naval aviation news

70th Anniversary Naval Aviation

MAY 1981


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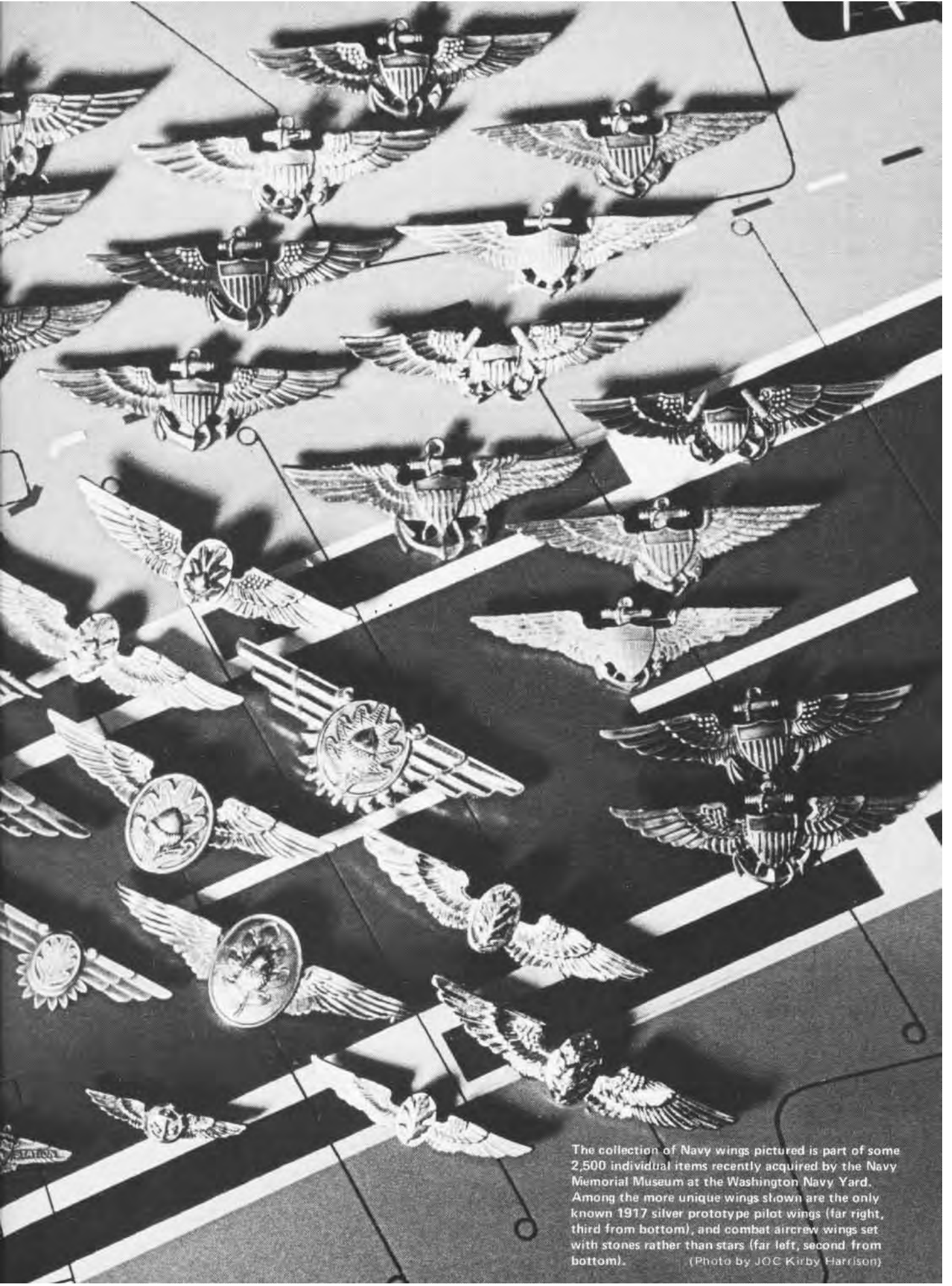

The collection of Navy wings pictured is part of some 2,500 individual items recently acquired by the Navy Memorial Museum at the Washington Navy Yard. Among the more unique wings shown are the only known 1917 silver prototype pilot wings (far right, third from bottom), and combat aircrew wings set with stones rather than stars (far left, second from bottom). (Photo by JOC Kirby Harrison)

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Sixty-Third Year of Publication

Vice Admiral W. L. McDonald Deputy Chief of Naval Operations (Air Warfare)

Vice Admiral E. R. Seymour Commander, Naval Air Systems Command

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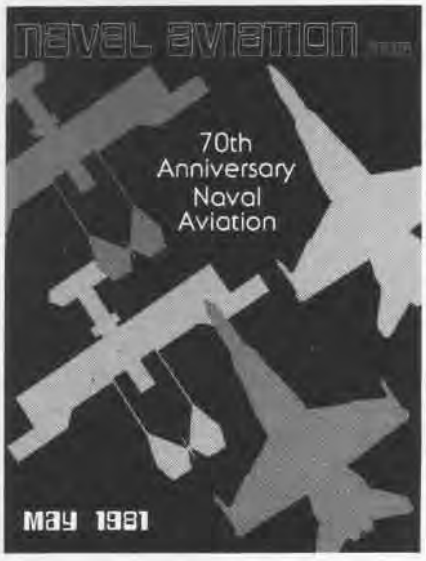

Wraparound cover by NANews Art Director Charles Cooney contrasts A-1 Triad with F/A-18 Hornet to commemorate 70th anniversary of Naval Aviation.

Features

Departments

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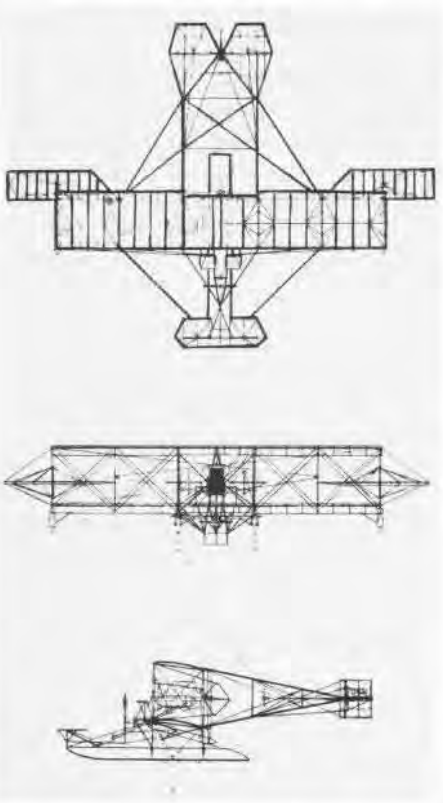
From the

EDITOR'S NOTEBOOK



On May 8, 1911, Captain Washington Irving Chambers, who had cognizance over aviation correspondence and activities, prepared requisitions to purchase two biplanes from inventor Glenn H. Curtiss of Hammondsport, N.Y. The first, which became known as the *Triad*, would be capable of taking off from or alighting on either land or water. Over time, this date has come to be accepted as the official birthday of Naval Aviation.

Establishing the exact date when it all began was not as simple a matter as it may have seemed at first. Some maintained that August 30, 1913, was a more appropriate starting point. On that date, the General Board headed by Admiral George Dewey recommended "the establishment of an Air Department in the Navy." On October 9 of that year, then acting Secretary of the Navy Franklin D. Roosevelt appointed a board of seven officers to "draw up comprehensive plans for a Naval Aeronautics Service." *Naval Aviation News* of November 1946 solemnly declared that August 30 was the correct date of birth.

There have been other ideas on the subject. One writer opined that Naval Aviation began on December 23, 1910. That was the date when Lieutenant Theodore G. (Spuds) Ellyson was ordered to report to the Glenn H. Curtiss Aviation Camp at North Island, San Diego, for flight training. November 14, 1910, the date of Eugene Ely's flight from the deck of USS *Birmingham* and January 18, 1911, which marked Ely's subsequent landing on and takeoff from USS *Pennsylvania*, were also attractive candidate dates for enshrinement. And there were several other possibilities. Clearly, a decision was in order.

The Navy chose May 8, 1911, as the official birthday. In 1961, no less an authority than the U.S. Post Office Department made it irreversible with a commemorative stamp proclaiming 1911 as the official birth year of Naval Aviation.

The A-1 *Triad* was completed in June and underwent trials in early July 1911. Captain Chambers had arrived in Hammondsport on the first day of that month and was on hand to see Lieutenant Ellyson qualify for his Aero Club of America pilot's license in this aircraft the following day.

The A-2, originally configured as a landplane trainer, was completed later in July. An interesting story is told regarding the construction of these two Navy aircraft.

There was no formal and complete set of plans for the A-1. Instead, Curtiss craftsmen worked largely from sketches which the inventor drew on the whitewashed wall of his workshop. At about this time, a new employee was hired and, being a conscientious man, he observed that the wall was covered with unsightly scribbles and smudges. Here was one place he could make an immediate and noticeable contribution to the fledgling company. When Curtiss came back to the shop one day he found that his drawing had been completely obliterated with a sparkling coat of fresh whitewash.

It was certainly an inconvenience but hardly a catastrophe. A new set of drawings with perhaps a few improvements were quickly sketched and the Curtiss production line was soon in business again. That was the way things were done in the aviation industry of 1911.

And so Naval Aviation was born.

DID YOU KNOW?

Awards

HT-8, NAS Whiting Field, Fla., has received the 1980 Vice Admiral John H. Towers Flight Safety Award. The Daedalian-sponsored honor, named for one of Naval Aviation's foremost pioneers, is presented annually to the Naval Air Training Command squadron which has achieved the most outstanding mission-oriented safety record during the fiscal year. The Order of Daedalians, headquartered at Kelly AFB, San Antonio, Texas, is dedicated to America's preeminence in air and space, flight safety and esprit de corps in the military air forces.

New SecNav Outlines Plans

Secretary of the Navy John F. Lehman, Jr., recently outlined his plans for the Navy by advocating 15 carrier battle groups and increased pay as primary conditions for a stronger Navy. He told a Navy League audience in Washington, D.C., "We must restore naval superiority . . . first and foremost in the priority . . . is people." He went on to say that his second priority is to begin at once to put together a procurement program which allows for major increases in shipbuilding, aircraft and weapons procurement. Secretary Lehman stated, "We are going to restore our maritime forces by building promptly to a 600-ship Navy . . . and increased amphibious assault capability." Remarking on the country's strong military industrial base, Lehman said, "It's time for a new assertion of responsibility and self-discipline on the part of the defense industry if we are going to expand . . . if we are going to re-arm."

Uruguayan Navy

The Uruguayan Navy has taken delivery of its first turbine-powered plane, a Beechcraft *Super King Air* maritime patrol aircraft. The plane will be used in search and rescue operations and to monitor fishing in Uruguay's coastal

waters. Fishing is a major industry and represents one of the country's major exports.

The *Super King Air* is uniquely suited to the Uruguayan Navy's mission requirements. A surface-search radar, mounted in a radome under the center of the fuselage, has a 360-degree scan and provides significantly better detection capability than conventional weather-radar systems. The aircraft, with

tip-tanks and a standard fuel system, can fly to a search area 50 nautical miles from its base at 25,000 feet and remain over the search area for 9.3 hours before returning to base with a 45-minute fuel reserve. A low-altitude mission at 2,000 feet gives a search endurance of 6.6 hours with a 45-minute fuel reserve.

Harpoon to A-6 Squadrons

Two McDonnell Douglas *Harpoon* antiship missiles are mounted on this A-6 *Intruder* between the fuselage and the outboard fuel tanks. Six *Harpoon* missiles were launched successfully from A-6s during recent tests off the coast of Southern California. The free-flight reliability rate for the missile now stands at 87 percent in 151 launches and 93 percent in the last 73 launches. *Harpoon* is scheduled for operational deployment in Navy A-6 squadrons later this year.

The *Harpoon* missile is already deployed on 93 destroyers, frigates and cruisers, 29 nuclear attack submarines and 39 P-3 patrol aircraft. At present, the

McDonnell Douglas Photo

Navy has about 250 A-6s in its inventory. Fifty of them are programmed to be fitted for *Harpoon*, the balance at a later date.

The addition of the *Harpoon* to the A-6E arsenal will enhance the aircraft's ability to survive in battle because it will be able to attack enemy ships from a safe range. It will also be able to defend carrier battle forces at distances beyond the reach of enemy ships equipped with antiship missiles.

Soviet Strength Increases

Director of Naval Intelligence Rear Admiral Sumner Shapiro told the House Armed Services Subcommittee on Seapower and Strategic and Critical Materials, on February 26, that the Soviet military challenge is one we can no longer ignore. RAdm. Shapiro said he sees the continuation of a number of trends in the Soviet Navy:

- Construction of larger, more capable, more versatile surface ships.
- Development of a large, nuclear-powered aircraft carrier much like our own which is capable of handling high-performance aircraft.
- General stability in the number of Soviet submarines, but the replacement of older, more vulnerable subs with several technologically sophisticated classes such as *Typhoon* SSBN, *Oscar* SSGN and *Alpha* SSN.
- Improvement in power projection, amphibious lift capability and sea-based aviation capabilities.
- Expanded access to overseas support facilities in forward deployment areas.

Grampaw Pettibone

Slip Sliding Away

As the 53,000-pound F-14 *Tomcat* was being towed by a spotting dolly from elevator #4 into the hangar bay, the aircraft and dolly began to skid. The director blew his whistle, gave the emergency stop signal and the plane captain quickly applied the aircraft brakes. The aircraft stopped with its main mounts 18 feet inboard of the edge of #4 elevator well. The safety observer then directed the plane captain to ride the aircraft brakes lightly as they again attempted to move forward. After approximately seven feet of roll, the dolly again began to skid. Emergency stop signals were again given by the safety observer and director. The plane captain applied the aircraft brakes and the dolly driver applied his emergency brake, but the aircraft and dolly continued to slide. Fearing brake failure, the plane captain began working the hydraulic hand pump to ensure good brake pressure. The aircraft, with wheels locked, continued to skid and pushed the dolly forward, forcing it to jackknife 90 degrees to the right. The chock walkers had difficulty getting the chocks under the skidding wheels of the moving aircraft. After several tries, the chocks were in place but were merely pushed along in front of the wheels. Several individuals, at considerable personal risk, attempted to stop the aircraft by pushing on the port intake and main mount. The dolly driver tried to pull the nose of the aircraft away from the #3 elevator well. However, the dolly could not gain traction. All attempts to stop the aircraft were futile and the safety observer yelled for all hands to get clear. Blue shirts jumped clear from both main mounts, the driver leaped

off the dolly, and the plane captain jumped from the cockpit as the aircraft and dolly approached the elevator opening. The aircraft and dolly continued sliding, striking an elevator security stanchion, and sliced through the steel restraining cable. The nose wheel continued over the edge, dropping the fuselage onto the elevator well lip. As the F-14 continued to nose over, the vertical stabilators contacted the top of the elevator well. It balanced there momentarily and then fell, impacting the water inverted, and sank within seconds.

Grampaw Pettibone says:

Holy suffering *Tomcats*! If this cat *had* nine lives, they were all used up in one fell sploosh!

This aircraft traveled a distance of 113 feet across the hangar bay and slid out the opposite elevator door. During the last 90 feet of travel, it was sliding out of control.

The ship was steady on course but had a 1.5-2.0 degree of starboard list, coupled with a one-to-three degree of heel, equating to approximately a five-degree starboard list.

The overall condition of the hangar deck nonskid was reported to have been satisfactory but just a bit slicker than normal. On the night prior to the mishap, a massive spill of ethylene glycol from the arresting gear machinery occurred just forward of this area, but it had been cleaned with swabs and speedy-dry.

During aircraft movement, there is no good way of predicting the onset of vicious hydroplaning short of sliding an aircraft across the deck, which is exactly what this crew did. Only minutes before, another aircraft was moved from this same spot and experienced sliding. When the F-14 was first pulled into the hangar bay, it began to slide. Maybe this *Tomcat* should have been caged at this point! A couple of lessons learned in this mishap were: (1) As good as they may be, the SD-1D spotting dollies just don't have the power or traction required to move high-gross-weight aircraft about on a slippery deck, and (2) aircraft chocks are ineffective for stopping a sliding aircraft. Old Gramps knows both of these facts to be true as they have been documented many slides and crunches ago. But another fact is also true: Until we have better equipment in hand, we have to rely upon the wisdom of man to overcome the shortfalls of the machines. The problems associated with moving aircraft about a carrier have plagued our Bird Farms for as long as I have been growing a beard and, occasionally, we need reminding. But, dang it all, gang, two such occurrences within a year is a bit of an over (the side) kill!

As a word in defense of this crew who, for whatever reason, let this one slip through the crack, maybe we have heaped impossible responsibilities

ILLUSTRATED BY Osborn

upon them. If either of these two mishaps occurred under the guise of operational commitments, tempo of operations, can-do attitudes or inadequate support equipment, then perhaps we had better slide the tempo to a halt until we get it all in one sack, mates. Old Singed Whiskers thinks it is high time we made conservation of critical assets a serious partner in today's aviation business.

Spin Training

The pilots were scheduled for a basic aircraft maneuvering tactics flight in two F-4 *Phantoms*. The NFO scheduled to fly in the back seat of one was replaced by a pilot, since the flight was to terminate at another field in order to ferry an F-4 back to home field. Following a normal brief, preflight, start and taxi, the two F-4s departed for the training area.

After entering the training area, one of the F-4s set up on the left "perch" for a barrel-roll attack on the other *Phantom*. The pilot commenced his attack which was countered by a hard turn into him by the other F-4, forcing a mild overshoot.

After a series of reversals and counter reversals, the F-4 under attack turned left at a high angle of attack with full left rudder. To increase his turn rate, the pilot used some opposite aileron, at which time the F-4 departed to the right and entered a right spin.

At spin entry, the altitude was approximately 10,000 feet, airspeed fluctuating between 0 and 80 knots and angle of attack pegged at 30 units. The pilot immediately neutralized the controls and put the stick forward to unload. He then deployed the drag chute, which had no noticeable effect on the aircraft. Full forward stick, right aileron and neutral rudders were then employed.

At approximately 7,500 feet, the pilot told the back seat pilot to eject, which he did by utilizing the lower handle.

The two pilots experienced a normal ejection sequence and landed safely in the water close to each other. Two helicopters in the area responded immediately. Each aviator was picked up by a separate helo and returned to the home field dispensary.

Grampaw Pettibone says:

Jumpin' Jehoshaphat! With pilots like this one on our side, we don't need enemies! Where the heck did this pilot get his aerodynamics trainin'? Maybe he slept through the lectures. The cause of the accident was simple: a pilot-induced spin by the use of cross controls at high angles of attack – *in violation of a warning in NATOPS!*

Some drivers fail to understand that in actual "fighting the airplane," you lose if you spin. It is regrettable that in this day and age we lose aircraft in this manner. Bein' aggressive is certainly desirable, but this gent failed to recognize the fine line that separates aggressiveness and plain foolhardiness. (Reprint from *NANews*, June 1974.)

Photo by JOC Kirby Harrison

From the Air Boss

This article has been adapted from a Naval Aviation briefing for industry delivered by VAdm. Wesley L. McDonald, Deputy Chief of Naval Operations (Air Warfare) on December 2, 1980.

Naval Aviation has come a long way in 70 years. The striking contrast between the Curtiss A-1 *Triad* of 1911 and the McDonnell Douglas F/A-18 *Hornet* of 1981 provides a rough idea of the progress we have made in terms of technology alone.

The airplanes we fly may be more sophisticated than those flown by Ellyson, Rodgers, Towers and a host of others, but our problems are basically not too different in many ways. We are still talking about people and airplanes, and how best we can blend the two together to get the most national security for the taxpayer's dollar.

I think everyone recognizes that, today, we are stretched awfully thin. We have, for example, only 12 carrier air wings which provide us an adequate one-and-one-half-ocean capability. Unfortunately, we now have a three-ocean requirement. To cover our commitments, we have had to draw carriers from both the Mediterranean and the Pacific to fill the gap in the Indian Ocean.

This problem of having too few assets to go around is not limited to our carrier forces. For example, we have only 24 VP squadrons to cover our many, and increasing, long-range ASW and other patrol responsibilities. To this, we have some excellent Reserve backup but, here too, we are running a little short.

We have all read in the newspapers that the new administration is going to solve all of our security problems with truckloads of money. Even if this were so, I still think some shortages will be with us for quite a while. First of all, it takes time to develop and produce all the new weapons systems and equipment we need. Secondly, while it looks like we are going to have some increased defense spending, we are going to have to use this new funding

wisely. There will be many competing programs and, in this time of general austerity in the federal budget, it seems unlikely that we will be presented with everything we want. There really is no Golden Goose in Naval Aviation and consequently there are never going to be enough dollars to completely fund all of the programs which seem absolutely essential. We will continue to have to spread the available money around in a prioritized manner.

One of the things we are paying a lot of attention to is the development of systems which will also provide us with a payoff in people. The F/A-18, for example, is showing tremendous gains in reliability and maintainability. The projections are that the manning in an F/A-18 squadron will be about 20 percent less than the manpower required to operate the same number of A-7s in a fleet squadron.

In any assessment of Naval Aviation today, we have to talk a little about our starting point. I would say that our inventory, which includes aircraft like the F-14, E-2C, A-6E, EA-6B, S-3A and the P-3C, is a superb testimony to American technology. Although the procurement of these systems, as you well know, has been lagging behind our requirements, I now think we are finally moving out smartly to get ahead of the bow wave. If the 1981 budget will stay as it is, and the plans for 1982 come to fruition, we should enjoy a dramatic turnaround from our position several years ago.

For the most part, we are looking at a fairly modern force, especially with the forthcoming introduction of the F/A-18 and the introduction of the SH-60B as the airborne part of the LAMPS MARK III system in 1984. And we are constantly updating all of our capabilities.

But when we view our assets in terms of the future, we are looking at a force that will be starting to retire in the 1990s. It is here in the 1980s, now, that we have to move out and develop the technology which will provide us with the weapons systems that will ultimately take us into the 21st century.

Let's talk for a few moments about new systems, some of which we are already beginning to see. I have mentioned the F/A-18 which will replace the F-4 and A-7. The first Fleet Readiness Squadron (FRS) of F/A-18 *Hornets*, VFA-125, was established in November of last year. This squadron will start transitioning fleet squadrons in 1982. A second FRS, VFA-106, is programmed for NAS Cecil Field in FY 84, and a third is planned for MCAS Yuma in FY 86 or 87.

Our new LAMPS MARK III SH-60B helicopter is demonstrating tremendous potential in the ASW field. This ship/air system is now undergoing extensive testing and we expect to have it operating in the fleet in the near future. Like the F/A-18, the SH-60B has been designed for greatly increased reliability and maintainability. For these reasons, and its greatly improved performance over existing systems, it should also pay off handsomely in terms of both manpower and dollar savings over the long term.

We are in the process of developing a new advanced flight training aircraft and training system, VTXTS, to replace the T-2Cs and the TA-4s. Conceptually, the aircraft

SH-60B Seahawk during sea trials.

in the system will be small, fast, maneuverable, and the cockpit will have many state-of-the-art items to be found in operational aircraft. It will burn considerably less fuel and, as part of a comprehensive training system, will provide the new aviator with the exposure he needs to transition smoothly and expeditiously into fleet aircraft. Again, we are attempting to make long-range savings in man-hours and operating costs, while at the same time doing a better job than we have been able to do before.

In the mid-1990s, we will need a new aircraft to replace the F-14 and the A-6. We will also need something to replace the S-3, the E-2, the KA-6 and even the COD aircraft. And last, but certainly not least, we will need to look for an advanced maritime patrol aircraft to replace the P-3. Upgrading the P-3 even further is an option that we are also examining.

Meanwhile, as a strategy for the near term and as a consequence of fiscal realities, we are going to have to extract maximum use from existing systems. This probably means extending some of the systems which can still be operationally exploited while we work on replacements.

We are looking for maximum commonality in all our systems and are independently developing only those new items whose requirements are unique to Naval Aviation. This means making maximum use of off-the-shelf equipment without foreclosing on any of our options for new development when such new development is warranted.

The question of V/STOL is on everybody's mind, and there are many who are wondering what the Navy intends to do with this concept. I think it is obvious that V/STOL aircraft cannot be substituted as an immediate replacement for our current conventional carrier aircraft. For one thing, there is just too great an investment involved in our current force and the cost of immediate replacement is prohibitive. Further, the technology has not been developed to the point where we can abandon conventional systems in anticipation that the perfection of V/STOL is just around the corner. We have no intention, at this time, of substituting

Photo by JOC Kirby Harrison

"...our most important strength for the future lies in our people, not only those who fly the airplanes, but those who maintain them. The best weapons systems in the world are only as good as the people who make them perform."

XV-15 NASA Photo

smaller V/STOL carriers for big deck carriers. This does not preclude, however, reactivation of a carrier like *Oriskany* to augment our big deck carrier force. Such an addition will enable us to put more tactical air at sea in the near term, when we need it, and in fact provide us with the only CV force building option available in the Eighties. Further development of smaller carriers to augment our big deck force definitely is in our plans for the future.

V/STOL clearly offers great potential and, with this in mind, we are moving ahead to design some of the aircraft that will bring this technology forward for a decision in the next few years. V/STOL is going to be an important factor in our planning considerations during the 1983-87 time-frame.

It appears that now is the time to exploit technology to get that all-important fighting edge. We are looking for the kind of technology that will allow us to do the job better with greater reliability and minimum costs. We want the technology which gives us the long-term lead that cannot be countered easily and that forces the Soviets to spend more time and money developing defensive rather than offensive systems. And, finally, we need the technology which permits Naval Aviation the flexibility to adapt to the wide variety of scenarios that confront us and which will enable us to deal with a spectrum of threats ranging from first-line Soviet forces to those we will find in third world countries.

We are going to have to work under a system of priorities which takes into consideration the constraints we face in both people and dollars. Our first priority should be the development of a credible offensive punch and the associated systems that permit us to deliver that punch. Right behind that has to be our commitment to reliability. The threats we face can saturate us with pure numbers, so it is absolutely essential that we can count on our systems to perform reliably in the face of quantitative superiority. We must sequence our priorities because we cannot develop a large number of systems concurrently. Today's R&D costs are just too high. We must also strive for commonality of components. That may mean fewer new systems in the future, but will result in significant savings in cost.

All of us need to realize that Naval Aviation is only one element, albeit an important one, of our overall naval force. We must evaluate our candidate systems against proposed improvements in other components of the Navy. Better yet, we must learn to determine how to better exploit the systems which have already been developed for surface and subsurface forces. We must find out, for example, how we can more fully exploit the surface ship or submarine-launched *Tomahawk* missile system, or how we can use satellite technology or improve our ASW capability with information generated by towed arrays.

One important improvement, which has taken place specifically to pull all of the development areas together,

is the establishment of the Directorate of Naval Warfare (OP-095). This organization is designed to give us a coordinated and cohesive program which takes into account surface, subsurface and air warfare aspects of weapons systems development.

What are some of our needs for the future? For one thing, the whole arena of standoff weaponry: the weapons, the fire control systems and the surveillance systems. But keep in mind that we will never be able to do everything by standing off. You can beat defenses down. You can neutralize them to some degree. But, somewhere along the way, somebody is going to have to fly over that target. We have to develop tactics and systems to complement *Tomahawk* and other standoff weapons, so that we can assure the destruction of the enemy's systems.

The ability of our carriers to operate at sea for extended periods is another important requirement. This demands an improved COD aircraft.

We need more fuel-efficient engines. We also need more aerial capability to dispense fuel, particularly with the F/A-18 and other multi-engine aircraft coming into the force in larger numbers.

While we have a plethora of needs, we also have a number of strengths which make me optimistic that we will overcome our problems in Naval Aviation and maintain the kind of war fighting capabilities that we have prided ourselves on in the past.

First of all, we have a strong Navy-industry team working to solve our many problems. Secondly, we have the kind of technology that gives us a qualitative edge. This technology is continually advancing, providing us more innovations, better performance, better reliability, smaller component size and even, in some cases, cheaper unit prices.

But our most important strength for the future lies in our people, not only those who fly the airplanes, but those who maintain them. The best weapons systems in the world are only as good as the people who make them perform.

In summary, I think it is important to reemphasize the obvious – that the task ahead is not an easy one. Putting together the kind of force we need for the coming years will be fraught with many problems – problems involving people, weapons systems and dollars. It is important, however, to put all of this in the context of Naval Aviation history, and remind ourselves that the past 70 years have included times of serious difficulties, as well as many accomplishments. Some periods have been especially tough and we have often faced withering criticism. But, through all of this, I am positive that even our most vociferous critics never seriously questioned our motivation, dedication and professionalism. That is why Naval Aviation has survived over the years and has established the reputation for excellence which all of us are the proud beneficiaries of today.

F/A-18 Hornet

Time Flies

70 Years of Naval Aviation

By Clarke Van Vleet

When manned flight first became a reality, it brought vast changes into man's life. The ability to fly lifted him out of the horse and buggy, and eventually took him to the moon. The changes are still unfolding and are expanding ever farther into space.

From the beginning, as man looked skyward he envied the bird, free in his flight. After the French made the first ascent in balloons in 1783, Thomas Jefferson observed that the new discovery could lead to "transportation of commodities; traversing deserts, countries possessed by an enemy; conveying intelligence into a besieged place, or perhaps enterprising on it; reconnoitering an army; etc."

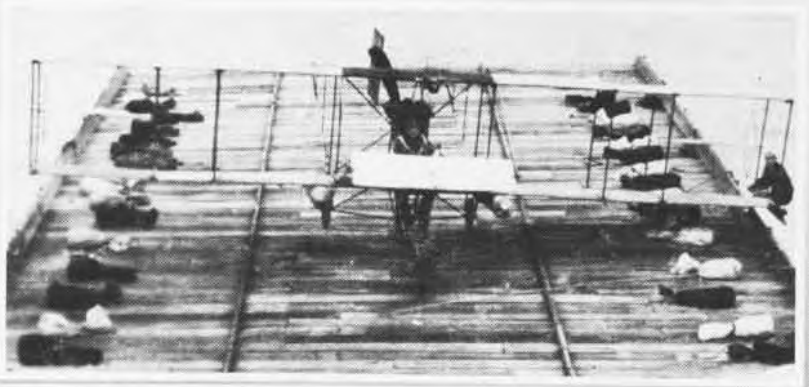
Kite flyer Benjamin Franklin also mused, "And where is the Prince who can afford so to cover his Country with Troops for its Defense, as that ten thousand Men descending from the Clouds might not in many Places do an infinite deal of Mischief before a Force could be brought together to repel Them?"

Many years later, in 1861, John LaMountain ascended in a balloon moored to the deck of the Union transport *Fanny* to observe Confederate positions — the first sea-based aerial reconnaissance. And Thaddius Lowe went aloft from a specially constructed boat which carried an observation balloon.

As the art of aeronautics progressed, men began working on "flying machines." Finally, in 1898, Assistant Secretary of the Navy Theodore Roosevelt recommended the appointment of naval officers to an interservice board to investigate the military possibilities of Professor Samuel Langley's winged vehicle. By 1909, six years after the world's first sustained flights in a 16-horsepower machine flown by the Wright brothers, a group of officers was urging the purchase of aeroplanes by the Navy.

Then, in 1911, Glenn Curtiss and Eugene Ely dramatically demonstrated to the Navy and to the world that the aeroplane was capable of shipboard operations, that aviation could go to sea. And on May 8, that same year, the Navy ordered its first airplane. The A-1 *Triad* was a 60-mile-per-hour machine of rubberized linen, sailcloth, bamboo and wire, and a number of other more important materials that comprised its main structure. That day marked the official birth date of U.S. Naval Aviation.

The small naval air arm developed rapidly. The Navy's first attempt to launch the A-1 from a compressed air catapult at Annapolis in 1912 was a failure as a crosswind blew it into the water. However, a subsequent launching the same year was a success when the A-3 piloted by Ellyson was launched at the Washington Navy Yard. A successful



Top, Ely landed shipboard in 1911 proving that aviation could go to sea. Below, U.S. Naval Aviation recruiting poster circa 1918.

test with a Curtiss flying boat followed a month later.

The first call to action came in 1914 when President Woodrow Wilson ordered elements of the Atlantic Fleet to Veracruz during the Mexican crisis. A contingent of aviators, men and planes was shipped with the fleet from the embryonic naval air force then at Pensacola (consisting of 6 officer pilots, 4 student pilots, 23 enlisted men and an assortment of 8 aeroplanes). Their mission was to search for mines, photograph the harbor and reconnoiter enemy positions inland from Veracruz. A "first" was chalked up when one of the planes returned from a mission with sniper-fire bullet holes in its wings — first marks of combat on an American aeroplane.

That same year, WW I erupted in Europe. When America entered the conflict on April 6, 1917, the Navy had only one air station in operation, 48 qualified and student aviators, and 54 aircraft. Expansion was unprecedented. Thousands who enrolled in the Naval Reserve Flying Corps became pilots, ground officers, mechanics and technical specialists.

A Naval Aviation unit was the first military detachment from the U.S. to reach France. Twenty-six American naval air stations were established in Allied countries. By war's end, Navy and Marine pilots had flown more than three million miles of war patrols, and had sunk or damaged 12 of the enemy's U-boats.

Development of the long-distance flying boat was a by-

F4U-4 Corsairs prepare for sunrise serenade over North Korea, 1950.

WW I Curtiss F-5L was standard Navy patrol boat during the 1920s.

F6F Hellcat fighters served on WW II carriers.

product of the war. Although the big Navy-Curtiss (NC) planes were finished too late for the war, one of them, the NC-4, made a trailblazing transatlantic crossing in May 1919. It dramatized the progress of aviation in general and Naval Aviation in particular.

Technical progress characterized the Twenties — the radial-cooled engine, better radio communications, a bomb-sight, oleo struts, folding wings, a turntable catapult and dive-bombing techniques. Torpedo attack, scouting, spotting for gunfire and the application of aviation to polar exploration and photographic survey were also developed during those years. By the end of the decade, the United States had its first three aircraft carriers — *Langley*, *Lexington* and *Saratoga*.

As the Thirties drew to a close, ominous rumblings of war again echoed across both oceans. Naval expansion was authorized and the pilot training program stepped up. The attack on Pearl Harbor on December 7, 1941, demonstrated the power of sea-based aviation as Japanese carrier planes, in one swift blow, devastated America's principal naval base in the Pacific and eliminated a major portion of the Navy's heavy surface power.

However, aided by her distance from the enemy and fortunate in her industrial might, America rallied and built the ships, planes and equipment, and trained the land, sea and air forces which ultimately led to victory.

TBM Avengers aboard ASW escort carrier during the war.

Search, attack and ASW aviation called on patrolling Catalinas and blimps.

SB2U returning to Ranger (CV-4) after ASW patrol.

While flanked, and thus protected, by two oceans, these vast seas still had to be scouted to be effectively controlled. Whereas in WW I the early flying boat did the job around the British Isles, patrol aviation in WW II expanded to cover virtually all waters of the globe — from the thousand-mile frozen front of the Aleutians to the sun-baked Solomons, from the Bay of Biscay to the Bay of Bengal, from the vital shorelines of North America and the convoy routes of the Atlantic to the vulnerable sea lanes of the Caribbean. With a variety of missions and planes, along with five fleet airship wings, 17 fleet air wings scouted and searched, reconnoitered and rescued, and pressed home bombing and torpedo attacks both day and night against enemy surface shipping, submarines and shore targets alike.

During the war, the U.S. operated 111 aircraft carriers of all types, including the CVE escort class. All of the four large carriers sunk by enemy action went down during 1942 before new task group tactics were developed. The fast carrier task force consisted of three to five aircraft carriers accompanied by supporting battleships and cruisers, surrounded by a screen of destroyers. This tactical formation resulted in an improved mutual defense for the participating ships and in concentrated offensive power. By operating several such groups in proximity, it was possible to bring a force of 1,000 carrier-based planes to bear against a single enemy objective.

Navy and Marine pilots destroyed over 15,000 enemy aircraft, sank 174 warships and, in the Atlantic, destroyed 63 U-boats. Operating as an integral part of naval forces, the Navy's air arm contributed its full share to the power of the fleet in achieving control of the sea and final victory.

Carrier aircraft performance continued to improve after WW II and at the outbreak of the Korean conflict in 1950, the Navy was flying jets and helicopters from carriers. Helos played an important part in Korea, particularly in the search and rescue role of retrieving downed aviators and wounded from combat areas. Naval Aviation was a decisive factor in that war. Sorties by Navy and Marine pilots increased by nearly 20 percent over WW II. In supporting the United Nations' effort, Naval Aviation played a different role than it had in the Pacific island-hopping campaigns. There was a new breed of aircraft, missions were different, flying hours longer, more days spent on the firing line, in worse weather and increased enemy AA. Action was concentrated on supporting the GI on the ground and an interdiction campaign that finally helped to stop the enemy.

In spite of the Korean truce, world peace remained uneasy, and American naval forces continued to guard the seas to maintain the unstable balance. Several times, these forces provided support to menaced nations, patrolled troubled waters and evacuated refugees, playing the role of both humanitarian and protector.

Revival of the technique of naval blockade during the Cuban missile crisis in 1962 found carriers and patrol aviation prepared for the mission. On other occasions, they were at hand to provide assistance during hurricanes, typhoons and earthquakes in widely scattered geographic areas around the world.

Advances in science and their military applications continued to bring new weapons, equipment and tactics to Naval Aviation. Air-to-air and air-to-surface missiles had become standard aerial weapons. New families of faster, heavier and more sophisticated jet aircraft joined the fleet. Many improvements were made in antisubmarine warfare equipment and tactics. Atomic power went to sea, driving the 75,700-ton nuclear carrier *Enterprise*, which was more than twice as long as the Navy's first carrier, *Langley*, and eight times heavier.

Man's efforts to conquer space began in earnest in the Sixties, as manned orbital flight became a reality and a

A-4F takes a wave-off from Coral Sea (CVA-43) 1968.

series of successes culminated in the first lunar landing. More than half of the nation's astronauts had Navy backgrounds, and Naval Aviators made the first U.S. suborbital and orbital flights. A former Navy pilot was the first to step on the moon. Navy ships and squadrons made the recoveries of all 59 astronauts of the *Mercury*, *Gemini* and *Apollo* space shots, and carried out the same recovery missions for the *Skylab* series.

Satellites developed by Navy scientists have expanded our knowledge of space and a Navy satellite navigation system gave to all nations an accurate means of traveling the earth's oceans.

The end of the Sixties and the beginning of the Seventies saw the U.S. involved in another long conflict in Asia. In the face of many self-imposed military limitations and constraints, and repeated efforts by the U.S. to see differences settled at the conference table, the Vietnamese war dragged on, to become America's longest.

The burden of the Navy's air action for nearly 10 years fell on the carriers and aircraft of the Seventh Fleet. The *Walleye*, the laser-guided "smart bomb," which automatically homes in on target, was successfully tested in combat. Helos flexed their muscles in a larger combat role and became aerial tanks and flying cargo freight trains. Land-based patrol aircraft scoured the coastline of South Vietnam in *Market Time* operations, searching out enemy infiltrating vessels and vectoring surface forces to intercept.

Seventh Fleet aircraft performed the most extensive aerial mining operation in history, blockading avenues of supply before the enemy began serious cease-fire negotiations. History may well credit Naval Aviation as one of the most decisive factors in bringing the hostilities to an end. An uneasy truce finally resulted in U.S. disengagement and the return home of American POWs in 1973.

Two years later, Naval Aviation was again called upon to assist in the evacuation of civilian refugees fleeing the Communist takeover of South Vietnam. In 1979, Navy's air arm helped to rescue thousands of boat people who took to the seas to escape mounting Communist tyranny. Later that year, elements of Navy Air were called upon for a show of strength during periods of tension over Cuba, Iran and Afghanistan.

Naval Aviation plays a major part in U.S. Navy fleet operations. Carrier-based aircraft serve as the primary offensive and defensive weapons of carrier striking forces, providing the mobility and versatility which is the hallmark of U.S. naval power. Carrier-based antisubmarine aircraft and shore-based patrol planes guard our strike forces against the undersea menace and challenge missile-launching submarines wherever they may be lurking in the vast ocean spaces. Helicopters are important extensions of Naval Aviation with missions encompassing search and rescue, vertical replenishment, medical evacuation, personnel and cargo lift, antisubmarine warfare and minesweeping, fire suppression and reconnaissance.

The oceans, which cover three-fourths of the earth, are the cushions of our country's defense. They are the avenues which connect America with her friends and allies, and over which are carried the raw materials vital to the health of her economy. They must be controlled if the nation is to survive.

Top, SH-60B Seahawk. Above, Navy scuba divers going in to place flotation collar around Skylab III after splashdown in 1973.

McDonnell Douglas Photo

Evolution of Naval Aircraft

By Hal Andrews

The F/A-18 *Hornet* and the SH-60B *Seahawk* have applied the latest in available aerospace technology to meet the complex requirements of modern aerial warfare. Forward-looking concepts are hardly new to Naval Aviation. They have characterized the development of naval aircraft for 70 years. Even so, it is difficult to fully grasp the extent of progress which has been made from the first flimsy hydroaeroplane of 1911 to the peak of the piston-engine aircraft era, exemplified by WW II aircraft like the F6F, to the sophisticated weapons systems soon to enter service.

The first Navy aircraft, designed and produced by avia-

tion pioneers like Glenn Curtiss and the Wright Brothers, had special features to make them more useful to the Navy mission. The A-1 *Triad*, for example, had combined float and wheel landing gear.

Most of the aircraft purchased during those early years were float planes or small flying boats. All were wood and fabric biplanes with plenty of wire bracing typical of the period. They were used for pilot training, testing equipment and weapons, and developing their role in fleet operations.

The years preceding WW I were experimental ones in all respects for the embryo seaborne air arm. With the U.S. entry into WW I, the German submarine threat defined the prime operational aviation mission for the Navy as anti-submarine patrol. Available types, with necessary modifications, were placed in production, and aviation personnel were trained as part of America's mobilization. As operations began, design of new types of aircraft was dictated: patrol planes of increased range, and fighters to offset the threat of the German seaplane fighters against our patrol planes. Other avenues of development were also followed where they gave promise of providing increased aviation capability; emphasis was generally on water-based aircraft. By the time naval aircraft development really hit its stride, the war was fortunately over.

After the Armistice, naval operations slowed to a peacetime pace. But exploration of aviation capabilities and the development of aircraft continued almost unabated. The 1919 flight of the NC-4 across the Atlantic was one of the more publicized results of this continuing activity. A reawakened interest in ship-based aircraft and efforts to put to use the many developments in aircraft construction, made among the various countries during WW I, contributed to the appearance of a large number of new designs over the following years. Some attempted too big a leap and were not successful, but the lessons learned were made available for other new designs. Money limitations prevented putting many of these into production, and service operations for several years were conducted in modified and modernized WW I types. Operations with the fleet received major attention, primarily in observation and long-range scouting roles. Torpedo and bombing attack capabilities were also developed.

The formation of the Bureau of Aeronautics in 1921 created a single authority to direct and coordinate all aviation developments in the Navy. A more systematic approach to the development of an advanced prototype aircraft program, already under way, was crystallized by BuAer. The Bureau itself laid out the basic design for many of these aircraft. Detailed design and construction were accomplished by aircraft companies or the Naval Aircraft Factory.

Many of the early BuAer programs made significant contributions to the advancement of aircraft and to the operation of aircraft at sea. Two can be singled out as having the greatest effect on Naval Aviation: the development of the radial air-cooled engine and the necessary equipment for carrier operations. The Navy's main aircraft power plant emphasis had been on big liquid-cooled engines suitable for large, long-range scout and patrol planes. However, the need for much smaller seaplanes, suitable for catapult operations from warships and landplanes for use aboard the forthcoming carrier, *Langley*, dictated a new approach. The air-cooled radial engine proved to be the answer. In regularly increasing sizes, it became the mainstay of all Navy aircraft, as well as most U.S. military and all U.S. civil transport aircraft until superseded by gas turbine engines.

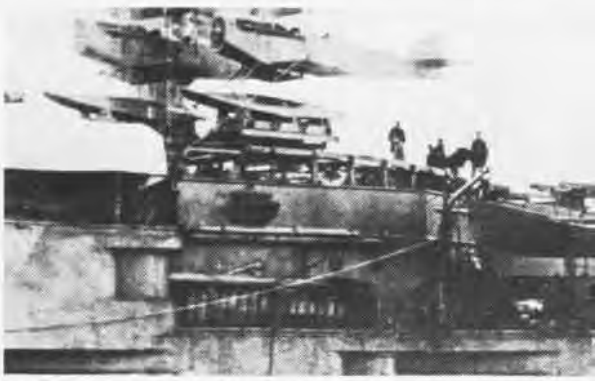
A special effort during the early Twenties was the racing aircraft program which greatly advanced the art of high-speed airplane design and produced a number of world and United States speed records. While both the U.S. Army and

Navy dropped out of this field after the mid-Twenties, early air-cooled-engine Navy aircraft continued to set international performance records in the late Twenties.

With its first air-cooled radial engine in service, BuAer sponsored and otherwise supported higher powered versions. These engines appeared from 1926 on and led to the first really effective carrier-based aircraft – the fighter, scout and a torpedo plane used on *Lexington* and *Saratoga*. Similarly powered seaplanes became the mainstay of battleship and cruiser aviation. The new radials also contributed to major advances in flying boats for the patrol squadrons. Based on the latest Navy designs with all-metal hulls and internal structure, along with the radial engines, new patrol planes were procured to replace the old WW I boats.

Where possible, commercial types were purchased for transport and utility duties. Thus, such aircraft as the Ford and Fokker trimotor transports became the first monoplanes in general Navy service use.

The late Twenties and early Thirties saw many advances in naval aircraft. With the needs of the operating forces for effective aircraft being met, the Navy sponsored new designs using features such as all-metal fuselage construction and the newly developed streamlined cowlings



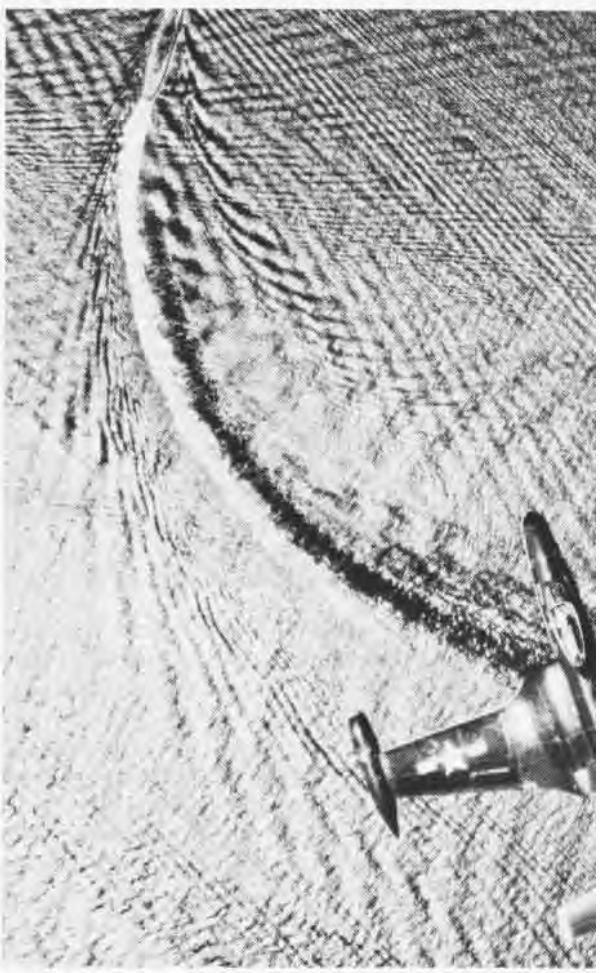


Photo by Ltjg. N. R. Gearhart

Top, Curtiss A-1 Triad, Navy's first aircraft, 1911. Middle, Boeing F4B-1 carrier-based fighter of the 1930s. Bottom, Martin P5M-1 Marlin ASW flying boat, as seen from the wrong end of the problem, late 1950s.

to reduce the drag of the air-cooled radial engines. New concepts such as the autogiro were evaluated as they appeared. This unusual aircraft was evaluated as offering no great benefits over conventional aircraft for Navy and Marine missions. Development of monoplane-configured flying boats and carrier aircraft was also initiated. For several years, attempts were made to expand the success of the earlier Loening amphibian by either providing amphibious floats for scout/observation aircraft or designing new amphibious types. By 1935, it was apparent that only in the utility role did the obvious advantages of the amphibian outweigh the design penalities for shipboard-type aircraft.

All metal construction, retractable landing gear, wing flaps, cockpit canopies and the new twin-row radial engines were all standard features of the new Navy aircraft of the mid-Thirties. While monoplane combat types were being tested, the biplane held its place as the primary carrier aircraft configuration for several more years. Strangely enough, the fighter biplanes were the last types to be supplanted, serving with monoplanes, dive and scout bombers and torpedo planes. Monoplane flying boats replaced the earlier biplanes during the late Thirties. The biplane fighters finally left the ranks of first-line combat types — in 1941!

World War II saw the exploitation of the high-powered

Center, top, some of the first Curtiss N-9 float planes on catapult track of USS Seattle, 1916. Center, bottom, McDonnell F2H Banshees of VF-22 depart for strike against North Korean targets, 1950s. Above, top, formation of Vought OS2U Kingfishers, 1942. Above, Ryan FR-1 Fireball had both reciprocating and jet engines, 1945.

reciprocating engine monoplane configuration for all carrier-based types. Ever increasing engine power and all manner of design ingenuity were used to provide the greatest possible combat capability. Carrier operations were enhanced by such devices as powered folding wings and the regular use of catapulting.

As patrol operations were extended around the world, land-based patrol planes were obtained to join current designs of the more familiar water-based types. Again, the amphibian was seen to have operational advantages – the PBY series proved to be of great value in all theaters even though outclassed in performance by its more modern water and land-based contemporaries.

During the war, three developments made their appearance which were to have a profound effect on the trend of naval aircraft design: greatly expanded use of airborne electronics (avionics), including the introduction of radar, the turboject engine and the helicopter. Advances in these areas made a significant impact on the design of all subsequent naval aircraft.

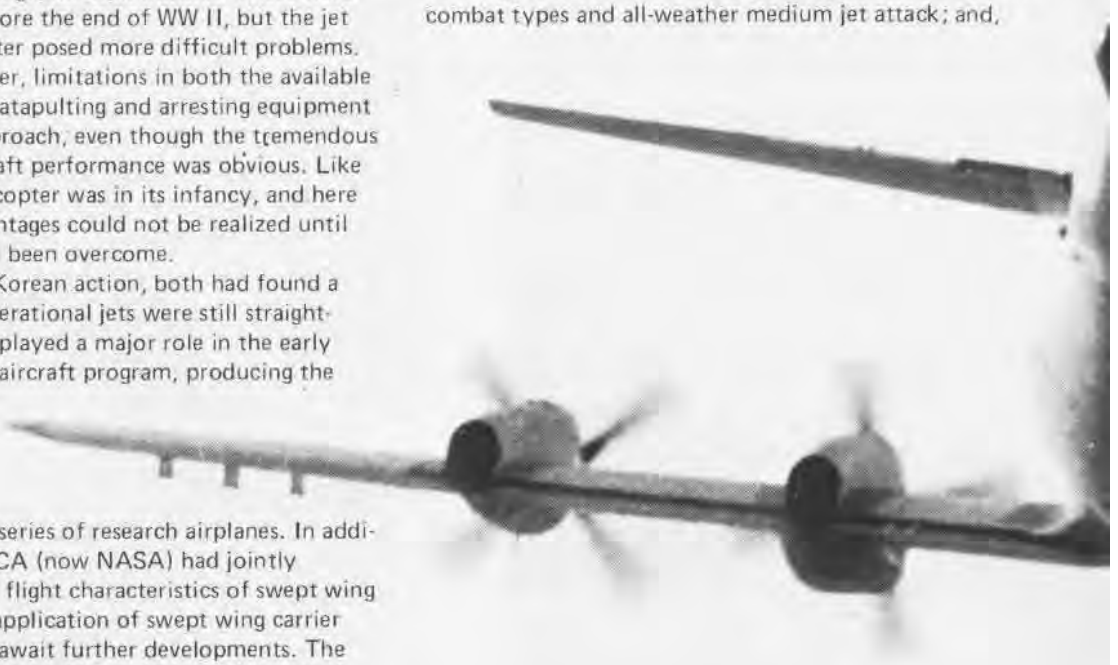
Radar and other advancements in electronics were adapted to existing aircraft and thus became a part of Naval Aviation in a rather straightforward manner. These were fully accepted long before the end of WW II, but the jet engine and the helicopter posed more difficult problems. In the case of the former, limitations in both the available engines and in carrier catapulting and arresting equipment dictated a cautious approach, even though the tremendous impact on fighter aircraft performance was obvious. Like the jet engine, the helicopter was in its infancy, and here also the potential advantages could not be realized until technical problems had been overcome.

By the time of the Korean action, both had found a place. However, the operational jets were still straight-winged. The Navy had played a major role in the early post-WW II high-speed aircraft program, producing the record-breaking D-558 series of research airplanes. In addition, the Navy and NACA (now NASA) had jointly explored the low-speed flight characteristics of swept wing aircraft. However, the application of swept wing carrier combat aircraft had to await further developments. The new fighters did feature such innovations as pressurized cockpits and ejection seats, and tricycle landing gear had become standard. Helicopters had completely supplanted the cruiser and battleship-based scout seaplanes and were proving their worth for carrier plane guard and general utility duties.

Subsequent years, the mid-Fifties, saw some of the most rapid technological advancements in the 70 years of Naval Aviation. Aircraft, armament, propulsion avionics and carrier equipment all went through major evolutions, resulting in many of the aircraft, missiles and other systems that are still playing significant roles today. Extensive efforts to develop carrier equipment suitable for operating the continually higher performance jet aircraft led to the adoption of the angled deck, and the steam catapult and construction of the *Forrestal*, the first of the larger class carriers.

Swept wings were finally introduced to carrier aircraft. With afterburner jet engines and aerodynamic, structural and flight control system advances, as well as new materials and manufacturing methods, supersonic fighters quickly followed. Air-to-air missiles, and the radar and fire-control systems to employ them led to the missile-only, all-weather intercepter. Light and heavy jet attack aircraft rounded out the carriers' strike capability. Inflight refueling techniques, employing standard carrier aircraft types as tankers, came into service, greatly increasing the flexibility of carrier operations.

The late Fifties and early Sixties saw the beginnings of other types which are mainstays today – Mach 2+ carrier combat types and all-weather medium jet attack; and,



with turboprop engines, the beginning of a new era in airborne early warning and land-based patrol aircraft. Small turboshaft engines revolutionized helicopter design and operations.

Every aeronautical technology path pursued in the Fifties was not destined for success. Neither the early V/STOL efforts nor a seaplane fighter program passed the experimental stage. The application of jet engines to flying boats was finally dropped, though the last prop-driven patrol seaplanes flew on into the Sixties.

With the Sixties came more advances – and another armed conflict. A new engine in the turbine family, the turbofan, made possible significant improvements in subsonic payload and/or range. The latest carrier fighter, attack and ASW aircraft all use turbofan engines. The long-drawn-out combat operations in SEAsia brought renewed emphasis on ground attack, initially in carrying greater bomb loads. Later, advanced air-to-ground weapons were developed as more effective armament. Combat brought back cannons for fighters and also resulted in installation of a variety of electronic warfare devices. Helicopters for all missions in combat areas were equipped with armament and the helicopter gunship was introduced.

As combat operations came to a close, a variety of new aircraft and modified versions were in use, or coming into use, to provide further improved combat capabilities for our seagoing forces. Specially equipped airborne mine defense helicopters – along with standard Marine types modified for this mission – played a part in final operations there, and continue to do so. Electronic warfare aircraft have become increasingly important to successful mission accomplishment. The Marines introduced V/STOL operations into their air wings through adoption of a successful British design. Helicopters in the inventory were modified to serve new roles operating from non-aviation ships, particularly ASW.

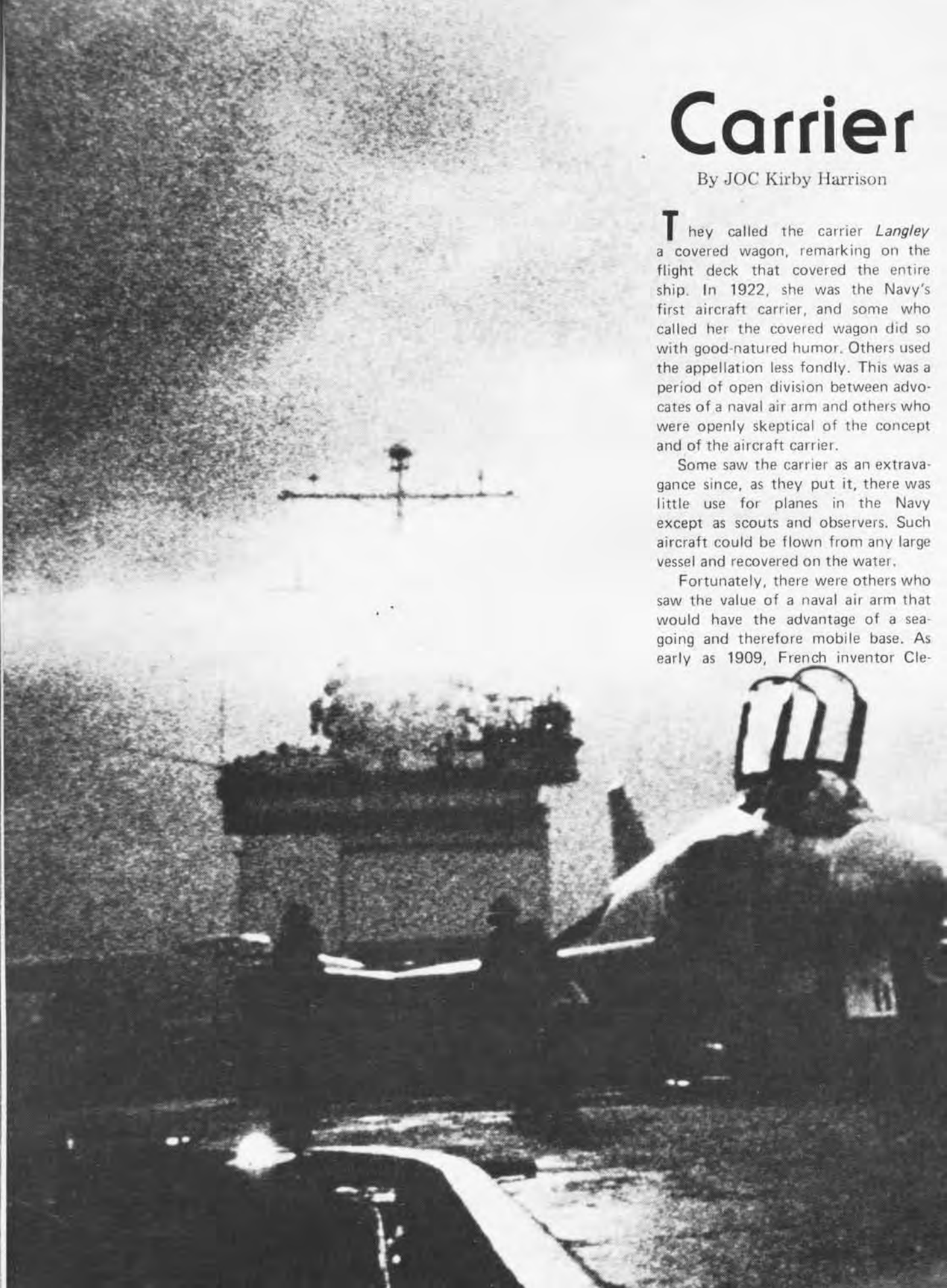
The Seventies saw further evolution in naval aircraft. The use of some new technologies has been very obvious, such as variable sweep wings. Others are less apparent, such as the incorporation of low light imaging systems. Still others are not evident in the appearance of the aircraft itself, such as the extensive use of the latest computer technology in almost every area of Naval Aviation. But all have their effect in the design of naval aircraft and their operational effectiveness.

At the beginning of the Eighties, the turbine engine has almost completely displaced the piston engine. Off-the-shelf procurement of trainers, utility and transport aircraft has brought current commercial aircraft into the Navy inventory in these roles. Current development and modification programs, besides introducing the most up-to-date technology to the fighter/attack and surface combatant ASW roles, will bring greatly improved V/STOL capability to Marine Aviation and introduce significant improvements in mission systems of existing aircraft types. The future promises continued enhancement of Naval Aviation's capabilities, as advances are made in all the fields on which it is dependent.

P-3 Orion returns to Moffett Field after a 12-hour patrol.

Carrier

By JOC Kirby Harrison



They called the carrier *Langley* a covered wagon, remarking on the flight deck that covered the entire ship. In 1922, she was the Navy's first aircraft carrier, and some who called her the covered wagon did so with good-natured humor. Others used the appellation less fondly. This was a period of open division between advocates of a naval air arm and others who were openly skeptical of the concept and of the aircraft carrier.

Some saw the carrier as an extravagance since, as they put it, there was little use for planes in the Navy except as scouts and observers. Such aircraft could be flown from any large vessel and recovered on the water.

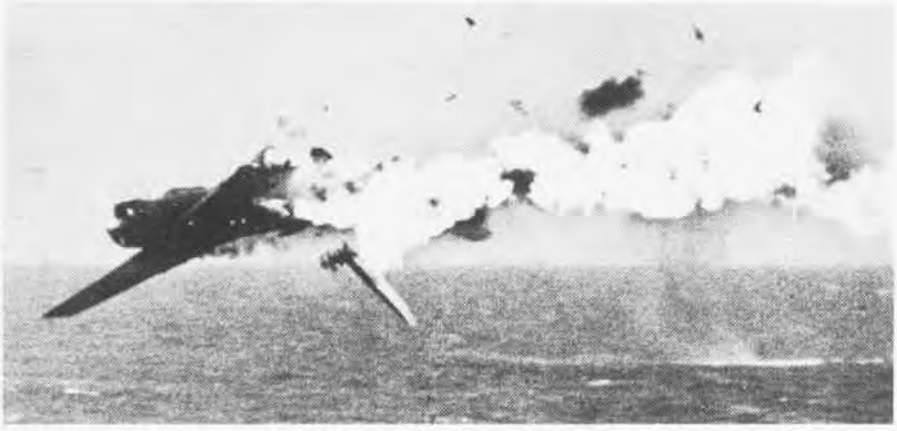
Fortunately, there were others who saw the value of a naval air arm that would have the advantage of a seagoing and therefore mobile base. As early as 1909, French inventor Cle-

ment Ader wrote a pamphlet on military aviation. Addressing operations over the sea, he said:

These vessels will be constructed on plans very different from those now in use. Firstly, the deck will be clear of all obstacles: flat, as wide as possible, without spoiling the nautical lines of the hull; it will have the aspect of a landing field . . . . The housing of the planes will necessarily be arranged below the deck . . . . This between-deck space will be reached by a freight elevator sufficiently long and wide enough to receive a plane with wings folded . . . . To one side there will be the service personnel workshop, charged with repair and maintenance of planes in constant readiness for takeoff.

A year later, Eugene Ely made history by flying off a wooden deck set up at the forward end of the light cruiser *Birmingham*. Just three months after that, he brought his plane to an arrested landing on a similar flight deck built on the stern of the cruiser *Pennsylvania*. It was the birth of carrier aviation, if not of the carrier proper.

Aircraft are prepared for launch aboard the Navy's first nuclear-powered carrier Enterprise. Photo by E. J. Filtz



A Japanese torpedo bomber (right) sheds pieces after a direct 5-inch shell hit from a U.S. carrier during the battle off Kwajalein in the Pacific. Fire rages (below) aboard Bunker Hill during the Battle of the Marianas, the largest carrier battle ever fought.

U.S. carrier-based SBD Dauntless dive bombers (bottom) bank over a burning Japanese heavy cruiser during the Battle of Midway. "Jeep" carriers in the Atlantic proved impressive in anti-submarine work. Right, Guadalcanal sailors prepare to take a captured German submarine in tow.

The U.S. Navy's first carrier — built as such from the ground up — was *Ranger*, commissioned in June 1934. But much earlier, there had already been an ironic foreboding of the future of the aircraft carrier. It had occurred in 1928, with Fleet Problem VIII. The war games had planes from *Langley* making a surprise attack on Pearl Harbor.

The 1941 attack on Pearl Harbor by the Japanese was a complete surprise but perhaps should not have been. Just a year earlier, the British had put an exclamation point to the importance of naval air operating off carriers. In a devastating attack, British *Swordfish* torpedo bombers had caught the Italian fleet at anchor in Taranto, and in a matter of minutes sank three of Italy's six battleships.

The lone consolation in the aftermath of the Japanese attack was the fact that none of the three U.S. carriers had been in port. As the fleet carrier program escalated at tremendous speed during the early days of the war in the Pacific, U.S. shipyards also began turning out smaller "jeep" escort carriers. Despite their relative size, the jeeps gave a good accounting. In the Atlantic, *Guadalcanal* and *Card* made history for the specialized carrier. *Card's* F4F *Wildcats* and TBF *Avengers* sank eight German U-boats and caused several others to break off attacks on Allied shipping during the war. And *Guadalcanal* accounted for one of only three German submarines captured during WW II, the U-505.

In the Pacific, carriers led the defense with a simple strategy — stay on the offensive. At the Battle of Midway, U.S. carriers turned back the

Photo by JOC Kirby Harrison

Japanese. A year later, the carrier *Hornet* took Lieutenant Colonel James Doolittle and his Army B-25s just 668 miles from Tokyo and launched them in a strike against the Japanese heartland. A Japanese prisoner of war later told of sighting *Hornet* and the accompanying *Enterprise* during the hours prior to launch, and of reporting to his captain, "There are two of our beautiful carriers now dead ahead. The captain rushed to the deck, looked at *Hornet* and *Enterprise*, and responded, "Indeed, they are beautiful, but they are not ours." He then went below and shot himself.

At Coral Sea, the first naval battle to be fought entirely by carrier aircraft, the U.S. won a decisive victory. The battle for the Marianas, the greatest carrier battle in history, was another victory for the U.S., and the Japanese navy would never again offer more than token resistance.

When the war ended, the U.S. Navy had 99 active carriers of all types. Post-war cutbacks and lack of funding hurt the carrier program. By the end

Flight deck personnel aboard Midway (left) attend a briefing. Above, an S-2 Tracker gets the "go" sign from the flight deck officer during operations aboard Kearsage.

of 1947, the fleet had only 20 active carriers, nine of them escort carriers.

War's end saw the first landing aboard a carrier of an aircraft powered by a jet engine, when a Navy FR-1 *Fireball* landed aboard *Ranger* in May 1945. But the British again took the U.S. Navy one up, landing the first pure jet aboard a carrier – a De Havilland *Vampire I* aboard the carrier *Ocean*. The *Fireball* had both reciprocating and turbo jet engines.

When the war began in Korea, the U.S. and Britain teamed up with a carrier force for the initial strike against North Korea. Britain's carrier *Triumph* and USS *Valley Forge* sent 57 carrier planes against North Korean targets. It was a complete surprise for the North Koreans and the raids had devastating effect. The North Koreans had felt safe in being more than 400 miles from the nearest U.S. airfields in Japan.

The war in Korea ended, but this time U.S. efforts at maintaining a carrier Navy were more successful. It was the birth of the age of the super-

From contrasting eras, two F9F-2 Panthers (below) fly over Wasp during the late days of the Korean War, while (left) the much more modern A-7 Corsair passes over the carrier Ranger.

Photo by William M. Powers

Photo by R. L. Lawson

Photo by LCdr. H. H. Love

The late Fifties and early Sixties saw the birth of the super-carriers, among them the first nuclear-powered carrier Enterprise (right) with her distinctive island superstructure. One of the latest, USS Nimitz (below) is seen here with the nuclear-powered guided missile frigates (l-r) South Carolina and California.

carrier, with the commissioning in October 1955 of *Forrestal*. Rapidly advancing aircraft technology and the advent of high-performance jets were a major factor in design. *Forrestal* was the first carrier designed with an angled flight deck and was meant to carry the most advanced jet.

Secretary of the Navy Charles S. Thomas spoke at *Forrestal's* commissioning, declaring that the carrier "encompasses the greatest amount of the most varied equipment, machinery and lethal weapons ever assembled in one place in man's tumultuous history . . . she is a dream come true . . . ."

And there were more technical advances. Powerful steam catapults now hurled heavy jet aircraft off the deck, from a standing start to better than 140 knots in less than 300 feet. The new aircraft demanded more refined landing systems, and such inventions as the Fresnel lens greatly improved carrier landing technique. When *Enterprise* joined the fleet in 1961, she was the first nuclear-

powered aircraft carrier the world had seen. Just four years later she and other U.S. carriers were involved in the war in Vietnam. Flying off the U.S. supercarriers and others of WW II vintage, reactivated and modernized, Navy pilots carried the bulk of U.S. air power in Southeast Asia. Carrier pilots in Vietnam were instrumental in establishing U.S. air superiority.

The age of the supercarrier continues. USS *Eisenhower* is the latest, weighing in at more than 91,000 tons, with a crew of nearly 6,300 and approximately 100 aircraft embarked. Her reactors furnish power for 13 years of operation without refueling. Her flight deck, 4.5 acres, is nearly twice the size of most WW II carriers, and the strike capability by comparison is awesome.

The U.S. Navy's supercarrier is Clement Ader's dream come true. As he had put it in his description of the future of naval warfare 63 years ago, ". . . an aircraft-carrying ship becomes indispensable."

Photo by Phillips

Along with the new supercarriers, are their new "super" aircraft, among them the F-14 Tomcat (right), F/A-18 Hornet and S-3 Viking.

NAVAL AVIATION HALL OF HONOR
This is the fifth in a series of articles on each of the first twelve men to be enshrined in the Naval Aviation Hall of Honor.

Theodore G. Ellyson

By Helen Collins

Fate bestowed many firsts on Theodore Gordon "Spuds" Ellyson. He was in the right places at the right times, and he had what it took to do the job. He was the first Naval Aviator, the first naval flight instructor, the first naval test pilot, the first to fly a float plane from a catapult, the first to make a power stall landing – unintentionally – which has been used ever since by seaplane pilots for landings in the black of night or on smooth water. And there were other firsts.

Born in Richmond, Va., on February 27, 1885, he was remembered later by schoolmates as always fighting someone bigger than himself. Sometimes he fought to uphold a principle, sometimes just to win a fight when the odds were against him.

Since there was no appointment available when young Ellyson wanted to go to the U.S. Naval Academy to prepare for the naval career he sought, he was sent first to the Annapolis Preparatory School. While there, he lived in a boarding house run by two motherly sisters whose cooking he especially enjoyed. He would ask for so many helpings of potatoes that his roommate started to call him "Spuds." He carried the nickname for the rest of his life.

Ellyson was appointed to the Academy in June 1901 and graduated in January 1905. He was commissioned Ensign on January 31, 1907, after the required two years of sea duty. At one point, Midshipman Ellyson despaired of ever getting his commission. When he took his physical after duty in the tropics, he was found to be anemic and declared unfit for naval service. Ellyson could imagine no future out of the service. However, some months later, the Secretary of the Navy granted him a "delayed" reexamination and he passed that physical.

Ellyson was in Manila as navigator of the second-class cruiser *Rainbow*, when Kenneth Whiting, later NA #16, arrived on October 8, 1908, for duty in the submarine *Shark*. Six weeks later Whiting moved over to command *Porpoise*, the other submarine in the Asiastic Fleet's flotilla of two, and Ellyson was ordered to *Shark* as executive officer, later assuming command. Unlike the newer subs, *Shark* and *Porpoise* had no periscopes. The only view the men had was by peering through a little round glass deadeye below the hatch lid. During the following months, at least one submarine dove nearly every working day. After each dive, they repaired, improved if they could, and then went down again. The fix-improve-try again routine became a habit that served Ellyson well in his later assignments.

In December 1909, Ellyson was ordered home. During his years on Asiatic Station, he had been generally uninformed on events that were taking place at home, since newspapers took at least a month in transit. The advent of flight was not believed by many who had been in the Pacific area for a long time, and so Ellyson discovered a new world when he arrived home in mid-March.

The following month he took command of the submarine *Tarantula* at Charleston, S.C., and sailed for Annapolis where he resumed the run, fix and try again routine. During this time Ellyson was promoted to Lieutenant Junior Grade. From Annapolis he moved on to Newport News, Va., as Inspector of Machinery and prospective commanding officer of another submarine, *Seal*.

While there, Ellyson was invited to dinner by Admiral William F. Halsey, Jr., together with Kenneth Whiting who had also returned from Asiatic Station. Across the dinner table, Whiting talked to Ellyson about flying and told him that he had put in a request for flight training.

On December 16, 1910, Ellyson sent in his request for duty in connection with aeroplanes. The answer he received, dated December 22, was the same that had been given to John Towers and others. It read, ". . . You are informed that this application has been noted and placed on file for consideration at an appropriate time." Many believed that there was no place in the Navy for aircraft.

In the meantime, however, Captain Washington I. Chambers, who had become an advocate of Naval Aviation, had read a letter from Glenn Curtiss expressing the opinion that the Navy would soon want airplanes and offering to train an officer, at no expense, at the Curtiss aviation grounds in southern California.

On December 22, the date of the detailer's letter to Ellyson, Chambers prepared a memorandum specifying the type of officer to be sent to the Curtiss aviation school.

The next day, December 23, orders went out to Ellyson which were to make him the first Naval Aviator.

The day before Christmas, Ellyson's commission as Lieutenant arrived in the mail and a messenger delivered a night wire, "Your orders to Los Angeles mailed today." His orders reached him on December 27 and he was on his way west.

Ellyson spent his first 10 days at North Island working as a mechanic, covered with grease, while he and Curtiss tried to get the Curtiss hydroaeroplane into the air. Again, it was the familiar routine of "If at first you don't succeed, try, try and try again." The hydroaeroplane finally flew on January 26 and on February 17, 1911, Curtiss taxied his plane to the armored cruiser *Pennsylvania* at anchor in San Diego Harbor and, with Ellyson directing operations from a rowboat, was hoisted aboard and off again by ship's crane, and then returned to base – an early demonstration of the adaptability of aircraft to naval uses.

That same month he became the first passenger to go aloft in a hydroplane when he made a flight in a *Triad* hydro-and-landplane with Curtiss at the controls.

Ellyson continued to work hard and on March 31 he addressed his report to the Secretary of the Navy:

In Obedience to the Department's order #5021-42 of December 23, 1910, I report that in my opinion and in that of Mr. Curtiss, I have qualified in practical aviation. This means that I am qualified to fly a standard eight-cylinder Curtiss biplane under favorable weather conditions, but more practice must be had before I will be capable of flying in strong winds, making ascents in a limited space, or landing on a designated spot. I have had no practice in flying the hydroaeroplane.

And on April 12, 1911, Glenn Curtiss wrote to the Secretary of the Navy regarding Ellyson's qualifications:

I have the honor to report that Lieut. Ellyson is now competent to care for and operate Curtiss aeroplanes and instruct others in the operation of these machines. Mr. Ellyson is a hard worker and has acquired considerable knowledge of the art of aviation. He has been especially successful in operating the machine and is easily capable of qualifying for a pilot's license. It is a pleasure for me to recommend Mr. Ellyson as a man who will make success in aviation.

Ellyson asked for permission to accompany Curtiss when the latter returned to the Curtiss school in Hammondsport, N.Y. Chambers sent word that Ellyson would receive the orders he requested. While en route to Hammondsport in April, Ellyson stopped off in Washington, D.C., to see Chambers. They agreed to order two Curtiss biplanes – a practice plane they called "Lizzie" and the *Triad*, a high-powered, two-man machine that could be rigged as a landplane or hydroplane. Chambers was to write the broad specifications and Ellyson as inspector would authorize all the needed improvements.

From Hammondsport, Ellyson sent daily letters to Chambers urging more speed on requisitions and in transferring John H. Towers (later Naval Aviator #3) so that Towers could catch up with three other Curtiss students whom Ellyson was instructing. He felt that Towers could catch up easily.

The new hydro waiting on the ramp was the focus of his interest. He and Curtiss planned to flight-test the A-1, the Navy's first plane, on July 1, 1911. They took it up four times that day. Curtiss made the first two flights and Ellyson the last two.

The next day, Ellyson offered to fly Chambers, who had been present for the first flight, 22 miles up the lake to where he would board his train. The weight of the two men kept the plane from lifting off, although Ellyson ran the engine wide open until the radiator boiled and the engine smoked. The plane was still on the water when they reached their destination. Minus his passenger, Ellyson took off easily for the return flight as night fell. When he glided in to land on the black lake, he thought he was still some 30 feet in the air when the nose of his pontoon slapped the water and sent the machine rocketing upward again. He opened the throttle, leveled off, circled, glided again – and bounced again. There were no lights near enough to help him find the level of the lake and so he decided to feel for the surface. Holding the nose up slightly, he eased the throttle until he felt the machine settling. Slowly he went down into the dark until the heel of the float kissed the water. He snatched the throttle back and the machine coasted to a stop. He had just invented the power stall landing.

On July 6, 1911, Ellyson was issued Aero Club of America Certificate #28 as Aviator. The Navy still had no qualifying method of designating aviators.

Piloting a plane equipped with a slotted pontoon, Ellyson was successfully launched on September 7 from a wire cable attached to a dock – another experiment in the search for a means of launching aircraft from ships.

By September, Ellyson had decided that it was time to leave Hammondsport as the fall weather was interrupting flying activity. He reached the Aviation Camp at Annapolis in October, preceded by Towers, their two recently acquired mechanics and the two planes. When Ellyson discovered that their hangar at the camp was right in the

line of fire from the Academy's rifle range, he decreed that everyone had to leave the field whenever the midshipmen were firing. He devoted his time there to active flying, testing gasoline engines and experimental work; and established several endurance, altitude and speed records.

The first long-distance flight by a naval airman was made by Ellyson, accompanied by Towers, on November 3, 1911, when he flew from Annapolis, Md., to Milford Haven, Va. It set a nonstop distance record for hydroplanes, 112 miles in two hours, two minutes.

An invitation arrived from Curtiss for Naval Aviation to winter on North Island in California. It was not long before Ellyson had orders to establish a Naval Aviation camp at North Island on land offered by Curtiss. He was to be in charge of the two Navy Curtiss planes, while the one Wright machine was independently under the control of Lieutenant John Rodgers.

Ellyson helped to establish the new camp but in March he was injured in a flying accident that kept him inactive for some time. He became impatient with the enforced idleness and asked for orders to return East. Orders arrived by telegraph detailing him to the Bureau of Navigation for temporary duty with Capt. Chambers, where he wrote specifications for new Navy planes. In May he returned to the Aviation Camp in Annapolis. Trips to Hammondsport and to the Burgess plant in Marblehead, Mass., as traveling inspector and test pilot punctuated his flying at the camp.

Later that year, on November 12, 1912, flying a Curtiss A-3, Ellyson made the first successful takeoff from a catapult mounted on a barge at the Washington, D.C. Navy Yard. The next month, he flew the C-1, the Navy's first flying boat, from the same catapult. Ellyson's tests were the beginning of a long series of improvements as catapults were modified and enlarged by Naval Constructor Holden C. Richardson and others.

Ellyson was detached from Naval Aviation on April 29, 1913. He went back to sea on the dreadnought *South Carolina*, which took him into the Caribbean on maneuvers and eventually to a Veracruz landing, before heading back for home and routine operations.

When the Navy finally began to issue designations in 1915, Ellyson was given Number One.

Orders to the Naval Academy dated June 24, 1916, sent Ellyson to Annapolis for duty with midshipmen on cruises on USS *Wyoming* and USS *Kansas*.

The war intervened and in February 1918 Ellyson was once again a pioneer, ordered to New London for duty with the wooden subchasers, designed as the latest antisubmarine weapons. The chasers were to patrol coastal waters with depth charges. Some of them were to cross the Atlantic and hunt where the submarines hunted, near the ends of the convoy routes. Ellyson had been promoted to Lieutenant Commander in May 1917, and he received his promotion to Commander soon after his arrival in June 1918 at Plymouth, England, where an American subchaser base was being set up. There, he helped to develop successful antisubmarine tactics and doctrine.

After the Armistice, he put American crews aboard a squadron of German vessels that were being taken over as transports. He briefly commanded Nucleus Crew #14 aboard the German liner *Zeppelin*, taking aboard 5,000 officers and men of the U.S. Army's 35th Division and 129th Field Artillery. On the last day of April he turned the ship over at the Brooklyn Navy Yard.

Ellyson then took command of the four-stacker, *J. Fred Talbot*, about to deploy to the Mediterranean, and sailed her to Europe. This was followed by duty aboard USS *Little* and USS *Brooks*, until he was reassigned to aviation duty as executive officer of NAS Hampton Roads on January 10, 1921.

His stay there was brief because in September he was ordered to the newly established Bureau of Aeronautics as head of the Plans Division. His projects there included torpedo seaplanes and a piggyback plane for S-type submarines.

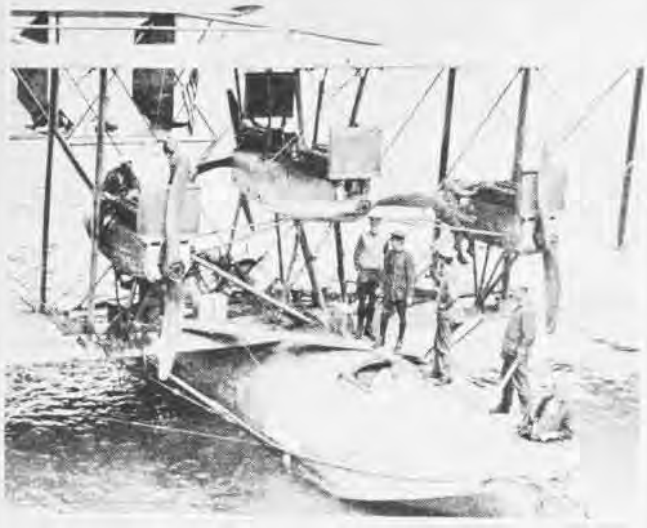
In December 1922, Ellyson left for Brazil as the Aviation Member of the U.S. Naval Mission which was to aid in reorganizing the Brazilian Navy. This assignment kept him in Brazil for almost two and one-half years. He returned to the Bureau of Aeronautics but was there only until July 1925, when he assumed command of Torpedo Squadron One. A short time later, he became executive officer of the seaplane tender *Wright*. Aboard only three months, he left to prepare for duty involving the fitting out of USS *Lexington*, the Navy's second aircraft carrier.

Ellyson reported to the Inspector of Machinery in Boston in September 1926 for the *Lexington* detail, after spending some time observing flight operations from *Langley* on the West Coast. Ellyson and Whiting, who was similarly involved with preparing *Saratoga* for commissioning, met at conferences several times. They were taking part in developing ships that would engage in the kind of war that had never yet been fought. Ellyson was aboard *Lexington* when she was commissioned and became part of the Navy. He was executive officer of one of the most unusual ships in the world.

Three weeks after the commissioning, a team of tugs maneuvered *Lexington* slowly through a specially dredged channel into Boston Harbor. There, a UO-1 plane piloted by Alfred M. Pride (later Admiral) made the first takeoff from her flight deck. Steaming on her first voyage, *Lexington* anchored first in Narragansett Bay and then made a fast run to Hampton Roads, arriving there February 25, 1928.

Ellyson's career was ended by his death two days later, on his 43rd birthday, in an airplane crash in lower Chesapeake Bay during a night flight from Norfolk to Annapolis.

The same trait that was first evident in Ellyson's childhood fights with older and bigger boys stayed with him throughout his life and raised him above the average. He was willing to stick his neck out. He also studied intensively, took on extra work, and was never deterred by forced landings and accidents, involved in the development of early aviation. He was the first of a long line of Naval Aviators and he set the fast pace we know today.



NC-4 was the only one to finish the flight.

The First Flight Across the Atlantic

(Condensed from NANews, May 1969.)

In 1917, fully engaged in WW I, the United States and her Allies were greatly concerned over the German undersea menace. Almost one million tons of Allied shipping were being lost every month to the wily U-boats. The airplane, another newly developed weapon, offered an effective way to combat the submarine but, ironically, because of the great ship losses, there were not enough bottoms available to carry these aircraft in adequate numbers to Europe. As a solution to the problem, the Navy decided to build flying boats which could transport themselves across the Atlantic under their own power. Operating from European bases, they would then have sufficient range to reach the center of German submarine activity. Up to this time the longest nonstop flight accomplished had been about 1,350 miles, flown under ideal conditions and in the vicinity of a landing field. The suggested route across the Atlantic for the proposed Navy flight was over 1,900 miles, over an area not well known for ideal flying weather – Newfoundland to Ireland.

The idea, even in 1917, really wasn't new. The challenge had existed for years and, as early as 1910, attempts were made to cross the Atlantic by air. First, there were balloons and nonrigid airships. Then, prompted by foresight and his great interest in aviation, England's Lord Northcliffe (the British William Randolph Hearst) offered a prize of £10,000 for the first successful transatlantic flight. He published his offer and the conditions for the $50,000 competition in his London *Daily News* on April 1, 1913. The award would go to the first aviator to cross the Atlantic by plane, either way, between the North American continent and any point in Great Britain or Ireland, within 72 consecutive hours.

Following the *Daily Mail's* sensational announcement, French and Italian aviators were quick to enter the lists while, in America, Rodman Wanamaker, heir to the Philahelphia mercantile fortune, revealed a contract with Glenn Hammond Curtiss to build a large flying boat.

Curtiss, first to build a practical seaplane and inventor of the flying boat, had harbored a consuming desire to fly the Atlantic before anyone else. To assist him, the Navy sent an advisor to the Curtiss plant at Hammondsport, N.Y. The young officer, Lieutenant John H. Towers, Naval Aviator #3, had been taught to fly under the cognizance of Curtiss. They were close friends.

The craft was to be named *America* and, for a while, it was presumed the pilots would be Curtiss and Towers. However, Curtiss had greatly restricted his personal flying activities and the Navy Department was somewhat skeptical of the ability of *America* to make the flight. In any event, Towers was called away in April 1914 to take part in the Veracruz operation in Mexico.

Lieutenant John Cyril Porte, Royal Navy (Ret.), was selected to fly *America* across the Atlantic. On August 3, 1914, however, Germany declared war on France, the next day on Great Britain. World War I was on and the *America* and a sister ship were sold to England as prototypes for 62 patrol seaplanes; Cyril Porte devoted his attention to the Royal Naval Air Service; and the transatlantic flight was off.

In September of 1917, the chief of the Navy's Construction Corps, Admiral David W. Taylor, called in his key men, Commanders G. C. Westervelt, Holden C. Richardson and Jerome C. Hunsaker. They were ordered to build long-range flying boats capable of carrying adequate loads of bombs and depth charges, as well as defensive armament sufficient to counteract the operations of enemy submarines. After the meeting, Glenn Curtiss was summoned.

Curtiss and his engineers submitted general plans based on two different proposals: one was a three-motored machine, the other a behemoth with five engines. Both were similar in appearance, but they differed from conventional flying boats of the period in that the hulls were much shorter.

It was not practical to build larger airplanes and keep adding more engines to keep the whole affair in the sky, unless the load-carrying potential was also increased to include crew, fuel, equipment, accessories and armaments. Thus, the plan for the smaller, three-engined aeroboat was adopted, and the Liberty engine solved the power problem.

A design contract was let with the Curtiss Company, and Cdrs. Westervelt and Richardson were sent to the Buffalo plant to work closely with the Curtiss people. The plane would be named Navy-Curtiss Number One, or NC-1.

By December 1917, design work by the Navy-Curtiss team had progressed to the satisfaction of Washington. Secretary of the Navy Josephus Daniels gave his approval

to a contract calling for four flying boats of the NC type. Manufacturers were engaged to produce the hulls, wings, tanks and engines – all of which would be shipped to the Curtiss plant at Garden City, L. I., for assembly. At nearby Naval Air Station, Rockaway Beach, a huge hangar was built to house two of the NCs and a special marine railway was constructed to facilitate movement and beaching.

In July 1918, construction of the NC-1 was far enough along to warrant scrutiny by the head of the British Aviation Commission. In the report, it was stated, "The hull of this machine was examined. The machine is impossible and is not likely to be of any use whatever."

During September, the NC-1 was delivered to Rockaway and on October 4 it was ready. The test pilot in charge of the flight was Cdr. Richardson.

Engines were started, the carriage was eased down the inclined railway and into the water until the NC-1 floated free. Back and forth it taxied as Richardson felt out the controls. Then he swung into the wind, and the world's largest flying boat rose into the air.

Soon the NC-1 would establish a record by carrying 51 men aloft. But on November 11, WW I ended and with it the need for a long-range antisubmarine flying boat.

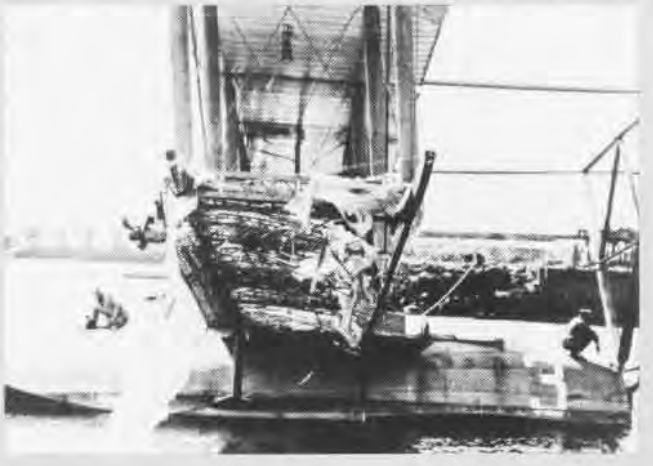
Within the Navy, there had been growing interest in the transatlantic flight. Lieutenant Richard E. Byrd, Jr., who had served as Commander, U.S. Naval Forces in Canada during the war, had worked with his operations officer Lieutenant Junior Grade Walter Hinton on the transoceanic problem. They had spent considerable time charting possible courses and considering the many requirements for a successful flight. Byrd wanted to be part of any transatlantic attempt in the NCs but, in the end, only Hinton was destined for a part in that venture.

In December 1918, Cdr. Westervelt returned from Europe where he had learned that several organizations were making preparations for a transatlantic flight. Based on a report by Westervelt to Navy Secretary Daniels, outlining the need to step up modification and production of the NCs, the Navy's Transatlantic Flight Planning Committee recommended that Great Britain, France and Italy also be invited to participate. The committee concluded, "It is believed that the prestige obtained by the United States Navy in thus initiating and making possible a great international flight of this nature will equal or exceed that obtained by attempting the flight alone and all chance of international jealousies will be avoided."

In February 1919, Byrd joined the Transatlantic Flight Section in Washington – Walter Hinton was at Rockaway.

The work on Long Island progressed at a feverish pace. Trials on the NC-1 had resulted in many changes. A four-engine configuration had worked so well on the NC-2 that the concept was adapted for the other planes. The cockpit was moved from the center engine nacelle to the hull. Work was stepped up on the NC-3 and NC-4.

Late in March, the NC-1 was damaged in a violent storm. It was decided to use the NC-2 for experiments until the latest possible date, then shift one of her wings to the NC-1, which would meanwhile be repaired and converted to the four-engine configuration. The NC-2 would then be out of the race.



Above, top to bottom, NC-1 taxies for takeoff in Trepassey Bay, Newfoundland. NC-2 was cannibalized for parts and did not make the flight. Damaged NC-3 taxied into the Azores under her own power. NC-10 was the last NC flying boat built.

On April 21, Towers and the Transatlantic Section moved to Rockaway. Three days later, at a conference with the captains of the ocean station ships that were to be positioned every 50 miles along the flight route, he gave the starting date of the flight as May 5.

On May 3, the three flying boats were placed in regular Navy commission. John Towers formally assumed command of NC Seaplane Division One and chose NC-3 as his flagship. Richardson was to be chief pilot of the NC-3. Naval Aviation pioneers Patrick N. L. Bellinger and Albert C. Read were detailed to the NC-1 and NC-4, respectively. Walter Hinton was to be one of the pilots of the NC-4. Lieutenant Commander Marc Mitscher would pilot the NC-1. Byrd was ordered to go aboard the NC-3 with Towers, but to proceed only as far as Newfoundland.

Meticulous as the planning had been, the Navy was taking no chances. There was an extra card up its sleeve — a long-range airship. The C-5, a nonrigid gas bag with an open cockpit and power/control car slung beneath, was capable of traveling long distances by air. The airship was ordered to proceed to St. John's, Newfoundland, where her commander would be joined by Byrd who would navigate it across the Atlantic. But, Byrd would again find his dream unreachable. The C-5 arrived in St. John's but a severe Canadian storm struck the field where it was tied, snapping the mooring lines before it could be deflated. Unmanned, it bobbed out to sea, never to be found.

A fire in the hangar, damaging the NC-1 and NC-4, and poor weather conditions delayed the flight. Then on May 7, when Chief Mechanic Howard, a flight engineer on the NC-4, lost a hand in one of the engine's propellers, Towers announced that the flight was indefintely postponed.

And so it was that there weren't many reporters around the next morning, May 8, when the "conditions favorable" weather report came through. By 10 a.m., with a minimum of fanfare, the NC flying boats were off.

The NC-4 had flown only once prior to the departure from Rockaway. Small but possibly important defects were to be expected, and her captain, Read, was hoping the trip to Newfoundland would prove sufficient for the "shakedown" period.

As the formation moved eastward, the navigators busied themselves with new "bubble" sextants designed by Byrd and a drift indicator adapted from an Italian airship gadget. Normally the two pilots would take turns at the controls, each relieving the other at half-hour intervals. But when rough air was encountered, it would take the strength of both men to keep the massive plane on course.

After passing Cape Cod, en route to Nova Scotia, the NC-4 developed problems in two engines and was forced to return to Chatham for repair. Read's "shakedown" had turned into a breakdown, giving rise to the NC-4's new name, *Lame Duck*. Bad weather delayed her departure till the 13th.

Conditions on the Newfoundland-Azores route had slowed down the NC-1 and NC-3. But after arrival in Halifax and minor repairs, they were off again on May 10.

Bringing up the rear, the NC-4 made it to the Canadian port a few days later and left for Newfoundland on the 15th. It was there at St. John's that the three flying boats were reunited. After a new engine was installed on the NC-4, the three NCs continued on their flight.

Read's plane was faster than the others. It was very difficult to keep from getting ahead of Towers in the flagship. But if he slowed down too much to keep in proper position, the big plane became harder to handle, so the NC-4 took the lead. They had 1,200 miles to go.

Sometime later, Towers and the crew of the NC-3 encountered heavy fog and decided to land and wait for the weather to clear. Descending to the water, the plane was hit hard by several huge swells and the NC-3 was damaged beyond repair. On May 19, a U.S. Marine battery stationed in the hills west of Ponta Delgada, Azores, sighted the flying boat and a destroyer moved in to lend assistance. John Towers stood in the heaving remnants of the NC-3 and shouted, "Stand off! We're going in under our own power!" He and his crew had sailed the cracked and broken boat 205 miles, backwards, through violent seas to their destination. He didn't need help now.

Bellinger, guiding the NC-1, had made the same decision to land, as Towers had. But as Mitscher put her down, high winds and a ground swell tore the lower section of her tail and carried it away. The crew was picked up several hours later by a Greek ship and taken to a Navy base ship.

Read arrived in Lisbon, Portugal, at twilight on May 27, 1919, the first man to cross the Atlantic by air. He "finished the job" four days later as the NC-4 landed at Plymouth, England.

Albert C. Read took the NC-4 on a recruiting tour of 39 cities after his famous flight. During WW II, Rear Admiral Read served as Commander, Fleet Air Norfolk. A total of 10 NC flying boats were built. NCs 5-10 were constructed in a three-engine configuration. Three of the planes were lost due to difficulties associated with open sea landings and subsequent attempts to have them towed by ship.

After WW II, the NC-4 was taken out of storage in southern Virginia and moved to the Smithsonian's preservation and restoration branch in Silver Hill, Md. Restoration was begun on the flying boat in 1967, in preparation for the 1969 display on the Mall in Washington, D.C., honoring the 50th anniversary of the transatlantic flight. In the fall of 1974, the NC-4 was moved to the Naval Aviation Museum, Pensacola, Fla., where she is on permanent display.

That the success of the NC-4 flying boat marked a monumental milestone in the progress of world aviation is undeniable. Yet it was this plane of which it was said a little more than 60 years ago, ". . . The machine is impossible and is not likely to be of any use whatever."

Death of a Pioneer

By Dwight R. Messimer

The Sinking of USS Langley, February 27, 1942

Japanese bomb scores near miss on Langley.

Dwight Messimer is the author of "No Margin for Error," the story of Commander John Rodgers' historic flight from San Francisco to Hawaii in 1925. This book has recently been released by the U.S. Naval Institute.

The Japanese pilot banked his twin-engine bomber, dropping the left wing for a better view. Below him were three enemy ships – his pulse rate jumped – a cruiser, a destroyer and, he leaned closer to the plexiglas, an aircraft carrier! His radioman pounded out the message: Enemy carrier X many planes X escort-cruiser-destroyer X position X course X speed X, . .the bomber rolled over on the other wing and roared away.

The carrier that had been reported was actually the seaplane tender USS *Langley* (AV-3), formerly (CV-1), the U.S. Navy's first aircraft carrier. On her flight deck Naval Aviation, in its most lethal form, had been born, nurtured and developed. *Langley* was more than just another ship. She was a piece of American history.

If any ship could be called a Cinderella, it was *Langley*. She had started out as a chambermaid in 1912 as the newly constructed collier USS *Jupiter* (AC-3). Ten years later with a new name, *Langley*, and a full-length wooden flight deck, she became a rather ungainly princess with a nickname to match – "Covered Wagon." In her glamour years she hosted many of Naval Aviation's early greats, and established a string of impressive firsts. Then, in 1937, the forward third of her flight deck was amputated and she was redesignated a seaplane tender.

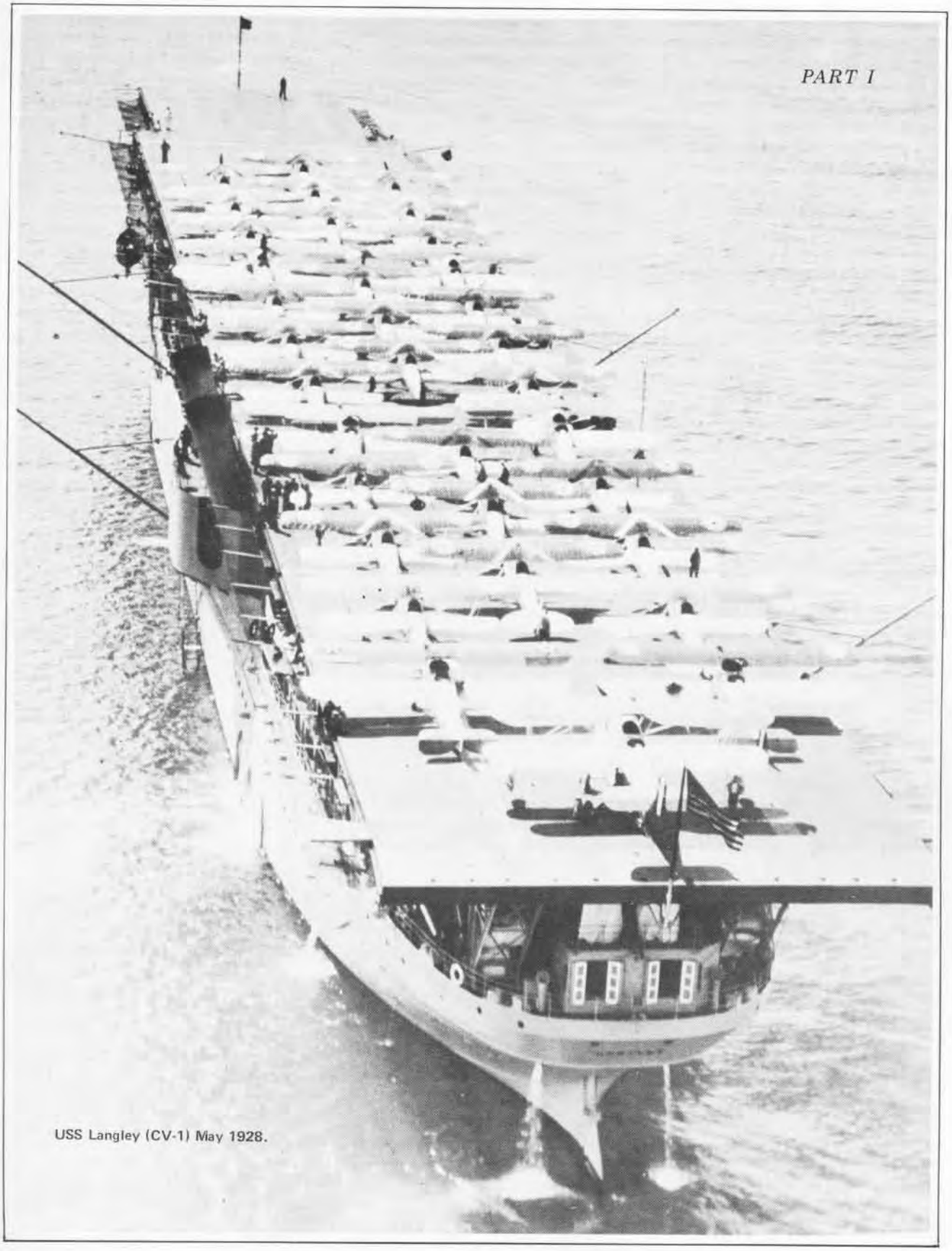
Now, five days out of Fremantle, Australia, her flight deck was again crowded with fighter planes and more were stored below. Her mission was to deliver 32 Army P-40Es, their pilots and ground crews to Tjilatjap, Java, in the face of overwhelming Japanese opposition. *Langley* was carrying fighter planes into battle, but she had to get them safely to port before they could be employed.

Escorting *Langley* on the dash to Java were two four-pipers, USS *Edsall* (DD-219) and USS *Whipple* (DD-217). From a distance a four-piper might have looked like a cruiser, which explains in part the pilot's sighting report. Why one looked less like a cruiser to the pilot than the other is unknown.

1150 to 1206 – *Langley* was at condition two, and half of the crew was being fed when the first Japanese bombers were sighted. Throughout the ship an assortment of horns, bells and gongs sent men running to their battle stations. On the bridge the captain, Commander Robert P. McConnell, gave the order to commence firing. There was very little with which to carry out that order.

Langley's antiaircraft armament consisted of four three-inch guns on the flight deck, four .50-caliber machine guns mounted on the signal bridge, and a few men with Browning automatic rifles spotted around the ship. There was no fire control worthy of the name, and the three-inch shells could not reach the bombers even with the fuses set at maximum. For *Langley* it would be a battle of maneuver.

Cdr. McConnell watched the on-



USS Langley (CV-1) May 1928.

coming bombers, trying to estimate their point of release by gauging the angle of elevation. He hoped he would be able to see the bombs leave the aircraft. When the angle of elevation had reached 80 degrees and he had not seen any bombs fall, he ordered hard right rudder. *Langley* swung away just as the first salvo landed off the port bow, right where she would have been had McConnell not turned her in time. But the shock from two near misses slammed into *Langley* like a sledgehammer, rupturing her hull.

Langley continued to twist and turn, trying to throw the bombers off as a second group swung in behind the tender, starting their run. Again waiting until he estimated that the planes had reached their release point, Cdr. McConnell maneuvered the ship radically, spoiling the setup and causing the bombers to pass over without dropping.

Langley's three-inch guns popped away ineffectually, splotching the otherwise clear sky with black flack bursts but not bothering the Japanese who wheeled around for another try. Below decks, men carried out their tasks ignorant of the details of the deadly drama unfolding above them. They were also unaware that tons of water were already pouring into *Langley*.

1206 to 1214 – Nine Japanese bombers started their run. *Langley* twisted left – the bombers turned with her. "Hard right rudder!" the captain bellowed, and *Langley* heaved herself over on a new heading. The bombers followed her around with parade-ground precision. Never taking his eyes off the planes, Cdr. McConnell said to his gunnery officer, Lieutenant Walter C. Bailey, "It appears that if the problem is set up correctly, the bombs will hit."

Torpedoman Second Class Howard Whan, sitting on the flight deck with a Browning rifle, thought the bombs looked like ice cubes tumbling from beneath the planes. Fireman First Class Marvin Snyder, a loader on number one three-inch gun, thought they looked like leaflets. Machinist's Mate Second Class Carl Onberg thought they looked like bombs and he hit the deck. The nine-bomb salvo that hurtled down toward *Langley* was one of the most accurate, or one of the luckiest, drops made during World War II. Of the nine bombs, five hit *Langley*.

The first bomb exploded on the main deck just forward of the jib crane, damaging and setting afire several boats and smashing the starboard firemain. Shrapnel slashed across the deck and punched into the bridge structure, mortally wounding Lt. Bailey, killing a Warrant Officer, Carpenter Robert A. Curtis, and wounding several others. The second and third bombs exploded on the forward edge of the flight deck, port side, damaging the elevator and starting fires in nearby P-40s and those stored on the main deck.

The fourth bomb hit the port stack sponson, erupting in a storm of shrapnel and chunks of debris that smashed through P-40s, splinter shields and men. The gun crew on number two three-inch gun was hard hit. Gunner H. E. Anderson was suffering from severe concussion and a hot-shellman was cut nearly in half. On number one gun, the loader asked Fireman First Class Snyder to relieve him, and then sank to the deck with a steel splinter between his shoulder blades.

The fifth bomb crashed through the flight deck near the stern, passed through the poop deck and exploded in a washroom next to the after steering engine room. The blast jammed the rudder at 35 degrees right, destroyed the after battle dressing station, killed one man and wounded many others. When the bomb exploded, the upward blast erupted in a fountain of flame and steel through the poop deck, searing, slashing and hurling overboard the crews of the two five-inch "bag" guns mounted there.

Instantly the poop deck became an inferno fed by the ready ammunition stacked near the guns, oil drums, layers of paint and an old pigeon loft that had been the executive officer's quarters.

1214 to 1300 – *Langley*, her rudder hopelessly jammed, steamed in a circle, smoke pouring from fires that covered two-thirds of her length. The ship's service telephone and voice tubes were out of commission, the firemain was shattered and there were reports of flooding below.

On the bridge Cdr. McConnell was sending out messengers in a desperate bid for information. He could feel the ship developing a port list and her speed was falling off. He turned to Yeoman Third Class John Kennedy. "Get down on the main deck and see what you can do about putting out the fires in those boats. We may need them."

While damage control parties worked feverishly to restore the water supply, others were ducking for cover each time a strafer made a pass. Lieutenant Commander Thomas Donovan, *Langley's* damage control officer, already had his hands full and more problems were on the way. *Langley's* list was becoming more pronounced and there seemed to be no way to stop the flooding.

Several stubborn fires raged beneath the flight deck, but the biggest, hottest fire burned unchecked on the poop deck. Ensign Michel Emmanuel, gunnery officer on the five-inch "bag" guns, had been injured in the back by shrapnel. As he lay on the deck, bleeding, he was horrified to see that the gun captain on the starboard gun had been decapitated and the first loader was writhing on the deck with a hideous abdominal wound. Everyone around him was riddled with shrapnel or burned. But Ens. Emmanuel's biggest concern was the fire around him. Directly below was the powder magazine and overhead was a pyrotechnics locker. Painfully getting to his feet, the officer collected what able-bodied men he could find and broke out fire hoses. Yelling to Boatswain's Mate Second Class Jesse Sellars to turn on the water, he braced himself to take the surge as the line charged. Nothing happened – there was no water!

Commander Lawrence Divoll, *Langley's* exec, moved through the ship assessing damage and organizing men into damage control parties.

Restoration of the water supply was a critical necessity which he knew was being worked on. Fighting fire would be the least of their problems, however, if *Langley* rolled over; and her list was steadily increasing. Cdr. Divoll headed down to the engine room.

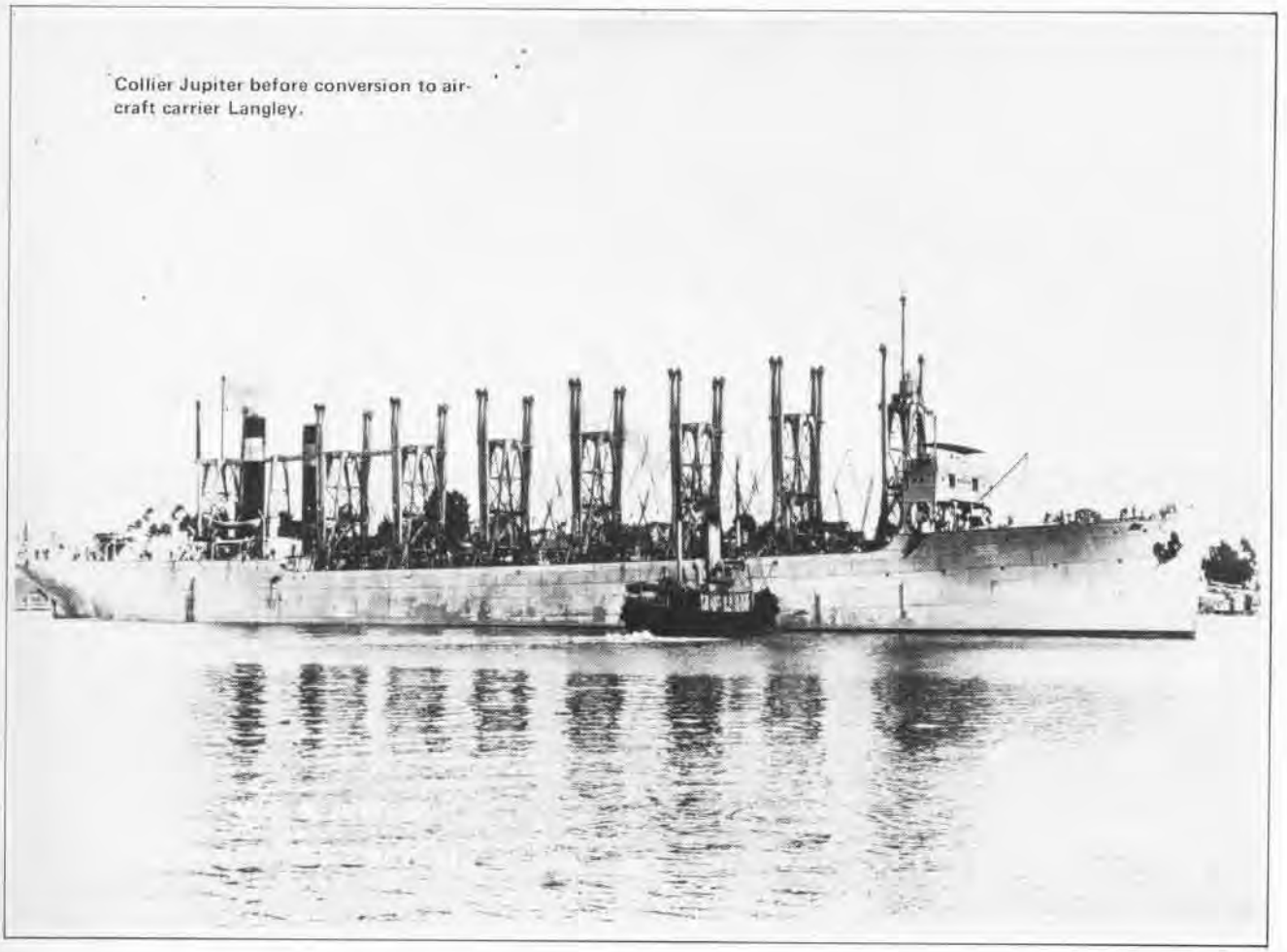
On the flight deck, only two of the three-inch guns were still firing. Overhead, the Japanese bombers circled out of range observing their victim while a few Japanese fighters came down to strafe. On the bridge the .50-caliber machine guns hammered away without any noticeable effect, as the fighters pumped 20-mm cannon rounds into the parked P-40s, setting five more afire and wounding more men.

On the second deck, aft of the bridge, Dr. Robert Blackwell was receiving casualties in the forward battle dressing station. Carpenter Curtis and Lt. Bailey were the first, and more were coming as men stumbled toward the dressing station or were carried on stretchers. In the after dressing station, Dr. J. F. Handley was working in a haze of smoke and steam, treating his first wounded man. His patient was his own assistant Chief Pharmacist's Mate Thomas Wetherell, whose right arm had been shattered by the blast that had taken out the washroom and everything above it. Wounded lay outside the door or were being brought in by survivors of the same blast.

Baker Third Class Frank Wetherby, a giant ex-logger from Oregon, had been passing three-inch ammunition from the forward magazine when the first bomb hit. He came to, with a terrific pressure on his ears, and saw little streaks of green lightning jumping all over the place. From somewhere above he could hear the sound of high-pressure steam escaping and around him were scattered three-inch rounds. Looking up, he saw daylight through a 10-foot hole in the deck. Through the hiss of steam and the ringing in his ears he heard a voice shouting to clear the magazine; it was being flooded immediately.

Damage control had succeeded in restoring water forward and lines were being run aft to fight the fire beneath the flight deck. Ens. Emmanuel had sorted his men out and had sent the wounded to the dressing station when the first working fire hose arrived. Despite his wounds, Ens. Emmanuel took command of the fire fighting in his area. He concentrated on keeping the fire away from the pyrotechnics locker and from spreading to the after magazine beneath their feet. Unknown to him, the locker was empty and the after magazine was at that moment being flooded.

(To be continued)



Collier Jupiter before conversion to aircraft carrier Langley.

TF Sans Hook

The Tandem Fighter

By Captain Al Raithel, Jr.

Among the varied overseas activities of Naval Aviation in WW I, the campaigns against the German submarine menace occupied front stage. Potentially the richest hunting ground for Allied aerial antisubmarine patrols was the eastern and southeastern area of the North Sea. However, the air above this area was strongly defended by seaplane fighters of the German Naval Air Service. Time and time again, Allied patrols were driven from the area by the Germans.

It was this environment which spawned the Navy's TF Tandem Fighter.

The British Felixstowe F-5 flying boat had been specifically designed to cope with operating conditions in the North Sea. Despite a capability for carrying heavier armament than previous designs it was no match for German seaplane fighters. At a conference at the British Air Ministry in London in 1918, a representative of Royal Naval Air Station Felixstowe proposed another flying boat of "battle cruising" type. It could accompany the larger, slower types on excursions into the North Sea and on raids on the Belgian and German coasts as protective escorts. It was to be faster than the F-5 and of equal endurance, but with greater armament and maneuverability.

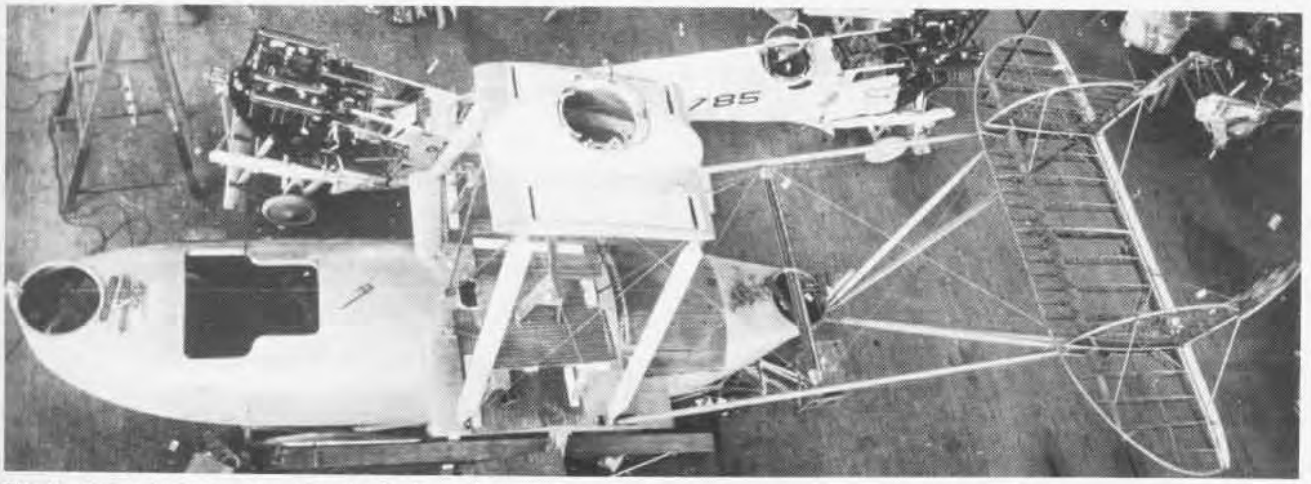
At that time, antisubmarine warfare had a number one priority in U.S. Naval Aviation, and preliminary investigations were begun in August 1918 to determine the feasibility of building such an airplane. Although the war ended that year, the U.S. Navy decided to go ahead with the project and a contract was let to the Naval Aircraft Factory in Philadelphia. Four TF Tandem Fighters were ordered and at least three were completed during 1920-23.

The plane got its TF designation from the back-to-back tandem-mounted power plants, hence the name Tandem Fighter. Three of the aircraft were to be equipped with tractor-pusher, Hispano-Suiza engines of 300 horsepower each, and one with Packard engines, all tandem-mounted. Heavy armament consisted of bow and stern gunners' positions in the hull, and a gunner's position in the center section of the top wing. This latter position undoubtedly was met with some consternation on the part of the gunners, as it was surrounded by the gravity fuel tank.

Flight test data was obtained and rudder control was found to be deficient at high power settings. A new design rudder was installed but for a variety of reasons, development of this aircraft was not continued and the Navy's first TFs faded into history.

Characteristics

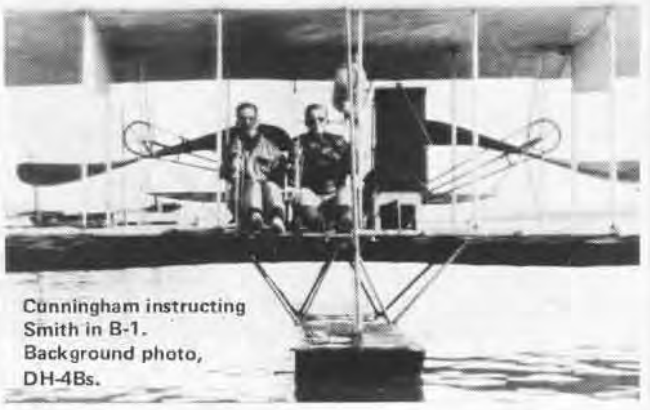
Power plants	2 Hispano-Suiza (300 hp) (One TF had Packard engines.)	Wingspan	60 feet
Gross Weight	8,846 pounds	Length overall	44.5 feet
Maximum speed	107 mph	Armament: Bombs	none
Stall speed	60 mph	Guns	3 scarf mounts for 1-3 guns each



This view taken during construction clearly shows three gunners positions.

From Hydroplane to Hornet

By Major John M. Elliott, USMC(Ret.)



Cunningham instructing Smith in B-1. Background photo, DH-4Bs.

Marine Aviation, a year younger than Naval Aviation, has been an active participant for 69 of Naval Aviation's 70 years. The date on which First Lieutenant Alfred A. Cunningham reported to the Naval Aviation Camp at Annapolis, May 22, 1912, is recognized as the official beginning of Marine Corps Aviation.

A Wright B-1 hydroplane was assigned to Cunningham in October of that year. He made several hundred flights in this aircraft but noted in a letter to Captain Washington Irving Chambers, USN that ". . . something seems to vibrate loose or off, on a majority of the flights made." He also pointed out that even when the engine was running well, the aircraft ". . . did not have enough power to climb over a few hundred feet with a passenger."

When the United States entered World War I, Marine Aviation consisted of only 6 officers, 1 warrant officer and 43 enlisted men. Recruitment was stepped up to meet wartime expansion and on January 9, 1918, the 1st Aeronautic Company of 12 officers and 133 enlisted men embarked for antisubmarine duty in the Azores. This was the first American aviation unit to go overseas completely trained and equipped.

Its mission was to counter the submarine menace in the North Sea. The Northern Bombing Group, created to combat this menace, was composed of two Wings – the Day Wing manned by Marines flying DeHavilland DH-4s and DH-9As, and the Night Wing manned by Navy flyers in twin-engine Caproni bombers. Four Marine squadrons were eventually sent to France, with a total of 149 officers and 842 enlisted men. In the short time remaining before the Armistice, they compiled a record to be proud of. They flew 57 missions, dropped 33,932 pounds of bombs, destroyed 4 German fighters confirmed and claimed 8

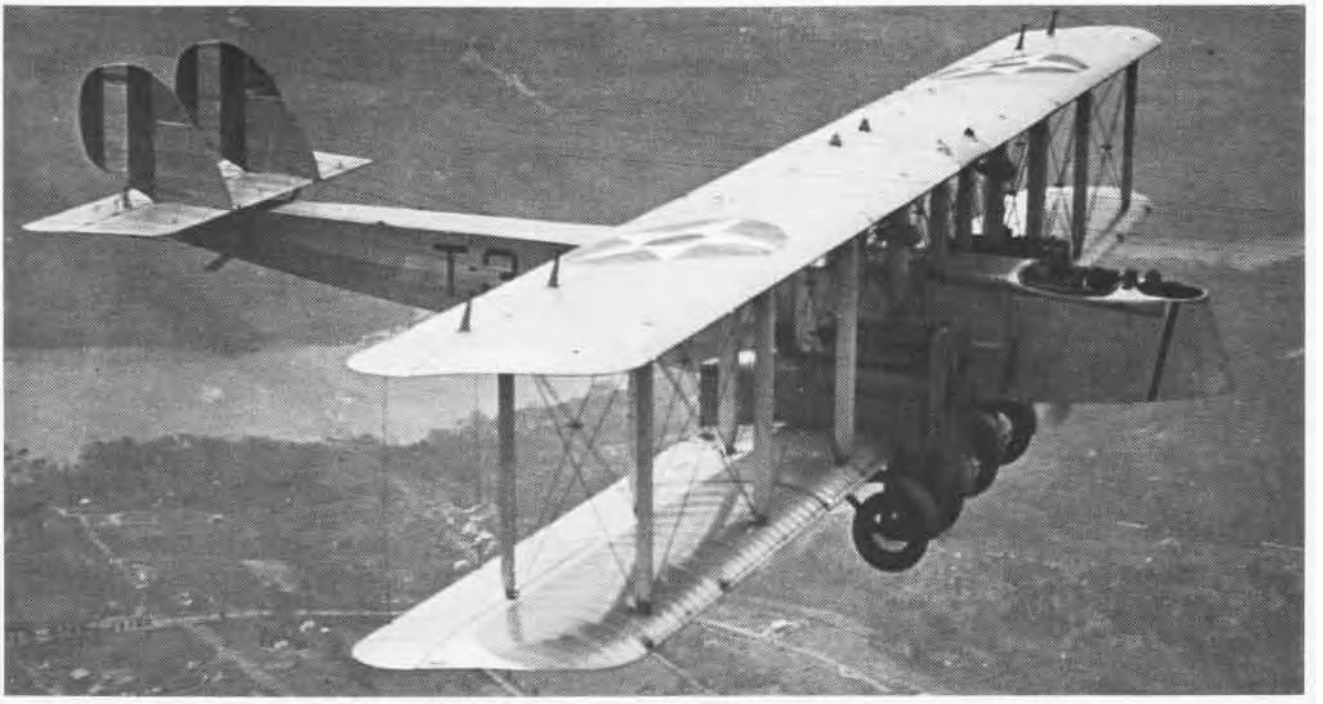
others, at a cost of 4 pilots killed, 1 pilot and 2 gunners wounded. The flu epidemic took more lives than did combat. This small group earned 30 awards and decorations, including two Medals of Honor and four Distinguished Service Medals.

At war's end, demobilization reduced the force and the Marines' first flying field at Miami was closed. The remnants were transferred to Quantico and Haiti where they operated as skeleton squadrons. Once again, Cunningham lead the way as he defined his concept of the mission of Marine Aviation. This concept of support of ground troops is still its primary mission and the basis of the tried and proven Air-Ground Team. At this early stage, Cunningham visualized the isolation of the beachhead by bombing railroads, roads and reinforcements, suppression of beach defenses by bombs and machine-gun fire and the value of radio communication between the aircraft and ground troops. All of these were soon to be tried in actual combat operations.

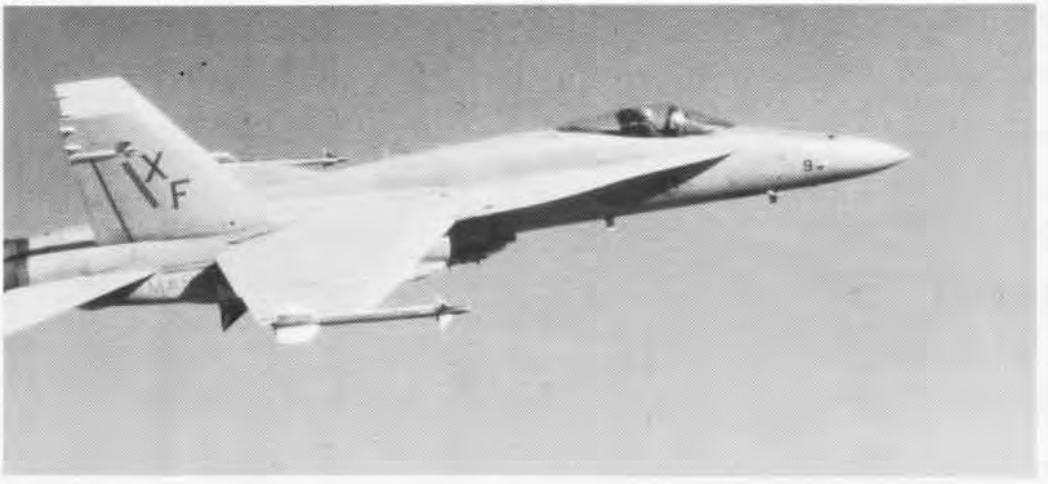
To demonstrate the feasibility of long-distance deployment of aircraft, several such flights were conducted in the early 1920s. A two-plane flight of DH-4s, in 1921, from Washington to Santo Domingo, established the record for the longest unguarded (not monitored by surface vessels) flight over land and water up to that time by U.S. Naval Aviation. In 1923, four Martin MT bombers were flown from San Diego to Quantico in 11 days for the first mass aerial delivery of aircraft from coast to coast. Again, in 1923, a record was established when two DH-4s flew from Port-au-Prince, Haiti, and Santo Domingo to Washington, St. Louis, San Francisco and return, for a distance of 10,953 miles in 127 hours of flying time over a period of two and a half months. While this may seem a poor showing by those who jet across the country in a commercial airliner, with hardly a thought, it represented outstanding achievement of both men and equipment in 1923, when there were few airports and none-too-reliable equipment.

The outbreak of civil war in Nicaragua in 1927 led to U.S. intervention and the introduction of Marines in an attempt to stabilize the government. This small-scale, drawn-out guerrilla war provided the first opportunity to practice some of the theories developed at Quantico with the beginning of limited close air support. While Marine Air operations had been conducted earlier in Haiti, Santo Domingo and China, this was the only time they were carried out under combat conditions. Lessons learned in Nicaragua led to the development of doctrines used in World War II, and produced some of its leaders.

Because of the depression during the 1930s, there was a considerable reduction in strength and consolidation in all branches of the military. However, two squadrons were formed as active components to augment Navy



McDonnell Douglas Photo



Top, Martin MT after cross-country flight. Above, F/A-18 Hornet. Right, CH-53E Super Stallion is the newest version of the Marines' workhorse. Opposite page, AV-8B with four 300-gallon external fuel tanks.

carrier-based squadrons. Personnel were rotated through these units, so that by the time they were deactivated, three years later, two-thirds of the Marine Aviators had served in one or the other. Marines were not to have regular carrier-based squadrons again till 1945.

The attack on Pearl Harbor on December 7, 1941, virtually wiped out Marine aircraft in Hawaii, although a few remained in San Diego, Wake Island and Midway Island. East Coast squadrons were scattered on maneuvers but within seven days returned to Quantico, packed up, and were on their way to the West Coast. The valiant defense of Wake Island was supported by just a few pilots flying new and strange aircraft, with a lack of trained mechanics and technical manuals. It was only through their dedication and initiative that they were able to operate as long as they did. The decisive Battle of Midway was only a base defense operation for Marine Aviation, which didn't really come into its own until the capture and defense of Guadalcanal and the beginning of the long road up the island chain to victory. At last, adequate money, men and equipment were available to put into practice and perfect the long discussed concept of close air support. Marine squadrons were assigned their own CVEs and augmented Navy squadrons on CVs in 1945.

With the end of hostilities and reduction in force, Marine Aviation phased out the dive bomber, torpedo bomber and medium bomber squadrons, retaining only a fighter and transport capability. Some squadrons continued to be carrier-based as the air complement of CVEs, and most became all-weather qualified. Helicopters entered Marine Aviation in 1947, jet aircraft in 1948 and attack aircraft in 1950. All of this new equipment and the techniques employed to operate them were soon to be tried in combat.

At the outbreak of the Korean conflict on June 25, 1950, VMF-214 was aboard USS *Rendova* for maneuvers in the Hawaiian area. A request for a Marine Regimental Combat Team on July 2 resulted in the designation of Marine Aircraft Group 33 as the aviation component, and VMF-214 returned to El Toro as one of the units assigned to MAG-33. After a feverish period of activating, equipping and deploying reserve squadrons to the Far East, the first Marine air strike against the North Korean Army was made by VMF-214 on August 6. Marine aviation served aboard carriers as well as ashore throughout the conflict. The concept of vertical envelopment, conceived at Quantico, was tried and proven.

Marine Aviation continued to grow apace with Naval Aviation in jet aircraft and weapons, both nuclear and conventional. It entered the space age in the person of Lieutenant Colonel John H. Glenn when he made three turns around the earth in the first U.S. manned orbital flight.

Marine Aviation entered the Vietnam advisory program in April 1962 to provide helicopter support, and pursued this mission throughout the conflict. During this time fighter, attack, helicopter and transport aircraft all operated in direct support of Marines and others on the ground in fulfilling the close air support doctrine of the Marine Air-Ground Team.

Since the end of hostilities, Marine Corps Aviation has continued to hone its performance in support of ground troops with the capabilities of the V/STOL *Harrier*. And it will continue to carry out its traditional mission – with the soon-to-be-acquired F/A-18 *Hornet* – as a vital component of Naval Aviation.

McDonnell Douglas Photo

PEOPLE·PLANES·PLACES

Awards

Pax River's VX-1 was awarded the Commander Sea Based ASW Wings, Atlantic Bronze Anchor Award for excellence in overall retention in FY 1980. The strongest point in VX-1's selection was the active retention program that provides counseling services to its people. The squadron has found that keeping its personnel informed of their eligibility and program status develops a positive attitude toward the command and the Navy.

On *Ranger's* island, the crew has painted a large red E signifiying excellence in engineering, and a blue E for excellence in supply. Those Es were recently joined by a large blue H, representing the 1980 Habitability Excellence Award, sponsored by ComNavAirPac. Many factors contributed to *Ranger's* selection for the annual award, such as attention to berthing areas and heads, ship's store operations, special services, use of labor-saving devices, internal communications effectivenesss, etc.

The career counselor team at NAS Meridian saw its efforts recognized recently when RAdm. Edward H. Martin, CNATra, presented the CNATra Retention Award to the air station. ACCM Norman B. Parker and NC1 William L. Howell, along with 11 NAS departmental career counselors, comprise the team of hand-picked, highly-trained specialists under air station C.O. Capt. Robert R. Morton.

The FY 1980 Pacific Fleet Golden Anchor Award winners were announced by CinCPacFlt. Representing Naval Air Force, Pacific, they are *Constellation*, VA-115, VC-5 and NAS Agana. *Midway* was a runner-up and receiving mention were VF-151, VC-1, HSL-35 and NAS Whidbey Island.

Recent recipients of Battle Es include the West Coast's VAW-112, and VA-15, HS-15 and VP-11 representing the Atlantic Fleet.

HM-16, Norfolk, was selected as the HM Squadron of 1980 by Commander Sea Based ASW Wings, Atlantic. The *Seahawks* are justifiably proud as they have also recently been awarded a Battle E, the CNO Safety Award and a Silver Anchor Award for retention.

AMAN Lorraine R. South of VFP-63, Miramar, was chosen as Outstanding Military Woman of Achievement, 1980-81, for the San Diego area and 11th Naval District. Selected from among 33 nominees by the San Diego County Women's Council of the Navy League, Airman South received certificates of recognition from the Navy League and a scholarship to National University. The council sponsors the annual award to increase awareness and recognition of women, officers and enlisted, serving in the 11th Naval District, San Diego County and from Navy, Marine Corps and Coast Guard commands aboard ships.

Correction: VX-1, Patuxent River, was the recipient of a special CNO award in recognition of its three years and 14,000 flight hours of accident-free operations, rather than the CNO Safety Award as stated in *NANews*, March 1981.

Records

Several squadrons recorded accident-free milestones: VA-66, 18,000 hours; VA-65, 21,000; VP-67, 28,184; VP-65, 36,848; VP-68, 48,000; and VQ-4, 100,000.

Lt. David Sweeney, pilot, and LCdr. Les Smith, RIO, both from VF-21, made history recently when they logged the first touch and go, and the first trap of an operational F-4S aboard a carrier. The two *Freelancers* accomplished this during carqual ops aboard *Kitty Hawk* off the coast of southern

California. VF-21 aircrews logged a total of 58 day and 12 night traps in the newest version of the McDonnell Douglas *Phantom*.

Safety records were achieved by the following squadrons: VF-211, 2 years; VX-1, 3 years; HMH-462, 3 years; VAQ-131 and VP-4, 9 years; and VP-60, VAW-114 and VP-91, 10 years.

The *Ghostriders* of VF-142 completed a record-breaking cruise to the Indian Ocean, spending 247 of 252 days at sea. During their 1980 deployment, the squadron logged over 3,700 flight hours and 1,820 arrested landings. Every month the *Ghostriders* flew 500 flight hours, concluding the last month of deployment with an all-time squadron monthly record of 607.8 hours.

Three Naval Aviators achieved flight-hour milestones. LCdr. Lynn Rigg, VF-41, surpassed 1,000 hours in the F-14 *Tomcat*, while Cdr. Bob Tracy and LCdr. Les Smith of VF-21 logged 3,000 and 2,000 hours, respectively, in the F-4 *Phantom*.

Maj. John Cummings, C.O. of VMFA-451, Beaufort, S.C., is believed to be the first Marine Corps RIO to go over 4,000 flight hours in the F-4 *Phantom*. Previously, this milestone had been reached by only Air Force flyers. Maj. Cummings said, "You know, I couldn't have flown these 4,000 hours if it hadn't been for the outstanding maintenance people who have kept the F-4s flying all these years. Money can't buy the dedication these Marines have shown. . . ."

Rescues

The *Ranger* battle group provided assistance late last year to the naval support vessel *Sealift Arctic*, which had rescued 319 Vietnamese refugees from a sinking 60-foot boat in the South China Sea. Dr. Zeph Lane, CVW-2's flight surgeon, and CWO John Mott, *Ranger's* physician assistant, treated 10 victims of chemical burns which resulted from a mixture of diesel fuel and salt water in the bottom of their boat after an explosion and engine fire. They also treated another 80 persons who suffered from prolonged exposure. SA Pat Coffey acted as translator while PO1 Clifton Howard and PO3 Joe Falkenberry maintained medical treatment of the victims during the two-day sealift to Subic Bay. The medical assist team said the refugees were in generally good health and spirits, and that the experience had left the team with a great sense of pride in their involvement.

Honing the Edge

The *Freelancers* of VF-21 flew 100 percent of their assigned F-4S *Phantoms* in an extraordinary display of operational readiness. Cdr. Vince Huth, ComCVW-14, wrote in a message, ". . .your 11-plane launch and

flyover were indeed a tribute to the professionalism of all hands in VF-21. The team effort required to provide a 100-percent mission-capable squadron launch is a superb demonstration of your outstanding combat capability."

A QF-86 drone aircraft from PMTC is lifted off the runway at San Nicolas Island for delivery back to Point Mugu. The drone

is used as a target by the threat simulation department. A pilot normally flies it out to San Nicolas and back, but its nosewheel was damaged during a no-live-operator landing on the island's runway. The CH-53D called upon to carry the damaged QF-86 back to Point Mugu was from HMH-363, MCAS Tustin.

Total teamwork among elements of the regular and reserve Navy was the name of the game as 35 members of HAL-4, Norfolk, descended upon the Mississippi and Louisiana bayous for Exercise *Essential Bayou 81*. During the 10-day detachment, the *Red Wolves* provided close air support, medevacs, insertions/extractions and made reconnaissance flights. Each portion of the exercise was conducted with "aggressors" from SEAL Team One, San Diego, or Special Boat Unit 22, New Orleans. Throughout the operations, river boats ran back and forth in the narrow waters, countering moves by enemy patrol boats, trading fire with the aggressor SEAL teams ashore while being protected by the *Red Wolf* gunships. The mini AcDuTra was a complete success. The squadron flew over 160 flight hours in 12 days.

Tasked by the Chief of Naval Reserve to provide support for the joint military exercise *Halcon Vista XV*, ComResPatWing-Lant selected VP-66, Willow Grove, to represent the U.S. *Halcon Vista* (or hawk's view) is part of a continuing Joint Chiefs of Staff effort to work with South American armed forces by providing realistic joint training exercises. Commanded by Cdr. Walter S. Coleman, VP-66 operated from El Libratador Air Base, Maracay, Venezuela, flying maritime patrol missions. Because the air base lacked support facilities, the squadron formed a self-sufficient detachment which transported all maintenance personnel and equipment in its three participating aircraft.

The *Tigers* of VA-65 recently achieved another first with their A-6E target recognition attack multisensor (TRAM) aircraft. In training exercises in the Indian Ocean, Ltjg. Dave Anderson and LCdr. Mike Currie successfully fired an AIM-9H air-to-air missile which scored a direct hit. This was the first air-to-air missile the TRAM aircraft has fired since deploying with the fleet. TRAM gives the A-6 greater night visual capabilities through the use of forward looking infrared radar and also enhances its ability to deliver ordnance to a target through laser designation and guidance. This successful firing of an air-to-air missile reaffirms the A-6's all-weather, multi-role mission.

Et cetera

Today, everyone seems to be health conscious. But how many people do you know who pole vault for exercise? AFCM Ron C.

Fleming of VS-41, North Island, started when he was a young boy. "We had bamboo in the backyard, so I used to vault with that," he said. From bamboo poles, Fleming progressed to stiff poles and competed for three years in high school, and one year for the Navy after joining in 1955. When asked why he chose pole vaulting, he answered, "Well, I was too small for football, not fast

enough for track and didn't have the endurance for long-distance running. But I had enough of all the qualities needed to be a good vaulter." Fleming now participates in AAU divisional and national championships, Pan American games and others in masters competition (40 and older). He vaults higher now than he did when he was in high school and hopes to break the world's record for the 46-year-old group.

Cdr. Mannie Hendrix (R), aircraft inventory manager for ComNavAirLant, Norfolk, was unique for a while – sporting about town with Oklahoma license plates "Navy

Air" on his 1962 fire-engine red Thunderbird. That is, until last summer when Capt. Dale Meyer came aboard with Florida plates on his Datsun 280ZX identifying him as a firm believer in Naval Aviation, too. Capt. Meyer, assistant chief of staff for personnel at AirLant, says he tried to get "Fly Navy" plates, but someone got there before him. Cdr. Hendrix was luckier, however, and also has another car with "Fly Navy" plates.

Change of Command

CVW-3: Cdr. Bernie Smith relieved Cdr. Lou Schriefer.

CVW-7: Capt. Thomas S. Treanor relieved Capt. William Needham.

VA-12: Cdr. Ben Whitten relieved Cdr. Robert A. Maier.

VA-105: Cdr. Dale Raebel relieved Cdr. Russell Pearson.

VA-174: Cdr. Robert Smith relieved Capt. Robert Naughton.

VA-203: Cdr. David Dollarhide relieved Cdr. Tony Isger.

VF-41: Cdr. Henry M. Kleeman relieved Cdr. Arthur K. Cebrowski.

VP-91: Cdr. Ronald K. Meeker relieved Cdr. Samuel E. McWilliams.

Professional Reading

Brown, Eric. *Wings of the Navy*. New York: Janes Publishing, Inc., 1980. 176 pp. $19.95.

Good detailed coverage of Allied carrier aircraft of WW II. One chapter is devoted to each of 16 aircraft, 9 British and 6 U.S. from the Fairey *Swordfish* biplane to the Grumman *Hellcat*. Captain Brown describes the development history of each aircraft and comments on its wartime exploits. Of special interest is his evaluation of these warbirds in terms of flying characteristics and idiosyncrasies. There are plenty of excellent black and white photographs as well as a number of good line and cut-away drawings.

Henderson, Mary. *Famous Personalities of Flight Cookbook*. Washington, D.C.: Smithsonian Institution Press, 1981. 132 pp. $4.95.

A very unusual cookbook based on the recipes of well-known figures in aviation. The culinary secrets of early pioneers, astronauts, engineers, industrialists, all kinds of aviators and other unlikely persons are revealed here. The book includes recipes associated with names like Wright, Doolittle, Earhart, Lindbergh, Chenault, Northrop and many others. It provides a new and different insight into the personalities of some of the great men and women of aviation.

Rose, Lisle A. *Assault on Eternity: Richard E. Byrd and the Exploration of Antarctica, 1946-47*. Annapolis: Naval Institute Press, 1980. 292 pp. $19.95.

The absorbing story of Operation *Highjump*. Much of this book is devoted to the aviation aspects of this operation. R4D aircraft flew from the flight deck of the carrier *Philippine Sea* to Little America IV. From there, they fanned out on exploratory missions covering the Antarctic Continent. PBM flying boats also flew from tenders *Currituck* and *Pine Island*. One of these aircraft known as George I exploded and crashed on the ice pack. The story of the survivors' ordeal and their eventual rescue is a good true adventure story. This book recounts flying experiences over the frozen continent and provides a vivid picture of cold weather operations. Over 30 photographs.

Fade to gray

"Ghost Riders in the Sky," an old western song that recently enjoyed renewed popularity may be an apt description of future generations of Navy and Marine Corps aircraft. Like the phantom riders, they may fly in shades of gray. No more heavy, black numerals. No more red, white and blue U.S. markings. In some cases, not even red warning labels.

It's a question of survival and, according to Dave Hornick of the Naval Air Systems Command's Air Combat Survivability Branch, a pilot engaged in air-to-air or air-to-ground combat may be betting his life on how long it takes the opposition to make visual contact.

The new tactical paint scheme, now in the final stages of development at NavAirSysCom, is designed to minimize the initial detection range of the aircraft and reduce visual clues. The scheme has already been approved by the Chief of Naval Operations for A-4 *Skyhawk* and F/A-18 *Hornet* squadrons, and is beginning to find acceptance throughout the Naval Air community.

Tactical Electronic Warfare Squadron 133, an EA-6B *Prowler* unit out of NAS Whidbey Island, was one of the first to extensively test the new paint job and, according to Lieutenant A. C. Koon at ComNavAirLant's coordinating office, "You wouldn't believe how enthusiastic they were, and still are."

Koon says feeling among the squadron pilots was especially marked after air combat maneuvers using the old

By JOC Kirby Harrison
and Steve Ginsberg

and the new paint schemes. "Flying against the U.S. Air Force, they (the *Prowlers*) were being picked up visually as far out as 30 miles with the old paint job. With the new tactical paint scheme in later maneuvers, there were no visual sightings further away than five miles. And being EA-6B drivers, they wanted all the edge they could get."

"Everybody is in support of the program" says VAQ-133 safety officer Lieutenant Commander John Hershberger. "It's a tactical paint scheme for a tactical aircraft. Suddenly we're much more survivable."

According to Hornick, the fleet has always been involved in experimenting with various "camouflage" paint designs for its aircraft. "But, more than not, the information was inconclusive or conflicting," he adds.

During the Vietnam war, a portion of the air wing, flying close air support missions from *Kitty Hawk*, experimented with painting the upper surfaces of the aircraft with a jungle camouflage scheme. It seemed a logical development – until the pilot had to bank in a turn and presented a portion of the top side of the aircraft to enemy ground fire. The scheme in this attitude actually increased the visual profile of the plane.

The Navy presently has no less than six specifications outlining paint schemes and markings for aircraft and, according to Hornick, "We've had the present paint scheme and markings for 25 years (except that the gray top was changed from flat gull gray to gloss in 1971), and a steadily increasing flow of complaints about the scheme has been received from the fleet.

"We now have the technique for quantitatively determining the best tactical paint scheme for all our aircraft, which minimizes the visual detection range in a variety of combat situations. It's a definite step to improve chances of our pilots to survive and win."

The technique involves three

In marked contrast, the A-6 aircraft at left shows up vividly with the old paint scheme. The EA-6B below, with the new tactical paint scheme, offers a much lower "profile" to an opposing pilot.

phases. The first is use of a flight-verified computer model developed by Scipar, Inc., of Buffalo, N.Y., which predicts the visual reflectance of the coating required to minimize contrast between the aircraft and the background. This simulation takes into account all factors affecting visual detection, including aircraft shape, mission profile, threats and the environment. The new schemes were developed for use in four theaters: Europe, the Middle East, Southeast Asia and the Northern Flank. The flat gray paint schemes are a compromise, since they are intended for use on aircraft that may operate in any of the four theaters. However, theater-specific schemes are also being developed for contingency purposes.

The second phase is false color analysis. Contrary to logic, simply painting the entire aircraft a continuous flat gray tone does not mean the plane will appear that way under varying light conditions. With the sun coming from above, for example, areas of the shadowed underside will appear as a darker shade of gray. The answer is to use a lighter shade of gray on the lower surface in a pattern that will give the illusion of a continuous tone. The technique involves using scale models of the aircraft and a movable light source at different points around the model.

To ensure that the overall average reflectance is not compromised and to reduce visual clues under the new tactical paint scheme, aircraft markings are applied in shades of gray.

"In fact," says Hornick, "we found that, in close combat, it was to the pilot's advantage to even eliminate the red color used on the inside of speed brakes and flaps. The flash of red was an instant visual clue that telegraphed his intentions."

The final phase is flight testing. This involves a myriad of scenarios, including various weather conditions, low-level, desert and day and night operations.

Flight tests have already been completed for the A-4 and F/A-18, and a major field test will continue throughout the summer, with East and West Coast aircraft operating off the carriers *Eisenhower, Nimitz* and *America*, and from NAS Oceana. Tests will include 10 F-14 *Tomcats*, 10 A-7E *Corsairs*, 4 EA-6B *Prowlers* and 2 KA-6 *Intruders* from Carrier Air Wing Seven aboard *Eisenhower*. Eight EA-6Bs from *Nimitz* and *America* will participate, and F-4 *Phantoms* will carry the new paint scheme out of Oceana. Results of the testing are expected in August this year. Part of that evaluation will also include a reading on the effect on flight deck safety plane handling and visual requirements of the Landing Signal Officer.

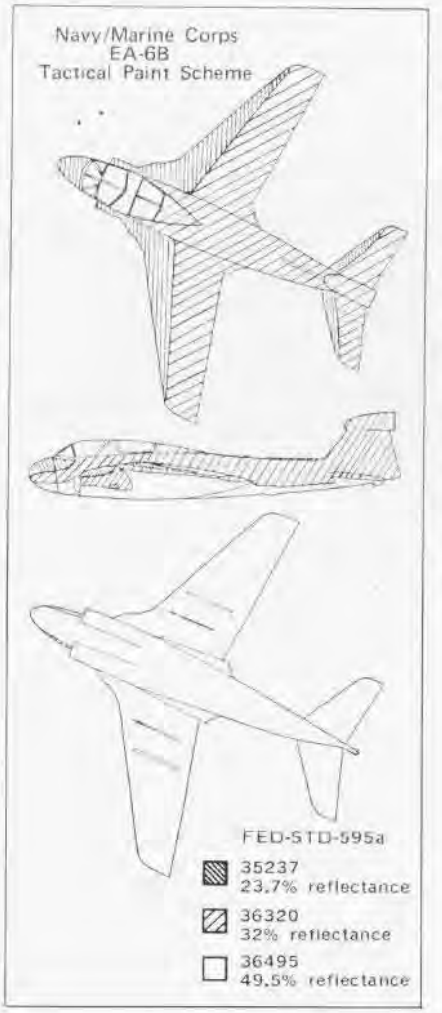
Work is now being done to design a new tactical paint scheme for the S-3 *Viking*, P-3 *Orion*, E-2 *Hawkeye* and the Naval Reserves' F-8 *Crusader*.

Hornick admits there has been some objection to the new paint scheme – among the suggestions that, with today's advanced technology and missile weapons, it isn't necessary for another pilot or ground gunner to have visual contact. "If this is the case," he asks, "why do we continue to train our pilots in close air combat maneuvers?" Although visual detection is not as important as it was in WW II and Korea, says Hornick, many current weapons systems employ optical backup systems and there is still a threat of visually directed gun systems.

There are also objections contending that the bright squadron markings are a morale factor contributing to a sense of camaraderie and competition.

"We knew it would be an emotional subject," says Hornick. "But the bottom line is survival in combat. Some years ago we converted the Marine helicopters to the flat green paint scheme with flat black markings, and we found very little difference in what is traditionally a very high squadron morale."

A fighter pilot, who advocates the switch to the lower visibility tactical paint scheme, explained his support in typically fighter pilot terms. "If you look at nature, you'll see that the most effective hunters are those who blend with their surroundings and take advantage of everything. They may not be real flashy, but they live a hell of a lot longer."



A number of squadrons, in addition to VAQ-133, have already opted to adopt the new tactical paint scheme. Some have even designed a lower reflectance paint scheme of their own pending completion of studies on their aircraft by NavAirSysCom. Other squadrons have kept their old squadron emblems, but have reduced their visibility by converting them to tones of flat gray.

Hornick feels approval of the proposed paint schemes for additional aircraft may be made by CNO, with possible slight modifications to be determined during flight evaluations. It appears that the final decision whether to allow the bright squadron emblems will be left to the individual type commanders' discretion, "but squadrons would have to be ready to repaint in an emergency."

By mid-1982, NavAirSysCom hopes to have revised the aircraft tactical paint scheme and markings specifications into one tone that will outline standard requirements for each type, model and series aircraft. A separate document will be prepared detailing theater-specific tactical paint schemes.

"The Air Combat Survivability Branch is always trying to increase the combat survivability of our aircraft," says Hornick. "This is just one of the programs, and we think a very effective one."

LETTERS

NAOs

I have been reading your fine magazine for slightly longer than my 25 years of naval service. I have always enjoyed flying and my association with Naval Aviation. My first flight in a Navy aircraft was in a PB4Y-2 (which I would like to see in a centerfold feature). For many years, I tried unsuccessfully to be designated a Naval Aircrewman. On September 14, 1972, I was designated a Flight Meteorologist and became eligible to wear the golden wings of a Naval Aviation Observer. Wings at last!

I particularly enjoy the historical articles and the squadron insignia page. Over the years I have watched changes with interest. Originally, only Naval Aviator wings appeared on the insignia page. Later, the aviator wings were displayed side by side with Naval Flight Officer wings, and eventually Naval Aircrew wings were also included.

As I read the article on the Naval Aviation Hall of Honor in the January issue, I was pleased to see that you identified RAdm. Moffett as the first Naval Aviation Observer. I am proud to wear those "other" golden wings [Naval Aviation Observer] which many Naval Aviators, Naval Flight Officers and Naval Aircrewmen do not know exist.

May I suggest that the time has come for a feature article on Naval Aviation Observers and their contributions to Naval Aviation. It would also be fitting to include their wings with the others on the squadron insignia page.

LCdr. Bruce F. DeWald, USN
482 Qual Court
Chula Vista, CA 92011

Ed's note: For PB4Y-2, see centerspread *NAVNews*, November 1979.

Computer Short Course

The Naval Research Laboratory and Naval Postgraduate School annually present a computer short course entitled "Software Engineering Principles." The two-week course concentrates on technical problems of software design and is intended to improve the participant's ability to evaluate software requirements, specifications, design, correctness and maintainability. The next presentation will be August 3-14, 1981, at the Naval Postgraduate School, Monterey, Calif., and is open to all DOD civilian and military personnel involved with the acquisition or development of software. Applications must be received by July 1. Tuition is $400 plus an activities fee of $35. For further information, contact Janet Stroup, Code 7590, Naval Research Laboratory, Washington, D.C. 20375. Commercial (202) 767-2774 or Autovon 297-2774.

Reunions, Conferences, etc.

VF-21/64 (1955-65) personnel, interested in a reunion in San Diego during the summer of 1981, are requested to contact AEC H. F. Paysinger, USN(Ret.), P.O. Box 204, Imperial Beach, CA 92032.

Torpedo Squadron 17 (1943-44) and Torpedo Squadron 84 (1945) reunion, in conjunction with the annual reunion of USS *Bunker Hill*, Seattle, Wash., July 3-5, 1981. Contact Al "Bull" Turnbull, Pasadena City College, 1570 E. Colorado Blvd., Pasadena, CA 91106. (213) 578-7341.

USS Washington (BB56) Reunion Group, Inc., will meet in Charleston, S.C., July 9-11, 1981, for its 15th reunion. For details, write John A. Brown, Box 13047, Columbus, OH 43213, or call (614) 237-6775.

USS Mission Bay (CVE-59) reunion July 16-19, 1981, Peachtree Plaza Hotel, Atlanta, Ga. For information: W. H. Barnett, Suite 1600, 100 Peachtree Street, N.W., Atlanta, GA 30303. (404) 522-8888.

Tin Can Sailors are having their fifth annual reunion July 31 through August 2, 1981, in Boston, Mass. For information and reservations, contact Edward Ward, Tin Can Sailors, Battleship Cove, Fall River, MA 02721.

USS Chandeleur (AV-10) reunion is planned for August 6-8, 1981, at Amana, Iowa. All who served aboard, please contact ship's reunion secretary, Mrs. Kenneth E. Boyd, Route 4 Box 145, Culpepper, VA 22701. (703) 854-5076.

USS Langley CV-1 and AV-3 (Covered Wagon) reunion October 2, 3 and 4, 1981, in St. Louis, Mo. Former squadron personnel, officers and crew members please contact: CPO Earl Gainer, USN(Ret.), 184 Beechmont Drive, Newport News, VA 23602. (804) 874-7232.

All former **VXN-8 Blue Eagle/World Traveller officers** interested in attending the seventh annual World Traveller's Ball at the Cedar Point Officer's Club, NAS Patuxent River, Md., on June 20, 1981, write LCdr. J. N. Roper, VXN-8, NAS Patuxent River, MD 20670, or call (301) 863-4798.

The Eleventh Annual Aviation Boatswain's Mates Symposium will be held July 15-19, 1981, at Naval Station, San Diego, Calif. Nominations for AB of the Year, Atlantic Fleet should be sent to ComNavAirLant Code 514; Pacific Fleet to ComNavAirPac Code 735.

Blue Angels' 1981 Schedule

May	
2-3	MCAS El Toro, Calif.
9	Andrews AFB, Md.
10	NAS Pensacola, Fla.
16-17	NAS Dallas, Tex.
23-24	NAEC, Lakehurst, N.J.
25	U.S. Naval Academy, Md.
30-31	Scotia, N.Y.
June	
6-7	London, Ont., Canada
13-14	NAS Corpus Christi, Tex.
20-21	Loveland, Col.
26-27	Provo, Utah
28	NAS Lemoore, Calif.
July	
4-5	NAS Atlanta, Ga.
11	Malmstron AFB, Mont.
12	Pasco, Wash.
18-19	Paine Field, Wash.
25-26	Chicago, Ill.
August	
1-2	Coney Island, N.Y.
8	NAS Whidbey Island, Wash.
9	Seattle, Wash.
15-16	Travis AFB, Calif.
22-23	Eau Claire, Wisc.
29-30	Richards-Gebaur AFB, Mo.
September	
5-7	Flint, Mich.
12-13	Champaign, Ill.
19-20	Williamsport, Pa.
26	NAS Patuxent River, Md.
27	NAS Oceana, Va.
October	
3-4	Tamiami, Fla.
10-11	NAS Memphis, Tenn.
24-25	Salinas, Calif.
31	NAS Point Mugu, Calif.
November	
1	NAS Point Mugu, Calif.
7-8	Kissimmee, Fla.
14-15	NAS Pensacola, Fla.

Present Day Heraldry

Do you know your armorial bearings?

We question not your love life. Rather, we're wondering if you know the background of your insignia.

Webster tells us that "Insignias (as military badges) resemble, or are likened to, armorial ensigns." In the Middle Ages, noblemen, knights and warriors were adorned with vivid coats of arms. The bold and fearless who took part in jousting tournaments and feudal conflagrations, especially those who ventured forth to the Crusades, proudly wore the emblems created for them by crown-appointed heralds.

Today's insignias have descended from the 12th century and are seen in myriad forms. Twentieth century heraldry for Naval Aviation readers, however, is best exemplified by those insignias assigned to units ranging from squadrons to top level staffs.

OpNavInst 5030.4B provides the criteria for design of insignias, and units with recently approved insignias are asked to examine their files for compliance with this instruction, particularly if they wish their emblems of heraldry to be entered in the annals for posterity.

Each month *Naval Aviation News* features a squadron or aviation unit and its insignia on the inside back cover. We would like to have a brief history of the squadron/unit, an insignia decal, an explanation of how the design originated, and a photo of the current squadron aircraft in flight. There are literally hundreds of Navy and Marine Corps organizations and only a dozen months, so it is impossible to satisfy all concerned. We regret this and solicit your patience. If at all possible, we will try to get your unit into print.

naval aviation news