NAVAL AVIATION NEWS

Naval Aviation's 65th Anniversary

MAY 1976

Sixty-Five

Since action at Veracruz in 1914, Navy and Marine Corps airmen and their supporting units have answered calls to combat in two world wars and two major Asian conflicts, and have responded to numerous lesser contingencies. As we signal the 65th Anniversary of Naval Aviation, it is right and proper to applaud those, living and dead, who answered America's summons to fight.

We must also hail those whose efforts have maintained and strengthened Naval Aviation during the intervals of peace which our country has enjoyed.

No one savors war. Yet we must maintain and fortify our flying units so that they can fight if required to do so or serve as an effective deterrent to war in the years ahead.

The same courage, skill, and day-in, day-out dedication which have been hallmarks of Naval Aviation in its 65 years, fortunately still exist. We are finishing out a century marred by conflict and too little peace while we are fast approaching a new century with fervent hopes of tranquility, freedom and security.

At this 65th Anniversary, we can take pride in the many accomplishments of Naval Aviation, its outstanding personnel, superior aircraft and weapons and brilliant record in war and peace. I sense that the times ahead will be trying ones which will test the ingenuity, the intelligence and the dedication to purpose of every member of the Naval Aviation team.

We have a large responsibility, one which equals and perhaps exceeds the magnitude of that which Naval Aviation has known in its comparatively brief history. We can be guided by the words of Abraham Lincoln: "I think the necessity of being ready increases. Look to it."

William D. Houser

Vice Admiral William D. Houser
Deputy Chief of Naval Operations (Air Warfare)

Years

This May marks the 65th Anniversary of Naval Aviation. Birthdays are occasions for reflecting on past achievements, and looking to the future.

Early in 1911 when Lt. Ellyson sent his reports from San Diego to Captain Chambers in Washington, D.C., his main technical concerns involved the hydro-aeroplane's float mechanism and the corrosive effect of salt spray on the craft's propeller. Today such problems seem remote from the standpoint of advanced development. They are not so distant in time. When we consider the frail craft which Glenn Curtiss taught Ellyson to fly and compare it with the Navy's planes of 1976, the source of wonder is not that our first aviation experience occurred so long ago but that it is so recent in our history. Sixty-five years comprise less than one expected lifetime.

To name the developments in Naval Aviation and the people who made them possible would be a worthwhile effort, but space here prohibits it. Suffice it to say that the design, maneuverability, armaments, speed and communications of our present aircraft must surely surpass anything Ellyson and Chambers ever dreamed.

We look forward to the future with the hope that our technology will keep pace with the ever-expanding demands for more capability. At the same time we must maintain a high state of fleet readiness and safety. The years immediately ahead may see the introduction of advanced V/STOL aircraft along with major technical advances in areas such as efficient variable cycle engines, new high temperature engine alloys and lightweight/high strength composite materials. We see prospects of low-cost and reliable inertial navigation systems based on ring laser gyro technology, extensive use of fiber optics and microcomputers and processors. In addition, advances in satellite, computer and communication technology will improve our global weather prediction capabilities to a degree not thought possible just a few years ago.

With all of these exciting possibilities for the future, I am certain we will continue to make technology serve the total needs of Naval Aviation. We in Naval Air Systems Command are dedicated to no less.

K L Lee

Vice Admiral Kent L. Lee
Commander, Naval Air Systems Command

editor's corner

Evolution of a Cover

This month's cover is the end result of considerable effort by Mr. Ryser Ericson (see page 5) who built the A-1 model depicted with the *Tomcat*, and associate editor JOC Bill Bearden. The Chief demonstrated his skills as both a photographer and as a virtuoso of special effects. Meanwhile, the magazine's one-man art department, Charles Cooney, produced several versions of a possible cover. Although not selected as the lead photo, these illustrations are so well done and appealing to the eye that they are presented here.

NAVAL AVIATION NEWS did you know?

Patuxent River Activity

One of the Navy's last seaplanes, a Martin P-5 *Marlin,* which had been a fixture at Patuxent River since 1968, left there in February bound for Norfolk. The *Marlin's* departure was vastly different from its arrival almost eight years earlier. That event was marked by a flyby and other special features (*NANews*, September 1968, page 2). This time the old flying boat's trip was made by barge, the patrol plane's wings removed for ease of transport and its fuselage secured to the barge. The *Marlin's* permanent home will be in the Naval Aviation Museum in Pensacola.

When Marine AH-1J *Cobra* 760 departed the Naval Air Test Center recently, it marked the successful completion of a 2,000-flight-hour, accelerated service trial on the T400-CP-400 engine package. The rigorous testing included attack helicopter mission profiles, 900 sand landings, and icing tests in Canada. This was the first T400 engine package to reach the 2,000-hour mark and it was still in good condition when it did. The time between overhaul and maintenance check schedules on the engine and airframe components was increased as a result of the accelerated service trial, which means a long-term saving to the government. *Cobra* 760 is now at NAS Corpus Christi, Texas, for overhaul and the engine is at MCAS Cherry Point, N.C., for further engineering evaluation.

Unusual aircraft or aerial maneuvers overhead are not an uncommon sight at the Naval Air Test Center. One day early in March, however, two low-flying airplanes had people guessing.

A T-39 *Sabreliner* appeared to be tailgating a large KC-130 *Hercules* tanker with what seemed to be a long steel cable trailing from each wingtip. The cables were refueling hoses and the T-39 was not as close as it appeared. But it was near enough to photograph a small radio transmitter flying through the air from behind the KC-130.

The transmitter is designed to spring from the tail of a downed plane when it hits the ground or water and emit emergency locator signals. The test at NATC was conducted to determine what would happen if the transmitter came loose accidentally during refueling. Project officer Lt. Brad Spahr of the antisubmarine aircraft test directorate explained, "We didn't want something crashing into the planes taking on fuel." He said that the trajectory appeared to be adequate to avoid difficulty for the refueling aircraft but they would still have to examine the films.

The transmitter is the crash position locator/flight data recorder which is already standard equipment on several Navy aircraft. The locator portion sends out a signal on the international distress frequency for 48 hours and the recorder provides accident investigators with a tape recording of the last 30 minutes before a crash.

NAVAL AVIATION NEWS did you know?

Golden Wings Paintings

Four original oil paintings of classic U.S. naval aircraft were presented to the National Air and Space Museum of the Smithsonian Institution on March 16 by MPB Corporation president William M. Scranton. The artist, R. G. Smith, is famous for his aircraft paintings. He was commissioned by MPB Corporation to do the series in honor of the golden wings, emblematic of Naval and Marine Aviation.

The paintings depict four distinguished Navy planes: Boeing F4B-3, Curtiss SOC-1 *Seagull*, Grumman F4F-4 *Wildcat* and Douglas SBD-3 *Dauntless*. Three of the paintings are slated for display in the Sea-Air Hall at the museum, below. The *Seagull* will be exhibited at the Flights of the

Arts Hall of the Smithsonian.

Vice Admiral William I. Martin, USN (Ret.), spoke at the ceremony, recalling his many experiences in flying all four of the aircraft during his long career.

In the picture, former astronaut and present NASM director, Michael Collins, views one of the paintings with VAdm. Martin.

Third Ramjet Launch

The Navy's low volume ramjet propulsion system, designed for higher speed, longer range tactical missiles of the future, made its third successful flight in February at the Pacific Missile Test Center, Point Mugu, Calif. It reached speeds of more than 1,750 miles an hour at low altitude to simulate a ship attack mission. The high-performance vehicle was launched from a PMTC A-7 *Corsair II* at 22,000 feet. It flew briefly at intermediate altitudes, then descended to below 1,000 feet for a sustained run before performing a pop-up maneuver to simulate positioning on a ship target. The flight covered nearly 50 miles and lasted approximately 90 seconds. Officials said the vehicle performed as programmed.

The low volume ramjet combines an integral rocket/ramjet in a single motor case. It is accelerated to flight speed by its solid-propellant booster in about five seconds. It then uses the exhausted rocket case as a combustion chamber to burn conventional jet fuel for long-range, sustained flight. Earlier tests have demonstrated high-speed flight at 13,000 feet altitude and maneuverability through a series of turns. In each case, the ramjet followed its planned flight with accuracy.

Tailored for air launch, the current vehicle is 15 feet long and 15 inches in diameter. However, it can be scaled larger or smaller to perform other types of missions, including surface-to-surface or air-to-air applications.

Longest F-5E Flight A long-distance flight record for Northrop's F-5E tactical fighter was set by LCdr. James Ruliffson, C.O., Naval Fighter Weapons School, on a cross-country flight from NAS Miramar, Calif., to NAS Pensacola, Fla. The 1,565-nautical-mile flight (about 1,800 statute miles) was made on February 25, nonstop, without refueling, in three hours and 10 minutes. The aircraft was flown in a normal ferry configuration, including three standard 275-gallon external fuel tanks which were carried throughout the flight.

Five F-5E *Tiger II* tactical fighters are used by the school's *Top Gun* pilots as adversary aircraft in air combat maneuvering training.

Viking Translant Two VS-22 *Vikings* landed aboard *Saratoga* off the coast of Italy early in March. They had just completed the first Atlantic crossing by S-3As. The flights proved that rapid augmentation of carrier antisubmarine assets is now possible with the *Viking*. The two aircraft left NAS Cecil Field and made stops at NAS Bermuda, NAF Lajes, and NS Rota before touching down on *Saratoga*.

The crossing was an auspicious beginning to the next round of flying operations for VS-22. During February, the squadron passed the 3,000-flight-hour mark. One at-sea period during that time was marked by 58 consecutive sorties launched without a cancellation.

VS-22 is the first East Coast squadron to deploy with the S-3A.

Triad Model This A-1 *Triad* is another in a long line of aircraft models built by Mr. Ryser Ericson whose collection occupies a substantial portion of his Northern Virginia home near the nation's capital (*NANews*, December 1973). Since he began modeling, Ryser has made more than 75 replicas of military planes — all in minute detail. Several months ago, *NANews* asked him if he would try his hand at the *Triad*, hoping it might be filmed with an F-14 *Tomcat* model for use on this issue's cover. Ryser worked weekends and evenings on the project. He compiled more than 100 man-hours studying technical drawings, fabricating the "hardware," and manipulating with delicate care his trained hands and fingers as he put the *Triad* together. The photo is testimony to Ericson's talent. He eventually plans on building a diorama with the A-1 as its feature element.

grampaw pettibone

Defensive Driving

A young instructor and a student pilot were part of a hurricane evacuation. They were scheduled to fly a T-28 *Trojan* to an Air Force base approximately 150 miles inland. The instructor had a considerable amount of experience in the T-28, with almost 1,000 hours in type.

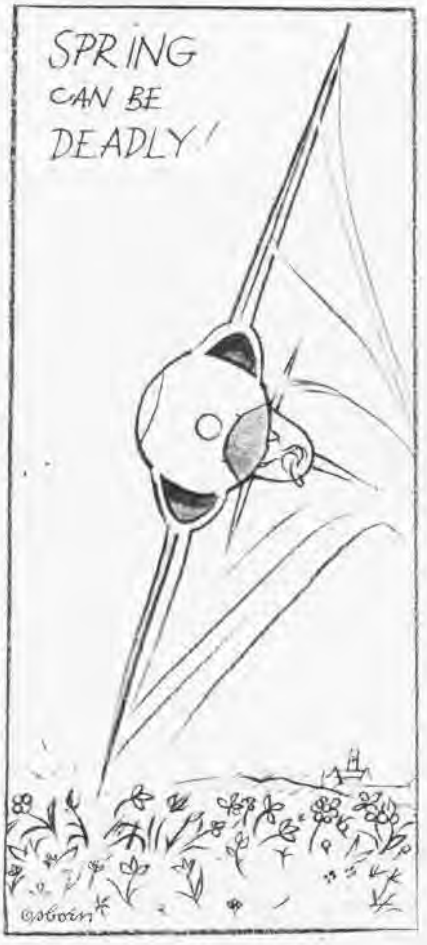
After considerable delay, the flight was cleared and became airborne without incident. The T-28 was directed to hold at an intersection short of the destination for approximately ten minutes, then was cleared to depart holding under radar vectors.

Radar gave the T-28 a vector of 320 degrees and a descent to 2,000 feet. This was the last UHF transmission received by the aircrew. After several minutes and no further UHF receptions, the instructor initiated a UHF call but no side tone or transmission was heard. The instructor then attempted to determine his position by tuning in a local VOR.

He received no audio identifier and there was no needle movement. There was an off flag on his indicator. The instructor then noted approximately 17 volts on his voltmeter. He assumed at this time that his generator had failed. He instructed the student to switch to battery-only position and number two inverter. Electrical control at this time was in the rear cockpit with the student.

The instructor set his transponder to code 7600, then to 7700, signaling radio failure and emergency to ground controllers. He secured his VOR and ADF to conserve battery power. He made several more attempts to transmit on guard frequency. The *Trojan* was still in actual IFR flight conditions. The instructor took physical control of the aircraft and commenced a climb.

Some time prior to 10,000 feet, the ICS system became inoperative. At approximately 10,000 feet, the instructor gave physical control to the student and put his oxygen mask on. He then took control as the student put on his oxygen mask — at approximately 13,000 feet.



The instructor leveled off at 17,000 feet and shortly thereafter an off flag appeared in the attitude gyro. The radio magnetic indicator became inoperative and barber-pole indications appeared in the gear position indicators.

For approximately 45 minutes, the instructor headed north in an attempt to reach VFR conditions. He then found a marginal VFR area between layers. Shortly thereafter the aircrew saw a dark contrasting area ahead and flew towards it at approximately 11,500 feet. They found a hole in the clouds through which terrain was visible.

The instructor made a descending spiral to approximately 3,000 feet and circled, searching for a feasible landing area. He determined that a stretch of highway was the most suitable and waited until traffic cleared the chosen section. He then executed a precautionary landing approach from 3,000 feet.

Touchdown was on a road with an upward incline and a slight left curve. Approximately 500 feet after touchdown, hydroplaning was experienced and aerodynamic braking used. As the aircraft closed rapidly on a tractor-trailer rig at the top of the hill, braking was utilized. The aircraft right main landing gear (MLG) left the road. The right wing struck a sign. The left MLG left the road. The right wing struck an embankment. The aircraft rotated clockwise very quickly. The nose gear sheared as the pilot lifted the gear handle. The left MLG folded as the rotation reached 90 degrees right of original heading. The aircraft came to rest 130 to 135 degrees right of its original heading. The pilots then exited the aircraft.

Grampaw Pettibone says:

Great horned toadies! This was a close one. This lad stayed cool all the way. Reminds me of a duck — calm and cool on the surface but paddlin' like fury underneath.

The pilot's decision to climb the aircraft instead of descending into the soup below was sound indeed. Although we can "Monday quarterback" this one a lot, the pilot did do some things right.

ILLUSTRATED BY Osborn

Got to Get Home

Two F-4 *Phantoms* departed on a cross-country flight. The drivers were to attend a conference. The flight to destination was uneventful. The return flight commenced at approximately 1200. The first leg proceeded as planned, terminating at an AFB. There, the pilots examined the destination weather. It was forecast to be poor.

They decided to file to an intermediate point, check destination weather and proceed if practical. By the time they arrived overhead at the intermediate point, the weather at destination had improved, so the flight continued to that destination. On arrival at home field, the pilots were advised that weather was 200 feet broken, with two miles visibility in fog. The runway was reported wet. The *Phantoms* had 12,000 pounds of fuel aboard and the pilots decided to retain the entire amount.

The flight split up at 12,000 feet (cloud tops were 7,000 feet). It was now night. The leader was to make the first approach. He proceeded on the precision approach to one mile from touchdown. He deviated only slightly from the ideal glide slope and azimuth. At one mile the pilot began going high and to the right of glide slope. Approaching one-half mile, he was advised by the GCA controller that he was "well above glide path, well right of course . . . if runway is not in sight, climb immediately to 1900." The pilot acquired sight of the runway and responded, "OK, got the field." Later he did not recall seeing the sequenced flashing strobe lights.

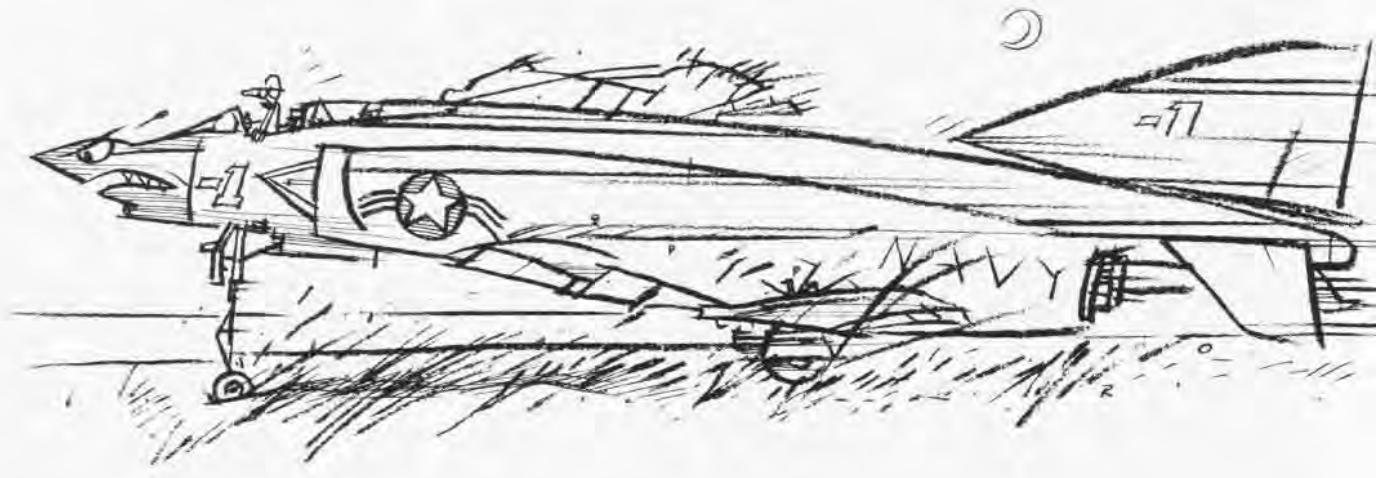
The F-4 was approximately 200 feet right of the center line. However, the pilot elected to continue. He attempted an S-turn toward the middle of the runway. He had the impression that his landing was accomplished on center line in the normal touchdown zone with the nose aligned with the runway. He felt that there was a very slight drift left. It was later determined that the right MLG touched down 375 feet from the approach end and five feet from the *right edge of the runway*. The left MLG touched down 75 feet further down the runway.

The pilot immediately deployed the drag chute and, recognizing a left drift, applied right rudder and aileron to counter the drift. He felt as if the aircraft were on ice and skidding to the left, out of control. He turned on the taxi light to better determine his position relative to the left edge of the runway. The left MLG departed the left side of the runway approximately 1,800 feet from the approach end and the right MLG departed the left edge 550 feet further down the runway. At this point the pilot notified the GCA controller that he was off the runway and requested the crash crew's assistance.

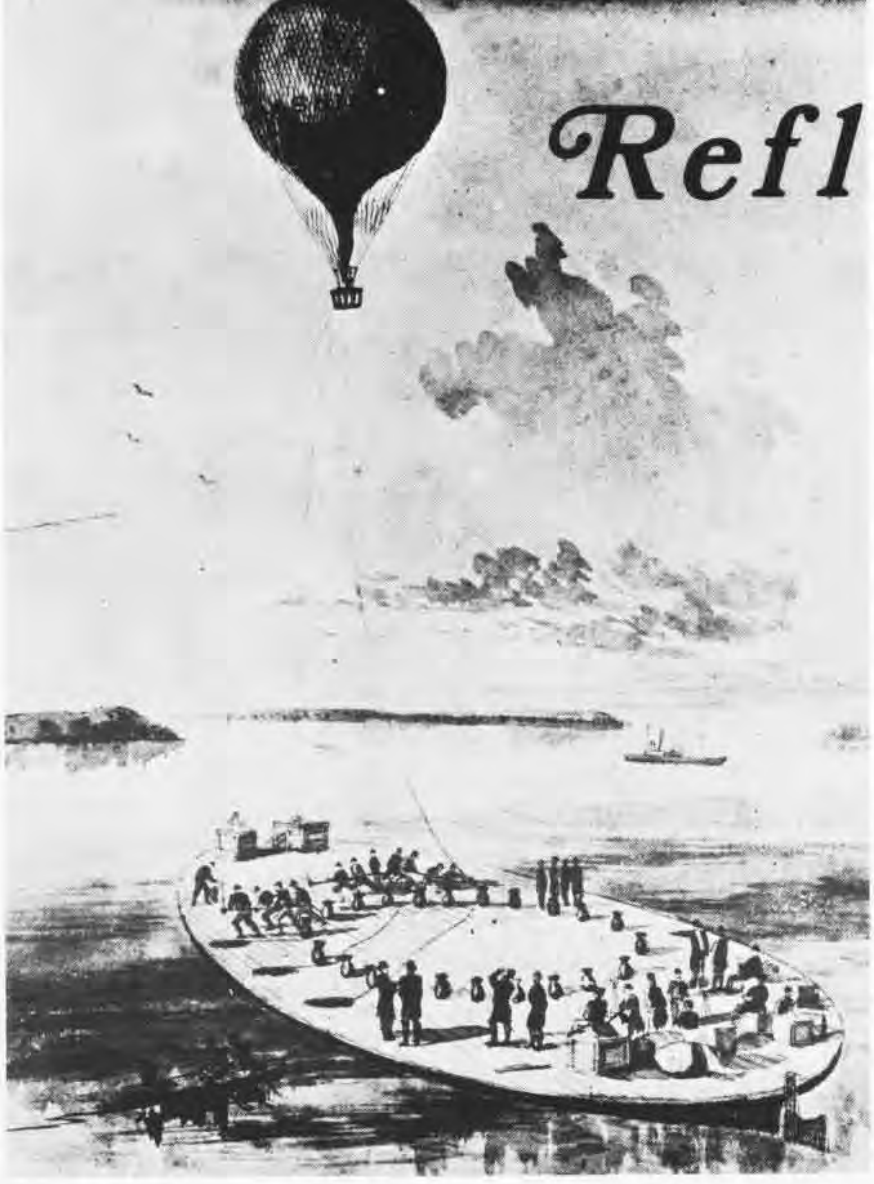
The area adjacent to the runway was grassy but very soft due to recent rains. The aircraft began fishtailing through the mud almost immediately and the pilot secured both engines. The left MLG was sheared as it came in contact with the concrete base of a distance marker. The wing was punctured by the left MLG trunnion as it sheared, and the left wing trailing edge flap and aileron were damaged on contact with the ground. After the wing was on the ground, the aircraft yawed to the left and came to a halt. The pilot was not injured, but the aircraft sustained substantial damage.

Grampaw Pettibone says:

Great balls of fire! Get home-itis got another bird! No matter how much we preach about the accident potential on return to home plate we still have a few aviators who "know better." These gents had a long day, a heavy bird, combined with poor weather — a real set-up. However, this driver could'a prevented the whole situation by "going around" instead of attempting to salvage a bad approach. Granted the strobe lights may not have been on — so what! That does not prevent a go-around. There's no excuse for this one by a so-called "professional pilot." 'Nuff sed!



Reflections



Aviation has brought vast changes to man's life — changes that are still unfolding and expanding infinitely into space. Many were even foreseen by America's founding fathers who, in another measure of their wisdom and foresight, speculated on what might stem from man's ability to fly.

After the first ascents in balloons by Frenchmen in 1783, George Washington wrote, "The tales related of them are marvelous, & lead us to expect that our friends at Paris, in a little time, will come flying thro the air, instead of ploughing the ocean to get to America."

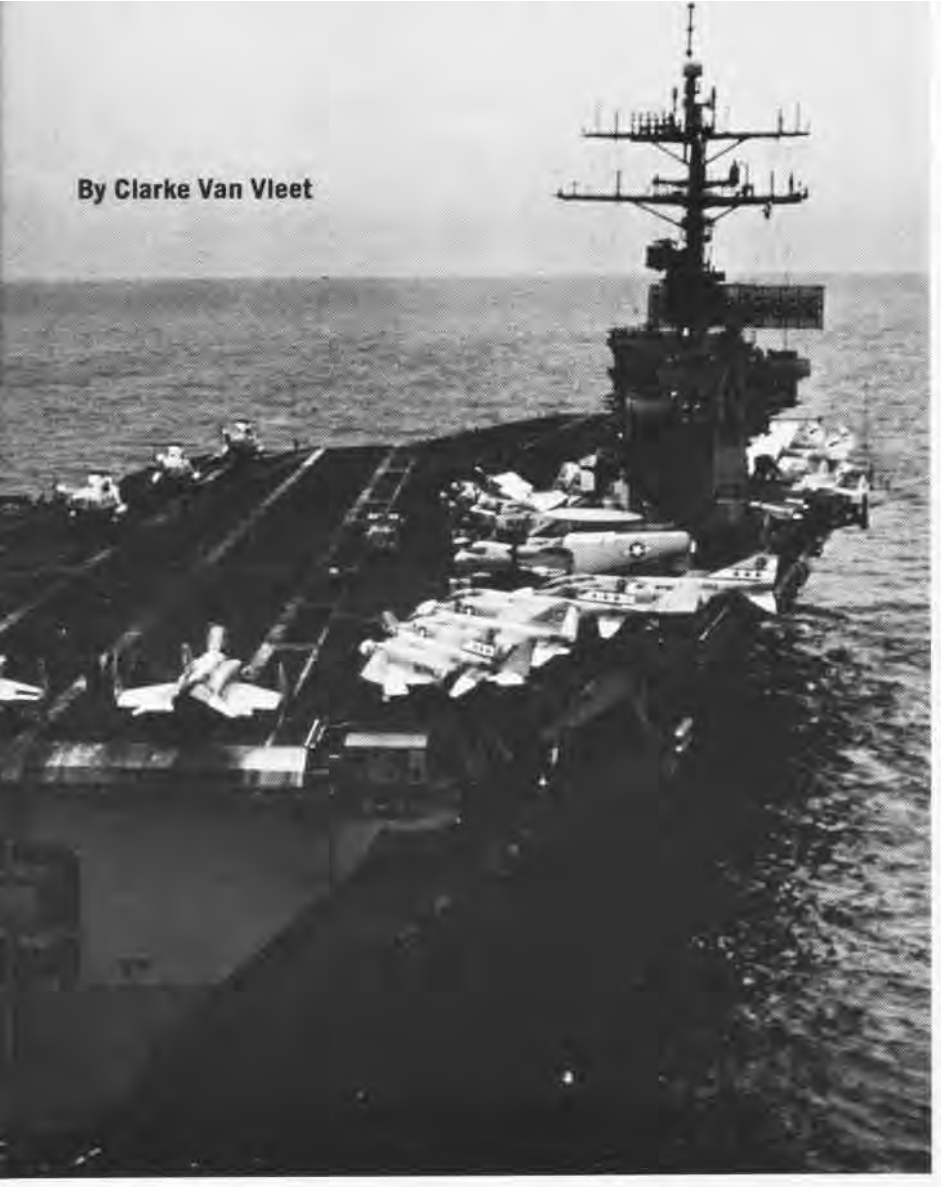
Benjamin Franklin may have been thinking of a *Skylab* when he mused, "It has been even fancied that in time People will keep such Globes anchored in the Air, to which by Pullies they may draw up Game to be preserved in the Cool, & Water to be frozen when Ice is wanted."

In 1784 Thomas Jefferson pondered that the new discovery could lead to "transportation of commodities . . . traversing deserts, countries possessed by an enemy, inaccessible mountains, or . . . reconnoitering an army, etc. . . ."

Seventy-seven years later, in 1861, John LaMountain ascended in a balloon moored to the deck of the Union transport *Fanny* to observe Confederate positions — in effect, the first sea-based aerial reconnaissance. And in the same Civil War, Thaddius Lowe went aloft from a specially constructed boat which carried an observation balloon. Some have stretched their imagination to term it "the first aircraft carrier."

As aeronautics progressed and men worked on "flying machines," the farsighted Assistant Secretary of the Navy, Theodore Roosevelt, recommended, in 1898, 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 airplanes by the Navy.

It was in 1911 that Glenn Curtiss and Eugene Ely dramatically demonstrated to the Navy and the world that the airplane was capable of shipboard operations. Landings on and take offs from a special platform on a combatant ship proved that aviation could go to sea. On May 8 that same year, the Navy ordered its first air-



By Clarke Van Vleet

plane, the A-1 *Triad*, a 60-mile-per-hour machine of rubberized linen, sailcloth, bamboo and wire. That day became the official birth date of United States Naval Aviation.

Developments progressed rapidly in the small air arm. The first call to action came in 1914 when Naval Aviators flew missions to search for mines, reconnoiter positions and photograph the harbor at Veracruz during the Mexican crisis. It was also the year World War I erupted in Europe. After America entered the conflict on April 6, 1917, a unit of Naval Aviation was the first military detachment from the U.S. to reach France. 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.

One of the outstanding products of the war was the development of the long-distance flying boat. Although the NC flying boats arrived too late for the war, one of them made the first trailblazing flight across the Atlantic in May 1919. It dramatized the progress of aviation in general and Naval Aviation in particular. George Washington's early predictions were beginning to come true.

The Twenties were characterized by impressive technical progress. The radial-cooled engine, better radio communications, a bombsight, oleo struts, folding wings, a turntable catapult and dive-bombing techniques were developed. Torpedo attack, scouting, spotting for gunfire and the application of aviation to polar exploration and photographic survey were emphasized. 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, the ominous rumblings of war again echoed across both oceans. Naval expansion was authorized and the pilot training program was stepped up. The attack against Pearl Harbor on December 7, 1941, proved the potency of sea-based aviation as Japanese carrier aircraft, in one swift surprise stroke, devastated America's principal naval base in the Pacific and eliminated a major portion of the Navy's heavy surface power. But aided by its distance from the enemy and fortunate in its industrial might, the U.S. built the ships, planes and equipment, and trained the land, sea and air forces that ultimately beat back the aggressors.

During WW II, the U.S. used 111 aircraft carriers of all types, including the escort or mini type. Of the four large carriers sunk by enemy action, all went down during 1942, before new task group tactics were devised. The fast carrier task force consisted of three to five aircraft carriers accompanied by supporting battleships and cruisers, surrounded by a screen of destroyers. These tactical dispositions 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 the naval forces, the Navy's air arm contributed its full share to the power of the fleet in achieving control of the sea and, thus, final victory.

Following WW II, the performance of carrier aircraft continued to improve and, by 1950 at the outbreak of the Korean Conflict, the Navy was flying jets and helicopters from carriers. Naval Aviation became a decisive factor in that war — action sorties by Navy and Marine pilots increased by nearly 20 percent over WW II. In helping the United Nations stem the aggressor, Naval Aviation played a different role than it had in the Pacific

island-hopping campaigns. Aircraft and missions were different, flying hours longer, more days were spent on the firing line, enemy AA fire was greater and the weather worse. Action was concentrated in support of the GI on the ground and an interdiction campaign that finally helped stop the enemy.

In spite of the truce in Korea, peace in the world remained on an unsteady footing. Continued control of the sea by American naval forces maintained the uneasy peaceful balance. On various occasions these forces provided support to menaced nations, patrolled troubled waters and evacuated refugees, thus playing the role of humanitarian and protector alike. Revival of the old technique of naval blockade during the Cuban crisis in 1962 found carriers and patrol aviation ideal for the mission. On other occasions they were at hand to give aid to the stricken when hurricanes, typhoons and earthquakes struck in widely diverse geographic areas around the globe.

The advance of science and its 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. Progressive improvements were made in antisubmarine warfare equipment and tactics, and atomic power went to sea driving the 75,700-ton nuclear carrier, *Enterprise*. This ship was over twice as long as and eight times heavier than America's first carrier, *Langley*, commissioned some 40 years earlier.

The Sixties also saw man's effort to conquer space begin in earnest as manned orbital flight became a reality and a series of successes culminated in the first manned lunar landing. More than half the nation's astronauts had Navy backgrounds and Naval Aviators made the first American suborbital and orbital flights. A former Navy pilot was the first to step on the moon. Satellites developed by naval scientists expanded our knowledge of space and a Navy satellite navigation system gave

to all nations an accurate means of traveling the earth's oceans. Ships and squadrons were the agents for the recovery of all 59 astronauts of the *Mercury*, *Gemini* and *Apollo* space shots, and they continued their worldwide recovery duties for the *Skylab* series.

At the same time, in Southeast Asia, the U.S. responded long and hard in another conflict. 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 war wore on, to become America's longest. The burden of the Navy's air action for nearly ten years was with the carriers and aircraft of the Seventh Fleet. Finally, naval aircraft performed the most extensive aerial mining operation in history, thus blockading avenues of supply before the enemy undertook serious cease-fire negotiations. History may well credit Naval Aviation as one of the most decisive factors in bringing about the cessation of those hostilities. An uneasy truce finally resulted in U.S. disengagement and the return home of American troops and prisoners of war in 1973.

Navies exist to control the seas and, in the U.S. Navy, aviation plays a dominant role in fleet operations. In the attack carrier striking forces, carrier-based aircraft serve as the primary offensive and defensive weapons, providing the mobility and versatility which is the basic source of U.S. naval power. The helicopter is now used on hundreds of ships of all types and is an important extension 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 this planet, continue to be the cushion of the country's defense. They also remain the avenues connecting America with her friends and allies as well as with the raw materials vital to her economic status. They are the surfaces that must be controlled if the nation is to survive.

SIXTY·FIVE YEARS

By Hal Andrews

Today's F-14 *Tomcats* have only some basic aeronautical principles in common with their early Navy pusher seaplane ancestors. A look at the airplanes halfway in between, such as the famed World War II SBD *Dauntless*, gives some hint of the path of naval aircraft evolution over 65 years. However, it's still difficult to accept the fantastic rate of progress in aviation since the first Naval Aviators flew Navy No. A-1 in 1911.

The Navy's initial aircraft were basically models offered by the early aircraft builders, with some emphasis on features that would make them more useful for Navy operations, such as the combined float and wheel landing gear of the A-1, a typical Curtiss pusher (page 20). Over the next few years, the aircraft builders were encouraged to build types more suitable for Navy needs; most of those that were purchased were seaplanes or small flying boats. All were wood and fabric biplanes with plenty of wire bracing, typical of the period. These early Navy aircraft were used for the many tasks necessary to develop an aviation force that could operate with the fleet: training pilots, testing equipment (radios, bombs, guns, catapults) for possible use and working out techniques such as operations from ships, scouting for the fleet, etc.

From the first beginnings until the present, the development of naval aircraft has gone hand in hand with the overall development of Naval Aviation. Airplanes, including the ever more complex systems they embody to give them their combat capability, are only one of the ingredients that make possible the many capabilities of Naval Aviation today. However, they do serve best to illustrate the great strides that have been made in 65 years.

The pre-WW I years were experimental ones in every respect for the embryo seaborne air arm. With the U.S. entry into World War I, the German submarine threat defined the prime operational aviation mission for the Navy as antisubmarine 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.

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 in production, and service operations for several years were conducted in modified and modernized WW I types. While operations with the fleet emphasized observation and long-range scouting missions, bombing and torpedo capability was also developed.

The formation of the Bureau of Aeronautics in 1921 created a single authority to direct and coordinate all

Grumman F-14A Tomcat, here being catapulted from the deck of USS Forrestal (CV-59) during carrier trials, employs latest in aeronautical and avionic technologies to provide the fleet with fighter aircraft whose overall capability is unequaled.

OF NAVAL AIRCRAFT

Douglas SBD Dauntlesses, like these photographed flying over the Pacific in 1943, were typical of carrier aircraft that bore the brunt of the early WW II combat action.

Curtiss pusher seaplanes, including AH-8 seen here with a modified float arrangement, were used to explore all potential facets of Naval Aviation during its initial years.

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 effort 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 the forthcoming operation of the carrier *Langley* dictated a new approach. The air-cooled radial engine proved to be the answer. In ever-increasing sizes, it became the Navy-sponsored mainstay of almost all military aircraft, as well as civil transport aircraft until superseded by turbine power plants.

Another special effort during the early Twenties was the racing aircraft program, which greatly advanced the art of high-speed aircraft design and produced a number of world and United States speed records. In many ways this program was not unlike that of the post-WW II high-speed program which produced the record-breaking Douglas D-558 series of research airplanes.

Where possible, commercial types were purchased for use in transport and utility work. Thus, such types as the Ford and Fokker trimotor transports joined the initial monoplane flying boats as the primary monoplanes in service use during the early Thirties.

By 1935, all-metal construction, retractable landing gears, wing flaps, cockpit canopies and the new twin-row radial engines were incorporated in Navy aircraft. Experimental monoplane combat types were being tested but the biplane held its place as the primary Navy carrier type 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 the first-line combat types—in 1941!

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 torpedo planes 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.

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 to reduce the drag of the air-cooled radial engines. New concepts such as the autogiro were evaluated as they appeared. The autogiro was evaluated as offering no great benefits over conventional aircraft for Navy and Marine missions. Development of monoplane flying boats 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 penalties for shipboard-type aircraft.

World War II saw the exploitation of the high-powered reciprocating engine monoplane configuration for all carried-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 theatres even though outclassed in performance by its more modern water and land-based contemporaries.

Naval Aircraft Factory F5Ls, first built in late WW I, continued, along with similar Curtiss H-16s, as principal patrol planes of the fleet until late 20s.

Boeing XF3B-1, one of several prototype fighters designed to use P&W Wasp, was tested in 1927 for either carrier or, equipped with floats, battleship ops.

Pitcairn XOP-1 autogiros were civilian models procured for Navy and Marine evaluation of new concept. Rotor was turned by airflow rather than power.

Curtiss Navy Racers of 1921 were first series of landplane and seaplane racers built for the Navy in the early 20s. They won races and set speed records.

Vought O2U-3 being launched from Pensacola typifies era of battleship and cruiser catapult seaplanes—eyes of the fleet between the two world wars.

SBC-4s, last carrier biplane dive bombers to enter service, incorporated other features of new monoplanes that also became operational in the late 30s.

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 turbojet 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 in spite of the Navy's high-speed research program and early Navy efforts to investigate the low-speed characteristics of swept-wing airplanes. Innovations such as pressurized cockpits and ejection seats were developed for these new fighters. Helicopters had completely supplanted the cruiser and battleship-based scout seaplanes and were proving their worth for carrier plane guard and general utility duties.

In subsequent years, extensive efforts were expanded to develop carrier equipment suitable for operating the continually improving jet aircraft. The efforts resulted in the adoption of the angled deck and the steam catapult and construction of the larger *Forrestal* and later class carriers.

Aircraft, armament and avionics development also continued at a fast pace through the rest of the Fifties. Afterburner jet engines coupled with aerodynamic, structural and control system advances, along with new materials and manufacturing methods, led to supersonic fighters for the fleet. Air-to-air missiles and the radar and fire-control systems to employ them led to the missile-only interceptor. Re-

Martin P6M-2 was the ultimate in flying boat technology. Termination of P6M program forecast end of Navy flying boats.

Hawker Siddeley AV-8As were purchased by Marines to evaluate VTOL tactical aircraft in regular Marine squadron ops.

lated applications of the same technology created a wider variety of attack aircraft — subsonic basic attack, all-weather and supersonic attack-reconnaissance types. Turboprop engines brought about a new era in patrol and airborne early warning aircraft, and the smaller turboshaft engines revolutionized helicopter design and operations. Inflight refueling techniques employing standard carrier types as tankers came into service, greatly increasing the flexibility of carrier 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 the 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

Grumman E-2B Hawkeye is launched from Constellation during Indian Ocean operations in 1974. Hawkeyes serve vital control function in carrier air operations today.

Lockheed P-3As introduced new era of turboprop pressurized aircraft to VP surface patrol and ASW operations.

Sikorsky RH-53Ds are specially equipped Sea Stallions used for mine countermeasures service, towing various sweeping gear.

seagoing forces. Specially equipped airborne mine defense helicopters — along with standard Marine types modified for this mission — played a part in the final operations there, and continue to do so. Electronic warfare aircraft have become increasingly important to successful mission accomplishment. The Marines turned to a successful British design to introduce V/STOL into their tactical operations. Helicopters in the inventory are being modified to serve new roles in support of non-aviation ships, particularly in ASW.

The use of some new technologies is very obvious, such as the 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. As more advances are made in all the fields on which Naval Aviation depends, better aircraft and airborne weapons system development will result and enhance the capabilities of Naval Aviation in the future.

McDonnell Douglas TA-4Js serve fleet training needs as well as being used for advanced training. Other A-4s are still first line attack aircraft after 20 years.

NAVAL AVIATION 65 in '76

THE LOG . . .

1911 The Navy ordered its first airplanes, two Curtiss *Pushers*, designed for a speed of at least 45 miles per hour. One, the A-1 *Triad*, was to be equipped for arising from or alighting on land or water.

1912 First Marine Corps officer assigned to flight instruction, 1st Lt. Alfred A. Cunningham, reported to the Naval Academy for duty in connection with aviation.

1914 The AH-3 hydro-aeroplane piloted by Ltjg. P. N. L. Bellinger and Ens. W. D. LaMont flew the first mission to support the Marines at Veracruz.

1916 Navy allocated $750 for development of gyroscopically-operated, bomb-dropping sight by Sperry Gyroscope Company.

1917 The Navy's training program was expanded to include an 18-month course for seaplane and dirigible pilots. It also provided for training enlisted men as aviation mechanics, with some to be selected for pilot training.

The Navy made a contract with Curtiss Exhibition Company to train 20 men of the Naval Reserve Flying Force as aviators. It also contracted with Goodyear Tire and Rubber Company to train 20 men as LTA pilots.

1918 The Bureau of Steam Engineering reported that the Marconi SE 1103 radio transmitter on the H-16 flying boat had shown its dependability. It was the first tube set developed for naval aircraft.

1919 Three NCs took off on the first leg of a projected flight across the Atlantic Ocean. NC-1 and NC-3 were damaged while landing in heavy seas and did not complete the flight. NC-4 landed at Lisbon, Portugal, becoming the first plane to fly the Atlantic.

1920 A Bureau of Construction and Repair report disclosed development and experimental work in metal construction for aircraft.

1922 Routine operations of catapults aboard ships began with the successful launching of a VE-7 piloted by Lt. A. C. McFall, from USS *Maryland*.

In the National Elimination Balloon Race, one of the Navy balloons which competed was filled with helium, the first use of the gas in a free balloon.

1925 The Naval Academy reorganized some of the school's departments to make Naval Aviation an integral part of its program.

1926 The first flight over the North Pole was made by LCdr. R. E. Byrd and AP Floyd Bennett in a trimotor Fokker.

Byrd

1927 A major advance in the transition from wooden to metal aircraft structures resulted from the Naval Aircraft Factory's report that corrosion of aluminum by salt water could be decreased by the application of anodic coatings.

1929 The Bureau of Aeronautics announced the policy of providing all carrier airplanes with brakes and wheel-type tail skids. This followed successful tests aboard *Langley* to eliminate fore-and-aft arresting gear.

1934 Lt. Frank Akers gave the first demonstration of the blind landing system designed for carrier use when he made a hooded landing in an OJ-2 at College Park, Md.

1936 Construction of David W. Taylor Model Basin was authorized. Its mission was to investigate and determine shapes and forms for U.S. vessels and aircraft.

1938 The Naval Expansion Act authorized an increase in the total tonnage of aircraft carriers among other naval vessels. It also increased the number of naval aircraft to not less than 3,000.

1941 The Naval Aircraft Factory began Project *Roger* to install and test airborne radar equipment, with various radar applications, including search, blind bombing,

MAY

and radio control of aircraft.

The seaplane tender *Albemarle* arrived at Argentia to establish a base for Patrol Wing Support Force operations and prepare for VP-52, the first squadron to fly patrols over the North Atlantic convoy routes.

The Engineering Experiment Station at Annapolis was tasked with the development of a liquid-fueled assisted takeoff unit for use on patrol planes. This marked the beginning of JATO in a program directed towards utilizing jet reaction for aircraft propulsion.

1942 Battle of the Coral Sea, the first naval engagement fought without opposing ships making contact.

The possibility of increasing the range of small aircraft by operating them as towed gliders was demonstrated at the Naval Aircraft Factory. Lieutenant Commanders W. H. McClure and R. W. Denbo hooked their F4Fs to towlines behind a twin-engine BD, cut their engines and were towed for an hour at 180 knots, at 7,000 feet.

The feasibility of JATO was demonstrated in a flight test by a Brewster F2A-3 at NAS Anacostia. Five British antiaircraft solid-propellant rocket motors were used.

A VR-2 flight from Alameda to Honolulu, the first transoceanic flight by NATS aircraft, began air transport service in the Pacific.

1943 The Naval Airship Training Command was established at Lakehurst.

1944 To meet the need for aviation personnel trained to use electronic countermeasures equipment, the Chief of Naval Air Technical Training directed that a special projects school for air be established at San Clemente.

1945 The first helicopter rescue was made when a U.S. Coast Guard HNS-1 helo rescued 11 Canadian airmen marooned in northern Labrador.

1946 Initial operational tests of an XCF dunking sonar carried by an HO2S helicopter were completed.

1948 VF-17-A, equipped with 15 FH-1 *Phantoms* became the first carrier-qualified jet squadron in the U.S. Navy.

A contract was issued to Goodyear Aircraft Corportion to design an ASW airship.

1950 A new test chamber was completed at the Ordnance Aerophysics Laboratory, Daingerfield, Texas, making it possible for the first time to test full-scale ramjet engines.

1952 The feasibility of the angled deck concept was demonstrated in tests performed on a simulated angled deck aboard *Midway* by Naval Air Test Center and Atlantic Fleet pilots using both jet and prop aircraft.

1954 A ZPG-2 airship, commanded by Cdr. M. H. Eppes, landed at NAS Key West after a record-breaking flight of more than eight days in the air.

CNO approved Project 125 of the carrier improvement program providing for installing an angled deck, enclosing the bow to improve seaworthiness, and making other changes to modernize certain carriers.

1958 Four F3H *Demons* and four F8U *Crusaders* completed nonstop trans-Atlantic crossings to test speed with which carrier aircraft could be delivered from the East Coast to the Mediterranean Fleet.

1961 Cdr. Alan B. Shepard became first American in space when he made a suborbital flight 116 miles high.

1966 First combat use of new land-based catapult capable of launching fully loaded tactical aircraft from runways less than 3,000 feet long, at Marine Expeditionary Airfield, Chu Lai, Vietnam.

A Vought XC-142A tri-service V/STOL transport was successfully tested aboard USS *Bennington*.

1967 Two A-7A *Corsairs* made first light attack jet flight across the Atlantic without refueling.

1969 *Franklin D. Roosevelt* put to sea with new development in carrier fire prevention, a deck edge spray system using light water.

1972 Navy planes mined harbors in North Vietnam by Presidential order.

Navy aircraft launched Operation *Linebacker*, the systematic, sustained campaign to reduce the flow of external supplies into North Vietnam and destroy the war resources already there.

1973 *Skylab II*, carrying a three-man, all-Navy crew, was launched for a 28-day mission in which it rendezvoused with the earth-orbiting *Skylab I*.

1975 USS *Nimitz*, the largest warship in the world, was commissioned at Norfolk.

A Navy task force evacuated the last American and Vietnamese refugees from South Vietnam.

Navy tactical air support participated in the recovery of SS *Mayaguez* and her crew.

NAVAL AVIATION 65 in '76

May 8, 1911

NAVY

Spad drivers are looked upon today as ancient aviators. However, these latter-day A-1 pilots are all youngsters by comparison with anyone alive now who saw the first Navy A-1 in flight. Those who actually flew the first Navy airplane during its 16-month career have long since passed on. There is one former Navy pilot, still very active, who can give first-hand recollections of what it was like to fly a Navy Curtiss pusher-type seaplane—Don Germeraad (*NANews*, September 1961) who flew the A-1 reproduction built in San Diego in 1961 to celebrate Naval Aviation's 50th Anniversary.

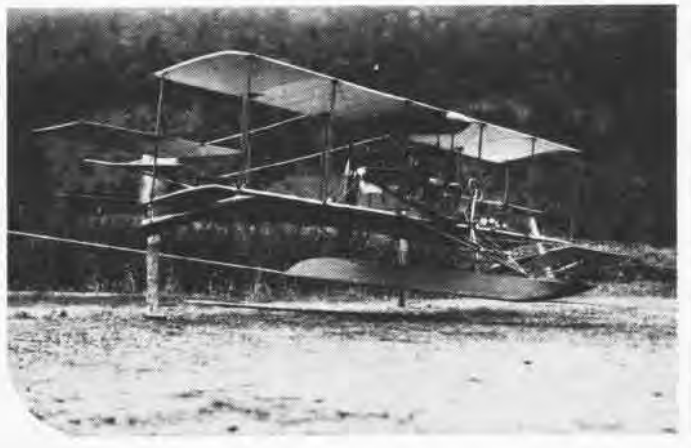
The original A-1, ordered by the Navy on May 8, 1911 (see page 8), was a typical Curtiss pusher biplane. At various times it was equipped with a float landing gear, wheeled landing gear and, for an initial period, with combined float and wheel landing gear which followed the pattern of other Curtiss *Triads*.

When initially flown, July 1, 1911, at Hammondsport, N.Y., by Glenn Curtiss and by Lt. T. G. Ellyson, Naval Aviator #1, a 50-hp Curtiss engine was used. The Navy's 75-hp engine was ready a week later and regular flights, both solo and with a passenger, continued through much of July. Recurring engine problems then resulted in a complete engine rebuild "without charge to the government."

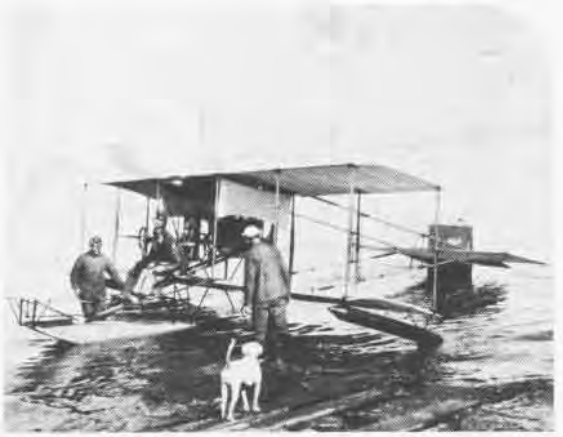
Following a few more flights in early September, the A-1 was shipped to the Aviation Camp at Annapolis, Md. There, both Lt. Ellyson and Lt. J. H. Towers, Naval Aviator #3, shared most of the A-1 flying as the Navy learned to use its new aeroplanes. Flights to various destinations on Chesapeake Bay were attempted, some of them successfully. Many experiments were made to explore the potential of aircraft in the Navy.

The A-1 was repaired and modified many times during the next few months. Late in December it was shipped to San Diego to continue flying during the winter months. It returned to Annapolis in May 1912, flying and being worked on regularly until it was wrecked during an early attempt at catapult launching in July. Flying resumed in late September but after another crash on October 16 it was "expended except motor. Not rebuilt." Like the many naval aircraft to follow, the A-1 made it possible for its pilots, aided by ground crews and others, to bring the advantages of aviation to naval operations.

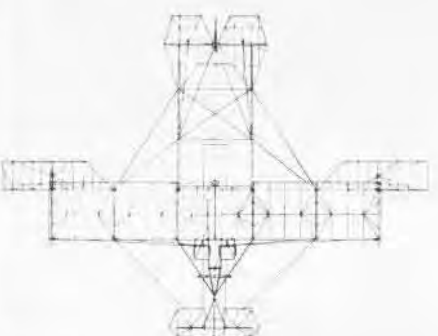
1961

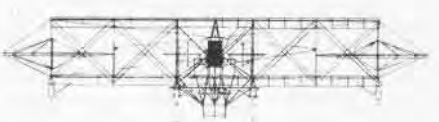


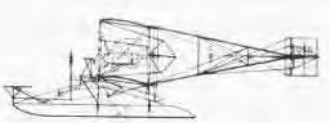
NO. A-1



Span	37'00"
Length	28'7"
Height	8'10"
Engine Curtiss V-8	75 hp
Maximum speed	60 mph
Maximum altitude recorded (seaplane)	975'
Maximum flight duration recorded (distance was 60 miles)	1 hr. 20 min.
Crew	Two







My Song

By Commander Jack Fellowes

On the occasion of Naval Aviation's 65th Anniversary, NANews asked Commander Jack Fellowes to describe what being a Naval Aviator means to him. He is assigned to the U.S. Naval Academy, lecturing on leadership and serving as officer representative for the football team. Recently he was given new responsibilities as special assistant to the athletic director. He is a former POW who was shot down over North Vietnam on August 27, 1968.

No American military man could ever forget such a date or such an experience. For me, a Navy pilot since 1957, it marked both the end of a career and the beginning of its meaning.

Until that time my life might be compared to an average takeoff: a slow rev of the engine, then a steady climb upward. My slow start began in Tucson, Ariz., where the challenge of Naval Aviation was the farthest thing from my mind. In fact, anything challenging was far from my mind, except how to get on that basketball court 24 hours a day. In those days the roar of aircraft was as unnoticeable as the buzzing of bees on hot summer days. Tucson was an Air Force town, too, bordered by Marana and Davis-Monthan Air Force Bases. The only times I ever remembered this, however, were when the big B-24s demonstrated their preference for flying over the fairways on the municipal golf course rather than the bases.

My indolent high school days rewarded me with one distinction. As yet unconfirmed by case studies, I am the only Naval Aviator alive to have had three senior years of high school. Even more impressive, each year marked a different school: Tucson High, the Hill School in Pottstown, Pa., and finally Naval Academy Preparatory School in Bainbridge, Md.

Plebe year at the Academy provided my first glimpse of Naval Aviation. Thoughts of a future in Navy Air hadn't even brushed the fringes of my mind until then. Now, they swiftly and surely moved in and took hold. Aviators—they were the guys to emulate! Whether company officers, or instructors, or battalion officers, they demonstrated a casual confidence, wit, and easy, relaxed manner in approaching all subjects and all peoples. That's what I wanted to be. I remembered a line my oldest brother, himself an aviator, had sung to me during one of our recent Christmas leaves together, "There are no Navy pilots down in hell." Seeing these guys for the first time, I think I understood why.

During second class summer my fascination with aviation and this idolized image of Navy pilots strengthened. Watching them land and take off during two weeks on the carrier was better than watching any movie or movie stars. Wearing boots, their pants tucked casually inside, a slight jaunt to their walk, a bit of the daredevil showing — these guys *were* movie stars! That summer I even joined them and flew off the carrier. I loved every minute of it. The greater the image of the Naval Aviator became, the more certain I was I could never serve on a destroyer. Surface line may be mighty fine, but not for me.

Pensacola decided it. As I drove through the gates into the "Cradle of Naval Aviation," I suddenly realized, my God, I'm here. Like walking into the Yankee locker room, or standing alone in Notre Dame stadium hours before a game — the ghosts of the greats hovered about, whispering enthusiasm, diligence, commitment.

I was ready to go. This is it, this is what I want. I resolved there and then to wear my Navy wings proudly, and to honor those who had come before me and those who would follow.

That resolve carried me through several more years of the rigorous training the Navy mandates for its pilots. Rigorous it has to be. Aviation is one of the very few professions in which a constant challenge exists. You either do things right or you may die. It calls for total commitment and absolute concentration. But it pays you back with the brand of excitement only an infant bird can know when it first learns to rise above the earth.

Each plane presented its own test and its own fascination. After solos in the T-34, the T-28 became the largest, most awesome aircraft ever built. Corpus Christi soon proved that wrong, with advanced training in the *Spad* (alias the A-1H).

Now, with the Golden Wings, I was a member of that elitest group, the fraternity of Navy pilots. The world knew us by the headrests on our ready room chairs, and the way our fingers flew in mock combat during happy hours, "And there I was at 10,000 feet, inverted. . . ."

Several tours followed and then came the ultimate pass-or-fail test — the A-6 and combat.

Navy pilots don't dream of shootdowns. Thoughts of them cause nightmares. The image of the cool aviator, ever calm, unruffled, jars against the reality of rocket fire. The hero doesn't tumble beneath a billowing parachute headlong into an unknown hostile land.

But tumble I did.

For the next six and one-half years I was one of several hundred guests at the Hanoi Hilton in North Vietnam. My initial reaction, as I reviewed the circumstances from the moment I was hit to the instant I pulled the face curtain, was one of shame. Surely I'd made a mistake. Surely there was something I could have done to save that plane.

Today I realize there probably wasn't. But I suffered then more than the usual it-was-just-one-of-those-days doldrums.

I'd been trained, like any decent aviator, to coddle that magnificence of

In one sense Cdr. Fellowes had to come from behind, as did Navy's football team when it topped Miami 17-16 last season.

Fellowes, on the sidelines, lets loose with the other midshipmen as the winning extra point goes through the goalposts.

engineering I flew. Its loss grieved me desperately.

As the war went on, my sense of loss, and of being a loser, worsened. Overhead I could hear fellow pilots flying, still actively participating in the war effort while I sat below, helpless in my prison cell.

This wasn't self-pity but I felt I was wasting some of the precious training and experience I had as an aviator. I had been shot down. Didn't that mean I went wrong somewhere? I faced the embarrassment of mistakes I must have made and the cardinal rule I'd violated: do it right, or you may die. And I almost did die.

Sometime in the spring of '71, I was moved with about 30 others to Skid Row, a punishment camp in which each of us was placed solo. During this time, an eventual two-year period in which we all did "penance" for the general harassment we'd imposed on our captors, I met and "communicated" with a bombadier navigator named Mike Christian. Like each of us, Mike had his own special method for maintaining sanity. Through the endless dreariness of those days, he recited poetry. *Gunga Din* and *The Highwayman*, story poems of adventure and heroism, drifted over the walls to those who roomed near him.

It was during this time he taught me a poem by another flyer, John Magee. Phrase by phrase I memorized the words to *High Flight*, repeating them so often that today the words are a part of me: "O, I have slipped the surly bonds of earth. . . ."

And so I had, before my shootdown. I soon realized I was doing so now, too. I was facing a similar challenge. The setting was different. The do-right-or-you-may-die rule applied here, even more forcefully. It wasn't airplanes we were trying to salvage now. It was each other.

In all my years in Naval Aviation to this point, when I had talked about flying, I talked about the planes, and the training, and the carriers.

Suddenly, in a position where I couldn't fly anymore, locked away from the rest of society, I had plenty of time to think — not about airplanes and hardware, but about people. In a sense, I began to see them for the first time. I began to appreciate not only those who were there with me, but those I remembered vividly, lovingly — from fellow pilots to the enlisted men who kept the planes safe for us to fly. It hit me then.

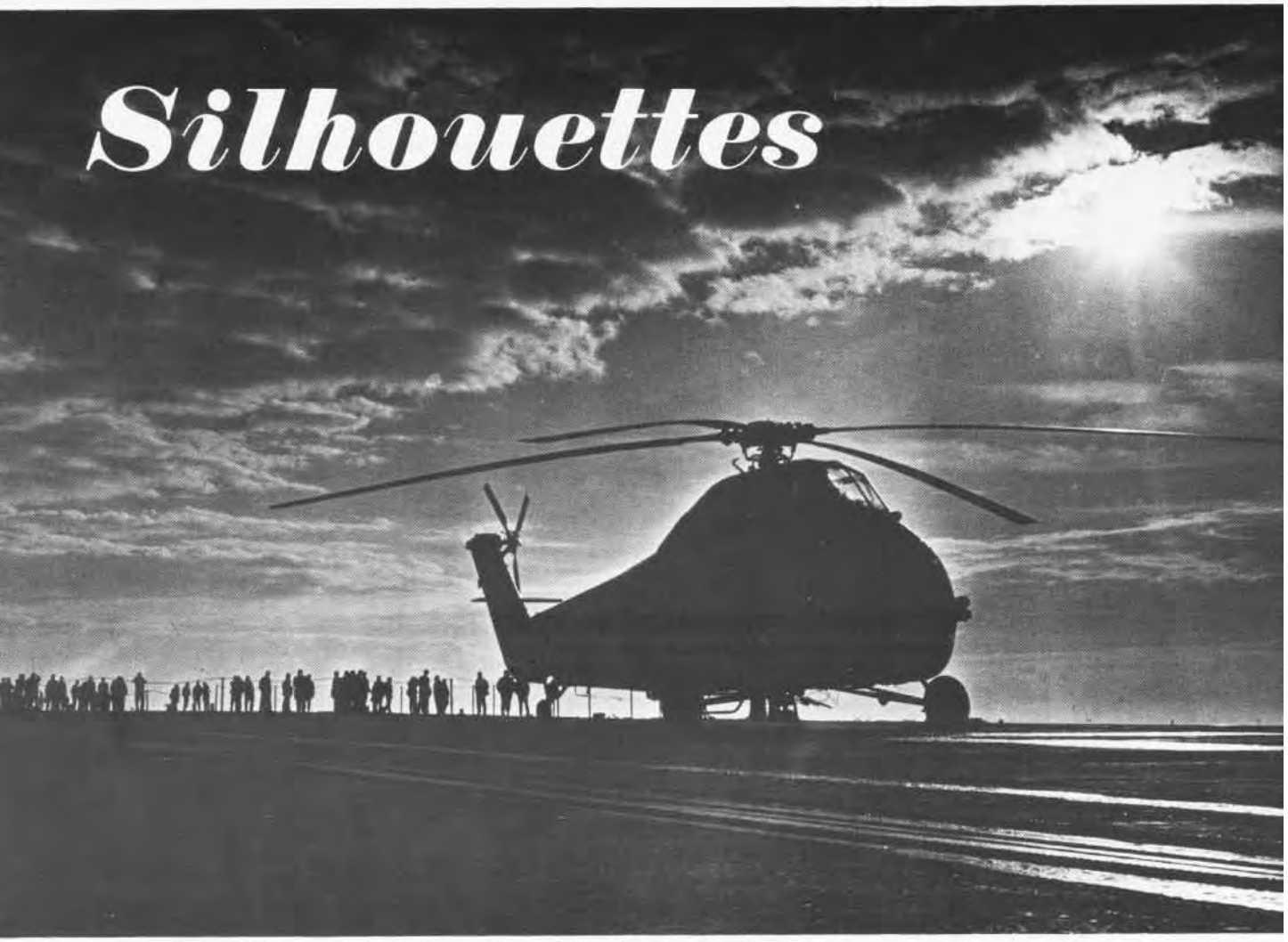
This is what Naval Aviation is all about. It's not the planes, the brightly colored insignia painted on the sides, or the squadron numbers, or the glamorous flight gear. It's the people.

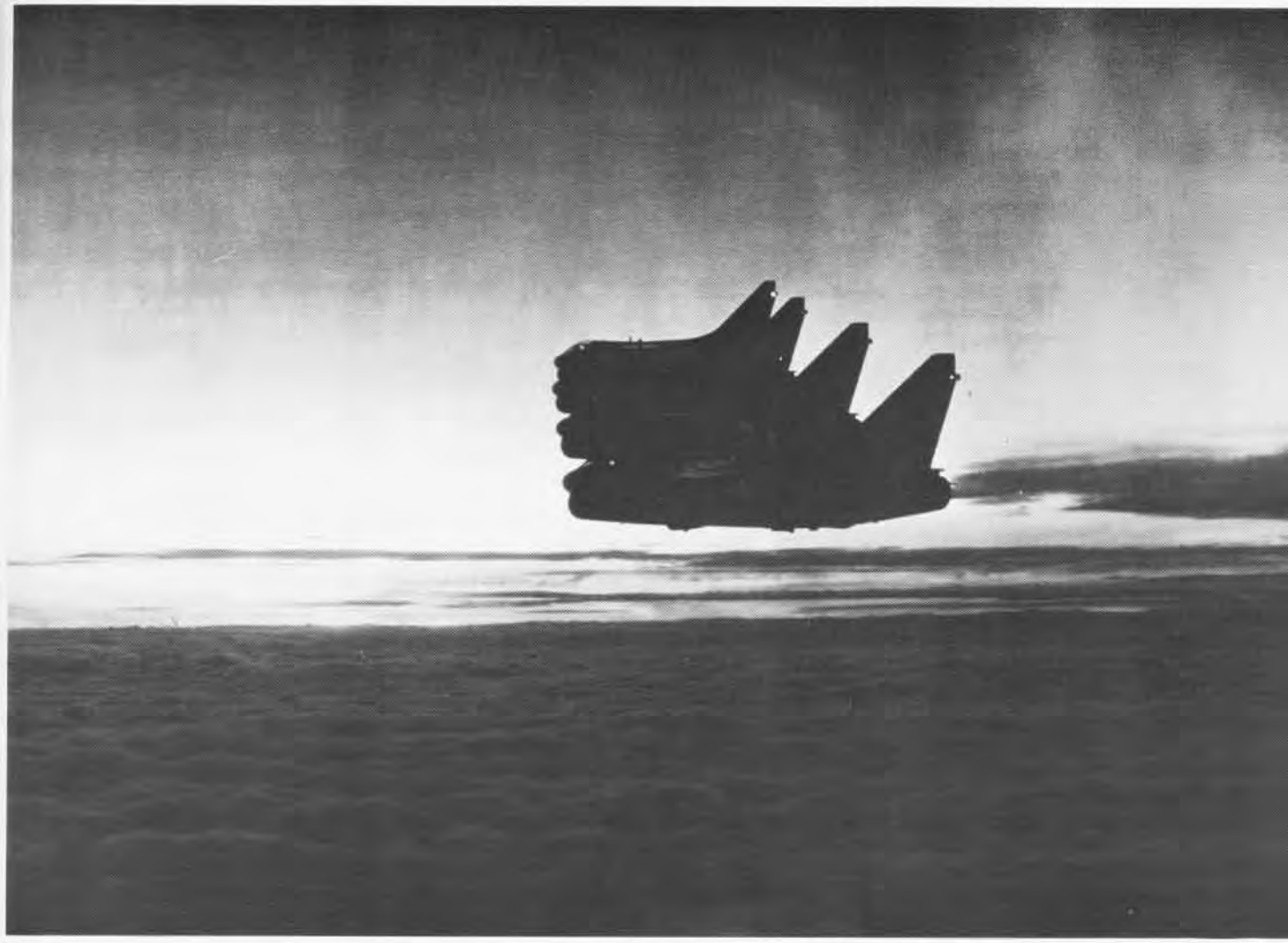
It's the lieutenant who helped feed me when my arms were too weak to move, the captain who led us in church call every Sunday, the lieutenant commander who knocked on the wall all night long just to keep the guy in the next cell alive until tomorrow.

Today, as an instructor at the Academy, I sing the same song I learned in my years as a student — but with a difference. Now I know what the words really mean.

I am personally convinced that there are no Navy pilots down in hell.

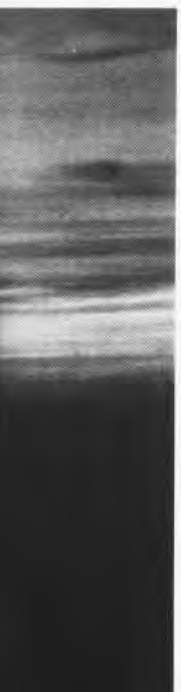
Silhouettes





'We tucked in close and banked toward the sun which was descending below an endless sea of ruffled clouds. The clouds seemed to cut us off from the earth below. We were in another dimension. The sky blazed . . . all mixed and bound with a symmetry no artist could contrive. And for a brief moment, I felt sorry for those who have never flown.'

Anonymous



'For men may come and men may go
But I go on forever.'

Song from The Brook
Alfred Lord Tennyson

NAVAL AVIATION
65 in '76

'You gain strength, courage and confidence by every experience in which you really stop to look fear in the face. You are able to say to yourself, "I lived through this horror. I can take the next thing that comes along." You must do the thing you think you cannot do.'

Alice Eleanor Roosevelt

'Stay with me God. The night is dark,
The night is cold: my little spark
Of courage dies. The night is long:
Be with me, God, and make me strong.'

A Soldier -- His Prayer
Anonymous

Dear Mom,

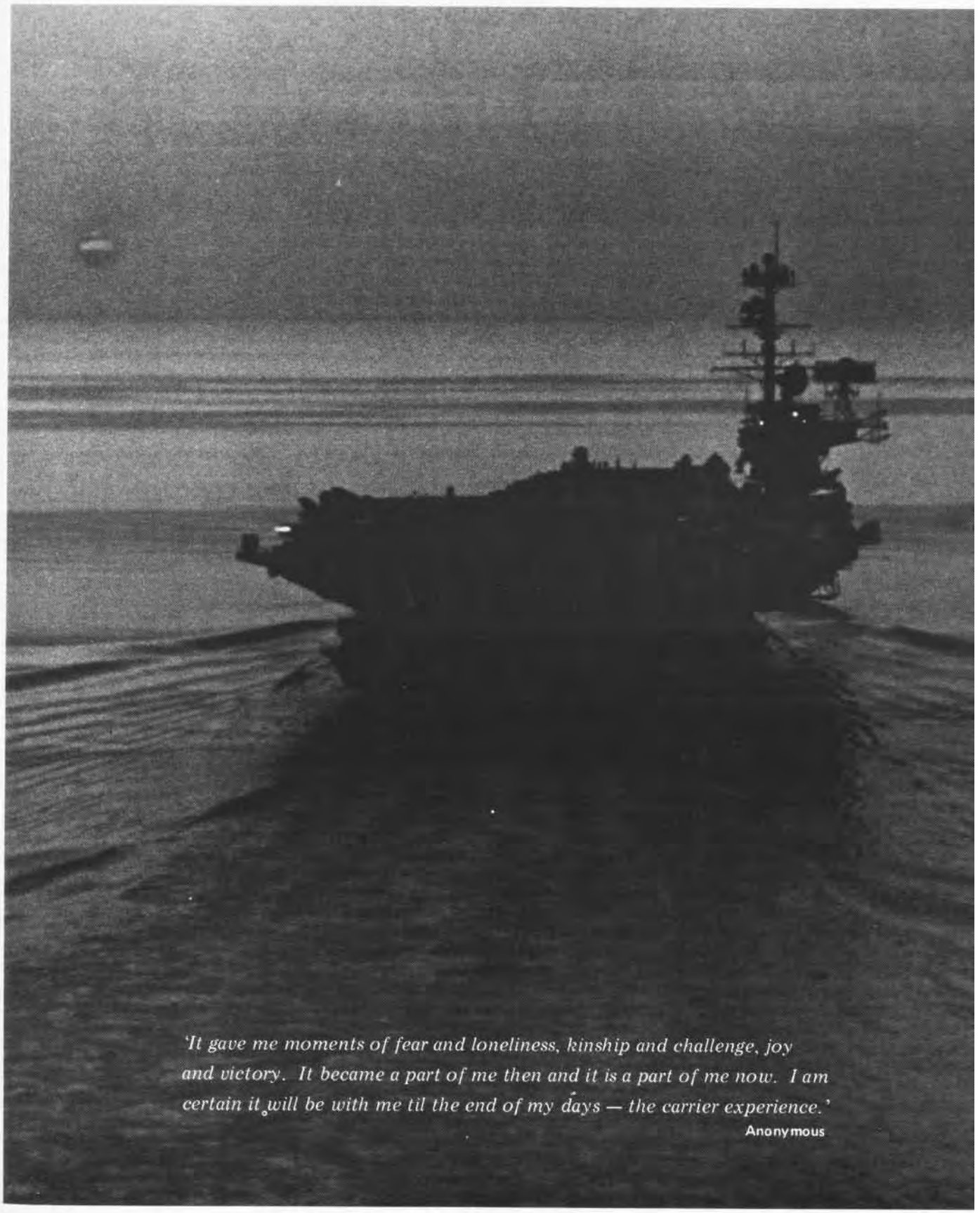
I must have lugged ten tons of tie-down chains today. Not to mention strapping pilots into planes and unstrapping them when they got back from a mission. And you wouldn't believe how weary you get, bucking those 25-knot winds across the deck. I'm so tired I think I could sleep sitting up. All I can say is, the Navy sure got their money's worth when they hired me as a plane captain.

'I have spread you abroad
as the four winds of the heaven.'

Zecharian 2:6

'And as a vesture shalt
thou fold them up,
and they shall be changed:
but thou art the same and
thy years shall not fail.'

The Epistle of Paul the
Apostle to the Hebrews



'It gave me moments of fear and loneliness, kinship and challenge, joy and victory. It became a part of me then and it is a part of me now. I am certain it will be with me til the end of my days — the carrier experience.'

Anonymous

touch and go

Builds and Flies His Own

The small yellow and white single-engine plane made a perfect barrel roll, banked and soared over the palm trees. Suddenly the engine coughed, sputtered and died.

At the controls, Ltjg. Gary McClung nervously banked the plane around for a "dead stick" approach to the tiny airfield. Passing over the end of the dirt runway, a sudden gust of wind caught the plane, forcing it to touch down on the very edge of the strip. It skidded off the runway, bounced several times on the rough, sandy ground and nosed over just short of a large tree stump.

Clutching the radio control transmitter, McClung rushed to the "crash scene." Fortunately, the trim little Citabria was undamaged. The Citabria is very aerobatic and is actually a scaled-down model of a full-sized airplane.

On its maiden flight, McClung, flew the Citabria into a tree. "I didn't have the trim right," he explains. "One of the bad things about a new airplane is that you don't know how it's going to act."

McClung, who is stationed at the Naval Communications Station, San Miguel, Republic of the Philippines, said he's always been interested in airplanes — anything that flies. "Even a spitball flying through the air would interest me."

As a 10-year-old in Liberty, Texas, McClung started building and flying U-control models, the kind with control cables attached to the wing that flies in circles around the modeler.

"They're hard to fly," McClung adds. "Some kids crash them on their first flight and are discouraged."

With McClung it was different. He wanted to know why it crashed.

"I started pursuing the field of aerodynamics, building planes and experimenting with designs of my own," he says. "It helped me get the feel of what aviation was all about."

McClung built and flew his first radio controlled plane several years ago while stationed at NAS Kingsville, Texas.

"I started building the Citabria last year while based at NAS Lemoore. It took almost a year to finish. Of course that included the research and figuring out the techniques I wanted to use. All the time wasn't just devoted to building it."

According to McClung, nearly everyone uses his own techniques to build models. "The fabric on the Citabria is pure silk," he says. "It simulates the cotton acetate fabric used on the real airplanes. When dope is applied it shrinks and tightens up just like the cotton acetate fabric. Some modelers use silkspan which is really a loose-weave tissue paper. It is very fragile and tears very easily."

McClung has even designed his own power panel box. "I use a motorcycle battery to provide electrical power for the glow plug

and starter. I have an electric starter which is really a luxury, and it sure saves the fingers."

McClung is currently building a glider which he says, "will have a small engine used only to get the plane to altitude. Then it shuts off and you're in free flight. If the weather is right, the glider may stay in the air for three or more hours. The beauty of radio control is that I can start the plane, taxi it out and take off all by myself. It's an independent hobby. You don't have to ask anybody to help you get your plane airborne." CPO D. B. Hays

Tracker's Historical Fly Off

The last planned S-2G *Tracker* fly off in the history of the Navy took place aboard *Kitty Hawk* recently on her return from the Western Pacific.

VS-38, commanded by Cdr. G. K. McCavley, participated in the historic event.

One by one the S-2s were hurled skyward in the usual manner by alternating catapults in a slingshot fashion. One pilot after another left *Hawk's* deck and disappeared into the clouds above. Their destination was NAS North Island, San Diego, their present home base.

It was back in 1960 that the men of VS-38 adopted the Claw as their symbol, and later became identified as the *Claw Clan.*

It was the first West Coast squadron to deploy with the S-2 series. In 1957, VS-38 was awarded the Arnold J. Isbell Trophy for

ASW excellence. It earned the trophy again in 1961 and 1974.

VS-38 has had 15 deployments aboard 19 carriers throughout the Western Pacific. Seven of these were in direct support of Southeast Asia operations in the Tonkin Gulf, which earned VS-38 the Meritorious Unit Commendation.

The squadron received the last and most sophisticated *Tracker* in the series, the S-2G, and became part of CVW-11 in April 1973. The air wing incorporated both strike and ASW assets on one carrier, *Kitty Hawk.*

Deployed with CVW-11 aboard *Kitty Hawk,* VS-38 left North Island in May 1975. Significant operations conducted with the Seventh Fleet included *Shark Hunt XIII, Readex 1-75,* the Sea of Japan transit and an ASW exercise with the Korean Air Navy.

During the transit to the United States, VS-38 began final plans for its transition to the jet-powered S-3A *Viking,* scheduled for June.

PH1 W. B. Fair

Ever Ready Baby Wait

An impending baby and a series of search and rescue missions kept Lt. Dave Belz, an aviator assigned to Naval Air Station, Corpus Christi more *semper paratus* than he might have liked not long ago.

It began when Belz and his wife Jan stayed awake most of one night, ready to head for the hospital.

There were false labor pains which subsided around 4 a.m., and Belz finally headed to work with only a few hours of sleep.

Though the day started out to be a slow one for SAR missions, the weather worsened in the afternoon and business picked up.

First, the pilot of a downed plane needed help.

No sooner had Belz and his crew returned to base than they were called out again to rescue a man and his two sons from a capsized boat. The sons were located quickly, but it took several hours of searching to find the father, who was clinging to the bow of the partially submerged vessel. To make the situation more interesting, Belz, who is primarily a fixed-wing pilot, was conducting his first helicopter rescue.

Back at base, Belz was preparing to airlift an injured man off an oil rig 100 miles offshore when a phone call from home summoned him on another urgent mission — the baby was on the way, for real this time.

Belz took his wife to the hospital and — about 20 hours later, they became parents of a healthy girl who weighed in at six pounds and seven ounces.

Valiant

A five-nation exercise involving 41 ships, 200 aircraft and about 18,000 men was conducted off the Southern California coast in March.

For 11 days, naval forces from the United States, Great Britain, Canada, Australia and New Zealand participated in Exercise *Valiant Heritage*. Operations included antisubmarine warfare drills, air defense, at-sea rearming and replenishment, carrier operations, missile firing at the Pacific Missile Test Center and simulated air attacks against participating ships.

The overall commander for the exercise was Vice Admiral Robert P. Coogan, Commander, Third Fleet, who observed activities from USS *Enterprise*. Members of his staff provided coordination from Fleet Air Control and Surveillance Facility, San Diego.

Opponents were divided into Blue and Orange Forces. The Blue Force, commanded by Rear Admiral Henry P. Glindeman, Jr., Commander, Carrier Group Seven, from his flagship, *Enterprise*, included 20 ships, three submarines and aircraft based ashore and on board the *Big E*.

The Orange Force included 13 ships, three submarines and a number of land-based aircraft under the direction of Rear Admiral Edward S. Briggs, Commander, Cruiser Destroyer Group Three, who embarked in the guided missile cruiser USS *Chicago*.

Four days of at-sea training exercises for all units were followed by the war-at-sea phase which was divided into three segments. The first was a "cold war" with the Blue Force close to the Southern California coast and the Orange Force further to sea.

In an atmosphere of growing hostilities, each force located and tracked the other's ships. Several "shooting" incidents took place and "higher authority" finally announced that war had been declared. An all-out effort by each side to locate and destroy the enemy followed.

During the second segment, the Blue Force was further to sea, with Orange protecting the coastline. During this "hot war," Blue conducted air strikes against designated targets on the mainland, while Orange attempted to disable Blue so that the strike could not be launched.

The strike took place when aircraft from *Enterprise* bombed simulated airfield and missile sites at the Navy's Chocolate Mountain Bombing Range near Yuma, Ariz.

For the final segment, an imaginary peninsula extending about 150 miles southwest from San Diego was added to the charts on board all ships.

The Orange Force was north and west of the peninsula, while the Blue Force controlled the tip of the penin-

Heritage

sula and all points south and east. Blue's mission was to get around the southern tip and then go north to San Diego. Orange's goal was to stop Blue's forces before they reached port.

Rear Admiral John D. E. Fieldhouse, Royal Navy, exercised tactical command of Blue Force during this final segment.

Third Fleet observers on board ships determined whether a particular attack was successful. Ships labeled "sunk" by the observers were declared out of action. These ships refueled and replenished at sea and then returned to port.

Keeping the forces refueled and supplied at sea was a full-time job for five oilers, an ammunition ship and a stores ship.

Valiant Heritage was designed to test and improve combat readiness. Early reports indicated that the mission was accomplished.

For left, aircrewmen aboard Chicago remove chocks from an SH-2 prior to launch in search of Blue Force subs. British frigates HMS Plymouth and HMS Berwick maneuver into position for at-sea replenishment from stores ship RFA Tarbatness, center. Aboard Enterprise, A-7s wait start of next launch cycle, above, and, below, ordancemen load bombs on Corsair for air strike against Chocolate Mountain near Yuma.

ADJ1 Wilson demonstrates new inflatable life vest and mini-raft. Below, Bill Engbrecht uses his helmet to empty mini-raft.

WET RUN

By Robert D. Lunch

I thought we were low and slow but we were at 40 feet doing about 40 knots, so, when I hit the water, it was like slamming into a brick wall. My ribs felt like everyone of them had been broken. So here's this pilot, with a bright orange helmet on his head that makes a wonderful target for the riflemen on the beach, floating there, with a look of disbelief on his face."

It was another search and rescue in Vietnam for ADJ1 John Wilson. Unlike most of his fellow rescuemen, he's still at it, participating in missions in the Point Mugu, Calif., area and testing new survival gear.

The Pacific Missile Test Center (PMTC) operates a sea test range that extends up to 300 miles into the Pacific and is 500 miles long. A tracking and communications center at Barking Sands, Hawaii, is part of PMTC. The center also operates USNS *Wheeling*, the most highly instrumented tracking ship in the Navy. Operations from the Kwajalein missile range are conducted in cooperation with the Army. SAR teams stationed at Point Mugu operate within helicopter range, sometimes in conjunction with Coast Guard ships and helos.

Eight islands off the Point Mugu coast lure small boats and scuba divers who sometimes come to grief. Downed planes are rare, but with civilian as well as military planes in the area, such incidents do happen.

Testing the new survival gear is not part of a search and rescue mission. Many of the tests are, in fact, conducted in the base swimming pool and some are made under simulated battle conditions. After each test, the crew and engineers of the crew systems branch huddle in a small room, crowded with flight gear, desks and survival equipment, to review and evaluate the merits of miniscule changes in design or procedure.

Body armor traces its history back to the Romans, who debated the merits of leather versus metal shields, through the age of chivalry into pre-Vietnam days, when aircrewmen wore flak suits and groin protectors that weighed almost 40 pounds. As the data bank grew, some of the body armor was eliminated. The groin protector, for example, was discarded because there were relatively few wounds in that area of the body. The size of the porcelain-carbide protective plates worn in place of the WW II flak vest was reduced. The plates now being tested at Point Mugu are about an inch thick but are smaller, lighter and easier for a downed aircrewman to discard.

"Don't drop it," warns Brad George, the leading test engineer. It is made of material which is quite brittle. When a bullet hits, its energy is expended in the almost instantaneous shattering of the ceramic.

The newest personal life raft is about the size of a cigar box. It is an integral part of the survival vest assembly. When a pilot hits the water he pulls a toggle that inflates a life vest, and another toggle to inflate the raft. The new rafts have very little freeboard, enabling a swimmer to roll into them with ease. A helmet makes a handy bailing bucket.

An inflatable life raft is technologically simple, but its design and use are surprisingly complex. Wind, waves and the when, where and under-what-conditions the equipment will be used, were involved in its design. One of the reasons the previous life rafts were bright yellow was because they could be easily spotted, but this also made them excellent targets. The new rafts are black.

The raft is only a part of the survival gear package. Shroud cutters, distress radios, mirrors, and pen and smoke flares are not as obvious, but just as important. Over the years, small changes have been made in each item, mostly from experience gained under combat conditions.

During the Vietnam era, Wilson says, most of the SAR team members made up their own kits which resembled chaps worn by cowboys. Equipment was designed for a minimum of

72 hours use. That figure is now down to eight hours. To some extent, the shortened time is due to better communications equipment that cuts the time a downed person is likely to be in the water. SAR training used to take 26 weeks. Currently, it requires six weeks and no longer includes hand-to-hand combat or weapons. Another reason for the shorter training period is that the need for SAR is not as great in peacetime.

The constant modification process depends on the suggestions and recommendations which flow into the Naval Air Development Center, Warminster, Pa., from PMTC test personnel, engineers, doctors, SAR crewmen and aircrews throughout the fleet. If the idea warrants study, it is evaluated and, if feasible, contracted out for the manufacture of a prototype. Some prototypes are sent to Point Mugu for developmental testing. A hardy group of Navy men and civilians test the new products on machines and in actual use by jumping from high diving boards into swimming pools and from helicopters into the chilly Pacific.

Bill Engbrecht, a general engineering technician with many years of survival gear experience, is one of the people who test the equipment. Bill usually plans the testing and is a willing subject if no one else is available. Branch personnel become personally involved in the testing in order to attain firsthand information on any problem.

Periodically, members of the branch fly to the Navy's National Parachute Test Range near the Salton Sea to monitor a new configuration or piece of equipment. In addition to its vast open spaces for jumpers, the highly saline waters of the large lake provide a calm basin where engineers can measure results more precisely than they can in the open sea.

The newest flak protector, life raft and survival gear are lighter than the old models and more variable. The raft, for example, can be eliminated on overland flights; the back plates can be eliminated in a plane in which the back of the pilot's seat is bullet-proof.

Most of the flaps and pouches on the new equipment are closed by hook-and-pile (Velcro) tape. When the two textiles are pressed together, they remain closed until deliberately pulled apart. The closure has great shear strength but the low peel strength makes it easy to open.

"Each improvement in a minor detail adds just one more increment to the safety of user and rescuer," says Wilson. "When you're down in the water, thrashing around with a guy who's in pain, weighed down by flight boots and other gear, with waves pouring over your head, there's no such thing as an unimportant detail. The difference between life and death can rest on a detail."

He should know. He made 11 rescues in Vietnam and since then has gone into the water dozens of times to help in various situations.

NAV LAB ON THE

If your first sight of the circular 155-foot object was from the air, you'd most likely gasp. You might even panic as did thousands of radio listeners to the eerie voice of Orson Wells reporting an imaginary earth invasion on *War of the Worlds*.

True, the object does appear to be an embedded spacecraft.

But, as your composure returns and you investigate further you'll see the object is a low, round building near an airfield.

Located in a remote corner of the Naval Air Facility, Warminster, Pa., this specially-designed structure houses the Navy's only inertial navigation facility. It belongs to the Navy Navigation Laboratory, a unit of the Naval Air Development Center, Warminster. NNL is just one of the numerous elements of NADC's many ongoing development, test and evaluation programs.

There are over 160 persons in NNL, directed by Mr. Ronald S. Vaughn.

"The most rewarding part of my job is watching naval officers in the fleet discover the value of systems the laboratory may have on trial at sea or in the air," says Mr. Vaughn. "It is exciting to see the Navy users explore the increased potential that such a new system gives them. To all of our engineers, the ultimate reward is having our work put to practical use."

More than 60 percent of all research and development at NNL deals with navigation for surface ships and submarines, with the remaining 40 percent concentrating on airborne navigational systems.

As one of the Navy's ten research and development laboratories, NADC is a principal field activity for the design and cradle-to-grave management of aircraft systems. The center is located about 30 miles north of Philadelphia. In the rolling countryside of historic Bucks County, government scientists and engineers conduct research, development, test, and evaluation of, and life cycle support for major naval aircraft systems.

The center has expanded substantially since its acquisition in July 1944. Its capabilities were rounded out in 1973 when the Naval Strategic Systems Navigation Facility from Brooklyn, N.Y., joined NADC to form NNL.

NSSNF traces its lineage back to 1912 when it conducted the first operational test and evaluation of gyrocompasses at sea. On land, the basic test concepts and procedures and the Scorsby test stand — the basic unit of test equipment for shore-based, dynamic evaluation of gyroscopic instrumentation — were developed. In addition, NSSNF has been active in research and development of magnetic compasses, gyrostabilizers and dead-reckoning equipment. In 1950, the navigation facility developed the technical requirements for, and monitored the development of, the first inertial navigation system for naval vessels.

The field of navigation has expanded rapidly in the last two decades. Prior to that time, most of the components of precision navigation systems — inertial and satellite navigation equipment, precision electronic systems and sonar beacon positioning — were practically unknown.

Navigation is almost as basic to the Navy as men and ships. A naval vessel cannot develop its full potential unless it knows where it is and how to proceed to its destination. Too, the facets of navigation — position, heading, roll, pitch and speed — are fundamental inputs to almost all shipboard fire-control systems. Therefore, it is evident that navigation is a vital part of all naval weapons systems.

Apart from the flying saucer appearance of the NNL building, there is something "out of this world" about inertial navigation. Its sensors and instruments must provide the answer to the navigator's eternal question, "Where on earth am I?"

Other systems of navigation are tied to earth reference points. Inertial systems, after an initial setting, operate on information received solely from the motion of the vehicles they are navigating.

ROCKS

The initial setting (alignment) on naval aircraft provides a reference platform that must maintain the horizontal plane of the earth and the north-south line on that plane during an entire flight. This initial setting is the crucial operation that brings the world into the system. A difficulty peculiar to the Navy is the intervention of a pitching and rolling ship between the world and the reference platform being set.

Alignment under such adverse conditions presents problems that require unusual precision in the alignment mechanization and basic inertial sensors.

NNL's solution to these problems lies in the inertial facility. Every detail of the facility design, including its location and flat circular construction, was undertaken to provide test piers undisturbed by extraneous vibrations. The location is reputed to be on one of the best geologic and seismologic strata in the U.S.

The building was specifically designed to house the inertial sensors lab used for inertial component research, development and evaluation. Inertial instruments, gyros and accelerometers, provide basic motion-sensing information for self-contained inertial navigation systems.

The sensitivity of these instruments requires a very stable, low vibrational disturbance laboratory where engineers can collect data on instrument performance.

Cultural noise is isolated from the sensor lab so that the vibration sensed is no higher than the vibration level in bedrock.

The shape of the building, the dual foundation and the domed wood roof were designed to decrease building vibrations. A separate building houses utilities that serve the facility, including air-conditioning and heating units. The sensor lab is a super-clean room in which the air is controlled to eliminate 99.7 percent of all particles larger than 0.3 microns.

Within the sensor lab, 12 granite piers bonded to the underlying bedrock provide stability for work with the inertial instruments. A seismograph continually monitors background noise.

Most important, the rock structure at the site has a very low vibration level. "The background noise level in this area is low enough that we have picked up earthquakes as far away as Japan on our seismograph," says Mr. Tom Sanders, head of the airborne navigation division.

"NADC develops navigational systems for vehicles ranging from submarines to aircraft," Mr. Sanders explains. "This facility responds to a total picture rather than being limited by application within specific vehicles."

The diversity in the application of technology by this lab is reflected in some of the projects.

Mr. Sanders has worked on the development of sensors for a carrier aircraft inertial navigation system (CAINS) which is used in several carrier-based aircraft today, including the S-3A, F-14 and E-2C. This was the first government-furnished inertial system in any aircraft.

A current project is the development of a ring laser gyro supporting the ring laser gyro navigation system. This gyro differs from the conventional electro-mechanical gyro because it uses an optical sensor, using light beams to sense a wide range of rate inputs. It is a strap-down inertial system that uses a computer for data processing and will replace the more costly and less reliable platform gimbal systems.

Of the ongoing projects at NNL, Commander Allen L. Kruger, deputy director, says, "The biggest challenges facing us are ring laser gyro technology, the global positioning system and the joint tactical information distribution system."

Anyway you look at it, NNL is in the forefront of navigational systems for the future, for both ships and aircraft. And there is scarcely a Navy aircraft or ship in existence without systems that have been conceived or whose performance has not been enhanced by NADC's program of development and systems engineering.

Journey to Tonga

By JO1 Dan C. Gay, Jr.

May 8, 1942 — USS Lexington (CV-2) Sunk. USS Neosho (AO-23) Sunk, USS Sims (DD-409) Sunk, USS Yorktown (CV-5) Severely Damaged." This could have been a headline describing one of the most important battles of WW II — the Battle of the Coral Sea.

The battle was a tactical victory for the Japanese because they inflicted more damage than they received. On the other hand, it was considered one of their greatest defeats because, for the first time, they were stopped in their advance through the South Pacific toward Australia. It also helped to set the stage a month later for the Allied victory at Midway — the turning point in the war in the Pacific.

The Coral Sea battle marked the first time that an entire naval battle was fought solely by aircraft. It was also the first time that opposing fleets never sighted each other: they were at least 150 miles apart.

After the fighting, some of the wounded were transferred to the hospital ship *Solace*, anchored off the island of Tonga. Eight of the men died. In July 1942, at the behest of Queen Salote of the Kingdom of Tonga, they were transported by barge to the island for burial. (The remains were returned to U.S. cemeteries after the war.) This burial may also have been a first and a last because, later in the war, men who died on ships were usually buried at sea, as were most of those who gave their lives in the Battle of the Coral Sea.

Thirty-three years later, in April 1975, 13 Americans journeyed to Tonga to dedicate a plaque "In loving memory of those who died in the Battle of the Coral Sea, eight of whom were first interred on Tonga 31 July 1942." The Americans were members of the Battle of the Coral Sea Association, founded in 1969 by ADR2 William F. Surgi, Jr., of the Naval Air Reserve Unit, Washington, D.C. During the war Surgi was an aviation mechanic in VF-42 which flew the F4F *Wildcat* from *Yorktown*. After 11 years of active duty, he left the Navy for 22 years. Two years ago he joined the Naval Air Reserve.

The association is composed of 400 members and includes Coral Sea veterans, friends and family members, vetèrans of other naval service, and persons interested in naval and air history in general. It is interesting to note that the father of one of the members was engineering officer on the Japanese light carrier *Shoho*, which was sunk during the Battle of the Coral Sea. Another member was communications officer on the Japanese cruiser *Abo*. The association's purpose is to commemorate the historic battle, to memorialize those who lost their lives and to honor living participants of the Coral Sea campaign. Thus, it seemed appropriate to erect a marker at the place where some of the Coral Sea casualties were buried soon after the battle.

In 1973, Surgi wrote to King Taufa'ahau Tupou IV, son of the late Queen Salote, inquiring about the feasibility of erecting a marker at the site of the original burial. A positive answer came from the Commander of the Tonga Defense Services who acted as liaison during the negotiations that ensued. Early in 1975, he said that the King had suggested that the plaque be placed more prominently on the memorial to Tongan veterans of World Wars I and II. The cenotaph is located in the main square of the capital, Nuku'alofa, and is unique in that it is now both Tongan and American.

The group of 13 Americans, led by Surgi and his wife, Jean, participated in the official dedication ceremony on April 29, 1975, during which the plaque was unveiled and wreaths laid on the monument by Surgi and the Deputy Prime Minister of Tonga, the Honorable Tuita. Afterwards, they had an audience with King Taufa'ahau Tupou IV and presented him with a U.S. flag which had flown over the Capital on May 8, 1974, a plaque from the carrier USS *Coral Sea* (CV-43) and a Coral Sea Association patch. Henceforward, each year on Remembrance Sunday in November, the Tongans will fly the U.S. flag and play the U.S. anthem along with those of Tonga and the United Kingdom in a ceremony at the cenotaph.

"We wish, finally, that the last object to the sight of him who leaves his native shore, and the first to gladden him who revisits it, may be something which shall remind him of liberty and the glory of his country." These words were spoken by Daniel Webster a century and a half ago during an address on the laying of the cornerstone of the Bunker Hill Monument. With monuments such as the one at Tonga in distant parts of the globe, the American who leaves his native shore finds other reminders "of liberty and the glory of his country."

In front of Throne Rock, association founder Surgi poses with his wife and the others who journeyed to Tonga. This site was used for councils by early kings of the island.

NDBS

Ed's Note: The following information was sent to Naval Aviation News by LCdr. R. P. Flower from the office of Air Weapons Range Coordinator in the Aviation Programs Division of the Deputy Chief of Naval Operations (Air Warfare). It constitutes amplifying information regarding no-drop bomb scoring, a facet of which was described in the March 1976 issue.

The use of practice bombs is a proven training method and there is no valid substitute yet perfected. There are no plans to take the fleet's MK-76s away from them.

NavAirSysCom has evaluated the Pease System which was mentioned in the March issue of *NANews*. It has merit but expanding efforts are required to fully develop the no-drop bombing system (NDBS). NDBS's estimated cost is $1.5 million which includes use of tracking radars.

The weapons impact scoring system is funded and currently in the procurement stage to provide improved scoring, at reduced manpower levels, for 21 basic weapons training targets.

NDBS is a proven method of providing tactical weapons training. The Navy and Air Force currently operate a number of radar bomb scoring (RBS) sites to provide NDBS weapons delivery training against tactically realistic domestic target complexes. However, these sites are limited to scoring medium and high altitude level delivery tactics only.

An adaptation of the NDBS method of training to low altitude level, dive, dive-toss and loft delivery is possible. By using NDBS, an unlimited number of domestic tactical target complexes become available for advanced tactics and weapons delivery training.

The NDBS requirements have been validated by CNO. NavAirSysCom has been tasked to develop an NDBS profile tracking and range surveillance system for the major fleet air weapons training complexes.

An in-depth study of the all-attitude NDBS problem and feasible solutions has been completed.

Simulation studies have been completed on the RBS and Air Combat Maneuvering Range (tri-lateration) methods of NDBS and both show excellent potential.

Photographer's Mate

In reference to the Bob Moore article "The Photographer's Mate" in *Naval Aviation News*, September 1975, I offer the following comments which may be of interest.

On page 34: The camera in the upper photo is not an 8x10 View Camera; it is a Cirkut Panoram Camera. The people in the photo, left to right, are L. A. O'Dille, Kelso Taylor, E. J. Wheatley, Lyman E. Goodnight and A. J. Munz.

The aerial camera in the bottom picture on page 34 is an F&S (Folmer and Schwing) 4x5 glass plate, hand-held aerial camera in the hands of W. L. Richardson during its first tests at NAS Pensacola, Fla., in 1917.

On page 35 the two photographers with the Bell and Howell motion picture camera are, left to right, Seaman Colie and W. J. "Bill" Murtha, Photographer 1/c, who was the first naval photographer, in 1927, to be awarded the Navy Distinguished Flying Cross along with Lt. Ben Wyatt for their photo flights during the first Alaskan aerial survey in 1926. The caption for this picture by its wording gives the impression that *Langley* had catapults and arresting gear in 1924. Arresting gear, yes, but there were no catapults on board USS *Langley* up to and including 1928.

In the lower photo on page 35, the statement that Joseph Pelter was the first enlisted man in the Navy to win the Navy Distinguished Flying Cross is not correct. Please note that I stated above that W. J. "Bill" Murtha, Photo 1/c, was the first naval photographer to be *awarded* the Navy DFC.

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Will Rumors Never Cease?

Throughout history, big guns, for some curious reason, seem to have attracted myths like flies. The U.S. Navy's 18-inch gun was supposed to have ended up as ballast in the bowels of a hospital ship. The murdered bodies of sadistic — and presumably diminutive — master sergeants were always being found in the muzzles of giant coast-defense guns.

Up to now, the most durable such myth, which managed to hang on for nearly a third of a century, was that the kingpins of the pre-World War II fixed defenses of Singapore were the 18-inch guns originally built during WW I for HMS *Furious*. Just ten years ago, that particular item of nonsense was laid to rest by this writer in the January 1966 issue of the *U.S. Naval Institute Proceedings*.

The appearance of "Battle Problem IX" in the January 1976 issue of *Naval Aviation News*, has re-awakened another of these big-gun myths. This one concerns an oddball, one-of-a-kind 16-inch gun that overlooked the Pacific entrance to the Panama Canal for some 30 years. So that a whole new generation of military and naval buffs won't get this bizarre story going for another 50 years (it first saw light in the 1920s), the entire thing ought to be squelched right now.

In the mid-1920s, four 16-inch 50-caliber naval rifles, rendered surplus by the Washington Treaty, were emplaced by the Army a few miles from the canal's Pacific terminus, in an area then known as Bruja Point and later as Fort Kobbe. These were not, however, the Canal Zone's first 16-inchers, for on one of the small, conical islands at the very entrance to the canal a much older gun of the same caliber had been emplaced about a decade earlier. Built at the turn of the century as the first American venture into ordnance of that size, this particular gun, finally taken to Panama in 1917, was only 35 calibers in length. So squat and ungainly was it in appearance, particularly when compared to the long, graceful (and better publicized) new naval guns installed in the Twenties, that no one could believe that the original weapon had been designed that way.

Anyway, the rumor got started that this ugly duckling was the product of some past miscalculation in the construction of its emplacement which had necessitated an on-the-spot shortening of the tube by four, six, or eight feet, depending on who was telling the story. Needless to say, it was the kind of story that caught on like wildfire in barracks and officers clubs throughout the Army.

So widespread did the story become that the Army's ordnance department in Washington was, by about 1930, besieged with requests for its confirmation. Finally, the Chief of Ordnance moved to put a stop to the entire business. He directed that the gun actually be measured and that the results be furnished to Washington.

Back from Panama came the figures two weeks later: the gun was one-sixteenth of an inch *longer* than when it had left the arsenal three decades before. This unanticipated reversal of the myth was "probably due," in the officialese of the reply, "to inaccuracy or sag of tape or elongation in firing."

The rumor has nevertheless continued to flourish long after the gun was scrapped late in World War II.

E. R. Lewis
House Library
House of Representatives
Washington, D.C. 20515

Kate?

I'm not at an aviation facility, so *NANews* arrives a little late. In spite of that, each issue is welcome and eagerly scrutinized by my airplane drivers. I know you're always anxious to be correct in everything you publish, and so I thought I'd offer some assistance along that line.

The article on NAS Ottumwa was enjoyable, since I went through preflight there in 1946. However, on page 13, you describe a *Kate* from *Tora, Tora, Tora* as an SNJ-5. No way! For those of us with eagle eyes (and membership in the Experimental Aircraft Association, and former owners of the type), it's no trick to identify a Vultee SNV-1 (or BT-13A) *Vibrator* in a sparkling paint job! There have been a few changes, but the fixed gear, the wing tips, and the tail cone/tail feathers leave little doubt in our minds. As an aside, my logbooks show I pushed six of the 11 old-timers (including the *Vultee*) around the pattern at one time or another. I enjoyed seeing them again, and look forward to more of the same.

James F. Jensita, Jr.
C.O., Fleet Operations
Control Center, Pacific Fleet
FPO San Francisco 96617

Ed's Note: OK, but — that aircraft is registered in the Civil Aircraft Register as an SNJ-5.

Panthers

I tremendously enjoyed "Soliloquy — Part II" in the December 1975 *NANews*. Aside from my enjoyment of your unnamed contributor's well-written reminiscences, I was reminded of how much I could use some *Spad* stories for the history of VA-35, which I am preparing in book form. If any of your readers flew AD-4s and/or AD-5s with VA-35 and would care to add a personal touch to the history of the *Panthers*, I'd greatly appreciate hearing from them.

The article on Ely's first landing, in the January issue, was super. A really fine piece of work. I also like the new feature "The Log" and hope you continue it beyond the 65th Anniversary of Naval Aviation.

Keep up the good work.

Peter Kilduff
57 Sefton Drive
New Britain, Conn. 06053

Reunions

Personnel who served aboard USS *Wasp* (CV-7) will hold their fourth reunion July 16-18 at the Sheraton Olympic Villas, 6700 Sand Lake Road, Orlando, Fla. For more information, contact George M. Millican, 3337 Delia Lane N.W., Huntsville, Ala. 35810.

The men and officers who were members of VMF-312 from 1943 to June 1945 will hold their fourth reunion October 7-10. The reunion will be held in conjunction with the Marine Corps Aviation Association's Convention at the Sheraton National Motor Hotel, Arlington, Va. Contact M. O. Chance, 3315 Damascus Rd., Brookeville, Md. 20729.

Battle Problem IX

On page 22, Battle Problem IX was described by Jackson R. Tate. I was in VF-1 for that cruise on *Sara* — section leader — same as Jack Tate. Adm. Reeves had all the airplanes spotted way up forward so the two 8" turrets could fire at the enemy, *Detroit*. Thereby hangs another story. I was first off the next a.m. with a 25-foot run to the bow, about 35 knots wind over the deck. Hairy!

Max Welborn, Capt. USN (Ret.)
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NAVAL AVIATION NEWS

FIFTY-EIGHTH YEAR OF PUBLICATION

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Deputy Chief of Naval Operations
(Air Warfare)

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Naval Air Systems Command

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COVERS – JOC Bill Bearden filmed the F-14 and A-1 models, front (see Editor's Corner and page 5). Back cover scene is the Pacific, 1944, and Helldivers of Task Force 58.1 returning from a bombing mission over Chichi Jima. On inside front a TBF approaches for a bow landing on USS Yorktown in the Pacific, 1943.

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In this anniversary issue it was deemed appropriate to show you some representative insignia from earlier days in Naval Aviation. Here they are:

VB-5	VP-4	VP-102	VS-11
VP-7	VP-5	VP-81	VT-1
VS-72			VT-5
VO-2			VO-4
VF-4	VS-12	VS-71	VP-42
VF-71	VCS-8	VS-5	VF-2


SQUADRON INSIGNIA










Naval Aviation NEWS