military sales were made with priority deliveries, including 50 biplane Curtiss SBC-4 dive-bombers withdrawn from the Navy – mostly from reserve bases – for the French. Late May and early June saw the evacuation of British forces, and many French soldiers, from Dunkirk back across the Channel, under the most intense air combat of the war up to that time. In June, France fell; with the armistice, German forces occupied much of the country, particularly along the Channel coast, with obvious intentions on England. Italy had meanwhile joined the war on the German side.

Against this background, and in keeping with the president's 50,000-plane program, Congress acted to further increase the armed forces. Naval Aviation would increase to 10,000 planes, with the accompanying carriers and auxiliaries. Considering the lead-time for trained pilots, aircraft, and carriers, major orders were placed for hundreds of training planes, along with large increases for current production combat models, and development and production of more capable advanced models. The first three of a



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new class of carriers were also ordered.

In July, Germany made its plans to invade England, recognizing that the first step was to eliminate her RAF fighters. This action – subsequently recognized as the Battle of Britain – began in August. Known only to those who needed to, the outcome of this battle would depend on a new "radio direction finding" system, along with supporting fighter direction centers that the RAF had established. Here, the Navy, led by the Naval Research Laboratory, had been pursuing this same "radio" technology on a similarly secret basis. Following trials of an experimental system with the fleet, action was under way on the first carrier installation – aboard *Yorktown* (CV-5). Out of the limelight, the British Tizard Commission visited the U.S., and a top-level exchange took place that month which resulted in major technology advances in both countries – with immediate applications to what would soon be officially titled "radar" by the U.S. Navy.

While the battles in the skies over England and the Channel raged, the first deliveries of their new monoplanes were of much more direct interest to Marine aviation personnel and to those flying and supporting battleship/cruiser seaplanes here. These were Douglas SBD-1 dive-bombers and Vought-Sikorsky OS2U-1s, respectively. The OS2Us, like their predecessors, could be flown as seaplanes or landplanes. Neither had the folding wings that would charac-



Early radar transmitter antennas on forward hull of a PBV-2 for tests in mid-1941 – insulated stubs carried the long antenna wires. Masts on top of rear hull carried the receiving antenna wires for the British radar system.

terize almost all subsequent new shipboard aircraft, and .30-caliber guns were major components of their armament, but they were otherwise typical in construction and basic features of those still to come. That month, a number of older destroyers were converted as seaplane tenders to support the wider ranging PBVs of the VP squadrons in both oceans.

Hitler canceled the German invasion plans in mid-September. The RAF pilots in their *Hurricanes* and *Spitfires*, with the fighter director's guidance based on radar to put them in the right place, had stopped the Luftwaffe's drive to vanquish them.

Casualties were high on both sides, and the margin slim, but the "few" had won the battle. The Luftwaffe was far from beaten, however, and the Blitz of London – night bombing – began. Elsewhere, the war expanded as the Italians, already fighting in North Africa, moved through the Balkans and invaded Greece.

The initial Martin PBM-1s, the first fleet aircraft with power turrets, entered service with VP-55. It was the beginning of a new generation of larger Navy flying boats promising increased performance, armament, and payload over those of the PBVs. Armor protection for patrol plane crew members was also being introduced. And *Yorktown* went to sea with its new radar.

With the trade of U.S. destroyers for bases in British possessions, VP Neutrality Patrol operations extended from Bermuda to Newfoundland, while the first new seaplane tender to support VP operations where bases weren't available, *Curtiss* (AV-4), was commissioned in November.

Two of the Wasp air group's airplanes taxiing at NAS Norfolk in January 1941: the recently delivered VF-71 F4F-3 in the new light gray paint, and an SB2U-2 still in its colorful VS-72 markings.



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Deliveries of the first of 200 improved PBV-1s ordered in December 1939 also promised to better meet VP squadron needs, and the first PB2Y delivered in December brought new capabilities. For the carrier squadrons, the first SBD-2s, with longer range than the -1s, and the initial F4F-3s were finally being delivered. And the first directive went out to replace the bright colors and markings of Navy combat aircraft with low-visibility paint – light gray overall, except blue/gray on the upper surfaces of patrol planes.

As 1941 unfolded, the war in Europe and Africa continued to escalate. Germany came to the Italians' support in northern Africa and the British were again pushed back towards Egypt. Small, and not so small, "victories" and new thrusts occurred on each side. Across the Pacific, tensions increased as the Sino-Japanese war expanded. The gradual increase in newer model aircraft in Navy fleet squadrons continued. After five months at sea with the new radar, *Yorktown's* C.O. reported its effectiveness and recommended that carriers be equipped with radar, along with special tracking and plotting facilities, and friendly aircraft with electronic identification devices.

By summer, Britain and her allies lost in Greece and Crete while the Middle East was secured. In the Atlantic, Germany's submarine warfare against shipping was causing the latest threat to Great Britain's survival. Lend-lease, initiated in March to provide greater help to those "whose defense was important to U.S. defense," made more military aircraft directly available, by now primarily to British forces. In June came one of the war's great surprises as Germany turned on her partner in the sack of Poland and invaded Russia.

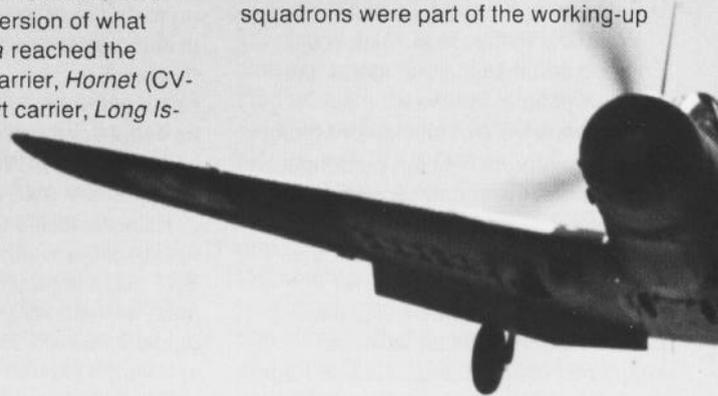
July saw an initial payoff of the Tizard Commission meetings of the previous year as the first PBVs and PBMs of Patrol Wing Seven were fitted with British radar systems.

Awkward as they were in both operation and installation (with their long, separate transmitting and receiving antennas at the low operating frequency, the former on insulated stub supports along the forward hull), they introduced both aircrew and ground personnel to a whole new capability for Navy airborne operations. With increased antisubmarine warfare operations, including those of the RAF Coastal Command and the use of radar, the shipping losses to German submarines and aircraft in the blockade of Britain were greatly reduced, but the submarines began to hunt more broadly.

Recognizing the difficulties of winter-time flying boat operations in the northern Atlantic, and with airfields available from the destroyers-for-bases trade, the Navy acquired 20 Lockheed *Hudsons* from British lend-lease allotments in October as PBO-1s to equip VP-82. With the official naming of U.S. military aircraft, its British name was retained, though this was not done in every case. The next month the first PBV-5A amphibian version of what was now the *Catalina* reached the fleet. Another large carrier, *Hornet* (CV-8), and the first escort carrier, *Long Is-*

land (CVE-1), converted from a merchant ship, were commissioned that fall. On the diplomatic front, relations between Japan and the U.S. grew worse and were reaching a standoff climax.

At the end of November 1941, the Navy counted up some 1,500 first-line combat planes in a total inventory of over 2,150 aircraft. The rest were trainers and support aircraft, those in the reserves, and various special-assignment and obsolete aircraft. The 1,500 filled out nine fighter, 14 scout/dive-bomber, and five torpedo plane squadrons in the air groups for the seven carriers, four each Marine fighter and dive-bomber and one Marine observation squadron, 23 patrol, and one scouting squadron for the new escort carrier. Included also were over 500 scout/observation seaplanes for battleship and cruiser operations, with more than half of these actually being used in seaplane training. The few scout/bomber biplanes remaining among the carrier squadrons were part of the working-up



A TBD is waved aboard *Enterprise*.

planes assigned to the new *Hornet* air group. The Marine ones were still flown by the observation squadron.

All the fighters carried four forward-firing .50 guns, the F4Fs having two in each wing while the F2As still carried two of theirs under the cowling, synchronized to fire between the propeller blades – as did the SBDs. While armor and self-sealing tanks were being installed in new production delivered carrier types, they were only beginning to be backfitted into squadron-assigned aircraft. External carriage on the wings was limited to one 100-pound bomb on each side, while the dive-bombers could carry up to one 1,000-pound bomb under the fuselage and the TBDs one MK 13 torpedo.

Catalinas made up almost all of the VP inventory – VP-55 with PBM-1 *Mariners*, VP-13 with PB2Y-2 *Coronados*, and the recently formed land-based VP-82 with PBO-1 *Hudsons* being the exceptions. The first PB5Y-5A amphibians were just coming into service with the San Diego-based Transition Training Squadron. Both .50 and .30 guns were fired by the gunners on the flying boats, all manually trained except for the .50s in the PBM and PB2Y power turrets. Maximum bomb loads varied from up to four

1,000-pound bombs on the PB5Ys, to six on the PBMs, and 12 on the PB2Ys. Alternatively, two torpedoes could be carried on any of the patrol planes.

While our Navy's strength was spread across two oceans, the main concern for carrier combat was in the Pacific, looking toward Japan. The make-up of their carrier fleet was known, but the air group inventory remained a question mark. It turned out to be formidable, particularly since it was all available for Pacific operations.

The Japanese carrier force operated in Carrier Divisions, basically each division having a pair of carriers and a complement of aircraft. Three main Carrier Divisions, each with two large carriers, were equipped with the latest aircraft. Each carrier's complement included 18 fighters, and 18 or 27 each torpedo-bombers and dive-bombers. The fighters were Mitsubishi A6M2 Type Zeros of later renown, the torpedo-bomber Nakajima B6N2s which turned out to be considerably more capable than our TBDs, and the dive-bomber Aichi D3A1s whose fixed landing gears contrasted with the otherwise clean lines of all of these Japanese carrier aircraft. While the D3A1 (later code named *Val*) was in all ways inferior to the *Dauntless*, the

Zero, like the B6N2 (later *Kate*), would turn out to have combat performance superior to its USN contemporary, the *Wildcat*. Some of this was due to its lighter construction, and it was not equipped with armor or self-sealing fuel tanks. But it was also aerodynamically and structurally a most efficient and effective design.

Two other Carrier Divisions operated a total of three light carriers, each with one smaller squadron of fighters and one of torpedo-bombers – mostly older models at that time. Having a large number of island bases, a considerable number of land-based bombers, reconnaissance aircraft, and fighters were operated from these, plus a limited number of long-range flying boats. Along with these long-range, monoplane seaplanes, a large number of single-engined, short-range biplanes were also operated from the bases, as well as from various ships – and a few small two-place monoplanes from submarines with special watertight hangars.

On December 7, 1941, aircraft from the six carriers of the Japanese Navy's First Air Fleet attacked Navy and Army bases in Hawaii. Ready or not, Naval Aviation entered World War II. Fortunately, our carriers were at sea. Significantly, with minimum additions and having lost one carrier in the Battle of Coral Sea, the carriers and aircraft of the U.S. fleet were substantially the same when they handed the Japanese their most important – and worst – defeat of the war at Midway six months later. ■

50 Years Ago – WW II

February 15: The Commander in Chief, U.S. Fleet, noting that reports on air operations in the European war stressed the need for reducing aircraft vulnerability, recommended that naval aircraft be equipped with leakproof or self-sealing fuel tanks and with armor for pilots and observers. Although the Bureaus of Aeronautics and Ordnance had been investigating these forms of protection for two years, this formal statement gave added impetus to the accelerated procurement and installation of both armor and self-sealing fuel tanks.

